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Dragana Avramov

Evolution Science and Ethics in the Third Millennium

Challenges and Choices for Humankind

 Springer

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*For the children of our children,
Una, Lore, Joren, Brent, Arthur, Emiel,
Sander and Thomas*

Preface

This book aims to revitalise and substantiate the idea that evolution science can, in the context of further progressing modernisation, provide a rational and robust framework for elaborating the main guidelines of a universal morality for the future. It also traces pathways for long-term biological evolution and cultural development and adaptation of humanity, in the direction of ecological sustainability of our planetary environment.

It argues that the traditional theistic belief systems are, in many respects, no longer well adapted to the needs of the novel environment of modernity and its exigencies for further human evolution and cultural development and adaptation, on the one hand; on the other hand, most secular ideologies only deal with humanity's present and future in a rather fragmented way and with a short-term perspective. Hence, the need for another framework to rethink values and norms that would safely guide the human species in making choices throughout new subsequent stages of biological evolution and cultural development.

The backbone of the general approach in this book is evolution science, and in particular bio-anthropology, which is understood here as the study of the biological origin, present and future of humanity. Bio-anthropology investigates the biology of the hominins, and its interaction with human societies, cultures and value systems, from a long-term evolutionary perspective. The rationale of the discourse in this book is based on the interaction of the long-term hominisation process with the fast changing environment of modernisation.

Building upon the theoretical framework of a former book by one of the authors ('Biosocial interactions in modernisation') ethical aspects are discussed for each of the major biosocial sources of human variation: individual variation, inter-personal variation, inter-group variation and inter-generational variation.

This book about evolutionary ethics is typically an interdisciplinary work. It should be of interest to a variety of human behavioural and social sciences, such as biological and cultural anthropology, biology, sociology, psychology, ethics, philosophy and theology. Although it is mainly addressed to scholars and students in social and behavioural sciences, it targets also lay people, since it deals in a holistic way with long-term challenges for the human species. Policy makers may find

issues and reflections that can help them better understand from where we are coming and inspire them to take action or orient their future policy direction in a longer-term perspective.

In addressing different ideologies, faiths and philosophical systems based on scientific study and personal reflections, the authors' aims are not to argue or try to demonstrate the primacy or superiority of one or other belief system or faith. This book's concern regarding the origin, evolution and long-term future of humanity relates to the human species as a whole and not to the interests or prerogatives of a particular group or population.

The authors' striving to make a synthesis of such a complex subject as shaping the future of humankind is underpinned by the huge and ever-increasing body of scientific literature on various aspects of a possible, probable and desirable future. This case is documented in some detail, referring the reader to a quite substantial body of literature. Most footnote references are limited to one or a few examples, whilst all of the consulted literature has been included in the bibliography.

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Dragana Avramov

Contents

1	Setting the Stage for Reflecting on a Universal Morality	1
1.1	Evolution Science	1
1.1.1	The Darwinian Revolution	2
1.1.2	The Modern Evolutionary Synthesis	3
1.1.3	The Molecular-Genetic Revolution	5
1.1.4	The Second Darwinian Revolution	5
1.2	The Hominisation Process	10
1.3	The Modernisation Process	14
1.4	Confronting Hominisation with Modernisation	17
1.5	The Time Dimension: The Third Millennium	19
2	Origin and Evolution of Morality	21
2.1	Evolutionary Mechanisms Producing Predispositions to Morality	21
2.1.1	Mutation	22
2.1.2	Selection	24
2.1.3	Migration	42
2.1.4	Genetic and Cultural Drift	42
2.1.5	Partner Choice	43
2.2	Evolutionary Background of Morality	44
2.2.1	A Brief Review of Evolutionary Ethics Theory	45
2.2.2	Biological Bases of Morality: Natural Needs and Drives	59
2.2.3	Evolutionary Causes of Human Morality	61
2.2.4	Major Stages in the Evolution and Historical Development of Morality and Content of Moral Systems	66
2.2.5	Biological Determinants of Moral Behaviour	74
2.2.6	Why Variability in Moral Behaviour?	81
2.2.7	Moral Ambiguity of the Evolutionary Mechanism	84

3 Adaptive and Maladaptive Features of Religious Beliefs as Sources of Morality	87
3.1 Introduction	87
3.2 Notions and Concepts	88
3.2.1 Religion	88
3.2.2 God	89
3.2.3 Religiosity	90
3.2.4 Spirituality	92
3.2.5 Relations Between Religiosity, Spirituality and Morality	93
3.3 Origin and Evolution of Religion/Religiosity/Spirituality	96
3.3.1 Earliest Signs of Religion/Religiosity/Spirituality	97
3.3.2 Kinship-Based/Tribal Religions	98
3.3.3 Organised or World Religions	98
3.4 Some Anthropological Questions and Paradoxes About Religions as Sources of Morality	110
3.5 Biological Determinants of Religiosity and Spirituality	113
3.5.1 Genetics of Religiosity and Spirituality	113
3.5.2 Neurological Basis of Religiosity and Spirituality	116
3.6 Evolutionary Advantages and Disadvantages of Religion	120
3.6.1 Proximate Advantages of Religion in the Pre-scientific Era	121
3.6.2 Ultimate Advantages of Religion in the Pre-scientific Era	128
3.6.3 Place of Religious Beliefs and Religions in Modernisation	129
3.6.4 Is God Redundant?	135
3.7 Science and Religion	137
3.7.1 Creationism, Creation Science and Intelligent Design	144
3.7.2 Challenges for Replacing Religion by Science as the Source of Morality	153
4 Challenges of Major Secular Ideologies	155
4.1 Introduction	155
4.1.1 Secularisation	156
4.1.2 Atheism	158
4.2 The Major Secular Ideologies of Modernity	159
4.2.1 Liberalism	159
4.2.2 Socialism	165
4.2.3 Feminism	169
4.2.4 Nationalism	175
4.2.5 Humanism	177
4.2.6 Ecologism	182

4.3	Constraints of Secular Ideologies as Sources of Universal Morality	185
4.3.1	The Fragmented Nature of Secular Ideologies.	186
4.3.2	The Short-Term Approach of Secular Ideologies	187
4.3.3	The Macro-level Approach of Secular Ideologies	187
5	Evolution-Based Universal Morality	189
5.1	Need for a Universal and Inclusive Morality	189
5.2	Rationale for Evolution-Based Ethical Choices.	192
5.3	Evolution-Based General Ethical Pursuits.	195
5.3.1	Ethical Prerequisites.	195
5.3.2	The Main Aim: The Phylogenetic Enhancement of the Hominisation Process	202
5.3.3	General Ethical Derivations from a Progressing Hominisation.	231
5.4	Evolutionary-Based Specific Ethical Challenges Related to Sources of Biological Variability	239
6	Evolution-Based Ethical Challenges Related to Individual Variability	241
6.1	Introduction	241
6.2	Age Variability.	242
6.2.1	Evolutionary Background of Growth and Senescence	242
6.2.2	Developments in Modernity Regarding Age Variability	243
6.2.3	Ethical Reflections Regarding Age Variability in Modernity	247
6.3	Sex Variability	255
6.3.1	Evolutionary Background of Sex Variability.	255
6.3.2	Changes of Sex Relations in Modernity	263
6.3.3	Ethical Reflections Regarding Sex Variability in Modernity	270
6.4	Individual Variability in General	274
6.4.1	Evolutionary Background of Individual Variability.	275
6.4.2	Developments in Modernity Regarding Individual Variability.	276
6.4.3	Ethical Reflections Regarding Individual Variability.	280
6.5	Interpersonal Relations	285
6.5.1	Evolutionary Background of Interpersonal Relations.	285
6.5.2	Interpersonal Relations in Modernity.	292
6.5.3	Ethical Reflections Regarding Interpersonal Relations.	301
7	Evolution-Based Ethical Challenges Related to Group Relations.	305
7.1	Introduction	305
7.2	Kinship and Family	306
7.2.1	Evolutionary Background of Family Variability	306

7.2.2	Family Variability in Modernity	309
7.2.3	Ethical Reflections About Family Variability in Modernity	312
7.3	Social Status Hierarchies	315
7.3.1	Evolutionary Background of Social Status Hierarchies . . .	315
7.3.2	Developments in Modernity Regarding Social Status Allocation	317
7.3.3	Ethical Reflections Regarding Social Status Acquisition	319
7.4	Race, Ethnicity, Worldview, and Political Conviction	322
7.4.1	Evolutionary Background of In-Group/Out-Group Relations	323
7.4.2	Developments in Modernity of In-Group/Out-Group Relations	326
7.4.3	Ethical Reflections About In-Group/Out-Group Relations	326
7.5	Competition and Cooperation Between States	328
7.5.1	Evolutionary Background of Relations Between States . . .	328
7.5.2	Developments of Relations Between States in Modernity . .	331
7.5.3	Ethical Reflections about Relations between States	332
8	Evolution-Based Ethical Challenges Related to Intergenerational Replacement	337
8.1	Introduction	337
8.2	Quantitative Issues Regarding Reproductive Behaviour	338
8.2.1	Evolutionary Background of Population Growth	338
8.2.2	Demographic Developments in Modernity	340
8.2.3	Ethical Reflections Regarding Population Growth	348
8.3	Qualitative Issues Regarding Reproductive Behaviour	357
8.3.1	Evolutionary Background of Qualitative Intergenerational Changes	358
8.3.2	Qualitative Reproductive Developments in Modernity . . .	358
8.3.3	Ethical Reflections Regarding Qualitative Reproductive Issues	371
8.4	Complementarity of Quantitative and Qualitative Reproductive Goals	393
9	Conclusions and Final Reflections	395
9.1	Ideological Conflicts in the Modern World and the Need for a Universal Ethic	395
9.2	Evolution-Based General Ethical Goals for the Future	396
9.2.1	Preservation of Ecological Sustainability	397
9.2.2	The Cultural Furtherance of the Modernisation Process . .	397
9.2.3	Phylogenetic Enhancement of the Hominisation Process . .	398

9.2.4	The Ontogenetic Development of Human-Specific Potentialities	398
9.2.5	The Promotion of Quality of Life	398
9.2.6	The Promotion of Equity	399
9.2.7	The Necessary Shift from Competitive Towards Cooperative Behaviour	399
9.2.8	The Promotion of Universalism	399
9.3	Evolution-Based Specific Ethical Challenges	400
9.4	Reconciling Religious and Secular Ideologies and Evolutionary Goals	400
Bibliography		409

Setting the Stage for Reflecting on a Universal Morality

1

Abstract

Dealing with the ethical challenges of humankind at the turn of the twenty-first century, and safely guiding the human species through new subsequent stages of biological evolution and adaptation and cultural development, requires rethinking of our values and norms in a longer-term perspective and at the planetary level. Therefore, this chapter starts by discussing the meaning of evolution and presenting an overview of the major stages of the development of evolution science—the Darwinian revolution, the Modern Evolutionary Synthesis, the molecular-genetic revolution and the Second Darwinian Revolution. Next, the two major developmental processes, the hominisation process and the modernisation process, are addressed, which are considered by the authors to be of pivotal importance for the future of human morality. Finally, by confronting the hominisation and modernisation processes, this chapter sets the stage for revealing the necessary changes in values and norms in view of adapting to further progressing modernisation and evolving toward higher levels of hominisation.

1.1 Evolution Science

Humans have always, and everywhere, raised questions about the origin and meaning of life—in particular human life—as well as about its causes.¹ Since the eighteenth century a process developed through which the traditional vision—the supernaturally, spiritually evoked creationism—was gradually ousted by the

¹Sproul (1979), Leeming (2009).

scientific view—the naturally and materialistically based evolutionism, and its explanatory mechanism, the present-day Modern Evolutionary Synthesis.²

The scientific, philosophical, ethical and societal repercussions of evolutionism was so strong, broad and profound that it may rightly be considered as the most fundamental intellectual revolution in human history.³ The replacement of the creationist vision by the evolutionist view and its explanation completely changed the way in which the human could think about his origin, development, meaning and future: it provoked a transition from a static towards a dynamic worldview. It replaced the spiritual conception of life by a materialistic one; the supernatural origin of life and humankind was replaced by natural determinants; the anthropocentric cosmic vision, which was already undermined in its spatial dimension by Nicolaus Copernicus's theory in the sixteenth century and the discoveries of Galileo Galilei in the seventeenth century, was now also fundamentally altered in its temporal and biological dimensions.⁴ As John Stewart⁵ states:

For the first time humans have a powerful, science-based story that explains where they have come from, and their place in the unfolding of the universe.

The emergence and development of evolution science, with its consecutive Darwinian revolution, Modern Evolutionary Synthesis, molecular revolution and Second Darwinian Revolution, provides us with a unifying framework, and a solid, naturalistic basis for rethinking values and norms to secure a safe and progressive future ontogenetic development⁶ and phylogenetic evolution⁷ of humankind.

1.1.1 The Darwinian Revolution

In the middle of the nineteenth century modern evolutionary theory, nowadays usually referred to as Darwinism, was independently developed by two scholars, namely Charles Darwin (1809–1882) and Arthur Wallace (1823–1913). It was Darwin's extensive treatise of 1859 *On the Origin of Species by Means of Natural Selection of the Preservation of Favoured Races in the Struggle for Life* that forced the definitive breakthrough of the evolutionary paradigm and its major explanatory mechanism, natural selection. From a cultural historical point of view, this monumental treatise rightly has been considered as the most important book ever written by one author.

When speaking about evolutionism, one has to distinguish between evolution as phenomenon and the evolutionary mechanism as the explanation of that phenomenon. In general terms, evolution can be described as the occurrence of changes

²Bowler (1984), Larson (2006).

³Mayr (1978).

⁴Gingerich (1993).

⁵Stewart (2008).

⁶Ontogeny: the development of an organism within its own lifetime from conception to death.

⁷Phylogeny: the evolutionary development and history of a species or larger groups of related organisms as they change through time.

in the genetic composition and structure of populations. Darwin and Wallace's theory about the explanation of evolution concentrated on the process of natural selection.

The essence of the discovery of natural selection to explain the origin of new species consists of recognising the following facts and their interrelationships:

- species are characterised by individual genetic variations;
- species have the potential for an exponential population increase, but remain demographically stationary due to the limited capacity of their environment, inferring that in nature there is a constant competition ('struggle for existence');
- from the confrontation of the variability principle and the reproductive competition it was deduced that some genetic variants adapted and survived better than others ('survival of the fittest').

These interrelationships can be represented by the following chained formulae^{8,9}:

$$\text{GRI} + \text{LR} \rightarrow \text{SE} + \text{V} \rightarrow \text{NS} + \text{T} \rightarrow \text{BI}$$

1.1.2 The Modern Evolutionary Synthesis

The evolution theory as an explanatory mechanism is nowadays much more developed and refined. In the course of the first half of the twentieth century, several other evolutionary mechanisms were discovered, not instead of natural selection, but complementary to the Darwin-Wallace explanation, namely mutation,¹⁰ genetic drift,¹¹ genetic migration,¹² and assortative mating.¹³ In the same period, or even somewhat earlier, Mendelian genetics,¹⁴ biometrical or quantitative genetics,¹⁵ and population genetics developed. A crucial milestone in the development of the Modern Evolutionary Synthesis was the formulation of the Hardy-Weinberg Law¹⁶

⁸Huxley and Flew, quoted in Oldroyd (1980, 118–119).

⁹GRI: geometrical ratio of increase; LR: limited resources; SE: struggle for existence; V: variation; NS: natural selection; T: time; BI: biological improvement.

¹⁰Morgan (1903), De Vries (1904).

¹¹Genetic drift: change of allele frequencies of monogenes as a result of the accumulation of random fluctuations in the intergenerational transmission of alleles in small populations (Wright 1929); see also Chap. 2, Sect. 2.1.4.

¹²Genetic migration: transfer of genes from one population to a genetically different one; see also Chap. 2, Sect. 2.1.3.

¹³Assortative mating: deviation of partner choice from a random mating pattern (Fisher 1918; Wright 1921, 1922); see also Chap. 2, Sect. 2.1.5.

¹⁴Mendel (1865), Correns (1900), De Vries (1900).

¹⁵Biometrical or quantitative genetics: a branch of genetics that deals with biological characteristics that show a continuous variation (Galton 1889; Pearson 1896; Kearsy and Pooni 1998).

¹⁶Hardy (1908), Weinberg (1908).

of 1908 that shows in a simple equation the incidence and intergenerational transmission of genes and genotypes in populations: this forms the basis of the mathematical modelling of the whole evolutionary process.

Around the 1930s, the theory of Darwin and Wallace had evolved to a much more comprehensive synthesis, also completely mathematically formalised, in which all known evolutionary determinants—mutation, selection, genetic drift, gene flow, and partner choice—were analysed in their mutual relations and interactions.¹⁷ Somewhat later, the Modern Evolutionary Synthesis was further elaborated and illustrated in a number of impressive comprehensive evolutionary treatises.¹⁸

In recent years several authors have, on the basis of mathematical models and computer simulations, developed theories about the self-organising capacities of complex systems.¹⁹ Self-organising potentials of complex systems have probably played an important role in the origin of life. If those theories applied to all living organisms, biological evolution would be driven by three complementary and interacting mechanisms: chance events (mutation, genetic drift), selection, and self-organisation of complex systems.²⁰ With the development of evolution science, humanity now possesses the intellectual capacity to consciously self-organise its future evolution, assuming it desires and decides to do so.

Due to the continuous progress in evolutionary biology, several scholars have in recent decades argued for a further shift in the denomination of the evolutionary paradigm, replacing ‘Modern Evolutionary Synthesis’ (MES) by ‘Extended Evolutionary Synthesis’ (EES). The aim is to integrate in the evolution synthesis not only primary evolutionary mechanisms but also more complex secondary evolutionary causes, and in particular organism- and ecology-centred evolutionary concepts or developments, such as developmental evolutionary processes,²¹ epigenetics,²² genomic evolution,²³ phenotypic plasticity,²⁴ evolvability,²⁵ self-organization,²⁶ evolutionary adaptive landscapes,²⁷ evolutionary capacitance,²⁸ ecological inheritance through niche construction,²⁹ multilevel selection,³⁰ etc. However, in our view, the continually developing insights in more complex evolutionary processes fits very well into the basic MES and does not reflect a fundamental evolutionary paradigm change.

¹⁷Chetverikov (1927), Fisher (1930), Wright (1931), Haldane (1932).

¹⁸Dobzhansky (1937), Mayr (1942), Huxley (1942), Simpson (1944).

¹⁹Prigogine and Stengers (1984), Kauffman (1993, 1995).

²⁰Depew and Weber (1995).

²¹Gould (1977), Gilbert et al. (1996).

²²Newman and Muller (2001), Jablonka and Lamb (2005).

²³Quayle and Bullock (2006), Wray (2010).

²⁴Pigliucci (2001), West-Eberhard (2003).

²⁵Wagner and Altenberg (1996), Kirschner and Gerhart (1998).

²⁶Kauffman (1993), Johnson and Lam (2010).

²⁷Gavrilets (1997), Svensson and Calsbeek (2012).

²⁸Rutherford and Lindquist (1998), Bergman and Siegal (2003).

²⁹Odling-Smee (2003), Abouheif et al. (2014).

³⁰Wilson (2010), Gardner (2015).

1.1.3 The Molecular-Genetic Revolution

The discovery of the molecular structure of genes (*deoxyribonucleic acid, DNA*) in 1953³¹ and the subsequent explosive development of molecular genetics³² enabled understanding, at the molecular level, of the duplication process of genes and the enormous genetic variability that exists in nature. It confirmed at the molecular level the knowledge of fields developed earlier in genetics at the cellular, individual, family and population level, and it opened the prospect of correcting deleterious genes and enhancing desirable genetic variants in plants, animals and humans. Recently, molecular geneticists successfully created a first form of ‘synthetic life’ by assembling a working bacterial genome from raw nucleotides.³³

In the domain of evolution science, molecular genetics has given a considerable new impetus for evolutionary studies, especially for the study of human evolution. The ingenious analytical methods developed on the basis of the knowledge about the nucleotide sequences in the DNA molecules of humans and other primates have, at the molecular level, confirmed or even refined the insights into the evolution, diversification and migration of hominins that were developed earlier on the basis of paleontological, anatomical and archaeological data.³⁴

Molecular genetics opens promising prospects for obtaining a deeper and more profound understanding of the development of many aspects of morality, to the extent that moral behaviour is linked to a multitude of personality characteristics, and the latter are partly influenced by genes.³⁵

1.1.4 The Second Darwinian Revolution

In the 1960s and 1970s evolutionary biology made a great leap forward with the development of a number of refined or new concepts and theories about the biological evolution of altruism, sex relations, and sociality in general: inclusive fitness,³⁶ kin selection,³⁷ reciprocity selection,³⁸ group selection,³⁹ evolutionary

³¹Watson and Crick (1953).

³²Strachan and Read (2010).

³³Venter (2013).

³⁴Cavalli-Sforza et al. (1994), Relethford (2001), DeSalle and Ian Tattersall (2008), Fairbanks (2010).

³⁵For instance Benjamin et al. (2002), Noblett and Coccaro (2005), Canli (2008).

³⁶Inclusive fitness: the sum of the number of offspring an individual produces and the number of offspring of his relatives that results from his altruistic behaviour (Hamilton 1964); see also Chap. 2, Sect. 2.1.2.5.

³⁷Kin selection: the evolutionary mechanism through which inclusive fitness of an individual is being achieved (Maynard Smith 1964); see also Chap. 2, Sect. 2.1.2.5.

³⁸Reciprocity selection: the evolutionary mechanism through which genes are selected thanks to altruistic behaviour between non-relatives (Trivers 1971; Alexander 1987; Nowak and Sigmund 1998; 2005); see also Chap. 2, Sect. 2.1.2.6.

³⁹Group selection: the evolutionary mechanism through which natural selection produces differences in reproductive fitness between groups (Maynard Smith 1964; Alexander and Borgia 1978; Sober and Wilson 1998); see also Chap. 2, Sect. 2.1.2.8.

stable strategy,⁴⁰ Red Queen theory,⁴¹ the Machiavellian hypothesis,⁴² selfish gene theory,⁴³ evolution of sex theory,⁴⁴ evolutionary game theory,⁴⁵ the Handicap Principle,⁴⁶ biocultural co-evolution,⁴⁷ etc. The innovation was so striking and fundamental, especially for the understanding of many aspects of the evolution of sociality, that Steven Gangestad and Jeffry Simpson⁴⁸ refer to it as “the theoretical reawakening” of the evolutionary sciences in the 1960s and early 1970s. Some authors already now refer to that period as the Second Darwinian Revolution,⁴⁹ which is probably the only fundamental novelty in the study of biosocial life since the Darwinian revolution of the 19th century.⁵⁰

In 1974 many of the new concepts and theories about the biological evolution of sociality were synthesised by Michael T. Ghiselin,⁵¹ but the public breakthrough of the evolutionary study of sociality came in 1975 with Edward O. Wilson’s⁵² epoch-making oeuvre on the behaviour of social species: *Sociobiology: The New Synthesis*. Wilson defined sociobiology as the systematic study of the biological evolution of social behaviour, in which knowledge from ethology,⁵³ ecology and genetics is incorporated in order to show how social species adapt to the environment by evolution.

⁴⁰Evolutionary stable strategy: a strategy that cannot be invaded by any alternative strategy in a population (Maynard Smith and Price 1973); see also Chap. 2, Sect. 2.1.2.8.

⁴¹Red Queen Theory: organisms that live in coevolved interactions with other evolving organisms in a changing environment, must constantly evolve (Van Valen 1973); see also Chap. 5, Sect. 5.3.2.3.

⁴²Machiavellian Hypothesis: the increase in brain size during human evolution evolved due to intense social competition in which increasingly sophisticated ‘Machiavellian’ strategies were used as a means to achieve higher social and reproductive success (Alexander 1974; Humphrey 1976; De Waal 1982; Byrne and Whiten 1988); see also this Chap., Sect. 1.2.

⁴³Selfish gene theory: evolution occurs through the differential reproduction of competing genes, the more successful forms of which survive at the detriment of alternative ones. Richard Dawkins (1976) coined in this respect the term ‘selfish gene’; see also Chap. 2, Sect. 2.2.4.4.

⁴⁴Ghiselin (1974), Maynard Smith (1978), Daly and Wilson (1978).

⁴⁵Evolutionary game theory: application of game theory to the evolution of living organisms (Maynard Smith and Price 1973; Maynard Smith 1982; Gintis 2000; Barash 2003); see also Chap. 2, Sect. 2.1.2.6.

⁴⁶The handicap principle: living beings display their biological superiority through costly morphological or behavioural signals, showing their ability to squander wastefully some of their natural resources. (Zahavi and Zahavi 1997).

⁴⁷Biocultural co-evolution: the feedback-causal relationship between biological evolution and cultural change, resulting in an acceleration of both processes (For instance, Washburn 1959, 1960; Cavalli-Sforza and Feldman 1981; Lumsden and Wilson 1981; Durham 1991; Boyd and Richerson 1985; Gintis 2011); see also this Chap., Sect. 1.2 and Chap. 2, Sect. 2.1.

⁴⁸Gangestad and Simpson (2007, 435).

⁴⁹Wright (1994), Horgan (1995), Machalek and Martin (2004).

⁵⁰See also Gardner (2013, 104).

⁵¹Ghiselin (1974).

⁵²Wilson (1975).

⁵³Ethology: the study of (comparative) animal behaviour, usually with a focus on behaviour as an evolutionarily adaptive phenomenon.

From the 1970s onward the new biological concepts and theories concerning the evolution of social life have also been applied to human social behaviour.⁵⁴ Richard Alexander⁵⁵ did pioneering work in generating ingenious hypotheses and theories with regard to various issues such as the evolution of morality in intergroup competition, the relationship between biological evolution and culture, human parental investment and nepotism, and scenario building, consciousness, and human communication. Furthermore, in 1978, Edward O. Wilson clarified his ideas on human social evolution in *On Human Nature*.⁵⁶

In addition to theoretical work, including mathematical modelling of the evolution of social behaviour, and empirical investigations on populations in various stages of cultural development—hunter/gatherer, agrarian and industrial stages—valuable new insights were also gained by applying game theory and experiments⁵⁷ to evolutionary theory.⁵⁸ An interesting finding is that the results of well-controlled laboratory game experiments correspond well to the behaviour of people in natural settings.⁵⁹

Specifically, human-oriented sociobiological theoretical work and empirical research concern a broad variety of issues, such as individual drives or traits,⁶⁰ sex

⁵⁴For instance, Gregory et al. (1978), Chagnon and Irons (1979), Bowles and Gintis (2011), Voland (2013).

⁵⁵Alexander (1975, 1979, 1987).

⁵⁶Wilson (1978), see also Wilson's recent book on 'The Social Conquest of Earth' (2012).

⁵⁷For instance, prisoner dilemma game (Axelrod and Hamilton 1981; Axelrod 1986); public goods game (Yamagishi 1986; Fehr and Gächter 2000; 2002); dictator game (Kahneman et al. 1986); gift exchange game (Fehr et al. 1993); trust game (Berg et al. 1995); ultimatum game (Henrich 2000).

⁵⁸For overviews of evolutionary game experiments see, amongst others, Maynard Smith (1982), Gintis (2000), Barash (2003), Bowles and Gintis (2011).

⁵⁹Bowles and Gintis (2011, 39ff).

⁶⁰For instance, nepotism (Alexander 1979; Bellow 2004); dominance (Omark et al. 1980); jealousy (Daly et al. 1982); cheating behaviour (Trivers 1974); cheating detection (Cosmides and Tooby 1992); self-deception (Trivers 2000; 2011); suicide (Mascaro et al. 2001); menopause (Peccei 1995); senescence (Hamilton 1966).

relations,⁶¹ reproductive behaviour,⁶² social relations in general,⁶³ and, last but not least, morality.⁶⁴

Parallel to the post WWII developments in evolutionary theory about the evolution of social behaviour was the transformation of bio-anthropology from a mainly descriptive to a more explanatory science, mainly through the application of the Modern Evolutionary Synthesis. A major result of this transformation was the development of the theory about biocultural co-evolution,⁶⁵ based on the salient parallelism between the biological evolution of the hominins⁶⁶ and the development of human culture. The general idea is that genetic evolution and cultural change permanently interact and mutually reinforce each other and that cultural phenomena are under the same evolutionary pressures—mutation, selection, drift, and migration—as genetic traits.⁶⁷

The Second Darwinian Revolution also underpinned the emergence of evolutionary psychology, although much of what is published in this field is in fact sociobiology.⁶⁸ An evolutionary approach to social and cultural behaviour requires in-depth study at the individual level of the way in which the brain functions in order to create social and cultural adaptations. Indeed, evolutionary psychology studies the evolved human psychological mechanisms regulating individual

⁶¹For instance, mating behaviour (Daly and Wilson 1978; Buss 1994; 2007; Miller 2000); kinship systems (Van den Berghe 1979); monogamy (Melotti 1980; Fisher 1992; De La Croix and Mariani 2015); incest avoidance and incest taboo (Van den Berghe 1980; Wolf 1995); cuckoldry and mate guarding (Hiatt 1989); polygyny (Borgerhoff Mulder 1990); sexual attractiveness (Gangestad and Thornhill 1997).

⁶²For instance, parental investment and sexual selection (Trivers 1972); sex ratio and male surmortality (Trivers and Willard 1973); parent-offspring conflict (Trivers 1974); sexual dimorphism and reproductive strategies (Daly and Wilson 1978); paternal confidence (Gaulin and Schlegel 1980); paternity security and avunculate (Greene 1980); infanticide (Dickemann 1979); child abuse (Lenington 1981); hidden ovulation (Daniels 1983); birth spacing (Blurton Jones 1987); adoption (Silk 1990); rape (Thornhill and Palmer 2000); demographic transition (Borgerhoff Mulder 1998).

⁶³For instance, biopolitics (Somit 1976); food sharing (Isaac 1978); evolution of cooperation (Axelrod and Hamilton 1981); cooperation and international politics (Axelrod 1984); ostracism (Gruter and Masters 1986); in-group/out-group relations, xenophobia and racism (Reynolds et al. 1987); aggression and war (Shaw and Wong 1989; Van der Dennen 1995); life history theory (Hill 1993); wary cooperation theory (Alford and Hibbing 2004).

⁶⁴For instance, Campbell (1975), Stent (1980), Alexander (1987), Wilson (1993), Wright (1994), Hauser (2006), Krebs (2011), Boehm (2012).

⁶⁵For instance, Washburn (1959), Cavalli-Sforza and Feldman (1981), Lumsden and Wilson (1981), Durham (1991), Boyd and Richerson (1985), Gintis (2011).

⁶⁶Hominins: the various human-like species that evolved in the course of the hominisation process, ultimately resulting in the emergence of the present species *Homo sapiens sapiens*.

⁶⁷Cavalli-Sforza and Feldman (1981), Boyd and Richerson (1985), Cziko (1995), Mesoudi (2011; 2016).

⁶⁸In many quarters, the terminological shift from sociobiology to evolutionary psychology has probably more to do with political correctness than scientific scrupulousness, such as the desire to avoid association with a field that has been accused of biological determinism and reductionism, racism, sexism, etc. (Silverman 2003; Webster 2007) or the fact that, particularly in the United States, the more individual-oriented psychology is politically more fashionable than the more socially oriented sociobiology.

behaviour resulting in social and cultural dynamics.⁶⁹ Evolutionary psychology endeavours to produce a synthesis of evolutionary biology and psychology,⁷⁰ focusing on the cognitive-mental level as the mediator between social reality and individual behaviour. It seeks to identify specific cognitive mechanisms that were designed to solve specific adaptive problems in the environment in which they emerged. A fundamental proposition of evolutionary psychology is that the mechanisms of our social cognition were adaptations to the hunter-gatherer culture of the Pleistocene past. This implies that our brain, with its basic mental content-specific cognitive mechanisms, is not adapted to the present environment of high population density and social complexity that we experience in modern culture.⁷¹ Today the neuro-cognitive behavioural sciences contribute significantly to evolutionary psychological theory. The processing of social cognition appears to occur via specific neuro-cognitive processes and sections of the brain.⁷²

The Second Darwinian Revolution is not only influencing psychology. Sociobiology has also given a boost to behavioural ecology.⁷³ This is of great importance for the study of the evolution of social behaviour, because that discipline usually examines biosocial relations under pressure from environmental conditions and the availability of resources. The sociobiological approach is also, albeit slowly, being introduced to sociology.⁷⁴ Other offshoots of the recent evolutionary revival are bioeconomics,⁷⁵ sociobiological psychiatry,⁷⁶ and evolutionary political science.⁷⁷ Last but not least, there is a revival of evolutionary ethics.⁷⁸

The broad diversity of the specialised—and sometimes competing—research fields in the realm of the biosocial sciences, each with their distinct conceptual and methodological approaches, that in recent decades developed around the evolution of social behaviour, might be interpreted as a sign of the weakness or even the fallacy of the evolutionary approach. However, as Kevin N. Laland and Gillian R. Brown⁷⁹ pertinently concluded in their comparative overview of various evolutionary perspectives on human behaviour, the recent explosive development of new concepts, theories, observations, and experiments about the evolutionary background of (human) social behaviour is complementary rather than incompatible.

⁶⁹Tooby and Cosmides (1990), Wright (1994), Gangestad and Simpson (2007).

⁷⁰Buss (1999), Barrett et al. (2002).

⁷¹Dunbar (2007).

⁷²Bechara (2002).

⁷³Borgerhoff Mulder and Schacht (2012).

⁷⁴For instance, Ducros (1981), Crippen (1994), Niedenzu et al. (2008), Turner et al. (2015).

⁷⁵For instance, Koslowsky (1999), Landa and Ghiselin (1999), Hodgson (2007).

⁷⁶For instance, Rancour-Laferriere (1985), Stevens and Price (1996), McGuire and Troisi (1998).

⁷⁷For instance, Rubin (2002), Alford and Hibbing (2004), Fowler and Schreiber (2008).

⁷⁸Campbell (1979), Alexander (1987), Nitecki and Nitecki (1993), Farber (1994), Katz (2000), Hinde (2002), Boniolo and De Anna (2006), Høgh-Olesen (2010), Krebs (2011), Boehm (2012).

⁷⁹Laland and Brown (2002, 317).

1.2 The Hominisation Process

The evolution of humankind is the result of the hominisation process that took place over a period of six to seven million years during which a prehominin anthropoid was transformed, over a series of successive hominin waves and radiations⁸⁰—*Australopithecus/Homo habilis/Homo ergaster/Homo erectus/Archaic Homo sapiens*—to the present-day *Homo sapiens sapiens* (Fig. 1.1). This major evolutionary transformation⁸¹ was initiated by the acquisition of bipedalism and was mainly characterised by a gradual, though substantial increase in brain capacity and the associated development of unusual levels of novelty⁸² in the domains of nutrition (shift from mainly vegetarianism to omnivorism), complex social life (including cooperative breeding⁸³), language and culture.

The study of the parallelism between the biological evolution of the hominins and the development of human culture during the hominisation process has resulted in several anthropological theories of biocultural co-evolution.⁸⁴ The hominisation process was not only accompanied by the emergence of the specific human type of culture—euculture⁸⁵ as opposed to protoculture⁸⁶ of some animal species—but also by a gradual increase in complexity of that culture and of the speed with which successive cultural phases followed each other. The success of the hominins in the Pleistocene was due to the cumulative cultural change that much more rapidly

⁸⁰It appears more and more clearly that each major stage of the hominisation process, and in particular the earliest stage, was characterised by the development of several variants. For instance, the *Australopithecus/Paranthropus* stage included variants such as the *Sahelanthropus Tchadensis*, *Adiripithecus ramidus*, *A. anamensis*, *A. afarensis*, *A. bahrelghazali*, *A. africanus*, *A. garhi*, *A. sediba*, *A. deyiremeda*, *A. prometheus*, *A. naledi*, *Kenyanthropus platyops*, *P. aethiopicus*, *P. boisei*, and *P. robustus* (Stringer 2012; Stringer and Andrews 2012; Tattersall 2012; Berger et al. 2015).

⁸¹Maynard Smith and Szathmáry (1995).

⁸²Flinn and Coe (2007, 340), Antón and Snodgrass (2012), Isler et al. (2012).

⁸³Hrdy (2011).

⁸⁴For instance, Washburn (1959), Lumsden and Wilson (1981), Boyd and Richerson (1985), Durham (1991).

⁸⁵Euculture: specifically human culture, showing high complexity, depending on intentional and symbolic behaviour.

⁸⁶Protoculture: rudimentary and non-symbolic forms of intergenerationally transmitting learned behaviour among non-human primates.

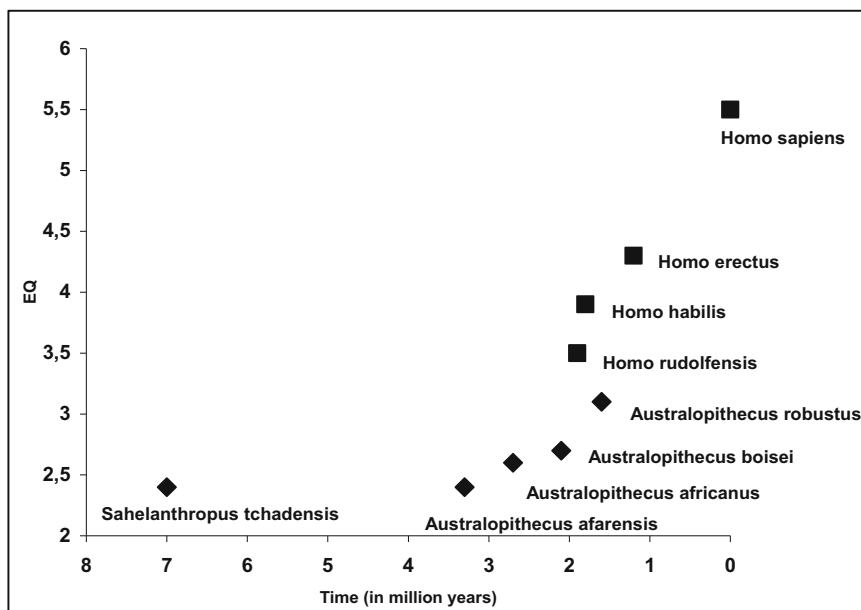


Fig. 1.1 The hominisation process (Cliquet 2010, 4) *Legend* EQ = encephalisation quotient is the ratio of the actual brain mass to the expected brain mass of a typical species that size

results in complex adaptations⁸⁷ than natural selection is able to produce genetic adaptations.⁸⁸

Biocultural co-evolution appears to reflect a neurological-cultural associative-causal relationship and a feedback-causal relationship. The hominin brain not only produced culture, but the adaptive advantage of this production also increased the selective pressure on the brain and favoured the accumulation and dissemination of mutations allowing for the brain's further growth.⁸⁹ This increasing encephalisation,⁹⁰ in turn, stimulated the further increase in cultural

⁸⁷ Adaptation is a concept that may have two different meanings, namely (phylo)genetic adaptation and ontogenetic adaptation. The first refers to a process through which a genetically determined or influenced feature spreads in a population by means of natural selection and thanks to which this feature succeeds in contributing to the survival and reproduction of its carriers; the second relates to physiological or behavioural changes during the ontogenetic development of individuals as adjustment to environmental living conditions, but are not genetically transmitted to subsequent generations. The concept of adaptation is applicable to biological as well as cultural traits. Whereas (phylo)genetic adaptations are intergenerationally transmitted through genes, vertically from parents to children, cultural adaptations can, vertically as well as horizontally, be spread through cultural learning processes. G.G. Williams (1966, 159) called an adaptation a "design for survival".

⁸⁸ Richerson and Boyd (2005, 146).

⁸⁹ Flinn and Coe (2007).

⁹⁰ Encephalisation: the tendency of the human evolutionary lineage toward larger brains through evolutionary time.

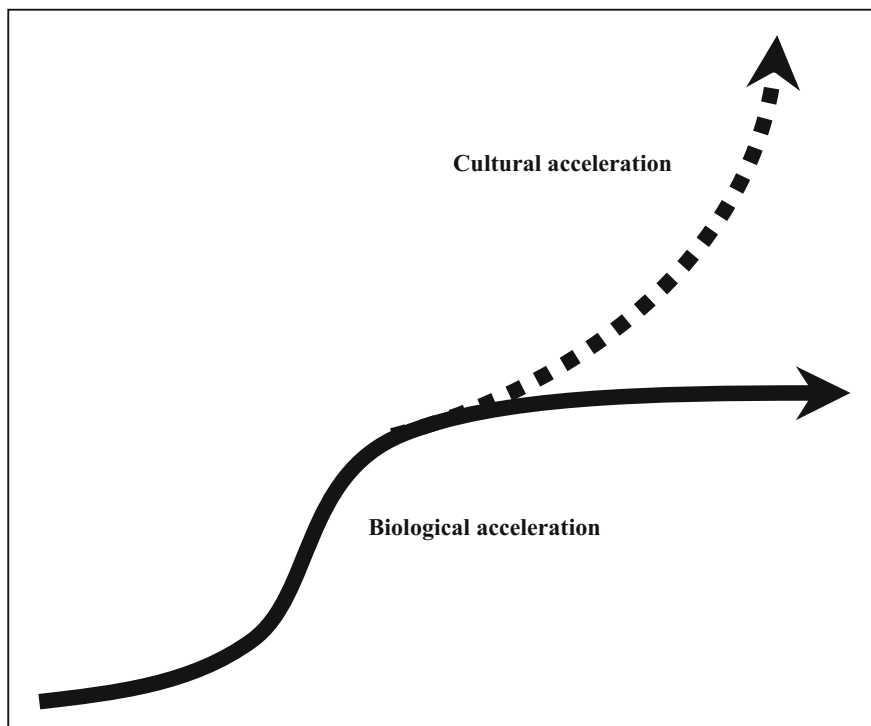


Fig. 1.2 Biocultural co-evolution among the hominins (Cliquet and Thienpont 2002, 620)

innovation and complexity.⁹¹ The biocultural co-evolutionary system moreover implies that today's human genome is partially a product of the culture that developed in the course of hominisation. In other words, *Homo sapiens sapiens* is the result—obviously unconscious—of a process of *autopoiesis*.⁹² As Peter A. Corning⁹³ formulated it:

In a very real sense, our species invented itself.

During the last phase of hominisation—the *Homo sapiens sapiens* stage—a divergence appears between the evolutionary tempo of individual neurological progress on the one hand and that of socio-cultural complexity on the other hand. Encephalisation, as measured by the size of the brain, seems to have stopped, whilst cultural acceleration has continued to progress, especially since the advent of the

⁹¹Not only the human brain, but several other biological characteristics of the human species are the result of the biocultural co-evolutionary process. The most salient example is the anatomy and physiology of human speech and facial communication (Cliquet and Thienpont 2002, 600; Gintis and Helbing 2015, 17), but also the dexterity of the human hands is a good example. Obviously, the same applies to many essential components of human culture, sociality and morality.

⁹²Autopoiesis: 'αὐτοποίησης' = self-creation in Greek.

⁹³Corning (2014, 242).

agricultural phase of human history, and even more since the Industrial Revolution (Fig. 1.2). The paradoxical divergence between the apparently stagnating individual encephalisation of *Homo sapiens sapiens* and the remarkable cultural growth in recent millennia can be explained by the transition from an individual level increase in neurological capacity to a biosocial type of encephalisation. Just as brain growth during hominisation was characterised by an exponential increase in the number of multiple interconnected neurons, resulting in an exponential enhancement of the associative capacity of the individual human brain, the more recent phases of cultural development in human history have been made possible by an exponential increase in the number of multiple interconnected individuals in demographically growing human societies. Hence, individual level encephalisation has been complemented by biosocial interconnectivity, resulting in an exponential increase in the overall capacity of growing and evolving human societies. This ‘biosocial encephalisation’ obviously applies only to cultural forms that can be developed via social mechanisms, such as technology and social organisation. It does not apply to cultural expressions that remain dependent upon individual creativity.⁹⁴

There are two major evolutionary biological features of *Homo sapiens sapiens* that made our species strongly dependent upon socio-cultural structures and processes for its development and survival. These features were, on the one hand, the shift from programmed behaviour based on fixed instincts and inherited action patterns toward a conscious control of behaviour through the development of the large brain hemispheres, and, on the other hand, the relatively short human pregnancy duration which caused women to give birth prematurely, before the baby’s brain had fully matured. Moreover, both the biosocial dependency of the human children and adolescents and the interdependency of adults increased and became more prolonged as human culture and society became more complex.

Initially, the evolutionary explanations for the enlargement of the brain in the course of the hominisation process strongly referred to the natural environment and/or human technology: the increasing brain capacity of the hominins was thought to result from changing selective pressures to demands emanating from the environment⁹⁵ or in response to tool making.⁹⁶ In recent decades, the causal explanation for the hominin brain increase has shifted to the exigencies of the increasingly complex social life.⁹⁷ In this context, theories about several specific explanations for the quick evolution of the hominin brain have been developed, such as pressures for the development of social intelligence,⁹⁸ the need for dealing with social deception and manipulation (‘Machiavellian intelligence’),⁹⁹ the

⁹⁴Cliquet and Thienpont (2002, 623).

⁹⁵Clutton-Brock and Harvey (1980).

⁹⁶Oakley (1959), Washburn (1959, 1960).

⁹⁷For instance, Etkin (1963), Dunbar (2003), Gamble et al. (2014), Gintis (2014).

⁹⁸Humphrey (1976).

⁹⁹Whiten and Byrne (1988).

exigencies of social cooperation,¹⁰⁰ the challenges of warfare,¹⁰¹ and the exigencies of mate choice.¹⁰²

The apparent stagnation of brain expansion in human evolution since the appearance of *Homo sapiens sapiens* does not mean that the evolution of humankind has reached an endpoint. Human genetic evolution is still on-going, with important genetic changes in the recent past.¹⁰³ Contrary to the long-held view that natural selection has ceased to affect humans, recent molecular-genetic studies show, in contrast, that the advent of the agricultural and industrial cultural eras has provoked an acceleration in genetic changes in *Homo sapiens sapiens*.¹⁰⁴

Although many detailed technical questions about the emergence, evolution and specificities of the hominins, and in particular the present *Homo sapiens sapiens*, remain to be resolved,¹⁰⁵ the development and accumulation of knowledge in various sciences, such as evolution science, geology and cosmology, genetics, including population genetics, behavioural genetics and molecular genetics, palaeontology and archaeology, primatology, bio-anthropology and cultural anthropology, sociobiology and evolutionary psychology, and neurology, has resulted in the fact that the origin, evolution, and specificity of humankind is no longer a mystery. Knowledge about the hominisation process allows us to distinguish future alternative directions in which humanity could evolve and to make rational choices about the trajectory to opt for.

1.3 The Modernisation Process

In bio-anthropology, it is now generally accepted that the specific human genome emerged as an adaptation to natural and socio-cultural living conditions that existed in the Pleistocene era, the Environment of Evolutionary Adaptedness (EEA),¹⁰⁶ sometimes called the Environment of Ancestral Adaptedness (EAA), which does not mean that no further genetic change would have occurred in the recent past, particularly since the invention of agriculture,¹⁰⁷ or is currently occurring.

With the onset of the scientific-industrial cultural stage, the human species entered a phase in its evolution and history that, in many respects, is a developmental threshold. Mankind has created an evolutionary novel environment of technologically advanced societies inhabited by anonymous millions, very different from the primordial environment of small face-to-face bands of hunter-gatherers, resulting in a shift from largely kin-based to largely non-kin-based social

¹⁰⁰Moll and Tomasello (2007), Brosnan et al. (2010), McNally et al. (2012).

¹⁰¹Alexander (1989).

¹⁰²Miller (2000).

¹⁰³Evans et al. (2005), Hawks et al. (2007), Williamson et al. (2007), Hawks (2016).

¹⁰⁴Armelagos and Harper (2005), Cochran and Harpending (2009), Byars et al. (2010).

¹⁰⁵For instance, Barash (2012), Weaver (2012).

¹⁰⁶Bowlby (1969).

¹⁰⁷Cochran and Harpending (2009).

networks.¹⁰⁸ Modernity created a macro-cosmos, very different from life in small groups, the ‘micro-cosmos’ to which we are biologically adapted.¹⁰⁹ Nevertheless, Edward O. Wilson¹¹⁰ considers modernity only as “a mosaic of cultural hypertrophies of archaic behavioural adaptations” to survival and reproduction in hunter-gatherer populations.

Cultural changes such as the development of science with its technological and societal applications, the emergence of the market economy, the shift towards industrial modes of economic production, the creation and use of new energy sources, and last but not least, the emergence and the implementation of the normative framework of the Enlightenment,¹¹¹ provoked a giant leap generally labelled as the modernisation process. Of course, modernisation has roots in a much longer historical process in which Steven Pinker¹¹² distinguishes three main stages: (1) the pacification process as a consequence of state organisation at the emergence of the agricultural era; (2) the civilising process in Renaissance times; and (3) the humanisation revolution in the wake of the Enlightenment.

The most fundamental feature and key determinant of modernisation consists, in the authors’ view, of the development of science—both ‘low’ and ‘high’ science¹¹³—which brought not only a more thorough knowledge and understanding of reality, but which made possible more effective ways of intervening in life, society and the environment. As Jacques Monod¹¹⁴ wrote in his well-known book *Le hasard et la nécessité*:

Les sociétés modernes sont construites sur la science. Elles lui doivent leur richesse, leur puissance et la certitude que des richesses et des pouvoirs bien plus grands encore seront demain, s’il le veut, accessibles à l’Homme.¹¹⁵

This interventionist nature of modern culture fundamentally changed human-kind’s biosocial and biocultural relationships, not only bringing about new challenges but also offering new opportunities for the future. The achievements of science and technology increasingly allow humans to master biosocial and environmental processes. In combination with the humanistic principles of the Enlightenment, modernisation may result in a sustained enhancement of the quality of life, provided that the sources of biosocial variation and ecological equilibria are understood and maladaptive practices are countered.

¹⁰⁸Newson and Richerson (2009) argue with their ‘kin influence hypothesis’ that the leading causal variable of modernity is a marked change in social network structure leading to a lower ratio of relatives to non-relatives.

¹⁰⁹Hayek (1979), Richerson and Boyd (2005, 230).

¹¹⁰Wilson (1978, 89).

¹¹¹Enlightenment: intellectual movement in Europe in the eighteenth century that emphasized the use of reason and the scientific method. It advanced ideals such as individual liberty, progress, tolerance, fraternity, constitutional government, and separation of church and state (Habermas 1978, 2; Heilbroner 1995, 58; Bruce 2002, 2).

¹¹²Pinker (2011, 56, 59, 129).

¹¹³McCloskey (2016).

¹¹⁴Monod (1970, 185).

¹¹⁵“Modern societies are built on science. They owe their wealth, power and the certainty that, tomorrow, still far greater wealth and power will, if he wants so, be accessible to the Human.”

Contrary to some doom- or scare-mongering individuals and groups who are of the view that modernity leads to a degeneration, de-humanisation or even the end of humankind,¹¹⁶ there is ample evidence that modernity has considerably improved material and spiritual living conditions, and consequently also the potential for morality of the human species. Modernity succeeded in freeing the human from the highly restrictive and oppressive cages of extended kinship and agrarian society, thus allowing for a richer fulfilment of human-specific individual and social potentialities.¹¹⁷

Indeed, never before in human history have so many people, at least in privileged parts of the world, lived decent lives, free from poverty, hunger, illness, disaster, misfortune, suppression, hard labour, drudgery, war, ignorance and superstition.¹¹⁸ Nevertheless, this positive view of the achievements of modernity does not blind the authors to the many shortcomings and derailments of modern culture, with its new technogenic risks (ABC warfare¹¹⁹ and GNR derailments¹²⁰), its dysgenic consequences, its failure to avoid non-contagious diseases, its poor mastering of exorbitant social inequalities, especially between nations, its persistent in-group oriented tribalism and tense inter-group relations, its belated population growth control, its improper use and abuse of natural resources, its decimation of biodiversity, its pollution of the environment and anthropogenic climate change, and, last but not least, its incapacity to adequately master biological drives such as greed, aggressiveness, envy, jealousy, spite and hatred, some of which might have had evolutionary advantages in the EEA, but currently endanger our future development and evolution.

The persistence of this mixture of old and new challenges to a safe and further progressing future is largely due to our inability to adapt swiftly and sufficiently to the novel environment of modernity, and we continue to behave as we did in the past, driven by our basic instincts of selfishness, greed, and multiplication that were adaptive in pre-modern living conditions.

Indeed, humanity has not had sufficient time to adapt to its novel environment of modernity. As Nick Bostrom¹²¹ states:

Human nature is in an evolutionary disequilibrium; our evolved dispositions are not adapted to the contemporary fitness landscape and do not maximize the inclusive fitness of current individuals.

In addition, modern societies still function partly on the basis of values and norms that emerged and were adaptive in pre-scientific living conditions, but are no longer adapted to the novel environment of modernity. In this respect, Marc Hauser¹²² rightly pointed out that many norms prescribed by traditional law or

¹¹⁶For instance, Chauchard (1959, 41), Kass (2002), Sandel (2007).

¹¹⁷Maryanski and Turner (1992), Veenhoven (2005).

¹¹⁸See also Kurzweil (2005, 396, 408).

¹¹⁹ABC: atomic, biological and chemical weapons (see, for instance, Croddy et al. 2004).

¹²⁰GNR: advanced technologies of the genetics, nanotechnology and robotics revolution (see Joy 2000; Mulhall 2002; Kurzweil 2005).

¹²¹Bostrom (2004, 339), see also Richerson and Boyd (2005, 230).

¹²²Hauser (2006, 423).

religion, or both, for instance topics in the field of bioethics such as contraception, abortion and euthanasia, clash with some of our innate moral intuitions that influence many of our decisions.

Hence, it is not surprising that many people are seriously worried about the future of modern culture that, despite its magnificent achievements, faces considerable challenges in multiple domains. As Robert Heilbroner saliently observes in his book *Visions of the Future*, the distant past evoked feelings of resignation and yesterday was characterised by optimism, today gives rise to anxiety.¹²³

The characteristics of the modernisation process allow us to distinguish between various possible future orientations and to a rational choice about the desirable direction to go in.

1.4 Confronting Hominisation with Modernisation

The divergence between the human genetic predispositions, that are still largely adapted to the ancient Pleistocene environment in which humans emerged and the present evolutionarily novel environment of modernity, requires cultural adaptation via technological interventions, on the one hand, and value changes, on the other hand, because the natural evolutionary mechanism is unable to produce the necessary genetic adaptations quickly enough.¹²⁴

Many challenges confronting modern societies today, or which can be anticipated in the near future, may result from the fact that the human body—particularly the human brain with its psychological mechanisms that specifically evolved as adaptations to Pleistocene living conditions—is in many respects no longer well adapted to the powerful process of increasingly rapid cultural change that started with the appearance of agriculture some 10,000–12,000 years ago, and that accelerated tremendously with the emergence of modern culture some 400–500 years ago. This resulted in a significant discrepancy between the original Environment of Evolutionary Adaptedness (EEA) and the evolutionary novel environment created by science. It is important to keep in mind that the EEA era covered 95% of the total time of existence of *Homo sapiens sapiens*. If the major former hominin stage in human evolution—the *Homo erectus* stage—is included in the calculation, the EEA era of existence accounts for up to 99%.

Although there exists today considerable between-country diversity in the degree or stage of achievement of science- and technology-driven modernisation, it can be observed that modernisation is seizing virtually all nations and cultures on the planet, perhaps with the exception of some remote and isolated hunter-gatherer populations. The processes that advanced industrial societies have experienced are,

¹²³Heilbroner (1995, 95).

¹²⁴However, not only biological evolution and modern cultural development evolve at different speeds, also the technological and social dimensions of modernity evolve asynchronously and unevenly. As Glover (1984, 186) stated: “Our present wave of problems exists because modern physical technology has come too early in our social development.”

therefore, also of importance to developing countries, many of which are experiencing a much more rapid modernisation than Western countries ever did.

Through the confrontation of the hominisation and modernisation processes, this book endeavours to deal with the necessary value and norm changes needed to adapt to the opportunities and challenges of a further progressing modernisation process and to evolve to higher levels of hominisation, being well aware that it is not possible—in the short run—to fundamentally change the human genetic predispositions which we inherited from Pleistocene adaptive processes. Notwithstanding the many obvious advantages modernity provides for, it may, as Bjørn Grinde¹²⁵ points out, in a number of respects, be an unnatural environment that causes people to behave abnormally.

Modernisation entails a matured and further progressing cultural stage, based on the application of science and technology allowing the optimal development of human-specific potentialities and enhancing quality of life. Looking forward requires reflection about ways to overcome present-day threats of biodiversity extinction, depletion of natural resources, overpopulation, underdevelopment, overconsumption, environmental pollution, anthropogenic climate change, ABC-weaponry threats and neo-colonial exploitation.

The mediating role of technology is having a transformative role for shared values and norms. However, forward-looking choices to be made are not technical/technological in nature. They are ethical.

The authors share Milton Rokeach's¹²⁶ understanding of values as enduring beliefs about specific modes of conduct or end states of existence that are personally or socially preferable. Norms are behavioural rules according to which one ought to behave. Morality refers to values and principles of conduct held by individuals and/or groups. The ensemble of values and norms in a culture constitutes its ethics, a domain of human thought that deals with good and bad.¹²⁷

Modern societies, notwithstanding their evolving ideologically pluralistic features and growing tolerance towards outliers and anomaly, continue to be strongly polarised along lines of religious and secular ideological struggles. As a result, many new ethical and political challenges remain unresolved or are inadequately addressed. In this book it is argued that theistic belief systems are, in many respects, no longer well adapted to the requirements of the novel environment. They do not trace pathways for managing future human evolution and cultural adaptation and development. Theistic beliefs tend to be more oriented towards buffering change than managing it. Most secular ideologies usually deal with humanity's present controversies by piecemeal development and address forward-looking in a too fragmented, conflicting and short-term perspective. They are usually limited to meeting the needs of specific population sub-groups and rarely address possible changes as they relate to the human species.

¹²⁵Grinde (1996).

¹²⁶Rokeach (1973).

¹²⁷Broom (2004; 2006), Adams (2005).

Dealing with the ethical challenges of humankind at the turn of the twenty-first century, and safely guiding the human species through new subsequent stages of biological evolution and adaptation and cultural development, requires rethinking of our values and norms in a longer-term perspective and at the planetary level. By confronting the hominisation and modernisation processes, later chapters reveal the necessary changes in values and norms in consideration of adapting to a further progressing modernisation and evolving toward higher levels of hominisation.

1.5 The Time Dimension: The Third Millennium

Futurologists¹²⁸ focus their attention mostly on a period of between five and fifty years. The reason is that the immediate future (less than five years) belongs to the domain of daily care: government-terms rarely exceed that time, at least in democratically ruled countries. The period over fifty years is also usually disregarded because it is expected that so many changes will occur that long-term prediction and planning are too uncertain.¹²⁹

Evolution scientists use an immensely broader time perspective than futurologists. Bio-anthropologists, who study the origin and the present and future evolution of the hominins, take a much longer-term perspective. Towards the past, this includes the full history of the hominins, extended over a period of several million years; for the present, this includes the study of the specificity, variability, and changeability of the currently living members of the hominin tribe, *Homo sapiens sapiens*; for the future, bio-anthropologists are interested in the further evolution of humankind, a time span that also can include many thousands, if not millions of years.

This book looks at ecological, biological and cultural developments in the coming decades up to the end of twenty-first century without losing sight of a longer-term evolutionary perspective of this millennium.

¹²⁸Futurology: study that deals with future possibilities based on current trends.

¹²⁹Cornish (1977).

Abstract

This chapter starts with a discussion of the role of evolutionary mechanisms in the development of predispositions to moral behaviour and the development of moral values and norms. Next, the evolutionary background of morality is dealt with. The major stages of evolutionary ethics as a scientific discipline are reviewed and the biological bases and causes of morality are discussed. Then an overview is given of the major stages in the evolution and historical development of morality and the content of moral systems. Finally, the genetic and neurological determinants of moral behaviour are addressed.

2.1 Evolutionary Mechanisms Producing Predispositions to Morality

Evolution science includes not only knowledge about how life, including human life, evolved on our planet in the course of time, but it also includes knowledge about the basic mechanisms that allow life to evolve—mutation, various forms of selection, migration, drift and partner choice.

Genes producing the capacity for developing innate moral sentiments and moral reasoning, as well as cultural processes resulting in moral codes that have a life-sustaining or life-reproducing effect, are subject to mutation and various forms of selection, and may also be influenced by chance fluctuations and migration. In other words, all of the known basic evolutionary mechanisms are, or may be, involved in the evolution of the two enabling components—biological and cultural—of human morality.¹

¹Cavalli-Sforza and Feldman (1981), McKenzie Alexander (2007).

Biological and cultural factors involved in the production of human morality are, in other words, not different from other biological or cultural characteristics related to life-sustaining or life-reproducing processes. This view is founded on the Dual Inheritance Theory (DIT)² which explains the biocultural co-evolution of human behaviour as a product result of two different and interacting evolutionary processes: genetic evolution and cultural change. Many ethical choices are, just like cultural innovations in general and physical biological features, dependent on the evolutionary mechanism, and specifically Darwinian selection.³ Human morality evolved to contribute solving adaptive problems and achieving adaptive goals.⁴ Moral systems are, in fact, cultural instruments that serve the same goal as biological organ systems, namely to promote ontogenetic and phylogenetic adaptation.⁵

The present scientific insight into the evolutionary process explains why a morally ‘blind’ mechanism was able to produce a purposefully oriented human morality with strongly universal, objective moral standards.⁶

2.1.1 Mutation

2.1.1.1 Genetic Mutation

Genetic mutation is a change in the chemical structure—the DNA—of a gene or a group of genes. Mutations are at the root of genetic variability and, consequently, form the basic condition for possible changes in the genetic composition of a population. Neutral mutations are evolutionarily neither advantageous nor disadvantageous; they can be responsible for some genetic variation between individuals. Harmful mutations can also be present in a population: this is either because they have been newly introduced into the gene pool⁷ or because they have not been completely eliminated by selection and, hence, were transmitted from earlier generations. Even beneficial mutations can be responsible for a certain amount of genetic variation, because the effect of selection that is responsible for their distribution in the population is not yet completed. Favourable genetic variants can spread in a gene pool, because they had a relative selective advantage in former generations due to environmental circumstances. In humans some less favourable mutations can thrive, because they have sufficient survival value in society’s sheltered cultural or economical conditions, or are even fostered by such conditions.

Genetic mutations are responsible for the neurological, hormonal, and other biological changes hominins underwent in the course of the hominisation process, so as to make several parts of the human brain more susceptible to develop or experience moral sentiments and to be able to produce moral ideas.

²Boyd and Richerson (1985), Durham (1991), Henrich and McElreath (2007).

³Bajema (1978), Alexander (1979), Cavalli-Sforza and Feldman (1981), Lumsden and Wilson (1981), Boyd and Richerson (1985).

⁴See also Krebs (2011, 257).

⁵See also Ruse (1999, 241).

⁶See also Talbott (2015, 707).

⁷Gene pool: the whole of the genes present in a reproductive community or a population.

2.1.1.2 Cultural Mutants

Cultural analogues of genetic mutations have been given several names, the best known of which is Richard Dawkins' 'meme' concept.⁸ In the domain of values and norms, new ideas are about how to change individual life and re-organise social life—the relations between the sexes and age groups, between social classes, between in-groups and out-groups—in order to adapt to new environmental or social challenges. They also need to include ideas about how to relate the human species to the evolving planetary biosphere, the planet itself, and the cosmos to which we belong. Well-known examples of complex moral innovations of great social importance were the in-group transcendent norms of early Christianity and Enlightenment humanism.

An important difference between genetic mutations and cultural innovations is that the first are, as far as is known, purely chance phenomena, meaning that they are probabilistic rather than deterministic in nature, whilst the second are more often the consequence of non-chance events. Inventions are often the result of a conscious search operation, which means that chance might also be involved. The non-chance, consciously or unconsciously directional, transformative or reconstructive character of cultural innovations⁹ has important consequences for the frequency of cultural mutants as well as for their spatial dispersion.¹⁰ Whereas biological evolution functions on the basis of Darwinian principles, cultural change occurs on the basis of both Darwinism and Lamarckism. The term Lamarckism refers to Lamarck's¹¹ theory of the biological inheritance of acquired characteristics. Biology has refuted the Lamarckian principle¹² in favour of Darwinian selection. Furthermore, the recent development of epigenetics—the study of the systems and processes by which genes' expression can be altered and transmitted to next generation(s) without changes in the DNA¹³—has raised the question whether this is a form of Lamarckism which would require a fundamental revision of the Modern Evolutionary Synthesis.¹⁴ Epigenetic processes do not alter genes, they only regulate their expression. So, epigenetic phenomena are, just as ordinary genetic phenomena, subject to selection processes for their long-term transmission and maintenance in the gene pool. Epigenetics cannot be considered as Lamarckism. However, the transfer of culturally acquired competences by means of learning applies very well to intergenerationally transmitted cultural features.¹⁵

⁸Dawkins (1976, 206).

⁹For a discussion of the different types of cultural innovation and their implications for the evolution of culture, see, for instance, Acerbi and Mesoudi (2015).

¹⁰Henrich et al. (2008).

¹¹Lamarck (1809).

¹²Heard and Martienssen (2014), Penny (2015, 2016). See also our discussion of Extended Evolutionary Synthesis (EES) in Chap. 1, p. 4.

¹³For instance, Allis et al. (2015), Giuliani et al. (2015).

¹⁴For instance, Skinner (2015).

¹⁵For instance, Gould (1980, 84): "Human cultural evolution, in strong opposition to our biological history, is Lamarckian in character. What we learn in one generation, we transmit directly by teaching and writing."

Another important difference between genetic and cultural mutants is that the former can only be transmitted via biological parents, whilst the latter can also be transmitted—vertically as well as horizontally and obliquely—by non-parents. This is the reason why cultural change can progress so much faster than biological evolution.

Hence, at the mutational level, one can already see that co-evolution between biological and cultural mutants may be present to a certain degree: moral ideas cannot be produced if the required brain capacity to produce them and the sensitivity to accept them are not available. Conversely, cultural innovations, also in the domain of morality, may change the direction or strength of selective processes on biological predispositions facilitating moral behaviour.

2.1.2 Selection

In general terms, the evolutionary concept of selection refers to the differential reproduction of genes and memes. Positive selection results in the preservation or even increase of particular genetic or cultural variants, whilst negative selection leads to a decrease, and eventually the elimination, of the targeted genes or memes.

In the evolutionary discourse about the effects of selection, two different but interrelated concepts are used: reproductive fitness and adaptation/maladaptation. Reproductive fitness, sometimes called Darwinian fitness or genetic fitness, refers to the degree that a genetic or cultural variant is differentially reproduced and transmitted to subsequent generations. It is, in fact, a quantitative indicator for the degree to which a trait is intergenerationally decreased, preserved or increased. The concept of adaptation/maladaptation refers to the degree to which an organism succeeds or fails, in a long-term perspective, in ontogenetically developing and phylogenetically evolving well-adjusted characteristics in its (changing) environment.

Hence, selection has a quantitative (reproduction) and a qualitative (adaptation) dimension. In the evolutionary evaluation of biological or cultural changes, often only the quantitative aspect of the change and its short-term dimension are considered, whereas the qualitative aspect and long-term dimension are left out of scope. A classical example is the demographic transition where the shift from high to low fertility is often said to be a maladaptive trait,¹⁶ because it would violate the maximisation of inclusive fitness principle.¹⁷

Considering both the quantitative and qualitative aspects of evolutionary change is particularly important for the human species with its enormous environmentally intervening potentialities. Not only the numerical reproduction of human genes or individuals but also the degree to which the ontogenetic and phylogenetic

¹⁶See, for instance, Hill (1984), Vining (1986), Pérusse (1993), Borgerhoff Mulder (1998), Richerson and Boyd (2005, 149, 169); see also Chap. 8, Sect. 8.2.2.1.

¹⁷Maximisation of inclusive fitness: theory which asserts that humans, like other organisms, developed through natural selection evolved behavioural tendencies in order to maximise their genetic representation in future generations in the context of constraints set by the environment and their phylogenetic past (Hamilton 1964).

development of human-specific potentialities is being achieved, should be duly taken into consideration. Moreover, reproductive fitness should be evaluated in combination and interaction with the degree to which the human succeeds in mastering its environment and achieving long-term ecological sustainability, resulting in what people would usually consider as enhancing quality of life, well-being, welfare, and happiness.¹⁸

In evolutionary biology several forms of selection are distinguished, e.g. natural selection, sexual selection, kin selection, group selection, social selection. In the domain of culture we speak of cultural selection. Biological and cultural forms of selection resulted in the formulation of a universal selection theory¹⁹ or a holistic Darwinian theory.²⁰ This means that Darwin's theory and explanatory mechanism—the presence of blind variation and the selective retention effect thereupon—is not only applicable to biological phenomena but also to cultural, technological and societal phenomena, and not least to moral phenomena.

2.1.2.1 Natural Selection

Natural selection is the well-known mechanism through which genes are differentially transmitted to subsequent generations due to the interaction with the natural environment.

The selection intensity against a genetic variant determines the reproductive fitness of that variant. Reproductive fitness can be achieved via various biodemographic mechanisms, namely differential mating, differential fertility, differential mortality, and differences in generation length.²¹

Whereas single step selection can change the frequency of individual genes or even complete genomes,²² it is only cumulative selection that can manufacture biological complexity, eventually also resulting in the emergence and evolution of different races and species.²³

Natural selection has not only been observed in numerous empirical and experimental investigations on a wide variety of species,²⁴ but it has also been developed in a mathematical theory of selection, expressed by what is now known as The Price Equation, in which intergenerational change is partly ascribed to the action of selection and partly due to other genetic mechanisms or environmental factors that influence the transmission of particular traits.²⁵

¹⁸See also Sartorius (2003, 171) who evaluates 'fitness' not only in terms of relative numbers of genes or individuals, but also in terms of increasing control over Earth's resources, resulting in differential growth in wealth and power.

¹⁹Universal selection theory: application of Darwinian selection beyond biological processes in order to explain evolutionary processes in a wide variety of other domains (see, for instance, Dawkins 1983; Cziko 1995).

²⁰Campbell (1965), Corning (2005).

²¹For instance, Cavalli-Sforza and Bodmer (2013).

²²For instance, Gintis (2014).

²³For instance, Dawkins (1986).

²⁴For instance, Dawkins (2010).

²⁵Price (1970, 1972, 1995), Hamilton (1975), Maynard Smith and Price (1973); see also Frank (1995; 1997; 1998; 2012), Grafen (2000), Gardner (2008), Harman (2011).

2.1.2.2 Cultural Selection

The concept of cultural selection can have two different meanings: it can refer to selection of biological characteristics due to cultural factors, but it can also refer to selective processes pertaining to cultural variables themselves, meaning that one cultural variant is more likely to be intergenerationally reproduced than alternative variants.²⁶ In the latter case, such differential cultural inheritance can be achieved through purely culturally transmitted mechanisms (learning, coercion), and/or through biodemographic mechanisms (differential mating, fertility, or mortality of the carriers of the cultural traits).²⁷

The transgenerational transmission of cultural traits is obviously much more complicated than that of genetic traits, because memes can be transferred through many more people than through parents. Indeed, whereas genes can intergenerationally only be inherited vertically (i.e. through biological parents), memes can also be transmitted horizontally or diagonally, i.e. through other persons or groups. Cultural heritage can even come from ancestors living many generations ago; it can have different effects according to the kind of trait, the type of heir, or the change of its contents in the process. Moreover, socio-cultural phenomena may be subject to such complex developmental changes, both within and between generations. Some researchers raise the question as to whether the current evolutionary mechanistic toolkit and its mathematics can suffice for measuring and fully explaining intergenerational cultural dynamics.²⁸

In an analogy to the genetic fitness concept, the term cultural fitness has been devised, aiming to measure the overall transgenerational influence, resulting from the combination of the transmission mechanisms and reproduction intensity. However, cultural fitness is an indicator that, because of its complexity, is much more difficult to quantify than genetic fitness.²⁹

In the context of this discourse, it is necessary to reflect more extensively on the concept of selection of cultural and, more particularly, moral ideas. The application of the evolutionary and population genetic framework on cultural variables is less commonly known in ethics and social sciences in general.

Indeed, cultural and in particular moral standards may, much like biological characteristics, be promoted or eliminated by selection. They can be positively selected when they have socially, culturally, or biologically, adaptively advantageous effects. In general, it can be stated that ethical ideas, like genetic variants, are under selective pressure.³⁰ The prevalence of moral values and norms that promote social, cultural or biological adaptation will increase, whilst moral variants that unfavourably influence societal functioning, or impede the ontogenetic development and genetic survival, will decrease or be eliminated, often together with their inventors or carriers. This applies mainly to values and norms that are, directly or

²⁶For instance, Stephen (1882), Keller (1915), Cavalli-Sforza and Feldman (1981), Mesoudi (2011, 64, 79; 2016).

²⁷For instance, Henrich (2004).

²⁸Laor and Jablonka (2013), Claidiere et al. (2014).

²⁹Claidiere and André (2012, 15), El Mouden et al. (2014, 233).

³⁰See, for example, Chudek and Henrich (2011, 224).

indirectly, of vital importance either for societal or biological intergenerational continuity.

This does not mean that all values and norms that spread or are maintained optimise inclusive fitness or are adaptive. In the same way as some biological characteristics, some values and norms can be neutral; others can even have unfavourable effects—be maladaptive—but, for a variety of reasons, nevertheless temporarily or partially survive.

With regard to biological characteristics, the presence or even persistence of maladaptive traits can be due to a variety of causes. They can be due to unfavourable mutations, which increase morbidity or mortality through which reproduction is partially reduced. Some unfavourable genetic variants may not be immediately eliminated ontogenetically or early in the life course or appear only after the peak of reproductive life. Some harmful genetic variants can have favourable effects in heterozygote combinations, in interaction with other genes, or in particular environmental conditions. Some favourable genetic variants may have become unfavourable due to changing environmental or cultural living conditions.³¹

Some of the biological mechanisms producing maladaptiveness are also applicable to maladaptive secular or religious norms, because compliance with such norms can also produce higher levels of morbidity or mortality, reducing reproductive fitness. Maladaptive cultural traits can nevertheless also persist, because they are compensated or protected by other cultural or even biological characteristics. In pre-scientific cultural stages, when no adequate insights existed into the causes of evolution, many cultural practices spread: some were founded on lucid insight, however, most emanated from superstition and resulted in inefficiency, if not in misery.³² As William J. Talbott³³ formulated so well, moral systems often include a ‘hodgepodge’ of social norms, including many norms that were not directly involved in the solution of their biosocial problems, because in prehistorical times—one could even say in pre-Darwinian times—when those systems emerged, people did not understand well their norms as means of solving their problems. Some of these maladaptive behavioural patterns can spread or maintain themselves temporarily, because selection against them is weak or the population fails to respond adequately, or their elimination is biologically or culturally compensated by other factors.³⁴

The degree of maladaptation must be evaluated at different levels of organisation—individual, population, generation—and according to time dimensions—short

³¹McGuire et al. (1997, 30), Nesse and Williams (1997, 15).

³²Many examples of relatively or potentially maladaptive cultural practices are known: drug abuse, alcoholism, smoking, necrophage customs, mutilations (e.g. ritual male circumcision, female genital mutilation, female foot-binding), human sacrifice, celibacy, infanticide, nutritional customs resulting in qualitative starvation, slavery, torture, wife-beatings, rape, witchcraft, environmental pollution, homicide, suicide, dysfunctional food and health care practices that increase infant mortality, reduce life-expectancy and/or lower personal productivity (Cavalli-Sforza and Feldman 1981; Barkow 1989; Edgerton 1992).

³³Talbott (2015, 700).

³⁴For instance, Barkow (1989).

versus long-term—and must be situated in the total ecological context in which the phenomenon prevails. Thus, it is not impossible that particular cultural practices, such as ritual mutilations, which have maladaptive effects at the individual level, may have had some advantageous effects at the population level in earlier cultural eras, for instance through population control, initiation into adulthood or preparation for war.³⁵

Nevertheless, a fact remains that many moral codes are in line with the biological predispositions of the human species.³⁶ This is especially the case where the genetic programming of particular biological predispositions is weak or incomplete, so that moral rules are necessary to complement or strengthen the effects of genetic factors in order to guarantee survival or reproduction. Well-known and evolutionarily well-established examples are moral codes for childcare, incest avoidance, in-group favouritism, altruism, reciprocal altruism and mutualism, sexual attraction/love, reproductive behaviour, and elderly care.

However, the different means and tools of biological evolution and culture, and in particular the different speed at which they can change, results in genetic fitness and cultural fitness not always being positively correlated.³⁷ They can be antagonistic and provoke serious biosocial stress as can be observed in modernisation.

2.1.2.3 Social Selection

Social selection is a concept often used in social biology, referring to social factors producing reproductive differentials of biological characteristics.³⁸ Social selection can operate at the group level, for instance, in the case of social class characteristics related to genetic factors and influencing reproductive behaviour³⁹; but it can be limited to situations whereby fitness is influenced by the behaviour of other individuals.⁴⁰ In this sense, social selection differs from other forms of selection, because it tends to be more reciprocal with several individuals selecting traits in each other.⁴¹

Social selection is to be distinguished from social assortment⁴² through which biological characteristics are differentially distributed over different social groups in a population.

The concept of social selection is often used as a synonym for cultural selection in the sense of selection of biological characteristics due to cultural factors.

³⁵Kardong (2010, 153).

³⁶Durham (1991), Ayala (2009), Teehan (2010), Mouden et al. (2014, 235).

³⁷El Mouden et al. (2014, 235).

³⁸Broca (1872), Fisher (1930; 1958), Nesse (2009).

³⁹Schwidetzky (1950), Retherford and Sewell (1988), Lynn and Harvey (2008).

⁴⁰For instance, in the case of hereditary diseases, mate finding and fertility may be changed considerably by the presence of affected family members (Yokoyama 1983).

⁴¹Krebs (2011, 60).

⁴²Scheidt (1925), Schwidetzky (1950), West-Eberhard (1979). The concept of social selection is often confused with the term social (as)sortment. In some cases the term social selection is used to refer to assortative processes (e.g. Montagu 1950, 331; Strickland and Shetty 1998, 8; Blane et al. 2008), in other cases the concept of sortment in fact refers to selective processes (e.g. in the book 'The Sorting Society' edited by Skene and Thompson 2001).

L. Krzywicki,⁴³ for instance, uses it in the domain of morality as the elimination of individuals who do not obey particular moral norms, resulting in the fixation of those norms. Another example of a moral factor involved in social selection is Christopher Boehm's theory that group punishment, through aggressive suppression of free-riding deviants, could have changed the human potential for behaving altruistically.⁴⁴

2.1.2.4 Sexual Selection

The specific sexual dimorphic features of a species are the result of sexual selection.⁴⁵ Charles Darwin, who initially developed the theory of sexual selection,⁴⁶ defined it as an evolutionary mechanism through which individuals acquire, via selection pressures on some of their sex-specific traits, reproductive advantages over other individuals of the same sex, and transmit their characteristics to their descendants of the same sex. Darwin distinguished two complementary components of sexual selection: competition within one sex over members of the other sex, and differential choice by members of one sex for members of the other sex. In 1915 Ronald A. Fisher⁴⁷ produced a first genetic analysis of mate selection, developing the concept of runaway sexual selection, a positive feedback mechanism between the selection of favourable traits and the higher mating success for such traits that explains the development of costly male epigamic traits as indicators of the presence of good genes.

Sexual selection is a form of natural selection, but whereas the latter operates through competition for survival, sexual selection operates through competition for reproduction.⁴⁸ After Darwin/Fisher, sexual selection fell somewhat into oblivion, but with the Second Darwinian Revolution it revived strongly with theoretical and empirical contributions by several eminent scholars.⁴⁹

Many biological and behavioural differences between the sexes, in particular those relating to reproductive strategies, can be explained by the sexually differentiated relative parental investment in offspring.⁵⁰ The strongly investing sex in offspring produces fewer descendants than the weakly investing sex. The strong investors will, consequently, develop a qualitative or K-strategy in order to ensure that each offspring produced has maximal opportunities for survival. The reproductive success of the weakly investing sex, in contrast, will be favoured by producing as many offspring as possible: it will develop a quantitative or r-strategy.⁵¹

⁴³Krzywicki (1951), quoted in Urbanek (1993, 328).

⁴⁴Boehm (2014).

⁴⁵For instance, Hutchinson (1959), Campbell (1972), Cronin (1993), Miller (2000).

⁴⁶Darwin (1859; 1871).

⁴⁷Fisher (1915); see also Fisher (1930).

⁴⁸Miller (2000, 8).

⁴⁹Williams (1966), Trivers (1972), Ghiselin (1974), Zahavi (1975), Maynard Smith (1978), Symons (1979), West-Eberhard (1979), O'Donald (1980), Lande (1981), Kirkpatrick (1982), Pomiankowski (1987), Bulmer (1989), Cronin (1993), Andersson (1994), Buss (1994), Miller (2000).

⁵⁰Trivers (1972).

⁵¹Daly and Wilson (1978).

These different reproductive strategies lead to different mating strategies. The less investing sex—usually the male sex—tries to get and inseminate as many partners as possible, leading to intra-sexual competition ('male-male competition'). The more investing sex runs more risks. It will consequently be more selective ('female choice'),⁵² since its interest is to get partners who are likely to guarantee a high chance of survival for their offspring. Together, male-male competition on the one hand, and female choice on the other, result in an enlargement of the sexual dimorphism of characteristics that fulfil functions in partner choice and adaptation. This double sexual selection leads to sexual differences in morphology, physiology and psychology.

In the course of hominisation, the sexual dimorphism for secondary sexual characteristics gradually decreased, leading—among other characteristics—to the so-called feminisation process of the human male.⁵³ As men's parental investment in larger-brained and longer-maturing offspring increased, the mating strategy of females and males evolved towards the establishment of more enduring relations and courtship investments, associated with a reduction in male-male competition, decreasing male physical robustness and behavioural aggressiveness, but enhancing the requirements of cooperation and sociability. In particular, the sex role differentiation within enduring family units that developed with group hunting, and in later cultural stages, with other sex differentiated activities (in which the more mobile males got separated from the food gathering and child caring females) required behavioural inclinations as well as normative agreements for mastering sexual competition. Whereas in prehuman species the sexual rank order is enforced by the physical presence of the dominant male(s), in human societies—where adult males and females perform spatially separated activities—biological control systems not only have to change but also have to be partly supplemented by socio-cultural regulations.

The hominisation process was not only characterised by changes in male sexual biology and psychology. Also the hominin female underwent important changes. While the male transformation mainly concerned secondary sex characteristics, the evolutionary changes of the female sex also concerned primary sexual features including concealed ovulation, large breasts, orgasm, multiple erogenous zones, frontal intercourse linked to face-to-face interaction accompanying bipedalism, and menopause.⁵⁴

The changes in sexual dimorphism pertained not only to morphological traits, but also, given the decreasing genetic programming of behaviour during the hominisation process, pertain to the evolution of innate moral sentiments and cultural codes regulating sexual behaviour. Hence, morality has not only evolved through the process of natural selection, but because moral virtues such as altruism,

⁵²Beware! The 'female choice' principle does not exclude the existence of ordinary, naturally or socially induced selective processes within the female sex, interacting with and reinforcing the effects of the specific sexual selective processes (see, e.g. Vaillancourt 2013).

⁵³Brace (1973), Armelagos and Van Gerven (1980), Hall (1982), Cliquet (1984), Ghesquiere et al. (1985), Steerneman et al. (1992), Plavcan and van Schaik (1997), Cieri et al. (2014).

⁵⁴For instance, Lancaster (1985).

kindness, generosity and cooperativity are sexually attractive, it is likely that their evolution was influenced by sexual selection as well.⁵⁵ Many human virtues may have evolved in both sexes through mutual mate choice for features such as altruism, kindness, empathy, magnanimity, conscientiousness, agreeableness, honesty, self-control, courtship generosity, fidelity, heroism, and parenting abilities.⁵⁶

2.1.2.5 Kin Selection

Of fundamental importance for the understanding of the evolution of social behaviour, in particular of human moral behaviour, are biological concepts and theories regarding the evolution of altruism.

Due to the many different definitions or interpretations that have been given to this concept, it is necessary to specify how it is usually applied in evolutionary biology. Originally coined by Auguste Comte in the nineteenth century as the antithesis to egoism, the term altruism is sometimes used as an ethical principle and sometimes as a behavioural act. In the latter case, it can strongly vary from modest forms of helping behaviour towards others to extreme forms of self-sacrificing deeds for others. In evolutionary theory, the concept of altruism is used in its behavioural meaning, independently of its moral intention that can be neutral, selfless or even selfish. It is defined as behaviour that, ultimately, reduces the reproductive fitness of a cooperating individual compared to the reproductive fitness of individuals who behave selfishly.⁵⁷

Darwin's theory of natural selection states that genetically influenced characteristics in a population maintain or spread themselves by means of a relatively higher reproduction of the carriers of the relevant genes. This concept of Darwinian or reproductive fitness explains the maintenance or spreading of virtually all genes that promote adaptive characteristics, whether they are of a morphological, physiological or psychological nature. However, there is one exception: genes determining or influencing biological characteristics that produce—in interaction with environmental factors—altruistic behaviour. Such behaviour implies that the genes of the altruist, who helps others or sacrifices himself for others, will be more or less reduced in the gene pool of the next generation(s), and will eventually become completely eliminated by natural selection. Nevertheless, altruistic behaviour exists in all social species and clearly appears to have great adaptive advantages. For a long time altruistic behaviour remained a paradox in Darwinian evolutionary theory.

Darwin was aware of the fact that behavioural traits that lead to reproductive self-sacrifice cannot be maintained evolutionarily by means of differential reproductive success. With his characteristic discernment, Darwin hypothesised that,

⁵⁵Cela-Conde (1987), Miller (2000), Nesse (2007), Cela-Conde et al. (2010), Phillips et al. (2010).

⁵⁶Miller (2000, 292; 2008, 219); see also Tang and Ye (2016).

⁵⁷Altruism can, obviously, include any kind of benefit to other individuals at some cost for the altruist—'behavioural altruism', as distinguished from 'reproductive altruism' by Clavien and Chapuisat (2013, 128)—but the insertion of the genetic endowment for the capacity of such behaviour in the individual genome and its spread in the population is dependent upon several evolutionary mechanisms (see also Clavien 2010).

on the basis of the genetic relationship between reproducing and non-reproducing individuals, some kind of family selection occurred whereby such altruistic characteristics nevertheless could spread, but he did not elaborate this idea.

In the 1930s, Ronald Fisher⁵⁸ and J.B.S. Haldane⁵⁹ suggested that genes which favour altruistic behaviour could be selected for if the beneficiaries would be genetically sufficiently related to the altruist, so that such genes could nevertheless increase.

The definitive breakthrough of this idea occurred in the 1960s when brilliant contributions by William Hamilton⁶⁰ developed a fully-fledged theory about kin selection. Hamilton proved, in a formal mathematical way, that the altruistic behaviour of an individual who lowers his/her personal reproductive fitness can be positively selected for when his altruistic behaviour increases the reproductive fitness of related persons to such a degree that his genes are increased in the next generation via related beneficiaries. Hamilton showed that natural selection promotes altruistic behaviour between relatives when the benefit for the recipient relative, weighted for the degree of relatedness,⁶¹ is larger than the cost for the altruist himself. In 1975 Hamilton,⁶² building upon the work of George Price,⁶³ showed that evolution of altruism between relatives is a specific form of group selection. (See also Sect. 2.1.2.8.)

Hamilton developed the inclusive fitness concept by referring to the degree to which genes are transferred to the next generation thanks to the ordinary reproductive fitness of an individual and the fitness of his/her relatives, which is the result of his/her altruistic behaviour. Thus, Hamilton amended the classical theory of natural selection by broadening the concept of fitness from reproductive fitness to inclusive fitness. In this way he gave an explanation for the possible genetic transmission of altruistic behavioural characteristics by means of differential reproductive behaviour of individuals.

John Maynard Smith⁶⁴ introduced the term 'kin selection' to Hamilton's theory on inclusive fitness. The kin selection concept is not limited to the effect an altruist has on the reproductive behaviour of relatives. It also includes the reproductive success of the altruist himself. Hamilton's theory also implies that the degree to which the reproductive behaviour of an individual is associated with nepotistic behaviour towards his/her own offspring, the principle of inclusive fitness, extends nepotism to other close relatives.⁶⁵

The kin selection and inclusive fitness concepts are very important for studies embedded in evolutionary theory. They offer a coherent explanation for the genetic transmission of characteristics that promote social behaviour transcending the

⁵⁸Fisher (1930).

⁵⁹Haldane (1932).

⁶⁰Hamilton (1963; 1964).

⁶¹See Wright (1922).

⁶²Hamilton (1975, 141).

⁶³Price (1972).

⁶⁴Maynard Smith (1964).

⁶⁵Alexander (1979).

parent-offspring bond. They are empirically well documented in the zoological and cultural anthropological and sociological literature.⁶⁶ However, some aspects of the mathematical way of analysis have been challenged.⁶⁷ Indeed, the inclusive fitness of a trait is very difficult to measure either in the field or in experiments.⁶⁸ Moreover, the fitness of a gene always involves the whole genome in which it is imbedded, and more particularly the other genes with which it interacts.⁶⁹

2.1.2.6 Reciprocity Selection

Building upon Hamilton's theory of kin selection, Robert Trivers⁷⁰ developed, in his paper on *The Evolution of Reciprocal Altruism*, an evolutionary model explaining the occurrence of altruistic behaviour between non-relatives, thus extending the evolutionary theory of altruism from kin to non-kin. Reciprocal altruistic behaviour changes not only the social relations in a population, but can also influence, via differential reproductive effects, the genetic composition of the population. This occurs in the first place regarding the transmission of predispositions for reciprocal altruism, and in the second place for all other traits that are linked to reciprocity. Therefore, the term used here, reciprocity selection,⁷¹ is analogous to the term kin selection.

The idea of the importance of reciprocity for the evolution of social life had already been advanced by earlier authors—among others Charles Darwin himself and especially Peter Kropotkin⁷² for whom mutual aid represented an important element for survival and progressive social development. However, it is only with Robert Trivers' contribution of 1971 that this question was dealt with in a more extensive and thorough way, and that a theory was elaborated which coherently links up with the present-day evolutionary synthesis. Moreover, Trivers' contribution represented the point of departure for a large number of other scholars, such as Richard Alexander, Mary West-Eberhard, Robert Axelrod, William Hamilton, Lee Alan Dugatkin, David S. Wilson, Elliot Sober, Martin A. Nowak, Karl Sigmund, Herbert Gintis, Samuel Bowles,⁷³ to further elaborate or refine the evolutionary study of reciprocity, also partly on the basis of economic game experiments,⁷⁴ and to develop it into a genuine evolutionary theory of cooperation. (See also Sect. 1.2.8.) Countless contributions have meanwhile been produced,

⁶⁶For an overview, see Dugatkin (2006, 123–141); see also, Essock-Vitale and McGuire (1980), Boehm (1999), Fry (2006).

⁶⁷Nowak et al. (2010), Allen et al. (2013).

⁶⁸Nowak and Highfield (2011, 109).

⁶⁹Gintis (2014, 494).

⁷⁰Trivers (1971).

⁷¹See also Boorman and Levitt (1973), Hamilton (1977).

⁷²Kropotkin (1902); see also West-Eberhard (1975).

⁷³Alexander (1974), West-Eberhard (1975), Axelrod and Hamilton (1981), Axelrod (1984; 2001), Dugatkin et al. (1992), Wilson and Sober (1994), Nowak and Sigmund (1998; 2005), Gintis (2000), Bowles and Gintis (2011).

⁷⁴For example, Axelrod and Hamilton (1981), Henrich et al. (2001; 2004; 2010), Fehr et al. (2002; 2003; 2004). For general overviews of game theory in evolutionary processes, see Maynard Smith (1982), Gintis (2000), Barash (2003), Bowles and Gintis (2011).

further refining or specifying the population genetic mechanisms that favour the origin and persistence of intraspecific cooperation in humans and other species.⁷⁵ Recently, Martin A. Nowak⁷⁶ distinguished and compared five possible mechanisms for the evolution of cooperation—kin selection,⁷⁷ direct reciprocity,⁷⁸ indirect reciprocity,⁷⁹ network reciprocity,⁸⁰ and group selection.⁸¹

In this context, special mention is deserved for the thesis of Herbert Gintis⁸² who proposed and modelled a form of prosocial behaviour that he calls strong reciprocity; he introduced the epithet *Homo reciprocans* for this type of behaviour.⁸³ Mainly based on game experiments, Gintis argues that people behave prosocially and punish anti-social behaviour to the detriment of themselves, even if the likelihood of future interactions is negligible. Gintis et al.⁸⁴ take into account different sources of knowledge, such as the demographic, ecological and social living conditions prevailing in Pleistocene times, empirical data on the moral values and norms of current-day hunter-gatherers and present modern populations, and the results of economic game experiments in well controlled laboratory conditions. They conclude that simple reciprocal interactions, let alone kin selection,⁸⁵ would not suffice to explain the origin of the specifically human morality in which moral values are treated as ends in themselves, rather than to just promote the interests of their proponents. The efforts that crime victims make to ensure that offenders are punished, or the selfless morally inspired actions many people get engaged in with the aim of changing society's norms and policies, are mentioned as examples of prevailing forms of strong reciprocity in everyday social life.

The theory about strong reciprocity has been subject to criticism,⁸⁶ not because selfless cooperation or altruistic punishment is being denied, but because it is explained by means of group selection instead of one of the evolutionary mechanisms that focus on individual selection. It has also been challenged, because there is no strong empirical evidence from field studies that uncoordinated costly material punishment is used in small societies, except in the regulation of sexual conflict.⁸⁷ Moreover, some evolutionary game experiments show that other forms of

⁷⁵For an overview, see for instance, Lehmann and Keller (2006), Comins (2008), Bowles and Gintis (2011).

⁷⁶Nowak (2006).

⁷⁷Hamilton (1964).

⁷⁸Trivers (1971), Axelrod (1984).

⁷⁹Alexander (1987, 93, 94) defined indirect reciprocity as “reciprocity occurring in the presence of interested audiences—groups of people who continually evaluate the members of their society as possible future interactants from whom they would like to gain more than they lose”; see also Boyd and Richerson (1989), Nowak and Sigmund (1998; 2005).

⁸⁰Nowak and May (1992), Ohtsuki et al. (2006).

⁸¹Wilson (1975), Wade (1978), Wilson and Sober (1994), Landa and Wilson (2008).

⁸²Gintis (2000); see also Fehr et al. (2002), Henrich et al. (2004), Gintis et al. (2008).

⁸³Gintis (2000, 251).

⁸⁴Gintis et al. (2008); see also Gächter and Herrmann (2006), Bowles and Gintis (2011).

⁸⁵See also Tomasello (2009, 52).

⁸⁶For instance, Burnham and Johnson (2005), Trivers (2006, 79ff), Nowak and Highfield (2011, 224ff), Yamagishi et al. (2012).

⁸⁷Guala (2012).

behaviour, such as cooperative success⁸⁸ or reward,⁸⁹ are more effective than punishment in promoting cooperative behaviour.

Notwithstanding the differences about the ultimate explanations for the type of selective processes which resulted in our capacity for cooperative altruistic behaviour, it must be acknowledged that evolutionary game experiments about reciprocity have considerably enriched our knowledge and insight about social interactions. They have also confirmed experimentally knowledge which was available via other research procedures—evolutionary theory, computer simulations, and above all, empirical observations in natural settings. Relevant findings of experimental games are: status quo is preferred over any alternative strategy; people cooperate even in one-shot game experiments; people favour short-term gains that entail long-term losses; cooperation increases strongly in stable groups; people cooperate more with partners than strangers; people are about twice as averse to taking losses as to enjoying an equal level of gains and are displeased when subjected to relative deprivation; free-riders⁹⁰ evoke negative emotions; altruistic punishment and reputation enhances cooperation; people respond strongly to increased costs of punishment.⁹¹

Hence, biological predispositions and cultural practices to detect, expose and punish selfish cheaters and free-riders are related to the mechanisms of kin selection and reciprocity selection, resulting in sensitivity to the needs of others. Such predispositions and practices are a way of establishing (reciprocal) altruistic behaviour.⁹²

In recent years, many researchers have continued, mainly by means of mathematical modelling and evolutionary game experiments, to further explore and nuance reciprocity theory by identifying specific factors and conditions under which various forms of reciprocal altruism—strong reciprocity, indirect reciprocity—can be selected for and explain the evolution of human sociality.⁹³

In particular, the recent progress in the study of reciprocity behaviour has led to a shift in focus from altruistic to mutualistic cooperation.⁹⁴ In sociobiological theory altruism and mutualism are often distinguished, whereby altruism is behaviour that involves a cost to the actor's survival or reproduction, while mutualism usually refers merely to (selfish) cooperation and mutual benefit for the actors involved.⁹⁵

⁸⁸Dreber et al. (2008).

⁸⁹Rand et al. (2009).

⁹⁰Free-riders: people with exploitative motives (Delton and Krasnow 2015, 23).

⁹¹Gächter and Herrmann (2006, 300); see also Gintis (2000, 245ff), Bowles and Gintis (2011), Nowak and Highfield (2011).

⁹²For instance, Fehr and Gächter (2000), Herrmann et al. (2008), Shimao and Nakamaru (2013).

⁹³André (2010), Bravo (2010), Fehr and Schneider (2010), Iwagami and Masuda (2010), Saavedra et al. (2010), Smead (2010), Barta et al. (2011), Chiang et al. (2011), Delton et al. (2011), Krupp et al. (2011), Pena et al. (2011), Sigmund (2012), Vollen (2012), Berger (2013), DeScioli and Krishna (2013), Jaeggi and Gurven (2013), Phelps (2013), Suzuki and Kimura (2013), Sylwester and Roberts (2013).

⁹⁴Baumard et al. (2013), Forber and Smead (2015), Tomasello et al. (2012).

⁹⁵For instance, Wenegrat (1990, 24), Joyce (2006, 13), Bowles and Gintis (2011, 2), Baumard et al. (2013, 61).

Mutualism is a term that is not only used for intraspecific forms of reciprocal altruism but also for interspecific forms of cooperation.⁹⁶

Mutually beneficial social behaviour is not only less costly than altruistic behaviour, but it is also less sensitive to cheating. An important difference between reciprocal altruistic behaviour and mutualism is that the first mainly relies on partner control, whereas the latter is based on assortative partner choice that is, as such, a form of social selection.⁹⁷ Mutualistic cooperation would therefore be evolutionarily more stable and facilitate more varied and complex prosocial behaviour.⁹⁸

The evolutionary theory about reciprocal altruism/mutualism is a pertinent example of the emergence and evolution of a biological predisposition that is related to a universally prevailing cultural precept called the Golden Rule that is not only in line with but also reinforces the biological predisposition.⁹⁹

2.1.2.7 Coercive Selection

In socially hierarchical societies, social cooperation can be induced by yet another mechanism, namely the forcing of group members to such behaviour. Daniel Krebs¹⁰⁰ speaks in such cases about forced altruism. Indeed, the importance of social coercion in the development of helping behaviour should not be underestimated, especially not in the human species. Social coercion can be used in two opposite ways: strengthening the social position of dominant individuals leading to increased forms of social inequalities, or weakening the potential abuse of rulers, cheaters and free-riders. The latter proximately results in the strengthening of cooperation and social cohesion, and ultimately enhances the reproductive fitness of the punishers and/or diminishes the fitness of cheaters and free-riders.

Pierre Van den Berghe¹⁰¹ is of the view that social coercion is to be considered one of the three major foundations—together with kin selection and reciprocity selection—of human social life. Although coercion and deference to coercion are ubiquitous in social animals in the form of dominance hierarchies,¹⁰² it is a behavioural pattern that is specific to the human species. Social coercion of conspecifics,¹⁰³ resulting in intra-species parasitism, is a unique phenomenon for the human species. In the animal kingdom slavery prevails among some ant species, but the enslaving only concerns other species, not the same one.¹⁰⁴ In the relatively egalitarian foraging hunter-gatherer societies social coercion, through moralistic aggression, kept alpha-male types from dominating group life.¹⁰⁵ With the

⁹⁶For instance, Bergstrom, in Hammerstein (2003, 241ff).

⁹⁷Eshel and Cavalli-Sforza (1982), Baumard et al. (2013, 61).

⁹⁸Forber and Smead (2015, 414).

⁹⁹For instance, Wilkins and Thurner (2010), Nowak and Highfield (2011, 273), Goodman (2014).

¹⁰⁰Krebs (1983, 65); see also Richerson et al. (2003, 373) who use the term coercive dominance.

¹⁰¹Van den Berghe (1979, 15, 16).

¹⁰²Clutton-Brock and Parker (1995).

¹⁰³Conspecifics: organisms belonging to the same species.

¹⁰⁴Wilson (1975).

¹⁰⁵Boehm (1999, 207).

development of the socially strongly stratified societies in the agrarian and early industrial eras social coercion developed very strongly and widely.

Although social coercion as a factor in community formation differs from kin selection and reciprocity selection, it may have as an ultimate effect that it allows for a higher reproductive fitness, either for the dominant individuals or for the group as a whole. Therefore, the term used here is coercive selection.

Punishment—or menace of punishment—is an important means to enforce socially desirable behaviour, and in particular cooperative behaviour in society. This is the reason why scholars started using the concept of altruistic punishment,¹⁰⁶ a somewhat antithetical term, because punishing cheaters and free riders is ultimately a selfish rather than an altruistic deed.

There already exists an impressive body of theoretical,¹⁰⁷ empirical,¹⁰⁸ and experimental research¹⁰⁹ showing that punishment of non-cooperators, free-riders and cheaters has not only a deterrent effect, but it promotes cooperative behaviour. Punishment also sustains large-scale cooperation in intergroup conflict and warfare.¹¹⁰ Altruistic punishment occurs even when there is a high cost for the punishers,¹¹¹ although other factors and conditions, such as cost-to-impact ratio,¹¹² reputation,¹¹³ gossip,¹¹⁴ trust,¹¹⁵ sympathy,¹¹⁶ reward treatment,¹¹⁷ inequity aversion,¹¹⁸ spite,¹¹⁹ envy,¹²⁰ and antisocial punishment,¹²¹ may be involved.

Punishment of selfish behaviour seems to be present in all human cultures.¹²² It is even found in extant mobile hunter-gatherer cultures—similar to our Palaeolithic ancestors—where they help to maintain a relatively egalitarian society.¹²³ Punishment is even common in animal societies where it is used to invigorate dominance, repress or restrain cheating, control offspring or sexual partners, and strengthen cooperative behaviour.¹²⁴ Punishment suggests the possibility of the evolution of ‘moralistic’ strategies in which punishers punish not only reluctant cooperators but also others who fail to cooperate and even those who fail to punish

¹⁰⁶Fehr and Gächter (2002), Boyd et al. (2003), de Quervain et al. (2004), Fowler (2005).

¹⁰⁷For instance, Frey and Rusch (2012), Guala (2012), Shima and Nakamaru (2013).

¹⁰⁸For instance, Boehm (1993), Henrich et al. (2001).

¹⁰⁹For instance, Gülerk et al. (2006), Pedersen et al. (2013), Przepiorka and Diekmann (2013).

¹¹⁰Mathew and Boyd (2011), Gneezy and Fessler (2012).

¹¹¹Henrich et al. (2006), Hauert et al. (2007).

¹¹²Egas and Riedl (2008).

¹¹³For instance, Rockenbach and Milinski (2006), Dos Santos et al. (2013), Kroupa (2014).

¹¹⁴Kroupa (2014).

¹¹⁵For instance, Balliet and Van Lange (2013).

¹¹⁶Ye et al. (2011).

¹¹⁷Choi and Ahn (2013).

¹¹⁸Hetzer (2013), Bone and Raihani (2015).

¹¹⁹Nakamaru and Iwasa (2007), Jensen (2010).

¹²⁰Pedersen et al. (2013), Bone and Raihani (2015).

¹²¹Hermann et al. (2008), Rand et al. (2010), Powers et al. (2012).

¹²²Fehr and Gächter (2000), Herrmann et al. (2008), Bowles and Gintis (2011).

¹²³Boehm (1999, 249).

¹²⁴Clutton-Brock and Parker (1995), Frank (1995), Boyd et al. (2003).

non-cooperators.¹²⁵ People take pleasure from punishing norm violations as can be seen in the brain activity associated with punishing defectors.¹²⁶ Nevertheless, humans prefer pool punishment to peer punishment.¹²⁷ Altruistic punishment is of particular importance in large societies of non-related people where kin selection and reciprocal selection perform less well,¹²⁸ but where institutional sanctioning, either in the form of beliefs in moralising Gods¹²⁹ or by secular authorities,¹³⁰ became a major coercive force.¹³¹ Overall, social coercion in the form of altruistic punishment is an important explanatory factor for understanding the evolution of human cooperation and the rationale of ethics.

2.1.2.8 Group Selection

Group selection is an evolutionary mechanism through which natural selection produces differences in reproductive fitness between groups.

In the past decades this type of selection has been the subject of a fairly sharp scientific controversy.¹³² This was probably due to an insufficient distinction between within-group selection, which has rightly been rejected as the explanation for the evolution of altruistic behaviour, and between-group selection that can be a powerful mechanism of selection between groups or populations and lead to the replacement of less successful groups by more successful ones.¹³³ It may also be related to an insufficient distinction between genuine altruistic behaviour that involves a fitness cost for the altruists and selfish cooperative group behaviour that nevertheless benefits all group members.¹³⁴ It is not impossible that the controversy was also partly fuelled by subtle, though often unconscious, differences in ideological views, more particularly concerning the primacy of views about individualism and collectivism.

In 1970, Michael E. Price¹³⁵ showed, with what is now known as the Price Equation, that altruism could spread via covariance between group benefit and the frequency of altruists in the group. Price's Equation is composed of a term that measures the contribution of within-group selection and a term that targets between-group selection by measuring the covariance between a character and its

¹²⁵Richerson and Boyd (1997).

¹²⁶de Quervain et al. (2004), Camerer et al. (2005), Strobel et al. (2011).

¹²⁷Traulsen et al. (2012).

¹²⁸Boyd et al. (2003), Nakamaru and Iwasa (2006), Marlowe et al. (2008).

¹²⁹See also the discussion on 'supernatural punishment' in Chap. 3, Sect. 3.6.1.2.

¹³⁰Yilmaz and Bahçekapili (2016).

¹³¹For instance, Marlowe et al. (2008), Baldassarri and Grossman (2011), Kuemmerli (2011), Isakov and Rand (2012).

¹³²Wynne-Edwards (1962), Williams (1966), Wade (1978), Trivers (1985) Dugatkin and Reeve (1994), Wilson and Sober (1994), Nesse (1994) Sober and Wilson (1998), Borrello (2005), Boyd and Richerson (2007), Corning (2008), Leigh (2010).

¹³³This form of between-group selection (Maynard Smith 1964; Leigh 1983) has been referred to by West et al. (2007) as 'old' group selection and by Molleman et al. (2013) as 'replacement' group selection.

¹³⁴Andre and Morin (2011, 2538).

¹³⁵Price (1970; 1972); see also Hamilton (1975), Frank (1995; 2012), Sober and Wilson (1998), Traulsen et al. (2005).

fitness, thus mathematically formalising the multilevel character of natural selection.

Regarding within-group selection, it is beyond doubt that Darwin's theory of natural selection concerns the individual—or even the gene—level of organisation. Darwin only hypothesised for human morality that selection operates at the population level. Probably, the abuse of the theory of individually oriented selection, that was made in the so-called social-Darwinist discourse,¹³⁶ partly caused the essence of Darwin's theory about the level at which selection operates to fade away somewhat. The idea spread that selection, particularly for the transmission of altruistic behaviour, operates for the good of the community.¹³⁷ However, as an explanatory mechanism for altruism, within-group selection raises a fundamental theoretical problem which was addressed by several leading scholars who initiated what is now called the Second Darwinian Revolution:¹³⁸ genetic mutations producing altruistic, i.e. self-sacrificing, behaviour are out-selected in a population consisting of selfish behaving individuals. Within-group selection based on altruistic behaviour is not an evolutionarily stable strategy, because mutations that promote selfish rather than altruistic behaviour will increase through natural selection.

However, genes for altruistic behaviour can be positively selected through group selection in situations where a population is divided into several subgroups.¹³⁹ An altruistic gene that is being selected against within its group will nevertheless increase in frequency when its group grows more strongly than other groups. This is thanks to the action of the carriers of the altruistic gene displaying behaviours beneficial to their group, for instance due to stronger cooperative actions or moralistic policing of cheats and shirkers.¹⁴⁰ Due to what is called Simpson's paradox,¹⁴¹ the share of group beneficial traits in the total population can increase in frequency. Individual competition within groups and group competition between groups can have opposite effects: selection on the lower level (within groups) favours selfish individuals, whereas selection on the higher level (between groups) favours cooperating individuals.

Several scholars have drawn attention to the possible reinforcing role of social assortment¹⁴² through which cooperative individuals tend to group and act together, thus increasing the likelihood of selection at the group level. In fact, this is

¹³⁶See, for instance, the discussions in Hofstadter (1944), Jones (1980), De Tarde (1984), Tort (1992).

¹³⁷For instance, Hauser (2006, 359).

¹³⁸Hamilton (1964; 1996) Maynard Smith (1964; 1982; 1989), Williams (1966), Price (1970), Trivers (1971; 1985), Maynard Smith and Price (1973), Wilson (1975; 1978), Dawkins (1976), Axelrod and Hamilton (1981), Axelrod (1984; 2001).

¹³⁹Haldane (1932), Wright (1945), Williams (1957), Maynard Smith (1964), Price (1970; 1972), Hamilton (1975); see the discussion in Sober and Wilson (1998, 55–100); see also Bowles and Gintis (2011, 46ff).

¹⁴⁰Boehm (1996; 1999, 205ff).

¹⁴¹Simpson (1951); see also the discussion in Sober and Wilson (1999, 23–26).

¹⁴²For instance, Eshel and Cavalli-Sforza (1982), Wilson and Dugatkin (1997), Wilson and Sober (1999, 135–142), Forber and Smead (2015).

Hamilton's kin selection mechanism, whereby its coefficient of relatedness is replaced by a comparable coefficient for altruistic assortative interaction between nonrelated people.¹⁴³ Also, group selection can occur or be intensified through the differential production of individuals migrating to other groups, a phenomenon that Lucas Molleman et al.¹⁴⁴ called contagion group selection.

The group selection controversy has also been fuelled, because altruistic individual behaviour and selfish cooperative group behaviour—the latter sometimes being called mutualism—have not been sufficiently distinguished. Group selection can also occur through a form of selection which John Maynard Smith¹⁴⁵ called synergistic selection and as the evolutionary model Peter Corning developed as The Synergism Hypothesis.¹⁴⁶ Indeed, selfish functional cooperation between members of a group, independently of their degree of genetic relationship, or their altruistic or reciprocal behaviour, might provide mutual advantages—proximately economic and ultimately reproductive—for the cooperating partners who may become a unit of selection.

Group selection has in all probability been of particular importance in the evolution of the hominins, because they possess a dual inheritance system—genetic and cultural. Dual inheritance theory (DIT)¹⁴⁷ predicts that, due to the nature of cultural inheritance, it may be an important force in the evolution of both genetically based cooperative predispositions and culturally developed moral codes systems favouring cooperative actions, which is an example of biocultural co-evolution.

Indeed, group selection can apply to cultural traits as well as to genetic traits. For cultural traits, the concept of cultural group selection is used.¹⁴⁸ Charles Darwin¹⁴⁹ advanced the idea that cultural factors can operate at the group level, because the Lamarckian transmission of acquired characteristics bypasses the biological inheritance system. J.B.S. Haldane¹⁵⁰ was the first to view the population as a whole as a unit of selection. Also, Ernst Mayr¹⁵¹ argued that human cultural groups, as wholes, could serve as the target of selection. A more elaborated development of this idea is found in the recent work of Robert Boyd and Peter Richerson, David Sloan Wilson and Elliot Sober, Christopher Boehm, Joseph Henrich, and Samuel Bowles and Herbert Gintis.¹⁵² These authors argue that the ultrasocial scale of organisation of the human species requires, in addition to kin selection and

¹⁴³Gintis (2000, 271).

¹⁴⁴Molleman et al. (2013).

¹⁴⁵Maynard Smith (1982; 1984; 1989), Maynard Smith and Szathmáry (1995; 1999).

¹⁴⁶Corning (1983; 1996; 1997; 2005; 2008); see also Corning and Szathmáry (2015).

¹⁴⁷For instance, Cavalli-Sforza and Feldman (1981), Durham (1991), Henrich and McElreath (2007).

¹⁴⁸Campbell (1965), Soltis et al. (1995), Henrich (2004).

¹⁴⁹Darwin (1871, 147).

¹⁵⁰Haldane (1932).

¹⁵¹Mayr (1988).

¹⁵²Boyd and Richerson (1990; 2005; 2007), Richerson and Boyd (1997; 2005), Wilson and Sober (1994), Wilson (1997; 2002), Sober and Wilson (1998), Boehm (1999), Henrich (2004), Bowles and Gintis (2011), Richerson et al. (2016).

reciprocity, cultural selection theories as explanatory models for large human populations with institutions such as moral systems and religions that can be considered as biologically and culturally evolved adaptations, which allow groups to act as singular units rather than as a collection of individuals.¹⁵³ However, cultural group selection may, in turn, elicit the further spreading of prosocial genes by purely within-group selection processes.¹⁵⁴

Indeed, as group size increases, the genetically based predisposition to nepotism or reciprocity may not suffice to further enhance sociality, therefore cultural institutions are required to promote or enforce the application of cooperation in large populations.¹⁵⁵ Herbert Gintis and Dirk Helbing¹⁵⁶ label the need for extra-familial socialisation institutions as support for altruistic forms of prosociality “the fundamental theorem of sociology”.

The evolution of the hominins in the harsh Palaeolithic era¹⁵⁷ in which those vulnerable bipedal and slow maturing creatures succeeded in surviving and evolving, thanks to the development of social life, strongly stimulated the development of altruistic features and decreased within-group competition, resulting in what Samuel Bowles¹⁵⁸ calls reproductive levelling. Christopher Boehm¹⁵⁹ has argued that the shift from hierarchical to relatively egalitarian social relations among early hunter-gatherer bands of anatomically modern humans—or even of *Homo erectus* in the Palaeolithic—strongly favoured the selection of genes for altruism by tilting the balance from within-group selection to between-group selection, thus further supporting the development and spreading of altruistic or cooperative traits, which was a thesis already advanced by J.B.S. Haldane in the 1930s.¹⁶⁰ Oddly enough, this shift intensified inter-group warfare because of the spread of altruistic genes that enhance the capacity for patriotic self-sacrifice; in turn, warfare further supported, via between-group selection, the spread of biological traits and moral codes for altruistic behaviour. Between-group selection supports altruistic genes favouring cooperation, because groups with many cooperators will have a reproductive and demographic advantage over groups with few cooperators.¹⁶¹ Cooperative groups will also be more successful in inter-group conflicts in which reputation, reciprocity, and retribution play such an important role.¹⁶²

In conclusion, at the end of the twentieth century, consideration of group selection re-emerged as an important component of a multilevel theory of evolution,

¹⁵³Wilson (2002).

¹⁵⁴Henrich et al. (2003, 462).

¹⁵⁵Henrich and Boyd (2001, 208), Wilkins and Thurner (2010, 635), Bowles and Gintis (2011, 93ff).

¹⁵⁶Gintis and Helbing (2015, 20).

¹⁵⁷Harms (2000), Baschetti (2007, 243).

¹⁵⁸Bowles (2006).

¹⁵⁹Boehm (1999, 220ff).

¹⁶⁰See also Choi and Bowles (2007), Smirnov et al. (2007), Lehmann and Feldman (2008), Bowles (2009), Ginges and Atran (2011), Gneezy and Fessler (2011), Saaksvuori et al. (2011), Halevy et al. (2012), Konrad and Morath (2012), Rusch (2014).

¹⁶¹Henrich and Boyd (2001, 85), Bowles (2006; 2009).

¹⁶²Boyd and Richerson (2007, 224), Bowles and Gintis (2011, 76).

more particularly for humans.¹⁶³ Natural selection is to be considered as a hierarchical process in which groups, as higher units of the biological hierarchy, are the vehicles of selection for individuals, just as individuals are vehicles of selection for genes.¹⁶⁴

John Teehan¹⁶⁵ refers to the whole of the different evolutionary mechanisms that promote altruistic behaviour and result in intensive social cooperation among genetically related and non-related group members—kin selection, direct and indirect reciprocity, coercion, and cultural group selection—as the human specific moral grammar.

2.1.3 Migration

Genetic migration occurs when a genetically different section of a population leaves a population and joins another population. Genetic migration can occur on a small scale, at the level of individual (mate) exchange, or on a large scale, as a massive population invasion. It can occur as a single, non-recurring population move, or as a continuous gene flow between two or more populations. It can be of a uni- or a bi-directional nature. It can be merely of a deterministic nature, assuming an infinite population size, so that no random elements resulting in drift are included; in contrast, it can also be subject to stochastic forces resulting in complex interactions between migration and drift.¹⁶⁶ Genetic migration may change the genetic make-up of either the sending or the receiving population. Genetic immigration leads to an increased heterozygosity and increased genetic variability within the invaded population, and to a decrease in between-population variance. It lowers the ratio of the variance between populations to the total (between and within) variance.¹⁶⁷

Migration is a mechanism that also can contribute to the geographical spread or social dissemination of cultural traits. An important difference between genetic and cultural migration is that the latter is not limited to the intergenerational transmission from parents to descendants, but can also occur horizontally via non-related persons.¹⁶⁸

2.1.4 Genetic and Cultural Drift

Chance events of a different nature to mutations may also influence the presence or disappearance of biological or cultural characteristics that fulfil a role in the development of moral sentiments, ideas or behaviours.

¹⁶³Borrello (2005), Traulsen and Nowak (2006).

¹⁶⁴Sober (1994), Sober and Wilson (1998), Wilson and Wilson (2007; 2008), Field (2008), Landa and Wilson (2008).

¹⁶⁵Teehan (2010, 41); see also Hauser (2006, 300).

¹⁶⁶For instance, Piazza (1990).

¹⁶⁷Wright (1965).

¹⁶⁸Cavalli-Sforza and Feldman (1981), Mesoudi (2011, 81).

In genetics, a well-known phenomenon is gene drift, also referred to as the *Sewall-Wright-effect*,¹⁶⁹ which can change allele frequencies of monogenes as a result of the accumulation of random fluctuations in the intergenerational transmission of alleles in small populations. The formation of each new generation is, in fact, a sampling process of the gametes available in the gene pool of the population. The smaller the population, the greater is the risk that allele frequencies in the next generation will deviate from those of the preceding one. Therefore this evolutionary mechanism has become less important in modern societies, which are usually composed of many millions of individuals.

In the cultural realm, cultural features can, just like genetic traits, be subject to random fluctuations as a result of sampling phenomena.¹⁷⁰ In the same way as its genetic analogue, cultural drift may have caused intergenerational changes in small populations. Cultural drift may also have occurred as a consequence of demographic catastrophes producing so-called demographic bottlenecks and founder effects, or as a result of migration of small population fractions.

Whereas cultural drift may have been a (minor) source of cultural variability in the past, when reproductive communities were very small and easily subject to random sampling phenomena, it has become irrelevant in huge modern populations.

2.1.5 Partner Choice

So far this chapter has discussed evolutionary factors that influence the genetic or cultural composition of a population, factors that change the relative prevalence of the different genes or memes in a population. In addition to evolutionary mechanisms that change the genetic or cultural composition of a population, there is also a mechanism through which the genetic or cultural structure of a population can be changed, i.e. the way in which genes present in sex cells or memes are combined in offspring through mate choice.

Partner choice may or may not occur at random, meaning that people choose their partner either by chance or on the basis of similarity (= positive assortative mating) or dissimilarity (= negative assortative mating) in some of their characteristics. In positive assortative mating more identical genes will be combined in offspring or identical memes transferred to individuals and the genetic or cultural differences between individuals in the population will increase. In the case of negative assortative mating the opposite occurs.¹⁷¹ A special case of genetic assortative mating concerns the positive or negative choice of blood relatives. A positive assortative mating for blood relatives leads to inbreeding, whereas a negative choice results in outbreeding. Inbreeding is a genetic consequence of biologically consanguineous mating, resulting in offspring with a higher than

¹⁶⁹Wright (1931).

¹⁷⁰Koerper and Stickel (1980), Bentley et al. (2004), Mesoudi (2011, 76).

¹⁷¹For instance, Mascie-Taylor and Boyce (1988).

random risk of carrying a double dose of all the genes that were present in a single dose in the common ancestor.¹⁷²

The type of assortative mating is important for individuals and populations, because it can more or less visualise particular characteristics in the population structure. Indirectly, it can also favourably or unfavourably influence some selective processes and influence the population composition.

In an analogy to the assortative mating for biological characteristics and its effect on the population variance of those characteristics, it can be assumed that this mechanism can also influence the distribution and variance of moral ideas and behaviour. Homogamy is well known to exist for a variety of cultural characteristics—educational level, leisure activities, and especially religious, moral or political convictions.

2.2 Evolutionary Background of Morality

The evolutionary mechanisms through which biological and cultural traits can be transmitted and disseminated have now been explained, it is possible to elaborate on the evolutionary background of biological and cultural phenomena related to values and norms, i.e. ideas about what is and what should be right or wrong.

Values and norms can be expressed through three channels: moral rules, religious rules and laws. The latter are usually developed on the basis of the first two. In this chapter, the discussion is limited to the evolutionary background of morality.

The concept of morality refers to a system of attitudes, standards, and/or behaviour by which humans evaluate certain forms of behaviour as good and other forms of behaviour as bad; morals are usually taken to refer to rules about what people ought to do and what they ought not to do, in particular regarding interpersonal and social relations.¹⁷³

Evolutionists usually address morality as a form of behaviour—behavioural morality—as opposed to abstract morality as it is usually developed by moral philosophers and theologians.¹⁷⁴ To the degree that biological predispositions to moral behaviour (as well as cultural values and norms) are important for the realisation of ontogenetic and/or phylogenetic processes, they are subject to natural selection, and thus will influence the reproductive fitness of individuals,¹⁷⁵ and the social relations between individuals and groups of individuals.¹⁷⁶

¹⁷²For instance, Cavalli-Sforza and Bodmer (1999, 341).

¹⁷³For instance, Irons (1996, 1), Hinde (2002, 3), Krebs (2011, 27).

¹⁷⁴Gintis (2015, 216).

¹⁷⁵Allchin (2009, 599).

¹⁷⁶Krebs (2011, 27).

2.2.1 A Brief Review of Evolutionary Ethics Theory

Evolutionary ethics is the study field that looks at how morality is in one way or another related to the biological evolution of humankind, and consequently to its present biological constitution. It has already a long history and is underpinned by extensive literature.¹⁷⁷

When discussing the relationships between biological evolution and morality, it is important to acknowledge that evolutionary ethics deals with three different issues, namely (1) to what degree do human moral sentiments as biological drives have an evolutionary foundation and, consequently, a genetic and neurological basis; (2) to what degree does biological evolution, via natural selection (or other evolutionary mechanisms), also contribute to the development of moral values and norms embedded in culture; and (3) can moral values and norms in turn change the evolutionary course?

The term evolutionary ethics covers a broad variety of theories and approaches about the relations between biological evolution and moral issues,¹⁷⁸ although some authors limit it to the attempt to derive specific ethical principles from evolutionary theory.¹⁷⁹ Two major approaches are usually distinguished, namely descriptive and prescriptive.¹⁸⁰

The descriptive approach endeavours to explain the evolutionary causal origin and/or functional maintenance of the biological dispositions or capacities for moral behaviour and/or of cultural values and norms, resulting in a biological theory of the ethical systems as the evolutionary product of natural selection or some other evolutionary mechanism.¹⁸¹ This is an approach to evolutionary ethics that Florian Von Schilcher and Neil Tennant identify as evolution of ethics.¹⁸²

The prescriptive (or imperative) approach attempts to derive substantive moral principles or moral guidance from the facts of biology/evolution and to provide a meta-ethical justification for morality on the basis of evolution science. This is in addition to its capacity to explain moral behaviour.¹⁸³ Evolutionary ethics can contribute both to normative or substantive ethics, which deals with what one should do and to metaethics, which examines why one ought to do what.¹⁸⁴ Von Schilcher and Tennant identify this approach as evolutionary ethics *sensu stricto*, namely ethics from evolution.

¹⁷⁷Referencing this extensive literature would take too much space. A broad selection of books and articles, going from Darwin (1871), up to Krebs (2011), Boehm (2012), and Volland (2013) is included in the bibliography at the end of this book.

¹⁷⁸Farber (1998), Teehan (2006).

¹⁷⁹For instance, Schloss (2004, 1).

¹⁸⁰Murphy (1982), Richards (1986), Maienschein and Ruse (1999), Woolcock (1999).

¹⁸¹For instance, Darwin (1871), Alexander (1987), Wright (1994), De Waal (1996), Katz (2000), Levy (2004), Joyce (2006), Krebs (2011), Gibson and Lawson (2015).

¹⁸²Von Schilcher and Tennant (1984, 160); see also Tennant (1983, 290).

¹⁸³For instance, Spencer (1892), Stephen (1882–1907), Keith (1946), Huxley (1957), Cattell (1972), Wilson (1978), Richards (1987), Rachels (1990), Dennett (1995), Mataré (1999), Hinde (2002).

¹⁸⁴Ruse, in Boniolo and De Anna (2006, 13), James (2011, 117).

However, not all of the relevant literature fits exactly into one of those two categories. Many authors develop a discourse of a more general nature, without explicitly taking a position concerning their precise approach. Most acknowledge the importance of knowledge about the evolutionary background of moral innate dispositions and cultural values and norms. They also hold the view that such knowledge about human nature has to be taken seriously when considering how to pursue desirable social or political goals and how to devise or choose between ethical norms. This stand can be observed even among those who categorically reject a prescriptive approach—for whatever reason.¹⁸⁵ Many contributions deal with methodological issues, such as the applicability or otherwise of the naturalistic fallacy.¹⁸⁶ A number of publications compare the evolutionary ethics approach to other, mostly religious, approaches.¹⁸⁷

Another issue related to the implications of evolution science and ethics is refuting beliefs and ideas that contradict the scientific knowledge acquired by evolutionary science or by one of the basic disciplines on which it is based.¹⁸⁸

When consulting and evaluating the older literature on evolutionary ethics from a present-day perspective, one should take into account that the scientific knowledge base in those days was much more limited. For instance, Darwin, Spencer, Haeckel and many others wrote their innovating treatises before the development of Mendelian genetics, population genetics, behavioural genetics and molecular genetics. Furthermore, the meaning of many concepts used might have been somewhat different from their current contents. The language used often mirrored the cultural and ideological context of those times, for instance the word *race* was often used for what is now considered to be the human species. Indeed, scientists, even when they try to approach human and societal phenomena in an ‘objective’, if not an aloof way, may be partially influenced by the cultural climate of their times, the character of their era, with its era-specific features including prejudices as well as achievements. This must have been strongly present in the era of the emerging novel way to look at human phenomena from a scientific point of view. Today it is often still partially the case, because many scientists are still under the spell of traditional religious convictions or are advocates of modern secular ideologies.

Therefore, the authors strive to read the historical ‘classics’ benevolently, taking into account those limitations and trying to assess what constituted the innovative aspects of the evolutionary ethical approach relative to the then dominant religious-philosophical views.

¹⁸⁵For instance, Huxley (1894), Dewey (1898; 1922), Chauchard (1959), Simpson (1964), Kitcher (1985), Hughes (1986), Williams (1988), Knapp (1989), Paridis and Williams (1989), Farber (1994), Campbell (1996), Woodcock (1999), Singer (1999), Ehrlich (2000), Stenmark (2001), Clavien and El Bez (2007), Ayala (2009), Purdom and Lisle (2009), Harris (2010), Illies (2010).

¹⁸⁶For instance, Richards (1986), Ruse (1994), Teehan and DiCarlo (2004), Curry (2006), Walter (2006), Rottschaefer (2007).

¹⁸⁷For instance, Knapp (1989), Williams (1996), Stenmark (2001), Clayton and Schloss (2004), Pope (2007).

¹⁸⁸See Singer (1999, 16).

Paul L. Farber¹⁸⁹ rightly distinguishes roughly three major episodes in the development of evolutionary ethics theory: (1) the Darwinian and Spencerian beginnings of evolutionary ethics as a consequence of Darwin's and Wallace's evolutionary theory of natural selection in the nineteenth century; (2) the new evolutionary ethics following the development of the Neo-Darwinian Evolutionary Synthesis in the 1930–1940s; and (3) the latest revision of the evolutionary ethics theory inspired by the Second Darwinian Revolution in the 1960–1970s.

Regarding the relationship between evolutionary ethics and traditional ethics, Michael Bradie¹⁹⁰ distinguishes three major approaches: (1) evolutionary ethics is a competitor of traditional ethics;¹⁹¹ (2) evolutionary ethics is complementary to traditional ethics;¹⁹² and (3) evolutionary ethics is a successor discipline to traditional ethics.¹⁹³

2.2.1.1 The Is/Ought Question and the Naturalistic Fallacy

As stated in the introductory chapter, this book approaches global morality from a biological evolutionary perspective, well adapted to the opportunities and challenges of the scientifically driven modernisation process. This implies that values and norms will be related, justified, and possibly derived from facts. This immediately raises the eternal philosophical and logical 'Is/Ought' question and the problem of the naturalistic fallacy.

Attempting to define the ultimate goal of value and norm systems in terms of ontogenetic development and phylogenetic evolution implies the rejection of the philosophically unbridgeable transition from fact to value—the notorious 'Is/Ought' controversy—and sinning against David Hume's¹⁹⁴ 'guillotine' which states that one cannot make a normative claim based on facts about the world, or George E. Moore's¹⁹⁵ 'naturalistic fallacy' which states that it is impossible to define what is 'good' in terms of one or more natural properties. Many philosophers and ethicists continue to maintain that a logical transition from fact to value is impossible. Science—the study of what 'is'—would not be able to make inferences about ethics—the prescription of the 'ought'.¹⁹⁶ Moore's thesis about the naturalistic fallacy caused "generations of philosophers to either ignore or ridicule discoveries in the biological sciences".¹⁹⁷

¹⁸⁹Farber (1994, 7).

¹⁹⁰Bradie (1994, 7).

¹⁹¹For instance, Spencer (1879), Huxley (1894).

¹⁹²For instance, Westermarck (1906), Campbell (1979).

¹⁹³For instance, Wilson (1998), Ruse (1999).

¹⁹⁴Hume (1739, 521). NB. Hume's brief discourse on the is-ought relationship is less categorical than is usually reported in the philosophical literature. Hume mainly argued that the is-ought affirmation "should be observed and explained), and at the same time that a reason should be given, for what seems altogether inconceivable, how this new relation can be a deduction from others, which are entirely different from it."

¹⁹⁵Moore (1903).

¹⁹⁶For instance, Sidgwick (1876), Dewey (1898), Moore (1903), Flew (1967), Ruse (1979), Kitcher (1994), Woolcock (1999), Singer (1999, 2002), van der Steen (1999), Elqayam and Evans (2011), Pruss (2013).

¹⁹⁷Hauser (2006, 3).

Opposition to evolutionary ethics, and in particular its prescriptive approach—ethics from evolution—comes not only from philosophical proponents of the naturalistic fallacy but also from opponents of a rational, scientific approach to ethical matters in general, such as most proponents of theological¹⁹⁸ and other speculative-metaphysical ethical theories, and proponents of intuitionist¹⁹⁹ and emotivist²⁰⁰ ethical theories.

Even a number of renowned evolutionists, notwithstanding the fact that they consider evolutionary knowledge of extreme importance for understanding the origin and evolution of values and norms, hold the view that evolutionary knowledge cannot serve as the foundation for a universal ethics, or prescribe desirable moral goals, or determine in which direction values and norms should be modified in the future.²⁰¹

Indeed, a simple transition from facts, and especially from isolated or static facts, to values is not always possible. Facts can often be interpreted in multiple or contradictory ways. For instance, it is not because the human species has experienced during the largest part of its existence phenomena such as disease and hunger that these phenomena must be considered as natural, or as good, and consequently that they ought to be preserved. Indeed, as Garrett Hardin²⁰² stated:

... the past is not a necessary guide to the future.

The natural fallacy has too often been used as a handy instrument to preserve existing abuses, mainly regarding social inequalities and inequities, with the aim of safeguarding the position of privileged groups in society.

Whilst a simple transition from fact to value is not always possible, a total rejection of the ‘Is-Ought’ transition is also not useful or reasonable. Here one risks lapsing into the opposite error, namely to commit the anti-naturalistic fallacy,²⁰³ sometimes called the cultural fallacy,²⁰⁴ or even the philosophical fallacy.²⁰⁵ In this respect the renowned Edward O. Wilson²⁰⁶ pertinently stated:

the naturalistic fallacy is itself a fallacy.

Steven Pinker²⁰⁷ rightly argues that the naturalistic fallacy leads quickly to its converse, the moralistic fallacy, meaning that ‘Ought’ implies ‘Is’, rather than ‘Is’ implies ‘Ought’. Margaret Mead’s²⁰⁸ superficial and prejudiced, though much

¹⁹⁸For instance, Zagzebski (2004).

¹⁹⁹For instance, Audi (2004).

²⁰⁰For instance, Stevenson (1963).

²⁰¹For instance, Wallace (1889), Huxley (1894), Simpson (1949), Dobzhansky (1967), Dawkins (1976), Barash (1977), Alexander (1987, 2005), Miller (1999), Ehrlich (2000), Allchin (2009).

²⁰²Hardin (1977, 115).

²⁰³Casebeer (2003), Walter (2006).

²⁰⁴Petrinovich (1995, 24).

²⁰⁵Baschetti (2007, 4).

²⁰⁶Wilson (1998, 250).

²⁰⁷Pinker (2002, 162); see also Ridley (1996, 257).

²⁰⁸Mead (1928).

admired study of the sexual behaviour of the Samoans²⁰⁹ is a striking example of reverse naturalistic fallacy.

Moreover, if ethics could not be based on facts, what is left for justifying moral principles? Supranatural revelations as described in the traditional organised religions? Intuitive feelings of about what is good? Arbitrarily chosen culturally constructed values and norms? From whatever source ethics derives its values and norms, they are facts—religious, emotional, cultural, but in any case, facts. Consequently, as Robert J. Richards²¹⁰ concludes:

...either the naturalistic fallacy is no fallacy, or no ethical system can be justified.

The authors argue that the mistake made by those who deny the possibility of an ‘Is/Ought’ transition is embedded in the formulation of the problem itself, especially in the understanding of the concept ‘Is’. Applied to life processes, too often this concept is considered to be a static or chaotic situation, whilst the ‘Ought’ is supposed to be dynamic and ordering. However, life is anything but a static or chaotic phenomenon. Life is—intra- as well as intergenerationally—an evolving homeostatic phenomenon, which is very vulnerable to outside conditions.²¹¹ Essentially it is a generic process, not only ontogenetically but also phylogenetically; it is also an ordered, goal-oriented phenomenon.²¹² The realisation of this ordered genesis—onto and phylo—requires an operating system to successfully achieve its completion.

In the human species the ontogenetic and phylogenetic development is no longer completely genetically programmed and does not occur automatically or autonomously. Human life cannot ontogenetically develop itself or evolve phylogenetically when all of the species-specific building blocks—physical, organic and socio-cultural—and the programmes that combine these components into functional structures and processes are not available. The onto- as well as the phylogenetic development of the human requires (in addition to molecular, morphological and physiological building blocks) cultural value and norm systems that need to interfere and mediate where genetic programming no longer suffices to achieve the generic processes. This discourse is in line with the argumentation developed by many present sociobiologists and evolutionary psychologists who turn the naturalistic fallacy on its head: ethical behaviour is a consequence of our genetic heritage resulting from natural selection that adapts us to our environments.²¹³ Indeed, a large part of the living conditions, which are culturally induced for the realisation of ontogenetic and phylogenetic programmes, are determined by the genetic specificity of the human species. Almost all important ethical and ideological challenges turn out to be biosocial challenges as well. As Alex Walter²¹⁴ stated:

²⁰⁹Freeman (1983).

²¹⁰Richards (1986, 286).

²¹¹Cannon (1939).

²¹²See also de Waal (2014, 201).

²¹³Ruse and Wilson (1986, 430, 431), Ayala (2009, 12); see also the discussion on “evolutionary anti-realism” in James (2011, 168ff).

²¹⁴Walter (2006, 34, 35).

We must recognize that while not all natural facts are relevant to ethical or moral discourse, all facts that are relevant to ethical and moral discourse will nonetheless be natural facts.

Hence, the naturalistic fallacy sets no obstacles to the existence of objective moral values.²¹⁵ On the contrary, as John Teehan and Christopher DiCarlo²¹⁶ argue, the naturalistic fallacy is the basis rather than the obstacle to evolutionary ethics. However, this does not mean that, within certain boundaries, no choices have to be made. Moral dilemmas require decisions about what to do.²¹⁷

Since the ontogenetic as well as the phylogenetic development of the human depends partially on socio-cultural living conditions, largely determined by values and norms, as well as by varying environmental living conditions, human ontogeny as well as phylogeny can be subject to some variation. This issue is addressed in Chaps. 5–8, which discuss the possible alternatives in the future ontogenetic and phylogenetic development of the human species and their ethical implications in a further modernising environment. Essential values and norms, resulting from the human-specific biogram,²¹⁸ needed to guarantee the ontogenetic development and phylogenetic evolution. They have to be related, confronted and justified with respect to the specific ecological and socio-cultural environment in which they have to be realised and to which they have to adapt. This choice of the specific ecological and socio-cultural environment in which humankind has to develop and evolve considerably narrows the normative options that can theoretically be conceived.

The authors approach the relation between facts and values, between ‘Is’ and ‘Ought’, from a scientific naturalistic perspective—a typical consequentialist approach—based on the premise that science provides the best available empirical knowledge for understanding and prescribing morality.²¹⁹

As Simon Young²²⁰ stated:

Naturalistic ethics are the only conceivably valid kind, because humanity is a part of nature and thus limited by her laws.

Indeed, since moral codes of vital importance are ultimately the result of the interaction between human nature and the physical and cultural environment in which it evolved or evolves, there is, as Robert Hinde stated, “no need to seek for any other source for oughts.”²²¹ Consequently, the authors are of the view that science, and particularly evolutionary science, must be the primary source for

²¹⁵Curry (2006, 243), Rottschaefer (2007, 397).

²¹⁶Teehan and DiCarlo (2004, 43).

²¹⁷Dewey (1922).

²¹⁸Biogram or biogrammar: the overall genetic determined biological programme of an organism that predisposes it to behave in distinctive ways (Tiger and Fox 1971).

²¹⁹Rottschaefer (1998, 16; 2007, 374), Kurtz and Koepsell (2007), Stenger (2009).

²²⁰Young (2006, 203).

²²¹Hinde (2002, x).

constructing a new, universal ethic.²²² In a recent contribution, Gregory Gorelik and Todd K. Shackelford²²³ advanced the evolutionary awareness concept for such an evolutionarily informed ethical framework.

2.2.1.2 The Darwinian and Spencerian Beginnings of Evolutionary Ethics

The development of evolutionary ethics²²⁴ began shortly after the publication of Charles Darwin's monumental book *On the Origin of Species by Natural Selection*. However, the idea that human nature includes some passions that constitute the basis of human morality could already be found in David Hume's famous *A Treatise of Human Nature*,²²⁵ and may go even back to Greek antiquity with the writings of Plato and Aristotle.²²⁶

Charles Darwin²²⁷ himself and also Alfred R. Wallace²²⁸ elaborated views on the evolution of ethical behaviour. Darwin addressed the evolution of the moral sense in Chaps. 4 and 5 of *The Descent of Man*. Darwin explained how moral predispositions, as evolutionary selected innate traits, could have evolved by the mechanism of natural selection. Although Darwin did not make explicit and systematic attempts to derive substantive moral principles from man's evolutionary past, in many places his book includes evolutionary inspired hints concerning specific ethical norms, for instance on sociality, slavery, and reproductive behaviour.

Herbert Spencer²²⁹ was the first to elaborate a full-fledged theory of ethics based on evolution, although he was more Lamarckist than Darwinist in his approach. His evolutionary views about the struggle for existence and survival of the fittest in society aimed at a socially progressive evolution, based on mutual aid rather than competition. This part of his work is usually shadowed by the fact that his writings have largely been interpreted and used to support a *laissez-faire* socio-economic philosophy.²³⁰

²²²For instance, Loye (1999).

²²³Gorelik and Shackelford (2014, 784).

²²⁴Williams (1893, 2), Ruse (1999), Thompson (1999).

²²⁵Hume (1739, 522ff).

²²⁶See, for instance, Curry (2006).

²²⁷Darwin (1871).

²²⁸Wallace (1900; 1905).

²²⁹Spencer (1862; 1864; 1892).

²³⁰The writings of authors such as Spencer (1851; 1862; 1864; 1879; 1892), Sumner (1883; 1914), and many others have resulted in the so-called Social-Darwinist school of thought in which the principles of Darwinian evolutionary theory were transferred and applied to the analysis of social order and social structure. Social Darwinists attempted to give a naturalistic account of ethical values based on the theory of evolution. The term social Darwinism was first used in the 1880s in Europe—in all probability it was the Gautier (1880) who invented the term and employed it in a pejorative sense to refer to theories that saw social laws as extensions of natural laws (Tort 1992). However, with time, the social Darwinist discourse evolved from what is now considered traditional social Darwinism in the second half of the nineteenth century, in which ideas about individual economic competition were used to justify *laissez-faire* economic policies, to several variants of collective social Darwinism in the early decades of the twentieth century. These included a militarist or imperialist social Darwinism (Fiske 1874; Strong 1885) and a racialist

In the nineteenth century several other scholars elaborated on the relationship between evolutionary theory and ethics.²³¹ Among the most well known was Thomas Huxley²³² who vigorously rejected the idea that evolution could serve as a foundation for ethics. Although a strong advocate of evolution, he was not in favour of an evolutionary ethics:

Cosmic evolution may teach us how the good and the evil tendencies of man may have come about; but, in itself, it is incompetent to furnish any better reason why that we call good is preferable to what we call evil than we had before.... Let us understand, once and for all, that the ethical process of society depends, not on imitating the cosmic process, still less in running away from it, but in combating it.

In contrast, in the nineteenth century the less well known Leslie Stephen²³³ produced the most developed elaboration of the Darwinian position on ethics. Just as Darwin, he believed that the hominisation process was characterised by an overall progress in human moral evolution.²³⁴

In addition, outside the English-speaking world several scholars developed ideas about evolutionary ethics. The sixty submissions to a contest for a prize in Germany in response to the question “*Was lernen wir aus den Prinzipien der Deszendenztheorie für die innerpolitische Entwicklung und Gesetzgebung der Staaten?*”²³⁵ provide an idea about the enormous boost that Darwin’s revolutionary theory gave to the development of ethically oriented biosocial writings.

In nineteenth century Germany, Ernst Haeckel²³⁶ was the most prominent among these scholars.²³⁷ Like Darwin, Haeckel was of the view that the evolutionary process promoted cooperation and interdependency between congeners as an instrument for survival. For Haeckel, the basic unit of evolution is not the individual, but society as a whole. Although Haeckel did not produce a specific publication on evolutionary ethics, several of his works include ideas or even whole

social Darwinism (de Gobineau 1853–1855; Chamberlain 1911) that used natural selection as an argument for the superiority of particular nations or races (cf. Hofstadter 1944; Jones 1980). Given this contentious history, the expression ‘social Darwinism’ can cover different meanings and is consequently often misunderstood, misused and abused. The recent developments in evolutionary theory, more particularly regarding the evolution of social behaviour, prompted Clavien (2015, 730) to state that one should rather speak about *Pro-social Darwinism*.

²³¹For an overview see Williams (1893), who provided not only an overview of the most prominent nineteenth century theoreticians on evolutionary ethics, but also deals with all major concepts and issues in this field, and also discusses a number of practical ethical implications of the application of evolution to ethics, arguing that the traditional ideologies on which moral action was based need replacement with a “newer and higher system... founded on the solid rock of scientific Truth”.

²³²Huxley (1894, 80, 83).

²³³Stephen (1882–1907).

²³⁴See Farber (1994).

²³⁵Schallmayer (1910): “What do we learn from the principles of evolutionary theory about the internal political development and legislation of states?” (authors’ translation).

²³⁶Haeckel (1866; 1868).

²³⁷See, for instance, also Rée (1877) with his interesting ‘*Der Ursprung der moralischen Empfindungen*’ in which he develops ideas that point in the direction of group selection.

chapters about the significance of evolution for morality.²³⁸ Haeckel has in recent years been linked to anti-Semitism and Nazi ideology by Christian conservative authors such as Daniel Gasman²³⁹ and Richard Weikart.²⁴⁰ They chose to ignore that Haeckel praised Jews as being important contributors to the German culture “who have always stood bravely for enlightenment and freedom against the forces of reaction, inexhaustible opponents, as often as needed, against the obscurantists”. They choose to forget that the Nazis outlawed immediately the German Monist League and completely rejected the Haeckelian teachings.²⁴¹

In France at the turn of the twentieth century, Jean-Louis de Lanessan²⁴² wrote an interesting treatise on natural ethics, based on a comparative biological approach and a cross-cultural approach, which he opposed to the beliefs in the traditional (Mediterranean) religions.

2.2.1.3 The New Evolutionary Ethics Following the Development of the Neo-Darwinian Evolutionary Synthesis

The emergence of the Neo-Darwinian evolutionary synthesis in the 1930–1940s²⁴³ gave a second boost to evolutionary ethics with the writings of a broad group of eminent evolutionary scholars.²⁴⁴

Whereas Julian Huxley, Conrad H. Waddington and Raymond Cattell thought that evolution science would allow the derivation of ethical values and norms from the study of evolution, Arthur Keith, Theodosius Dobzhansky and George G.

²³⁸See Heie (2004).

²³⁹Gasman (1998).

²⁴⁰Weikart (2004; 2009).

²⁴¹Christian conservatives, such as Richard Weikart, are eager to link simplistically, erroneously and maliciously evolutionary theory and in particular Darwinism to Nazism and racism, and in particular anti-Semitism. In his recent books “*From Darwin to Hitler*” and “*Hitler’s Ethic: The Nazi Pursuit of Evolutionary Progress*”, Weikart (2004; 2009) examined the supposed links between evolutionary ethics and Nazi ideology. He argues that there are strong similarities between evolutionary ethics and Hitler’s worldview. Of course, Nazi theorists used evolutionary theory, just as they used religious (“Gott mit Uns”) and socialist (“National-Sozialismus”) ideas to support and justify their ethnocentric in-group ideology aimed at obtaining power, resources and territories. What Weikart does not mention is that the evolutionarily inspired eugenics of the Nazis had nothing to do with eugenics: on the contrary, the Nazi so-called ‘Rassenhygiene’ was a dysgenic policy. Also their euthanasia programme had nothing to do with eugenics, let alone with evolutionary ethics; idem for their racial ideology that was absolutely deceptive, because the so-called ‘Arian race’ is not a biological entity. It is understandable that *bona fide* Darwinists are furious about the cheap and misleading—but ideologically (and probably also commercially) interesting—tactic among critics of Darwin’s theory to draw a link to a criminal ideology such as Nazism. Furthermore, Weikart chooses to ignore the roots of Nazi ideology to be found in old time Christian apology, First World War consequences and economic crises (e.g. Richards 2010).

²⁴²De Lanessan (1908).

²⁴³Fisher (1930), Wright (1931), Haldane (1932), Dobzhansky (1937), Huxley (1942), Mayr (1942), Simpson (1944).

²⁴⁴Haldane (1924), Huxley (1927; 1957; 1964), Leake and Romanell (1950), Keith (1946), Waddington (1941; 1960), Dobzhansky (1956; 1962; 1967), Simpson (1949; 1964; 1969), and Cattell (1933; 1944; 1950; 1972).

Simpson acknowledged that evolution was important for understanding the emergence and evolution of morality, but one ought not to look to evolution for its justification. Simpson wrote:

The evolutionary process in itself is nonethical—there simply is no point in considering whether it is good, bad, a mixture of the two, or neither²⁴⁵

Julian S. Huxley,²⁴⁶ one of the main architects of the new evolutionary synthesis, was also one of the main scholars who attempted to derive a foundation of morality from the study of evolution. Rooted in evolutionary science in the same line of thought as Herbert Spencer, Huxley advocated evolutionary progress, allowing increased control over and independence of the environment, as a measure for human action. Huxley²⁴⁷ was well aware of the fact that there is no purpose in evolution, only a direction, a trajectory—the line of evolutionary progress that can serve as a guide in formulating man’s purpose for the future:

If we wish to work towards a purpose for the future of man, we must formulate that purpose ourselves. Purposes in life are made, not found.

Huxley wanted to establish a scientifically based, rational and agnostic evolutionary humanism, as an alternative to the obsolete religious ideologies and the modern ideologies such as Marxism, existentialism and liberalism.²⁴⁸

Another renowned scholar to be mentioned is the psychologist and behavioural geneticist Raymond B. Cattell.²⁴⁹ His remarkable *A New Morality from Science: Beyondism* is one of the very few treatises that deals in great detail and in a concrete way with the foundations and derivations of an evolutionary ethics. Although the authors disagree with one of his major primary moral aims—“the maintenance of an ethos or atmosphere defined as ‘cooperative competition’ among groups”—they consider Cattell’s *Beyondism* as one of the most important and relevant contributions to the elaboration of a scientifically founded evolutionary ethics.

2.2.1.4 The Latest Revision of the Evolutionary Ethics Theory Inspired by the Second Darwinian Revolution

In recent decades a third wave of renewed and explosive interest in matters of evolutionary ethics can be observed.²⁵⁰ It is mainly a result of the Second Darwinian Revolution, as reflected in fields such as sociobiology,²⁵¹ behavioural

²⁴⁵Simpson (1964, 143).

²⁴⁶Huxley (1927; 1957; 1964).

²⁴⁷Huxley (1942, 576); for a discussion of the concept of evolutionary progress, see also Coming (1983), Nitecki (1988), Ruse (1996), Zarandi (2003).

²⁴⁸See Knapp (1989), Farber (1994), Ruse (1999), Phillips (2007).

²⁴⁹Cattell (1933; 1944; 1950; 1972).

²⁵⁰Murphy (1982), Alexander (1987), Nitecki and Nitecki (1993), Bradie (1994), Wright (1994), Petrionovich (1995), Thompson (1995), Ridley (1996), Arnhart (1998), Farber (1998), Maienschein and Ruse (1999), Mataré (1999), Katz (2000), Broom (2004), Joyce (2006), Sinnott-Armstrong (2008), Høgh-Olesen (2010), James (2011), Krebs (2011).

²⁵¹Hamilton (1964; 1996), Trivers (1971; 1985), Ghiselin (1974), Campbell (1975), Wilson (1975; 1978), Dawkins (1976), Alexander (1978), Daly and Wilson (1978), Chagnon and Irons (1979),

ecology,²⁵² and evolutionary psychology,²⁵³ but also in evolutionary anthropology,²⁵⁴ cultural anthropology,²⁵⁵ the evolutionary study of religion,²⁵⁶ neurology and cognitive science,²⁵⁷ molecular genetics and other fields of biomedical research,²⁵⁸ and cosmology.²⁵⁹

The sociobiologist Edward O. Wilson²⁶⁰ has strongly contributed to igniting or reviving the discussion on the reciprocal relationship between evolutionary theory and ethics. His outstanding *Sociobiology: The New Synthesis* gives an overview of the evolutionary-biological mechanisms that lie at the basis of the evolution of social behaviour, illustrated in chapters about all major social species, including the human species. Following partly justified criticisms on his last, brief chapter on the human species, Wilson wrote in a much more nuanced and detailed way about specific human sociobiological issues in his book *On Human Nature*. In his view, the capacity for and drive towards moral behaviour is, just as morphological and physiological characteristics, the result of evolutionary processes, and particularly natural selection. Wilson argues, in particular in *On Human Nature*, that knowledge about evolution and biology in general must serve as a foundation and guide for moral action. His discourse mainly concentrates on the analysis of the evolutionary emergence of morality and some problems humans experience in modernity because of their Pleistocene heritage, on the one hand, and the failures of traditional religious belief systems and modern secular ideologies, on the other hand, to reconcile our genetic heritage with the opportunities and challenges of modernity. Following Spencer's and Huxley's thinking, Wilson argues that evolution is characterised by a progressive development towards increased complexity. Contrary to Raymond Cattell's *Beyondism*, Wilson's works only occasionally include hints about the concrete contents of a future ethics, well adapted to the novel environment of modernity—cf. his cardinal values of the survival of human genes

Cronin (1993), de Waal (1996), Cronk et al. (2000), Nesse (2001), Corning (2005), Bowles and Gintis (2011), Volland (2013).

²⁵²Borgerhoff Mulder and Schacht (2012).

²⁵³Barkow et al. (1992), Wright (1994), Baron-Cohen (1997), Simpson and Kenrick (1997), Buss (1999; 2007), Barrett et al. (2002), Crawford and Salmon (2004), Gangestad and Simpson (2007), Crawford and Krebs (2008), Dunbar and Barrett (2009), Krebs (2011).

²⁵⁴For instance, Durham (1991), Dunbar (2004), Barash (2012).

²⁵⁵For instance, Boehm (1999; 2012), Cronk (1999), Richerson and Boyd (2005).

²⁵⁶Crippen and Machalek (1989), Guthrie (1993), Gauchet (1997), Boyer (2001), Pyysiäinen (2001), Atran (2002), Bruce (2002), Edis (2002), Wilson (2002), Barrett (2004), Broom (2004), Clayton and Schloss (2004), Everitt (2004), Harris (2004; 2010), Baril (2006), Dawkins (2006), Dennett (2007), Bulbulia et al. (2008), Stenger (2008), Volland and Schiefenhövel (2009), Wright (2009), Haught (2010), Pinxten (2010), Teehan (2010), Bellah (2011), Cunningham (2011), Shermer (2011), Stenger (2012).

²⁵⁷For instance, Guthrie (1993), Baron-Cohen (1997), d'Aquili and Newberg (1999), Newberg et al. (2001), Greene (2003), Harris (2004; 2010), McNamara (2006), Gangestad and Simpson (2007), Mendez (2009), Verplaetse et al. (2009).

²⁵⁸For instance, Hughes (2004), Mulhall (2002), Bostrom and Roache (2008), Buchanan (2011), Venter (2013).

²⁵⁹Kauffman (1995), Hawking and Mlodinow (2010), Stenger (2011), Krauss (2012).

²⁶⁰Wilson (1975; 1978; 1998); see also Ruse and Wilson (1985; 1986).

in the form of a common pool over generations, the favouring of diversity in the gene pool, and the promotion of universal human rights.

Wilson's²⁶¹ provocative statement that

the time has come for ethics to be removed temporarily from the hand of the philosophers and biologized

obviously provoked angry territorial reactions from many quarters.

In recent decades, many other renowned scholars from different fields have contributed extensively to the current discourse on evolutionary ethics. Examples are sociobiologist Richard Alexander,²⁶² biologists Francisco J. Ayala²⁶³ and Robert Hinde,²⁶⁴ historian Robert J. Richards,²⁶⁵ evolutionary anthropologist Christopher H. Boehm,²⁶⁶ philosophers Michael Ruse²⁶⁷ and Peter Singer,²⁶⁸ neurologist Joshua D. Greene,²⁶⁹ and evolutionary psychologist Dennis L. Krebs.²⁷⁰ Moreover, the bibliography of the present treatise includes some fifty books and a plurality of journal articles that have been written on evolutionary ethics since 1975.

It will not surprise the reader that, just as in the past, the recent literature on evolutionary ethics continues including many contributions in which the authors, for a variety of reasons (philosophical, cultural, but mainly religious) question or oppose the propositions of the third wave of evolutionary ethics.²⁷¹ For instance, Anthony O'Hear argues in his *Beyond evolution: Human Nature and the Limits of Evolutionary Explanation*²⁷² that evolutionary science cannot explain in a deterministic way every aspect of human nature, in particular its moral sense, because human consciousness has the freedom to make its choices autonomically. He overlooks that human consciousness is also the outcome of the evolutionary process and can be the cause and instrument of further human evolution and moral growth.

The opposition to an evolution-based ethics is part of a more general negative attitude towards evolution science, genetics, and biosocial science in general. Many social scientists, philosophers and ethicists, policy makers, and national or international governmental bodies often deny the importance and relevance of evolutionary biological, and more particular genetic factors that influence or even drive individual or societal processes. In United Nations, European Union or Council of Europe contexts some fundamentally important sociobiological issues or causes of societal challenges are simply not addressed or are concealed. Topics such as

²⁶¹Wilson (1975, 562).

²⁶²Alexander (1979; 1987).

²⁶³Ayala (1987; 1995; 2007; 2009).

²⁶⁴Hinde (1974; 2002).

²⁶⁵Richards (1986; 1987; 1993; 2008).

²⁶⁶Boehm (1996; 1999; 2012).

²⁶⁷Ruse and Wilson (1985), Ruse (1986; 1989; 1996; 1993; 1999).

²⁶⁸Singer (1981; 1984; 1993; 1999; 2002; 2009).

²⁶⁹Greene (2003; 2009).

²⁷⁰Krebs (2011).

²⁷¹For instance, Peters (1999), Woolcock (1999), Pava (2009).

²⁷²O'Hear (1997).

genetic causes of individual or group diversity, biological predispositions to group conflict, high fertility and population growth as a cause of persistent economic and cultural underdevelopment or environmental and climatic disaster, dysgenic effects of medical interventions or demographic trends, and eugenic measures for improving quality of life of future generations are usually considered to be sensitive issues and consequently politically incorrect. Ignoring clusters of such causes relevant at the global level inevitably results in lukewarm effects of fragmented policies.

From the very beginning of the emergence of ideas about the impact of evolutionary theory on the origin and development of morality, evolutionary debunking arguments have arisen, expressing the worry that morality might be discredited because of the finding that moral senses and even moral codes are the result of evolutionary forces. In recent decades, these worries seem even to have increased.²⁷³ For the evolutionary scientist, these worries appear to be highly unjustified, because instead of debunking, the opposite may be expected. The evolutionary basis of morality, together with culturally evolved moral senses and/or moral codes, precisely demonstrates the gigantic importance of morality for human development, survival and evolution.

2.2.1.5 Continuity, Refinement, but Persisting Discordance About Evolutionary Ethics

There is a strong continuity throughout the three waves of the development of evolutionary ethics up to date, both regarding the descriptive/explanatory approach and the prescriptive approach. A gradual increase is observed in the scientific evidence that moral instincts and moral values have a strong, albeit not a unique, evolutionary foundation, as well as in the facts supporting the possibility of deriving values and norms from the study of hominin evolution. There has been a considerable increase in the current scientific knowledge base about human evolution (in particular biocultural co-evolution) and the evolution of social behaviour (with the discoveries of mechanisms such as kin selection and reciprocity selection), genetics (population genetics, behavioural genetics and molecular genetics) and neurology. It forms a very solid scientific background, not only for understanding the biological origin and evolution of innate moral sentiments and cultural values but also for devising norms for future action.

Regarding the descriptive/explanatory approach, there is definitely continuity in the analysis of the origin and development of human morality from Charles Darwin and Ernst Haeckel, then Julian Huxley and C. Waddington, to Edward Wilson, Richard Alexander, Michael Ruse, and Dennis L. Krebs and Christopher Boehm.²⁷⁴

²⁷³For the discussion of evolutionary debunking arguments (EDAs) see, for instance, Kahane (2011) and Millhouse et al. (2015).

²⁷⁴Darwin (1871), Haeckel (1870), Huxley (1957), Waddington (1960), Wilson (1978), Alexander (1987), Ruse (1986; 1999), Krebs (2011), Boehm (2012).

However, in the prescriptive approach there is also a consistency, going from Hebert Spencer and Leslie Stephen, then Julian Huxley and Raymond Cattell, to Edward Wilson, and Robert Richards.²⁷⁵

Notwithstanding the continuity of evolutionary ethics theory throughout its subsequent waves, there are also important shifts in substance and methodology. The most striking is probably the shift from the traditional emphasis of evolutionary ethics as a competitive ethic to the newer approach of a cooperative ethic.²⁷⁶ In this regard, Michael Ruse²⁷⁷ refers to the traditional account as evolutionary ethics and the newer account as Darwinian ethics. The recent change in the contents (and methodology) of evolutionary ethics is largely the result of the explosive development of sociobiology and more particularly of the discovery or reconsideration of evolutionary mechanisms such as kin selection, reciprocity selection and group selection. However, sociobiologically or bioethically related research in scientific fields such as primatology,²⁷⁸ neurology²⁷⁹ and bioeconomic game experiments²⁸⁰ are also contributing. Contrary to Maurizio Meloni,²⁸¹ who perceives the recent developments in all of those fields as a transformation from “a biologization of morality into a moralization of biology”, the authors consider those developments to be a continuous process characterised by an ever further deepening of the insights into the evolutionary foundation of morality.

From the recent literature, it also appears that a lot of effort has been made to clarify the logical and philosophical questions about the naturalistic fallacy.²⁸² In addition, scholars in the domain of evolutionary ethics are much more aware of the complex interactions between biological-evolutionary factors and socio-cultural and ecological living conditions and determinants of values and norms.

However, notwithstanding this continuity and progress, both in the methodology and the descriptive/explanatory and prescriptive approaches, the scientific community continues to remain divided as to whether the study of evolution can only explain the biological origin and evolution of moral innate dispositions and values and rules or can also serve as the scientific basis for reflecting and devising values and norms for the future development and evolution of humankind.

Evolution science continues to provoke uneasiness, if not outright opposition in many quarters where people have difficulties in accepting a non-purposive, non-design approach to key philosophical questions.²⁸³ Some continue to believe

²⁷⁵Spencer (1862, 1892), Stephen (1882–1907), Huxley (1957; 1964), Cattell (1972), Richards (1987).

²⁷⁶Ruse (1989), Mizzoni (2002), Meloni (2013).

²⁷⁷Ruse (1986, 207).

²⁷⁸De Waal (1996, 2006), Kappeler and van Schaik (2007).

²⁷⁹Moll et al. (2003), Gazzaniga (2005), Tancredi (2005), Glannon (2007), Verplaetse et al. (2009), Churchland (2011), Marazziti et al. (2013), Seung (2013), Shoemaker (2012), Alvaro-Gonzalez (2014).

²⁸⁰Maynard Smith (1982), Gintis (2000), Bowles and Gintis (2011), Barash (2012).

²⁸¹Meloni (2013, 85).

²⁸²For instance, Richards (1986), Ruse (1986), Teehan and DiCarlo (2004), Curry (2006), Rottschaefer (2007), de Waal (2014), Kitcher (2014).

²⁸³See discussion in Vannelli (2001, 31).

that morality is essentially a cultural phenomenon and not a biological adaptation as a consequence of natural selection.²⁸⁴ Others argue that moral systems are an adaptation, comparable to essential biological characteristics.²⁸⁵

Paul L. Farber,²⁸⁶ in his analysis of the history of evolutionary ethics, pertinently observes that:

humans read values into nature, rather than discover them there.

Indeed, it is striking that people with very different ideological or political orientations made use of evolutionary theory to support their views and programmes. Contrary to what is often thought that only advocates of conservative or right wing liberalism with its '*laissez-faire*' socio-economic doctrine²⁸⁷ looked for a justification in evolutionary theory, progressives and left-wing advocates such as Marxists²⁸⁸ and feminists²⁸⁹ have also sought to base their revolutionary views on evolution science.²⁹⁰

Finally, looking at the extensive literature on evolutionary ethics that has been produced since Darwin's era, one is struck by the salient contrast between the large number of theoretical and methodological contributions, elaborating on the evolutionary origins and development of moral sentiments and ethical values and norms or how to achieve desirable values and norms, on the one hand, and the limited number of treatises that deal with the concrete implications of evolutionary theory for practical ethical applications on the other hand.²⁹¹ For instance, Raymond Cattell's 'Beyondism' is one of the very few works that includes both a theoretical approach and practical applications.

2.2.2 Biological Bases of Morality: Natural Needs and Drives

David Hume²⁹² already argued in the eighteenth century that moral values are the expressions of natural human drives aiming at the common good of society. Recent progress in evolutionary biology, particularly sociobiology and evolutionary psychology, but also in fields such as neuroscience and evolutionary or economic game experiments, espouses the Humean approach to ethics and philosophy.²⁹³

In the course of the second half of the twentieth century, scholars from different human disciplines have tried to list and classify natural human needs and drives and some have also attempted to derive values and norms from those predispositions.

²⁸⁴For instance, Sahlins (1976), Ayala (2009).

²⁸⁵For instance, Ruse (1995).

²⁸⁶Farber (1994, 9, 85).

²⁸⁷Spencer (1862; 1892), Sumner (1883; 1914), Carnegie (1920), Arnhart (2010).

²⁸⁸For instance, Woltmann (1899).

²⁸⁹For instance, Bebel (1879), Gowaty (1997), Hrdy (1999), Vandermassen (2005).

²⁹⁰See Richards (1986), Farber (1994).

²⁹¹See also Clavien (2015, 731).

²⁹²Hume (1739, 522ff).

²⁹³See Curry (2006), Hauser (2006).

Various sources of information have been or are being used in this venture: cultural anthropological studies about human universals,²⁹⁴ comparative zoological studies,²⁹⁵ bioanthropological, sociobiological and psychological studies,²⁹⁶ as well as studies using or referring to evolutionary science.²⁹⁷

In the authors' view, there are three major biological bases of morality: individual ontogenetic development, sociality, and reproduction; the latter being the basic condition for long-term biological evolution and adaptation.

2.2.2.1 Individual Ontogenetic Development

Most human needs and drives relate initially to the requirements of the individual ontogenetic development: drive for survival in general, thermoregulation, sleep, respiration, need for nutrition, physical safety, health care, family care, social bonding, mobility, resource acquisition, and habitat and territorial security. However, there is also the need for language development, creative and aesthetic pleasure, and—last but not least—intellectual understanding (including spirituality, religiosity and morality). Needs and drives deriving from individual ontogenetic development induced not only the innate sense of having the opportunity for individual self-realisation that includes aspirations such as survival, reproduction, freedom, welfare, well-being, and happiness, but may also result in the desire to implement basic values and norms usually grouped in modern times under the heading of human rights.²⁹⁸ The issue of individual ontogenetic development will be detailed further in Chap. 6.

2.2.2.2 Sociality

These are the human needs for living in groups. The recent advances in sociobiology have greatly enlarged the knowledge of biological needs for sociality: nepotism (altruism toward closest kin); reciprocal altruism between non-relatives; mutualism; in-group favouritism and out-group enmity; male bonding; social dominance and submissive forms of behaviour; egalitarianism; punishment of criminals, cheaters and free-riders. It will not come as a surprise that many scholars consider human supersociality as the primary source of our moral nature.²⁹⁹ The problems of human social relations are discussed further in Chap. 7.

2.2.2.3 Reproduction

Several human needs and drives are related to the process of reproduction, or, ultimately, the intergenerational transmission of genes (and memes): development

²⁹⁴For instance, Murdock (1945), Malinovsky (1960), Parsons (1964), Hockett (1973), Brown (1991).

²⁹⁵For instance, Tiger and Fox (1971), Wilson (1975), de Waal (1996).

²⁹⁶For instance, Montagu (1955), Bowlby (1969), Van den Berghe (1975), Doyal and Gough (1991), Maslow (1954; 1999).

²⁹⁷For instance, Cattell (1972), Wilson (1978), Alexander (1987), Arnhart (1998), Corning (2000; 2010; 2011), Bowles and Gintis (2011), Krebs (2011).

²⁹⁸Krebs (2011, 209, 210).

²⁹⁹For instance, Fowers (2015, 4).

of sexual identity; sexual mating; love; female choice; male-male competition; sexual jealousy; incest avoidance; childbearing, childcare and education. Some of the needs and drives listed above under ontogenetic development and group relations are also relevant for intergenerational processes, e.g. practically everything that appertains to social behaviour and particularly social status/hierarchy seeking, and resource and territorial acquisition. The challenges related to intergenerational replacement are further addressed in Chap. 8.

2.2.2.4 Competition Between Natural Needs and Drives

The natural needs and drives of humans not only allow the identification of basic values and norms in order to allow for a harmonious ontogenetic and phylogenetic development, but they can also be the source of serious and difficult moral controversies. In the first place, this is because some needs may be in competition or conflict with other needs; and in the second place, because some needs of some individuals or groups may be in competition with some needs of other individuals or groups. Moreover, since individuals may show variation in the degree of their needs and drives, some individuals may experience needs, drives and desires which are detrimental to the harmonious development of other individuals or even whole societies, e.g. the desire to cheat, steal, dominate, pester, torture, rape, enslave, or kill conspecifics. Finally, in many circumstances, particularly in times of scarcity of resources or territories, or in situations of strong social inequities, intra- as well as intergenerational needs may raise feelings such as jealousy, envy, spite, disgust, hate, anger, rage, grudge, revenge, or aggressivity leading to all kinds of (social) competition and even to social strife and revolution, if not war.

In conclusion, contrary to the view of those scholars that science, and in particular evolutionary science, cannot assign either meaning or purpose to the world it explores,³⁰⁰ the authors are of the opinion that evolution explains not only our biology, but can tell us a lot about what is good, right, or moral—providing that a comprehensive view is adopted, taking into account all relevant biological knowledge, and that this knowledge is considered in the context of the cultural opportunities modernity offers and the ecological constraints our planet imposes.

2.2.3 Evolutionary Causes of Human Morality

As already mentioned, human morality includes two different but interrelated phenomena:

- (1) The biological (neurological) basis of innate moral sentiments and the capacity for reasoning, also in the domain of morality, ultimately determined by genes;
- (2) The cultural values and norms (ethical codes), resulting from cultural creative processes and social learning and internalisation, but ultimately influenced or

³⁰⁰See, for instance, Miller (1999, 280), Wade (2009, 5).

driven by innate moral sentiments on the one hand, and the capacity for moral reasoning and judging on the other hand.

When discussing the evolutionary causes of human morality, both components of morality—the neurological basis (the genes) and the cultural codes (the memes) and their interactions—have to be considered, because both are subject to the same evolutionary mechanisms, namely mutation (genetic mutations of genes/cultural changes of memes), selection (natural selection of particular alleles/cultural selection of particular memes), chance fluctuations ('drift') (genetic drift of alleles/cultural drift of memes), migration (gene flow/cultural dispersion of memes).³⁰¹ (See Sect. 2.1).

The essential proposition here is that human morality (in both of its components) is the result and—as will be argued below—partly the cause of the hominisation process. Whether human morality is a direct biological adaptation to the hominisation process³⁰² or merely an exaptation (namely an indirect consequence of man's specific intellectual abilities)³⁰³ does not really matter. Direct adaptation or indirect exaptation is considered by many to be plausible for the explanation of the existence of a neurological basis of human moral sentiments. However, at first sight adaptation or exaptation may be less evident for the origin of values and norms that are traditionally believed to be the product of culture and disassociated from biological evolution. Of course, values and norms are cultural products and there is a considerable diversity in values and norms between cultures and within cultures. By stating that values and norms are a biological adaptation (or exaptation) the authors mean that they are phenomena deriving from certain biological needs, but whose actual content can vary within a certain range, in interaction with socio-cultural and environmental living conditions. Successful value and norm systems fulfilled for the socialising hominins the same survival functions as their somatic organ systems. Without those guiding and control systems, ontogenetic development—as well as further phylogenetic evolution of the socially dependent, large brain-steered hominins—was impossible. Among such organisms behaviour is no longer exclusively genetically programmed, but consequently requires cultural intervention to guarantee survival and further evolution.

The question is now which biological changes in the course of the hominisation process caused the development of human morality, both of innate moral sentiments and of cultural value and norm systems? Three, though mutually interrelated, biological-evolutionary changes, are distinguishable:

- (1) The shift from instinctive to conscious behaviour in hominin evolution;
- (2) The increasing prematurity of hominin offspring during the hominisation process;
- (3) The development of human sociality beyond the stage of the family.

³⁰¹For instance, Cavalli-Sforza and Feldman (1981), Lumsden and Wilson (1981), Boyd and Richerson (1985), Durham (1991), McKenzie Alexander (2007), Baumard (2016).

³⁰²For instance, Wilson (1978).

³⁰³For instance, Prinz (2008, 368), Ayala (2009; 2010, 9019).

All three of those biological-evolutionary changes during the hominisation process involve both the Darwinian evolution of biological entities (genes, neurons, hormones) and the combined Darwinian/Lamarckian change of cultural features (including values and norms), both of which merged in a biocultural co-evolutionary integration.

2.2.3.1 The Shift from Instinctive to Conscious Behaviour

The evolution of the hominins, starting from a pre-hominin primate, over a series of successive hominin waves, to the present *Homo sapiens sapiens* was not only characterised by the development of a bipedal gait, but mainly by the increase of the large brain hemispheres. This resulted in a gradual shift from a predominantly automatically programmed instinctual behaviour toward a predominantly conscious control of behaviour.³⁰⁴ The shift was characterised by an increasingly incomplete genetic programming of behaviour, necessitating an ever increasing degree of learned behaviour. In turn, this required the development of more complex forms of social organisation whereby cooperation and task division increased in importance and transcended the boundaries of close blood relationship. Such social behaviour requires the development of cultural regulatory systems, namely value and norm systems, in order to efficiently direct the ontogenetic development of the human. The increasingly more complex sociality of successive hominins was itself a major factor in the selective pressures for higher brain capacities—probably the most important case of biosocial co-evolutionary interaction.

2.2.3.2 The Increasing Prematurity of Hominin New-Borns and Enduring Dependency of Infants and Juveniles

The hominin brain growth with its shift from instinctive towards conscious control of behaviour during the hominisation process was associated with a prolongation of almost all life course phases—infancy, adolescence, adulthood, and old age. The only exception in this prolongation trend concerns the duration of human pregnancy. Compared to the duration of the great apes, the human pregnancy should last 21 months. In order to allow the big-brained human new-born to pass through the female pelvis at birth,³⁰⁵ and to keep the foetal metabolic demands in balance with the mother's metabolic capacity,³⁰⁶ evolution's adaptive strategy consisted, among others, of the premature birth of the human new-born. Hence, the human postnatal growth and development during infancy and adolescence became much more strongly dependent upon socio-cultural values, norms and structures for childcare. Moreover, the sociobiological prolonged infantile and juvenile dependency of the human child and adolescent increased and prolonged as human culture and society became more complex. Since humans are born so helpless, and infants and juveniles are dependent for so long, it takes many years of intensive learning and socialisation for the individual to independently survive, grow, and become a

³⁰⁴Jerison (1973).

³⁰⁵Portman (1944), Leutenegger (1982).

³⁰⁶Dunsworth et al. (2012).

functional member of a group. Even the motivation to learn and socialise must be stimulated by means of value and norm systems. The individual no longer knows instinctively what and how to teach his/her offspring in many domains that are important for survival. In modern culture, with its extensive educational requirements and rising standards for social and cultural performance, the care and oversight of infants, adolescents and even young adults transcends by far the role of parents and other kin and involves many more non-related adults. This brings us to the next crucial biological change in the hominisation process.

2.2.3.3 The Development of Human Sociality Extending Beyond the Family

The primary social bond in humans consists of the mother-child bond.³⁰⁷ In the course of the hominisation process, with its increasing needs for raising large-brained offspring, more enduring relations between mating partners/parents emerged, extending the mother-child bond to the nuclear family unit. Also, broader kinship relations had a supporting effect on childcare and survival. Family and more general kinship relations were biosocial structures that emerged in response to the two specific characteristics of the human brain, mentioned above.³⁰⁸

However, human sociality largely transcends the family/kinship level, by forming groups of people including less closely related or even non-related individuals, resulting in larger population units such as tribes and nations. Those larger population units fulfil many more biosocial functions, not only in regulating the relations between group members but also in securing and/or expanding resource and territory acquisitions, particularly in defending against or competing with other population units.³⁰⁹ Ultimately, these larger population units, including more distantly related individuals, also increased the survival and development opportunities of descendants—the intergenerational transmission of genes (and memes) of group members.³¹⁰ Human sociality is one of the most specific singularities in the hominisation process.³¹¹

The development of more complex biosocial units, such as enduring couples, larger kinship groups, and population units including less closely related individuals, in which prosocial predispositions, cooperation and division of labour, also between the sexes, increased in importance and transcended close kinship bonds, induced the selection and acquisition of innate moral sentiments that facilitate such behaviour, as well as the development of moral reasoning leading to abstract ideas about morality. Both the innate moral sentiments and the capacity for moral reasoning resulted in the establishment of moral rules that culturally regulate the social relations not only within but also between groups.³¹²

³⁰⁷For instance, Rossi and Rossi (1990).

³⁰⁸Van den Berghe (1979), Filsinger (1988), Salmon and Shackleford (2007).

³⁰⁹Alexander (1979; 1987), Diamond (1997; 2005).

³¹⁰Sanderson (2001), Wilson (2012).

³¹¹Wilson (2012, 45).

³¹²For a detailed discussion of the role of moral intuitions and moral reasoning in human evolution, see Chaps. 16 (203ff) and 17 (217ff) in Krebs (2011); see also Wilson (1993), Hauser (2006), Bowles and Gintis (2011), Boehm (2012).

Innate moral intuitions as well as rationally designed social value and norm systems not only need to be able to control, or keep within reasonable limits, selfish-oriented biological drives, such as dominance, aggressiveness, laziness, avarice, envy, pride, lust, greed, cheat, cowardliness, rage and anger, spite and revenge,³¹³ but also to foster cooperative and other socially important attributes, such as altruism, reciprocity and mutualism, generosity, compassion, equality, fairness, honesty, and deference.³¹⁴ Research on very young children shows that prosocial inclinations and preferences are intuitive and widespread, occurring in the form of helping behaviour, sensitivity to fairness, indirect reciprocity and cooperative interaction.³¹⁵ Also, studies on adults show that social cooperation occurs on an intuitive basis and is perceived as emotionally rewarding.³¹⁶ Comparative studies across the primate order show that human prosocial sentiments have a solid evolutionary foundation.³¹⁷

Biological control systems had to be complemented by socio-cultural ordering systems in the big-brained hominins. Group hunting, defence against or attacking other human groups required a totally different balance between competitive and cooperative drives and actions than a solitary way of life. Whereas morality is largely irrelevant to solitary organisms, it is a *conditio sine qua non* for developing and sustaining social life and becomes more complex as the size of the population increases.³¹⁸

Human morality, grounded in moral intuitive emotions and in the capacity for moral reasoning, became an evolutionarily advantageous and indispensable instrument for the survival and the successful propagation of the large-brained, long-maturing, strongly socialised hominins living in groups, which were at a high risk of extinction due to frequently occurring severe environmental crises and belligerently competing with other groups.

As Dennis L. Krebs³¹⁹ concluded in his magnificent *The Origins of Morality—An Evolutionary Account*:

The function of conceptions of morality is to induce individuals to uphold the social orders of their groups by constraining their selfish urges and biases, upholding relationships, promoting group harmony, resolving conflicts of interest in effective ways, dealing effectively with those who violate the rules, and fostering their interests in ways that, if everyone adopted them, would produce a better life for all.

³¹³Campbell (1975), Wilson (1993, 12), Krebs (2011, 92).

³¹⁴Krebs (2011, 201ff).

³¹⁵For instance, Warneken and Tomasello (2006; 2007; 2013), Hamlin et al. (2011), Schmidt and Sommerville (2011), Hepach et al. (2012), House et al. (2012; 2013), Kato-Shimizu et al. (2013), Sebastian-Enesco et al. (2013), Cortes Barragan and Dweck (2014), Kuhlmeier et al. (2014).

³¹⁶For instance, Rand et al. (2012), Aknin et al. (2013), Zaki and Mitchell (2013), Keltner et al. (2014).

³¹⁷For instance, de Waal (1996), Silk and House (2011), Grueter et al. (2012).

³¹⁸Rossano (2010, 174ff), Wilson (1993, 2).

³¹⁹Krebs (2011, 27).

2.2.4 Major Stages in the Evolution and Historical Development of Morality and Content of Moral Systems

Paraphrasing Theodosius Dobzhansky's well-known catchphrase '*Nothing in biology makes sense except in the light of evolution*',³²⁰ Joshua M. Tybur pertinently noted that '*Nothing in morality makes sense except in the light of evolution*'.³²¹

Indeed, in recent decades, particularly since the emergence of the Second Darwinian Revolution—with its discovery of evolutionary mechanisms such as kin selection, reciprocity selection, coercive selection, group selection, and gene-culture co-evolutionary processes—a considerable body of research consisting of theoretical analyses (including mathematically modelled evolutionary studies, empirical investigations, and evolutionary game experiments) has enormously enlarged our understanding of the origin and evolution of phenomena such as altruism, cooperation, sociality, and morality.

Also, in recent years there has been an ongoing interest in evolutionary ethics as can be witnessed from the continuing flow of scientific books and articles about the origin and evolution of morality.³²²

In this discourse about the major stages in the evolution and historical development of morality the following issues are addressed:

- (1) The major evolutionary changes in the dispositions of moral behaviour;
- (2) The major stages in the historical development of morality;
- (3) The temporal changes in the contents of moral systems.

2.2.4.1 The Major Evolutionary Changes in the Dispositions of Moral Senses, Moral Learning and Moral Reasoning

The concept of morality is usually defined as views and/or behaviour by which humans evaluate certain forms of behaviour as good and other forms of behaviour as bad, in particular regarding interpersonal and social relations. However, in order to consider the evolutionary antecedents and the evolutionary trajectory of human moral sentiments and behaviour, the concept of morality needs to be understood in a somewhat broader sense. It has to include precursor forms of social behaviours out of which typical human moral behaviour evolved.

As is well known, people have very different views of how morality emerged in the evolution and history of humankind. Religious people usually believe that morality is absolute, has a divine origin and is imposed by the supernatural power

³²⁰Dobzhansky (1973, 125).

³²¹Tybur (2012, 35); see also Richerson and Boyd (2005, 237).

³²²For instance, Ayala (2010), Cartwright (2010), Komter (2010), Manner and Gowdy (2010), Bowles and Gintis (2011), Brosnan (2011), Krebs (2011), Sussman and Cloninger (2011), Boehm (2012), Gaitan Torres (2012), Gamble et al. (2014), Gintis (2014), Hodgson (2014), Kitcher (2014).

(s) in which they believe.³²³ They often feel offended by the idea that human morality might have evolved from a so-called ‘monkey morality’.³²⁴ In contrast, most scientists think that morality emerged and evolved as a consequence of the interaction of biological needs, ecological constraints and socio-cultural living conditions. However, the scientific community is still quite divided about the relative share and interactions of biological and cultural factors in the development of moral principles. Bio-anthropologists, sociobiologists, and evolutionary psychologists and other students of evolution,³²⁵ as well as social scientists and philosophers, who have a good knowledge of evolution science,³²⁶ usually take a comprehensive view on the origin and evolution of morality. They acknowledge the biological origin and predispositions of moral sentiments and the capacity for moral reasoning, albeit being fully aware of the normative variability that can be produced by diverse ecological and socio-cultural living conditions. In the light of scientific knowledge there is no more room for a simplistic ‘moral nativism’.³²⁷

Behavioural research on various groups of mammals, and in particular primates, shows that many of the emotional sentiments and cognitive abilities that are foundational for developing human morality, precede the hominisation process. Human morality is grounded in our mammalian prehistory, particularly the mother-child bond. However, in many group living non-human primates, many more innate dispositions for ‘norm-related characteristics’, such as attachment and bonding, cooperation and mutual aid, sympathy and empathy, direct and indirect reciprocity, altruism and reciprocal altruism, righteousness, fairness, consolation, conflict anticipation, conflict resolution and peace-making, deception and deception detection, cheating and free-riding curbing, and group loyalty community concern are already present to a certain extent. This occurs within groups due to tensions between individual interests and collective interests, or between groups in order to manage or master intergroup conflicts.³²⁸

In the course of the hominisation process, the strongly increasing need for prosocial forms of behaviour induced selective processes. Through these processes the development of moral sentiments and the capacity for moral learning and reasoning became embedded in the human genome and made our brain function accordingly. In addition

³²³For instance, Haught (2000).

³²⁴For instance, Koukl (2012). There are, obviously, other objections to the facts or views that morality is grounded in our biology; in particular, objections against the supposed deterministic, and hence unalterable, nature of evolutionary biological factors, or the misapprehension that the involvement of evolutionary biological factors in moral behaviour implies that moral principles must be genetically encoded. For a discussion of these fallacies, see, for instance, Hauser (2006, 420).

³²⁵For instance, Darwin (1871), Westermarck (1906), Keith (1946), Waddington (1960), Cattell (1972), Campbell (1975), Alexander (1987), Wright (1994), Katz (2000), Hinde (2002), Hauser (2006), Joyce (2006), Sinnott-Armstrong (2008), James (2011), Krebs (2011), Boehm (2012).

³²⁶For instance, Singer (1981), Richards (1987), Maienschein and Ruse (1999), Richerson and Boyd (2005), Verplaetse (2009).

³²⁷See, for instance, the discussion on moral nativism by Jesse Prinz, Susan Swyer, and Valerie Tiberius in Sinnott-Armstrong (2008, 367–439).

³²⁸De Waal (1996, 2006), Flack and de Waal (2000), Joyce (2006), Verbeek (2006), Bekoff and Pierce (2009), Silk et al. (2013), Van Schaik (2016).

to the basic emotions—pleasure, surprise, pain, fear, disgust, anger—the hominisation process (with its increasingly strong development of prosocial forms of behaviour) evoked specific social emotions such as love, pride, embarrassment, guilt, shame, envy, and jealousy.³²⁹ Moral behaviour had a positive effect on reproductive fitness, because human groups with many altruists were more successful in dealing with the challenges of survival, adaptation, well-being, and competition with other human groups. Such group successes could even compensate for the fitness losses of altruistic individuals.³³⁰ Moreover, biological and cultural selective processes induced people to cooperate not only for self-interests and the well-being of others, but even for promoting social values and norms for their own sake.³³¹

Christopher Boehm³³² developed a theory in his recent book *Moral Origins—The Evolution of Virtue, Altruism and Shame* that the evolutionary origin of morality lies in the gradual development of a self-regulating conscience—the aptitude, faculty, intuition or judgment in distinguishing right from wrong. In his view, conscience evolution began with the social control or even suppression of alpha males, free-riders, cheaters and other socially deviant individuals, resulting in the social selection of genes that enabled people to internalise their group's moral rules, ultimately leading to more egalitarian, cooperative and altruistic group relations. Boehm situates this egalitarian revolution around 250,000 years ago, with the emergence of large game group hunting and meat sharing³³³ among archaic types of *Homo sapiens*, a period in hominin evolution that lies close to the appearance of anatomically modern humans some 200,000 to 300,000 years ago.³³⁴

In another recent book, *The Origin of Morality*, Dennis L. Krebs³³⁵ discusses the evolution of four primitive prosocial dispositions—deference, self-control, altruism and cooperation—as essential precursors to the development of the human moral senses and the capacity for moral learning and reasoning. In addition, he elaborates on the evolution of the uniquely human prosocial dispositions—deference to abstract ideas and distant rulers; suppression of selfish and aggressive urges; development of complex, indirect and equitable forms of cooperation; egalitarianism; strong reciprocity and indirect reciprocity; development of in-group favouritism ('tribal instincts').

The concept of moral sense goes back to Lord Shaftesbury who, in his *Characteristics of Men, Manners, Opinions, Times* of 1711, considered it as the origin of our moral ideas.³³⁶ However, this concept has acquired or is commonly being used in a more specific meaning, namely as the innate ability to discern between good and evil, between right and wrong.³³⁷

³²⁹Bowles and Gintis (2011, 186ff).

³³⁰Gintis et al. (2008).

³³¹Bowles and Gintis (2011, 1).

³³²Boehm (2012, 315–341).

³³³See also the 'egalitarian meat-sharing hypothesis' of Mameli (2013, 922).

³³⁴White et al. (2003), McDougall et al. (2005), Hublin et al. (2017).

³³⁵Krebs (2011, 75–142, 163–186); see also Wilson (1993, 29–120).

³³⁶Shaftesbury (1711).

³³⁷For instance, Broom (2004, XIII), Wright (2004, 328), Dawkins (2006, 214), Hauser (2006, 36), Krebs (2011, 9).

Currently, most scholars use the umbrella of the moral sense concept to distinguish a broad range of moral predispositions. For instance, in addition to the above mentioned primitive and uniquely human prosocial dispositions, Dennis L. Krebs³³⁸ distinguishes specific moral senses which he considers to be associated with the welfare of other individuals and groups and evoked by moral norms, namely conscience, moral sentiments about others (empathy), the sense of rights (self-control), the sense of moral obligation (duty), and the sense of justice (fairness).

It is needless to elaborate on the well-known fact that the strong increase in brain size and complexity during the hominisation process equipped humankind with a considerably enlarged capacity for learning; in particular for developing social and moral behaviour, not only through teaching but also through the processes of approval and disapproval, rewarding, and punishment.³³⁹

Finally, there is the salient human capacity of reasoning that allows for the development of conscious moral judgment and decision-making.³⁴⁰ This is also the result of the selective processes that occurred in the course of the evolution of the hominins to solve adaptive problems. Moral reasoning is a topic that raises, in scientific quarters as well as among lay people, much less discord than the issue of innate moral sentiments.

2.2.4.2 Major Stages in the Historical Development of Morality

Several scholars have distinguished and classified hierarchically the successive stages of the biocultural evolution of morality that shows phylogenetically as well as culturally a gradual increase and progressive complexity.³⁴¹

For instance, Gregory Peterson³⁴² distinguishes three stages in the evolving morality: (1) ‘quasi-morality’ in animals whereby genetically programmed instinctual drives enable organisms to influence the well-being of one another; (2) ‘proto-morality’ among social mammals, and in particular primates, whereby “animals begin to be able to rationally deliberate actions and their consequences, based on the acquisition of a variety of cognitive skills, including enhanced memory and planning abilities, the ability to map social relations and social hierarchies, some awareness of how one’s actions affect others, and the ability to form goals and roughly weigh pains and pleasures”; and (3) ‘genuine morality’ requiring mental capabilities beyond those needed for proto-morality, namely enabling abstraction and symbolic expression, and resulting in being disposed to develop moral sentiments and the capacity for moral learning and reasoning.

As a result of reading and interpreting the literature on the evolution of morality among the hominins, the authors would propose a following classification, roughly distinguishing three major stages in the evolution of morality: (1) a biosocial stage; (2) a cultural-religious stage; and (3) a cultural-scientific stage.

³³⁸Krebs (2011, 206–212).

³³⁹Crittenden (1992), May and Clark (1996).

³⁴⁰Krebs (2011, 217–232).

³⁴¹Shermer (2004, 26ff).

³⁴²Peterson (2000, 472–476).

The first one—the biosocial stage—concerns the very slow and gradual shift from a biologically based proto-morality of non-human primates in which social sentiments were developed, as listed above, to the biosocially based morality of the hominins in which emotional personality features further evolved and cognitive capabilities were increasingly engaged in moral judgment.³⁴³ This process took many thousands of generations during which the successive waves of hominins gradually succeeded in largely controlling and inhibiting their innate wanton drives. Philip Kitcher³⁴⁴ is probably correct in hypothesising that this evolution was linked to the evolution of our linguistic capacity that facilitated conversation and negotiation. The evolving hominin morality was characterised, among others, by changes in social relations from predominantly biologically determined dominance hierarchies to relatively more socially controlled egalitarian relations—the dominance of individuals being superseded by the dominance of the group, as Christopher Boehm puts it.³⁴⁵

The second stage—the cultural-religious stage—is a relatively recent stage that occurred some 8000–10,000 years ago, when human societies shifted from tribes to chiefdoms and then to states in the agrarian era. Organised religions started to gradually incorporate moral ideas and behaviours into divinely sanctioned moral values and norms systems.³⁴⁶ In the course of the agrarian era, with its increased means of subsistence and larger population sizes, the moral systems founded on religion were characterised by the re-establishment of stronger, but this time largely culturally and economically based, dominance hierarchies. This resulted in strongly increased social inequalities between different groups of people—men versus women, masters versus slaves, higher versus lower social classes, dominating versus subjugated populations.³⁴⁷ The satisfaction of innate egalitarian drives was, in a shrewd way, ideologically largely transferred to a heavenly and more righteous hereafter.³⁴⁸

In the third stage—the cultural-scientific stage—emerging in the wake of the scientific revolution and its associated Enlightenment, morality very gradually started to be more strongly influenced by scientific insights. The scientifically based stage is mainly characterised by two seemingly opposite features: (1) the extension of moral concerns to the self-actualisation of each individual—moral individualism; and (2) the extension of morality to the complete human species, and even to the biosphere and its planetary basis as a whole—moral universalism.³⁴⁹ This third stage is still in a very early phase of development, with values and norms again changing to more egalitarian standards, transcending the population genetic, ethnic or ideological in-group borders, and enlarging moral concerns to the biosphere and the ecology of the globe.³⁵⁰

³⁴³See, for instance, Bouchard and Loehlin (2001), Greene (2003, 847), de Waal (2007), Previc (2009), Boehm (2012), Tomasello (2016).

³⁴⁴Kitcher (2006, 136).

³⁴⁵Boehm (1999; 2012).

³⁴⁶Knauff (2000).

³⁴⁷Lenski (1984), Maynard Smith et al. (2010).

³⁴⁸Talbott (2015, 702).

³⁴⁹Darwin (1871, 147), Wilson (1993, 191ff).

³⁵⁰See also Singer (1981), Wilson (1993, 191ff).

Given this early stage of development of the present scientifically grounded moral era, it is understandable that its main features—moral individualism and moral universalism—are opposed and combated by conservative religious groups and institutions. Moral individualism and moral universalism are also parasitised by several regressive maladaptive behavioural trends such as increased moral relativism, minimised self-control, weakened moral teaching and learning, decreasing personalised social responsibility and duty, increased free-riding.³⁵¹ However, these epiphenomena should not derail the pathways to the establishment of a better-adapted moral balance addressing a broad variety of needs and drives at individual, group, national, international and planetary levels. The technical and technological modernisation is occurring at such a high speed that a comprehensive moral adaptation to the novel environment of modernity is urgent in order to avoid pending human-made disasters. However, moral adaptation has up-to-date been a slow process.

As argued above, several basic evolutionary mechanisms, such as mutation, natural selection, sexual selection, kin selection, reciprocal selection, coercive selection, and group selection, as well as cultural selection and biocultural co-evolution, have contributed to shaping the emotional and cognitive attributes that made humans sensitive to and receptive for the components of human morality that are universally present in human populations. They have also contributed to shaping many life- and reproduction-sustaining moral codes universally present in successful cultures.³⁵²

Evolutionary scholars have developed empirically well-documented and plausible theories about the mechanisms and scenarios concerning the biological evolution of moral sentiments and capabilities for moral learning and reasoning during the long-lasting hunter-gatherer stage of hominin evolution. However, it is not yet evidenced whether the agrarian/pastoral stage of cultural evolution has also influenced—and whether the scientific stage is currently influencing—the human genetic make-up related to moral predispositions. Whilst there is evidence for many physical and mental traits during the on-going biological evolution in the agrarian/pastoral and industrial stages of cultural evolution, it can only be hypothesised that the same process applies to neurological and/or hormonal characteristics that are related to moral sentiments. In this area, it is unlikely that really important genetic changes have already occurred, because of the relatively short duration of these cultural stages, the multifactorial nature of the genetic determinants of moral sentiments and cognitive capacities, and above all, the relatively small behavioural changes between the late Pleistocene, the agrarian/pastoral and the early industrial cultural eras.³⁵³ One can argue that the currently emerging moral stage in human evolution and history, based on scientific insights in the evolutionary process, might in the future have more substantial impacts. This is based on a premise that the direction of changes of the modern social, cultural and

³⁵¹See also Wilson (1993, 246ff).

³⁵²See, for instance, Huxley (1957), Cattell (1972), Alexander (1987), Cela-Conde (1987), Katz (2000), Hinde (2002), Broom (2004), Richerson and Boyd (2005), Lindsay (2008), Sinnott-Armstrong (2008), Cartwright (2010), Teehan (2010), Krebs (2011).

³⁵³Wilson (1978, 89).

technological environment can now be more effectively and consciously shaped to further evolution.

2.2.4.3 Major Temporal Changes in the Contents of Moral Systems

Many ethical theorists have dealt with the question of whether humanity has made moral progress in its long evolution and history. Has humanity been morally improving over time?³⁵⁴ Whereas there is unanimity about technological progress and quite some agreement about the development of culture, expert opinions differ about moral progress.

Overall, most authors acknowledge that the development of modernity, in comparison with previous cultural stages, has been accompanied by a considerable moral progress. Classical examples of improvements in moral values and norms are the development of democratic decision making and governance; and the abolition of oppression of women, child labour, slavery and the death penalty. There has been a general decrease in criminality; the recognition of individual rights; the acceptance of coexistence of diversity: ideological/religious, racial, ethnic and some aspects of sexuality.³⁵⁵ There is evidence of the prevention or reduction of inter-group violence and aggression;³⁵⁶ the extension of ethical concerns to other than human life forms and the physical environment on the planet.³⁵⁷ These changes show how strongly altering living conditions (particularly improving them) can affect the scope of moral reasoning.³⁵⁸

Conservatively thinking people may consider some of the modern personal decision-making liberties in matters of birth, partnership, and death, that people have acquired in advanced democracies as signs of moral degradation—the right to birth control (contraception, sterilisation, abortion, medically assisted fertility), partnership (personal partner choice, consensual union, LAT-relations,³⁵⁹ divorce), and death control (euthanasia, palliative care). However, these are clashes between the moral values embedded in earlier cultural stages and the evolving ones.

Some developments in the twentieth and twenty-first centuries—for instance, the (re)appearance of discriminatory ideologies have raised the question as to whether modernity is actually experiencing a dramatic moral regression instead of a further progression; for example Nazism, fascism, communism, and Islamist fundamentalism, the virtual globalisation of intergroup conflicts, the reappearance or resurgence of exploitative capitalism in the form of what is now called Neo-liberalism, the rise or revival of some forms of ego-centric behaviour at the cost of community development.³⁶⁰

³⁵⁴See, for instance, Kant (1790), Williams (1893, 466), Huxley (1942, 576), Stent (1969), Nisbet (1980; 2009), Corning (1983), Nitecki (1988), Ruse (1996), Zarandi (2003), Pinker (2011).

³⁵⁵For instance, Neuhaus (2009).

³⁵⁶For instance, Pinker (2011).

³⁵⁷For instance, Jamieson (2003).

³⁵⁸For instance, Sachdeva et al. (2011).

³⁵⁹LAT relations: living-apart-together.

³⁶⁰For instance, Neuhaus (2009).

The judgment of whether a new moral development is a progression or regression is usually based on purely ideological premises. The authors argue that a comprehensive and long-term evolutionary approach is an appropriate way to deal adequately with the question of adaptive versus maladaptive ethics and behaviour.

2.2.4.4 Selfishness and Selflessness in the Evolution of Morality

Evolutionary ethics has raised and dealt with several crucial sociobiological questions and biophilosophical controversies concerning the origin and evolution of morality: the natural/cultural determination of morality, the emotional/rational nature of morality, the Is/Ought relationship, the gene/individual/community level of selection, the individual/societal approach to morality, and last but not least the question of the relationship between selfishness and selflessness in moral behaviour.³⁶¹ At present, it is not an exaggeration to affirm that most of those controversies have largely been resolved or at least clarified.

Notwithstanding its high costs, altruistic behaviour has multiple advantageous effects at the individual as well as the group level, on health and well-being, on social cohesion and cooperation, and last but not least on intergenerational continuity.³⁶²

Although the controversy about selfishness/selflessness goes back to the earliest stages of evolution science, it strongly flared up with the emergence of the Second Darwinian Revolution through the basic works of William Hamilton, George Williams, and Robert Trivers³⁶³ and the more contemplative early writings of Michael Ghiselin, Edward Wilson, and Richard Dawkins.³⁶⁴ In particular, Dawkins' 1976 classic *The Selfish Gene* became a stumbling stone, because its provocative title made it subject to a lot of misunderstanding, if not coarse distortion.³⁶⁵

Apart from the conceptual confusion about the multiple meanings of the concept of altruism,³⁶⁶ it is quite understandable why the sociobiological findings about the relation between selfishness and selflessness are so profoundly disturbing. The hominisation process was made possible thanks to the development of human eusociality that, in turn, was partly based on the evolution of genetic predispositions and partly on compensating or even reinforcing cultural values and norms promoting altruistic behaviour. One of the major functions of altruistic sentiments and altruism-focussed cultural values and norms consists of curtailing powerful self-oriented drives; hence, our innate as well as our learned need to advocate, justify, and/or display our altruistic nature and reputation. The evolutionary explanation of the selfish/altruistic dynamics is strongly at odds with the

³⁶¹See also Harman (2013, 2014).

³⁶²Manner and Gowdy (2010), Lozada et al. (2011), Rand et al. (2012), Aknin et al. (2013), Keltner et al. (2014).

³⁶³Hamilton (1963; 1964; 1975), Williams (1966), Trivers (1972).

³⁶⁴Ghiselin (1974), Wilson (1975, 1978), Dawkins (1976).

³⁶⁵See, for instance, Midgley (1985); for a discussion of this issue, see also Tanghe (2013).

³⁶⁶Clavien and Chapuisat (2013).

widespread but obsolete view that altruism is a lofty moral virtue that is highly elevated above the allegedly sordid materialistic evolutionary explanations.

In the section on kin selection (Sect. 2.1.2.5) the discourse was started by defining altruism, irrespective of its intention, as behaviour that reduces the reproductive fitness of a cooperating individual compared to the fitness of individuals who behave selfishly. Sociobiology discovered evolutionary mechanisms—kin selection, reciprocity selection, and group selection—through which genetic predispositions for altruistic behaviour can nevertheless be biologically transmitted and promote the inclusive fitness of the altruists.

However, some scholars argue, mainly on the basis of their ideological beliefs, that ‘genuine’ or ‘moral’ or ‘sacrificial’ altruism—defined as love behaviour that has no compensating reproductive benefit at all—cannot be explained by any form of Darwinian selection and, hence, would be ‘maladaptive’. Its existence can only be explained on the basis of religious (supernatural) elements.³⁶⁷

First of all, the idea that moral or genuine altruism is a kind of behaviour that would be a specific characteristic of religious believers, and in particular Christian believers, is not only a typical in-group prejudice, but also flagrantly in contradiction with real facts. Moral altruistic behaviour is well known to be equally well present and practiced among people of various non-religious convictions—atheists, humanists, socialists, communists, ecologists, etc.³⁶⁸

Moreover, the theological interpretation of the application of the evolutionary toolkit on moral altruism sounds quite narrow-minded and does not fully grasp the complexity and diversity of Darwinian selective processes. It largely ignores the phenomenon of variability in altruistic behaviour, which can indeed be merely instrumental or more or less intensively motivated, and completely overlooks the neurological basis of emotions that are at the basis of various forms and shades of altruistic behaviour.

In contrast, the authors suggest that in *Homo sapiens sapiens*, with its high cognitive potentialities and refined emotional characteristics, deeply altruistically motivated forms of behaviour—moral altruism—might have as high a probability of being positively selected as more rudimentary forms of altruistic behaviour. This can occur via several evolutionary mechanisms; for instance, social assortment, direct or indirect reciprocal selection, or group selection.

2.2.5 Biological Determinants of Moral Behaviour

2.2.5.1 Genetic Determinants of Moral Behaviour

The question as to what degree genetic factors are involved in the development of moral sentiments or behaviour is difficult to answer. Moral behaviour is a complex phenomenon that includes features such as pro- and antisocial behaviour, altruistic and reciprocal behaviour, cooperation and mutual aid, sympathy and empathy,

³⁶⁷For instance, Schloss (2013, 213), Pruss (2013, 339), Clayton (2013, 347).

³⁶⁸For instance, Hofmann et al. (2014).

compassion, conscientiousness, agreeableness, moral judgment, conflict resolution and peace-making, deception and deception detection, cheating and free-riding curbing, community concern. Many of those components are in one or another way related to cognition, emotional personality, and psychopathology.

Hence, it cannot be expected that there exists one single gene for moral sense or behaviour. As is the case for many other complex characteristics, it can be expected that many genes as well as environmental factors are involved.

There are several general arguments in favour of the hypothesis that the human capacity for moral sentiments and behaviour is partially genetically determined. However, there is still rare hard evidence of the detection of genes linked to particular moral sentiments or forms of moral behaviour.

The general arguments are as follows. First of all, there are the findings on altruistic and other forms of moral sentiments and behaviour among social animal species, for which the comparative studies allow the identification of evolutionary origins and trends (see Sect. 2.2.4.1). Second, there is the universality of morality in the human species. This is a strong, although in itself insufficient, indication for a genetic predisposition. Third, there is the striking and ubiquitous phenomenon of in-group morality.³⁶⁹ Fourth, there is the overwhelming evidence of the role of genetic factors in cognition, emotional personality and psychopathology that are all involved in particular forms of moral sentiments or behaviour.³⁷⁰ For instance, all major emotional personality factors—neuroticism, extraversion, openness to experience, agreeableness and conscientiousness—have been found to be linked to a broad variety of moral sentiments or forms of moral behaviour.³⁷¹ In the domain of cognition, low cognitive abilities have often been found to be associated with delinquent or criminal forms of behaviour.³⁷² In particular, the important role of genetic factors in the aetiology of sociopathy and/or psychopathy is well established.³⁷³ People diagnosed with ‘antisocial personality disorder’ or ‘psychopathy’ show signs of moral insensitivity from an early age.³⁷⁴ Finally, there are the findings on moral sentiments or behaviour related brain structures and functions which are likely to have a genetic basis, because they cannot be linked to environmental or life course accidents. (See Sect. 2.2.5.2.)

What types of direct genetic knowledge about moral sentiments or behaviour are available? As is the case for any form of emotion or behaviour, three types of information are directly relevant for the involvement of genetic factors on particular forms of moral behaviour: (1) pedigree analysis of monogenic or chromosomal variants which are clearly linked to particular, usually pathological, conditions; (2) heritability estimates measuring the degree to which within-population variance

³⁶⁹Hartung (1995)

³⁷⁰For instance, Fuller and Thompson (1978), Plomin (1989), Plomin et al. (2008).

³⁷¹For instance, Costa and McCrae (1992), Ebstein (2006), Knafo and Israel (2009), Johnson et al. (2011).

³⁷²For instance, Hirschi and Hindelang (1977), Moffit (1993), Walsh and Ellis (2003).

³⁷³For instance, Jang (2005), Livesley and Jang (2008).

³⁷⁴Pinker (2008, 4).

in particular forms of moral sentiments or behaviour is determined by genetic factors, environmental factors, and genetic-environmental interaction and covariance; (3) molecular genetics of particular sentiments or forms of behaviour relevant to morality.

A well-known example of a monogenic factor is the MAO-A gene on the X-chromosome that controls the function of the enzyme monoamine oxidase that helps to break down important neurotransmitters. Men (who have only one X chromosome) with low MAO-A activity (MAO-A-L) demonstrate aggression with greater intensity and frequency, particularly when provoked or maltreated.³⁷⁵

Studies about the degree to which genetic and environmental factors, as well as gene-environment interaction, are involved in within-population variation of various forms of prosociality yield significant heritability estimates, ranging between 30 and 50%, for many components of moral sentiments of behaviour, including empathy, helping, cooperation, altruism, and trustworthiness.³⁷⁶

Also, heritability studies about antisocial behaviour show that approximately 50% of the phenotypic variance is due to genetic factors.³⁷⁷ Many studies have been undertaken on genetic influences on individual differences in aggression and antisocial behaviour,³⁷⁸ although in this domain heritability estimates show a broader variation, ranging from 35%³⁷⁹ to as much as 80%.³⁸⁰

The interesting fact about heritability studies of components of moral behaviour is that they indicate the degree to which behavioural differences between individuals are influenced by genetic factors. At the same time the above mentioned heritability estimates tell us something about the degree of possible effects of environmental factors (and many investigations also have estimations about genetic-environmental interactions), indicating that there is ample room and necessity for moral behaviour being environmentally influenced. The newly developing field of sociogenomics,³⁸¹ in which the effects of environmental factors on the expression of alleles will also be considered, will certainly allow deeper and more nuanced insights into the complex relations and interactions between genes and environments.³⁸²

³⁷⁵Ellis (1991), Brunner et al. (1993), Buckholtz et al. (2008), Sjöberg et al. (2008), McDermott et al. (2009).

³⁷⁶Rushton et al. (1986), Eisenberg et al. (2002), Fehr and Fischbacher (2003), Rushton (2004), Scourfield et al. (2004), Penner et al. (2005), Knafo and Plomin (2006), Hur and Rushton (2007), O'Connor et al. (2007), Volbrecht et al. (2007), Gregory et al. (2009), Knafo et al. (2009), Knafo and Israel (2009).

³⁷⁷Grove (1990), Blair et al. (2005), Ferguson and Beaver (2009), Nordio (2012).

³⁷⁸Knafo and Israel (2006), Hur and Rushton (2007), Craig and Halton (2009).

³⁷⁹Van der Valk et al. (1998).

³⁸⁰Dionne et al. (2003).

³⁸¹Sociogenomics: the study of the molecular basis of social life by means of identifying genes that are implicated in social evolution (for instance, Robinson et al. 2005).

³⁸²For instance, Robinson et al. (2005), Roberts and Jackson (2008), Slavich and Cole (2013).

Notwithstanding the overwhelming evidence about the importance of genetic factors in predicting pro/anti-social behaviour, little is yet known about the specific genes involved. As is the case with other complex behavioural traits, many genes with small effects may be involved and are difficult to unravel.³⁸³ Also, it cannot be expected that direct relations between genes and components of moral behaviour can be detected. Genes do not code for moral codes, but for proteins that may—often together with or in interaction with other genes and/or environmental factors—influence aspects of body build and function, cognition and emotional personality. In turn, these can lead to the presence (or absence) of moral emotions or forms of behaviour which are considered as moral (or immoral).

In recent decades, molecular genetics research has expanded its radius of action in the domain of behavioural genetics, and a specific molecular personality genetics is emerging.³⁸⁴ Given the substantial relations between personality traits and moral sentiments or forms of (im)moral behaviour, this domain opens promising perspectives to better understand the development of many aspects of morality. Although molecular personality genetics is still in its infancy, several interesting discoveries have already been made. They include genes that are involved in the control of several brain signalling molecules, such as the neurohormone oxytocin,³⁸⁵

³⁸³Plomin et al. (2008).

³⁸⁴For instance, Benjamin et al. (2002), Noblett and Coccaro (2005), Canli (2008).

³⁸⁵For a long time oxytocin has been well known for its role in reproductive behaviour, particularly in labour at childbirth and breastfeeding. In recent studies oxytocin is also related to several sexual forms of behaviour, such as orgasm (Lee et al. 2009), pair bonding (Walum et al. 2008), and maternity (Bakermans-Kranenburg and Van IJzendoorn 2008), which is reason some authors started called it ‘the love hormone’. However, more broadly, molecular genetic studies identifying variations in specific genes have found them to be associated with individual differences in forms of prosocial behaviour such as altruism, empathy, emotional perception, generosity, reciprocity, trust, and moral judgment (e.g. Kosfeld et al. 2005; Zak et al. 2007; Campbell 2008; Carter et al. 2008; Donaldson and Young 2008; Heinrichs and Domes 2008; Israel et al. 2008; 2009; Ebstein et al. 2009; Rodrigues et al. 2009; Mikolajczak et al. 2010; Tost et al. 2010; Van Dijk and Feith 2010; Reuter et al. 2011; Poulin et al. 2012; Walter et al. 2012; Zak 2012; Feldman et al. 2013; Jiang et al. 2013). Such findings led Zak (2012) to call it, in a recent book addressed to a broader audience, ‘the Moral Molecule’. In contrast, oxytocin deficit disorder (ODD) has been found to be linked to autism, sociopathy, psychopathy and narcissism (Ebstein et al. 2010).

and the neurotransmitters dopamine³⁸⁶ and serotonin.³⁸⁷ In recent years extensive reviews of the relevant literature have been published.³⁸⁸

2.2.5.2 Neurological Determinants of Moral Behaviour

This book has repeatedly distinguished two neurological pathways involved in the development of morality:

- (1) The neurological basis determining an innate moral sense;
- (2) The neurological capacity for moral learning and reasoning.

In the expert literature one will find differences in the weight that is being given to these two types of neurological processes involved in the development of moral behaviour, a discussion which goes back to David Hume's and Adam Smith's questions as to whether the foundation of morals is derived from reason or from sentiment.³⁸⁹ For instance, Francisco J. Ayala³⁹⁰ considers that the human moral evaluation of actions mainly result from human rationality, which allows us to anticipate the consequences of one's own actions, to make value judgments, and to choose between alternative courses of action. Although it must be admitted that many moral dilemmas are not instinctively and instantly addressed, but only after careful rational deliberation,³⁹¹ most authors now also stress the importance of

³⁸⁶Dopamine functions in the brain as a neurotransmitter that plays a major role in reward-driven learning. Variants of the dopamine receptor genes have been found to be associated with temperament dimensions such as novelty seeking, extraversion, reward, and ADHD (Ebstein et al. 1996; 2010; Benjamin et al. 1996; Okuyama et al. 2000; Faraone et al. 2001; Kluger et al. 2002; Schinka et al. 2002; Becker et al. 2005; Eichhammer et al. 2005; Lesch 2007; Kovacs et al. 2009), with increased risks of criminal behaviour, alcoholism, drug abuse, and antisocial personality disorder (Tahir et al. 2000; Rowe 2002), and with an increased risk of various psychopathologies (Beaver et al. 2013). The dopamine receptor genes are consequently thought to play a role in pro/anti-social behaviour (Eisenberg et al. 2007).

³⁸⁷Serotonin is a monoamine neurotransmitter with various functions, including the regulation of mood, appetite, and sleep. Serotonin also performs tasks in some cognitive functions, including memory and learning. Several investigations have established an association between variants of the serotonin transporter gene and neuroticism/harm avoidance (anxiety-related personality traits) (Lesch et al. 1996; Cohen et al. 2002; Tsai et al. 2002; Schinka et al. 2004; Sen et al. 2004; Willis-Owen et al. 2005; Crockett, et al. 2010). It has also been found that serotonin modulates striatal responses to fairness and retaliation in humans (Crockett et al. 2013). A number of studies have documented a statistically significant association between the serotonin transporter promoter region polymorphism and antisocial outcomes. For example, carriers of the low expressing alleles are at-risk of displaying ADHD symptoms (Cadoret et al. 2003), consuming large amounts of alcohol (Herman et al. 2003), and having childhood conduct disorder (Cadoret et al. 2003). The serotonergic system has also been identified as being potentially involved in the aetiology of extreme violence and serious aggression: lower levels of serotonin were found to correspond with greater involvement in acts of extreme violence and consequently can be a source in the development of antisocial behaviour (Lesch et al. 1996; Virkkunen et al. 1996; Moore et al. 2002; Retz et al. 2004; Hu et al. 2006).

³⁸⁸Knafo and Israel (2009), Ebstein et al. (2010), Israel et al. (2015).

³⁸⁹Hume (1739/1969, 509), Maynard Smith (1759); see also Wierzbicka (2007, 75).

³⁹⁰Ayala (2010, 9018); see also Thompson (1990).

³⁹¹Blackburn (2001), quoted in Churchland (2011, 111).

emotional personality characteristics, such as empathy, in the evolution of moral codes.³⁹² Emotions can even be an important drive for seemingly irrational behaviour.³⁹³

Ever since Charles Darwin,³⁹⁴ many evolutionary biologists have argued that human morality is partly founded on a natural moral sense, as a result of the hominisation process during which the human brain universally acquired the capacity to evoke moral behaviour and be receptive to moral codes, to intuitively develop moral judgements, to learn to behave morally, to reason about moral questions, and to develop moral codes.³⁹⁵ This does not imply that moral codes would be neurologically programmed, but that a neurological biogram was selected, which allowed for facilitating the production and receptivity of moral feelings and ideas. In *Moral Minds* Marc Hauser³⁹⁶ argues even that our moral faculty is equipped with an innate, universal moral grammar for building moral systems and making moral judgments. Or, as Mario F. Mendez³⁹⁷ concluded:

Humans have an innate moral sense....

The question now is which brain structures are involved in the production of evolved emotional and rational capabilities for moral behaviour? There is already reference above to the important roles some neurological chemicals play in the development and variability of moral behaviour.

In recent years, progress in neurobiology³⁹⁸ has allowed exploration and understanding of the neural bases of some of the most distinctive moral behavioural attributes of the human species, such as human altruism,³⁹⁹ reciprocity,⁴⁰⁰ care,⁴⁰¹ charitable donation,⁴⁰² social cooperation,⁴⁰³ social interaction,⁴⁰⁴ social

³⁹²For instance, Hoffman (2000), Greene et al. (2001), Greene (2009) Hauser (2006) Joyce (2006), Haidt (2001, 2007), Haidt and Craig (2007), Young and Koenigs (2007), Richerson et al. (2010), Krebs (2011, 213), Shoemaker (2012), Prinz (2015).

³⁹³For instance, Frank (1988, 254).

³⁹⁴Darwin (1871, Chap. 4).

³⁹⁵For instance, Pugh (1976), Wilson (1978), Kieffer (1979), Peters (2003), Greene (2003), Tancredi (2005), Hauser (2006), Verplaetse et al. (2009), Krebs (2011).

³⁹⁶Hauser (2006); see, for instance, also Greene (2003), Tancredi (2005), Mikhail (2007), Dupoux and Jacob (2007), Teehan (2010, 41).

³⁹⁷Mendez (2009)

³⁹⁸Moll et al. (2002; 2003; 2005; 2008), Jean-Baptiste (2003), Baschetti (2007b), Killen and Smetana (2007), Miller (2008), Narvaez and Vaydich (2008), Sinnott-Armstrong (2008), Mendez (2009), Verplaetse et al. (2009), Marazziti et al. (2013), Alvaro-Gonzalez (2014), Darragh et al. (2015), Decety and Wheatley (2015).

³⁹⁹Tankersley et al. (2007), Mathur et al. (2010), Marsh et al. (2014), Sul et al. (2015), Hein et al. (2016).

⁴⁰⁰Van den Bos et al. (2009), Watanabe et al. (2014).

⁴⁰¹Robertson et al. (2007).

⁴⁰²Moll et al. (2006).

⁴⁰³Rilling et al. (2002), Declerck, et al. (2013), Schroeder et al. (2013).

⁴⁰⁴Schilbach et al. (2006).

attachment,⁴⁰⁵ social reward,⁴⁰⁶ social decision-making,⁴⁰⁷ empathy,⁴⁰⁸ honesty,⁴⁰⁹ moral sensitivity,⁴¹⁰ moral judgments,⁴¹¹ distributional fairness⁴¹² and justice,⁴¹³ equitable decision-making,⁴¹⁴ egalitarian behaviour,⁴¹⁵ moral cognition,⁴¹⁶ moral disgust,⁴¹⁷ distaste for inequality and unfair treatment,⁴¹⁸ moral motivation,⁴¹⁹ moral action,⁴²⁰ moral attitude,⁴²¹ beauty and goodness,⁴²² and wisdom.⁴²³ This research has crystallised into a specific research domain some have called 'neuroethics'.⁴²⁴

In particular, new imaging techniques are used to define the neuro-anatomy of moral behaviour, to explore the centres of the brain associated with emotion, motivation, and moral behaviour in general,⁴²⁵ to determine what parts of the brain are used when solving moral dilemmas and passing moral judgments. Functional magnetic resonance imaging (fMRI) studies, along with other psychophysiological measurements in normal individuals,⁴²⁶ research on psychopathy or chronic anti-social behaviour,⁴²⁷ and investigations on patients with frontotemporal dementia (FTD),⁴²⁸ or with brain lesions leading to sociopathy,⁴²⁹ point to a neurobiology of

⁴⁰⁵Moll and Schulkin (2009), Lewis et al. (2012).

⁴⁰⁶Bhanji and Delgado (2014).

⁴⁰⁷Leben (2011), Rilling and Sanfey (2011).

⁴⁰⁸Gallese (2003), Seitz et al. (2006), Singer et al. (2006), Decety (2010), Decety and Porges (2011), Bernhardt and Singer (2012), Decety and Svetlova (2012), Ferrari (2014), Decety and Cowell (2015).

⁴⁰⁹Abe and Greene (2014).

⁴¹⁰Moll et al. (2002, 2007), Robertson et al. (2007).

⁴¹¹Greene et al. (2001), Moll et al. (2002), Borg et al. (2006), Koenigs et al. (2007), Prehn et al. (2008), Greene (2009), Young et al. (2010), Parkinson et al. (2011), Ciaramelli, et al. (2012), Yoder and Decety (2014).

⁴¹²Hauser (2006, 83).

⁴¹³Robertson et al. (2007), Buckholtz and Marois (2012).

⁴¹⁴Zaki and Mitchell (2011).

⁴¹⁵Dawes et al. (2012).

⁴¹⁶Sevinc and Spreng (2014).

⁴¹⁷Moll et al. (2005), Yang et al. (2013).

⁴¹⁸Camerer et al. (2005), Tricomi et al. (2010), Takahashi et al. (2012).

⁴¹⁹Frimer and Walker (2008), Narvaez and Lapsley (2009).

⁴²⁰Narvaez and Vaydich (2008).

⁴²¹Knoch et al. (2006), Luo et al. (2006).

⁴²²Zaidal and Nadal (2011).

⁴²³Meeks and Jeste (2009).

⁴²⁴Rees and Rose (2004), Gazzaniga (2005), Hubbeling (2011), Schirrmann (2013), Clausen and Levy (2015), Decety and Wheatley (2015).

⁴²⁵Cuningham (2010), Decety and Howard (2013).

⁴²⁶Greene et al. (2001), Moll et al. (2002; 2003), Decety and Cacioppo (2012).

⁴²⁷Hoptman (2003), Blair et al. (2005), Yang et al. (2009), De Oliveira-Souza, et al. (2008), Harenski et al. (2010).

⁴²⁸Neary et al. (1998), Mendez et al. (2005).

⁴²⁹Damasio et al. (1990), Eslinger et al. (1992), Anderson et al. (1999).

moral behaviour.⁴³⁰ In fact, all of the major dimensions of morality are related to the activity of one or more brain areas. As Frans De Waal⁴³¹ stated:

Morality is as firmly grounded in neurobiology as anything else we do or are.

Morality may be considered to be a social construct, but it would not exist without the brain. Whereas it is clear that there is no unique moral brain centre, there are many brain areas that are involved in the development of various forms of moral behaviour.⁴³²

Morality-related brain structures and functions are not immutable over the life course of an individual. Although humans develop moral sentiments at a very early age,⁴³³ there is increasing evidence for epigenetic and lifelong effects of attachment, care giving, educational activities, and responsive parenting on brain functioning and emotional regulation.⁴³⁴ Both behavioural genetic and developmental psychological research shows that environmental factors—internal as well as external—can influence brain functions related to moral behaviour.⁴³⁵ Responsible parenting stimulates earlier conscience development.⁴³⁶ Early experiences result in better or worse equipped brains for moral life.⁴³⁷ Brain damage at a young age or even during adulthood can unfavourably influence moral development or behaviour.⁴³⁸ The human brain possesses a neuroplasticity, namely the ability of neurons to develop new connections, resulting in a rewiring of the brain, even in cases of brain degeneration due to lesions.

To conclude, despite the predisposition of the human brain to develop an innate moral sense, moral learning and training remain of crucial importance.⁴³⁹

2.2.6 Why Variability in Moral Behaviour?

An important question that remains is how to explain, from an evolutionary point of view, the existence or persistence of a variation in personality characteristics and/or moral codes that can, in particular circumstances, result in diverse forms of (im)-moral behaviour?

As for all biological or cultural features that can influence survival, sociality or reproduction in a positive or negative way, there are several causal factors that have

⁴³⁰Relatively recent reviews of the neurological bases of moral behaviour can be found in Tancredi (2005), Hauser (2006), Moll et al. (2008), Narvaez and Vaydich (2008), Narvaez (2008), Mendez (2009), Ebstein et al. (2010), Churchland (2011).

⁴³¹De Waal (1996, 217).

⁴³²Joyce (2006, 140), Young (2012), Greene (2015), Oliveira-Souza et al. (2015).

⁴³³Hauser (2006, 303), Allchin (2009), Narvaez (2010).

⁴³⁴For instance, Karen (1994), Narvaez (2014), Bankard (2015).

⁴³⁵Narvaez and Vaydich (2008), Knafo and Israel (2009), Cowell and Decety (2015), Crockett and Rini (2015).

⁴³⁶Kochanska (2002).

⁴³⁷Lewis et al. (2000), Siegel (2001), Narvaez and Vaydich (2008).

⁴³⁸Eslinger et al. (1992), Christen and Regard (2012).

⁴³⁹Tancredi (2005, 43), Narvaez and Vaydich (2008).

to be considered for the variability in predispositions to moral behaviour or the production of moral codes. In particular, both genetic and environmental factors and their interactions can influence (im)moral behaviour. These factors and their interactions can elicit different forms of selection, resulting in varying degrees of adaptation or maladaptation.

First of all, genetic mutants can produce personality characteristics that induce, in combinations with particular environmental circumstances or life events, well-adapted or maladapted normative behaviour. A classical example is the presence of psychopathy which may have (had) some advantages in particular living conditions, but overall it is subject to strong negative selection or frequency-dependent selection,⁴⁴⁰ resulting in a very low prevalence at the population level.⁴⁴¹ Also, some morality-related memes can fail to meet the needs for a well-adapted ontogenetic, societal, or intergenerational development; hence, they are under pressure of partial negative selection, because they produce a higher morbidity or mortality, or because they appear less satisfactory from an existential point of view, and are consequently selected against and regress. For example, female genital mutilation, a custom related to male cuckoldry fears practiced in patriarchally dominated societies.⁴⁴² Once women become empowered to understand that this practice has unfavourable effects on their sexuality and health and that it is used to control and suppress their femininity, they will oppose it. The practice will regress or disappear, as is being witnessed in populations that are emancipating from their patriarchal domination.⁴⁴³

Some behavioural variants may be due to the presence of particular gene or genotypic combinations. For instance, many socially important biological characteristics that show a continuous variability are controlled by several genes—so-called polygenes or quantitative trait loci (QTLs)—the extreme variants of which can be stronger under positive or negative selection. Another example consists of allele combinations in heterozygous and homozygous genotypes that are subject to balancing selection.⁴⁴⁴

Some current genes and/or memes may have evolved in the harsh ecological and social living conditions of earlier cultural eras, where they had fitness enhancing effects. In current modern living conditions, they have lost their original advantage or have even become a disadvantage—they are the so-called evolutionary hang-overs. For instance, many scholars believe that ADHD (attention deficit/hyperactivity disorder) which has a relatively high prevalence in human

⁴⁴⁰For instance, Avilés (2002) showed that freeloaders increase in frequency when rare, but are selected against when common due to the reduced productivity of the groups they overburden with their presence.

⁴⁴¹For instance, Glenn et al. (2011), Boehm (2012, 28).

⁴⁴²Hrdy (1981, 184).

⁴⁴³For instance, Almroth et al. (2005).

⁴⁴⁴In balancing selection, a selective advantage exists in favour of the heterozygote genotypes, whereby the allelic variants of a gene in heterozygote combinations are favoured over their respective homozygote genotypes. Thus, both the alleles of a gene, in proportions dependent on the adaptive advantages of the heterozygotes compared to the homozygotes, are maintained in the gene pool. A well-known example is the sickle-cell polymorphism (e.g. O'Malley 2006).

populations (between 3 and 5%) was considered adaptive in prehistory, because the harsh living conditions required hypervigilance, rapid-scanning, quickness of movement, hyperactivity and response-readiness, and because women were more attracted to male risk takers.⁴⁴⁵ ADHD is obviously maladaptive in modern living and learning conditions.

It is very important for the understanding of the evolution of morality that humans are endowed with both egocentric and socially oriented drives.⁴⁴⁶ In matters of mutual competition, the three basic drives in this context—egoism, nepotism and altruism (extrafamilial generosity)—are clearly hierarchically ordered, self-interest being the strongest and altruism the weakest.⁴⁴⁷ These drives may be expressed in different ways and intensities according to social, cultural or ecological contexts. On an evolutionary scale, such basic drives may result in the simultaneous co-existence of different behavioural strategies that compete with each other.⁴⁴⁸ For example, variation in several emotional personality features, such as the big five dimensions of human personality (extraversion, neuroticism, openness to experience, conscientiousness, and agreeableness) can have different trade-offs between fitness benefits and costs depending upon the nature of the socio-ecological or socio-economic context.⁴⁴⁹ A classical example is violent behaviour⁴⁵⁰ that in conditions of inter-group conflict may be advantageous, but in peace times must be subdued (see also Chap. 7, Sect. 7.5).⁴⁵¹

A complicating factor is that humans can and do alter or vary their moral behaviour according to the identity of their beneficiaries or opponents. Kin, friends, and biological, cultural, religious or political conspecifics are often more amiably treated than strangers, or socially, philosophically (religiously), politically, ethnically or genetically different (groups of) individuals.⁴⁵² Peter Richerson and Robert Boyd⁴⁵³ developed their theory in this respect on the evolution of tribal instincts through cultural group selection.

Last but not least, various environmental factors⁴⁵⁴—biological, psychological, social, cultural, economic, ecological—can all seriously affect moral codes and/or forms of behaviour, in particular those regarding group related forms of behaviour. A striking example is the physiological effect of semi-starvation on the prevalence of social strife and crime.⁴⁵⁵ Moreover, moral values may be conceptualised in

⁴⁴⁵See Hartmann (1995), Shelley-Tremblay and Rosén (1996), Jensen et al. (1997), Crawford and Salmon (2002), Hartmann and Palladino (2005), Williams and Taylor (2006), Glover (2011).

⁴⁴⁶For instance, Sibly and Curnow (2012).

⁴⁴⁷Alexander (1987, 139–142), Boehm (2012, 331).

⁴⁴⁸Thomas (1984), Barr and Quinsey (2004), Cesarini et al. (2010).

⁴⁴⁹Nettle (2006), Cesarini et al. (2010).

⁴⁵⁰Gottschalk and Ellis (2010).

⁴⁵¹Hawley et al. (2007).

⁴⁵²For instance, Petrinovic et al. (1993), Hartung (1995), Bernhard et al. (2006), Mifune et al. (2010), DeScioli and Krishna (2013).

⁴⁵³Richerson and Boyd (2005, 192); Richerson et al. (2003, 368).

⁴⁵⁴Tancredi (2005), Fumagalli and Priori (2011), Krebs (2011, 89).

⁴⁵⁵Keys and Brozek (1951).

different ways. For example, the necessity to control fertility in modern culture is differentially implemented by freethinking people who apply a broad range of contraceptive methods; whereas many people follow the Roman Catholic Church which rejects the use of appliance methods, and only allows sexual abstinence or the use of so-called natural family planning methods.

2.2.7 Moral Ambiguity of the Evolutionary Mechanism

From the very beginning of the development of evolution science, eminent evolutionists have drawn attention to the amoral, ruthless character of the nature of the biological-evolutionary system (natural selection, mutation, genetic drift—“*le hazard et la nécessité*”, in the words of Jacques Monod⁴⁵⁶) and the need to replace it by a more humane system of evolution.⁴⁵⁷ Thomas Huxley’s⁴⁵⁸ concluding remark of his famous essay on *Evolution and Ethics* is well known:

Let us understand, once and for all, that the ethical process of society depends, not on imitating the cosmic process, still less in running away from it, but in combating it.

However, the recent development of sociobiological insights into the biological-evolutionary origin of morality, and more particularly of altruistic behaviour, shows that the evolutionary mechanism is not only responsible for the ‘red in tooth and claw’⁴⁵⁹ character of nature with its selfishness, greed, and competition, but also for highly valued forms of behaviour and moral principles such as unselfishness, (reciprocal) altruism and mutualism, and cooperation.⁴⁶⁰ Moreover, the biological evolutionary mechanism, with on the one hand its chance events (mutation, gene recombination, gene drift, developmental accidents) and on the other hand its deterministic process (natural selection), resulted in the construction of the human brain. Evolutionary mechanisms enabled life on this planet to attain a level of consciousness and cognitive ability that allows us, more particularly since the development of science, to decide about and direct our own future evolution and development. As Simon Young sums it up, we can be “designers of our own evolution and destiny”.⁴⁶¹

⁴⁵⁶Monod (1970, 135).

⁴⁵⁷For instance, in a letter to Hooker, Darwin wrote: “What a book a Devil’s Chaplain might write on the clumsy, wasteful, blundering low and horridly cruel works of nature” (quoted in Dawkins 2003, 8). See also Galton (1883), Stephen (1893), Huxley (1894), Dawkins (2003).

⁴⁵⁸Huxley (1894, 83).

⁴⁵⁹Alfred Lord Tennyson’s (1908) ‘*In Memoriam A. H. Hallam*’ (1850):

Who trusted God was love indeed
And love Creation’s final law
Tho’ Nature, red in tooth and claw
With ravine, shriek’d against his creed.

⁴⁶⁰De Waal (1996, 5), Myerud and Penn (2007, 291).

⁴⁶¹Young (2006, 32).

The perceived moral ambiguity of the evolutionary process can nowadays be addressed effectively, with its ruthless mechanisms—mutation, selection—on the one hand, but its remarkable end products on the other hand⁴⁶²—origin and evolution of life, consciousness, sociability, love, altruism, morality. There is the need to control the natural processes (natural selection, spontaneous mutation) by culturally induced biological processes (culturally induced selection and mutation), without, however, impeding the evolutionary process itself.

These aspects will be addressed in the following chapters.

⁴⁶²See also Joyce (2006, 222).

Adaptive and Maladaptive Features of Religious Beliefs as Sources of Morality

3

Abstract

The aim of this chapter is to look at religion and religiosity as sources of morality from an evolutionary perspective. The evolutionary origins of religious beliefs are investigated, genetic and neurological factors involved in religious behaviour are reviewed, and adaptive advantages and disadvantages of religions in pre-modern and modern living conditions are evaluated. The discourse on the organised religions is mainly focused on the Mediterranean region—Judaism, Christianity and Islam—whose essential characteristics and historical developments are briefly described and evaluated from an evolutionary point of view. The doctrines of the Abrahamic religions, as revealed in their basic scriptures, raise some anthropological questions and paradoxes about religions as sources of morality. The core of the chapter is devoted to the discussion about (1) individual and social effects; (2) proximate and ultimate effects; and (3) effects in ancestral and modern living conditions of religions as sources of morality and guidance for behaviour. The closing section of this chapter deals with the relation between science and religion. Two major issues are addressed: (1) the (in)compatibility of science and religion; and (2) the persistence of (neo)creationist beliefs.

3.1 Introduction

Substantial proportions of populations in modern(ising) societies are religious, with churches maintaining much of their traditional societal power and influence. However, their omnipotence as institutions has been gradually eroded, especially in countries that have embraced humanistic worldviews, high standards of education of the whole population, and where citizens have a strong sense of social protection. Religions have had to seek compromise with the findings of science and the values and norms emanating from philosophical or political ideologies such as liberalism,

socialism, feminism, ecologism, or humanism. A typical example is the ethical basis of gender relations and values and norms related to rights of women.

For several hundred years, the achievements of the natural and human sciences shattered and undermined the very philosophical foundations and moral authority of the traditional revealed religions and the personal beliefs of many people.¹

Some scholars are puzzled by the persisting religiosity at times of significant achievements and applications of science. How is the persistence or even resurgence of religiosity to be explained? Indoctrination in early stages of the life course?² Family pressure? Social status maintenance? Attraction to rituals? In-group sense of belonging? Loyalty to the tribe or to an ancient tradition? Disappointment with scientific materialism? Assignment of responsibility to supranatural power—de-responsibilisation of humans? Or is there, in addition, a more profound biosocial drive that might be genetically and/or neurologically hardwired?

The persisting religiosity in modern societies has incited many scholars to conclude that the predisposition to religiosity belongs to the “most ubiquitous and powerful forces in human life”,³ or is to be considered “as an ineradicable part of nature”.⁴ Is this really so?

This book will argue that religions and religiosity are part of our biological evolutionary and cultural historical heritage, which are adaptations—or exaptations⁵—to pre-scientific living conditions. Those times were characterised by a total ignorance of the causes of natural and life processes, and by the experience of powerless suffering resulting from disease, famine, crime, war, and natural catastrophes. However, the functional advantages of religious beliefs may change in the future as the living conditions modify.

3.2 Notions and Concepts

Since many of the notions and concepts related to religious issues can have different meanings, the authors want to clarify how they understand and use them in this book. Some readers may not agree with the interpretation or use of some of those concepts, but at least the choices are made clear and explicit.

3.2.1 Religion

In the expert literature on religion many definitions have been given about this phenomenon. The essential feature of religion, which many scholars agree upon, is

¹Gazzaniga (2005, 163).

²Shariff et al. (2016).

³Hamer (2005, 4).

⁴Wilson (1978, 169).

⁵Exaptation: shifts in the function of a trait during evolution (Gould and Vrba 1982).

the belief in a supernatural agent or power that created the universe, explains its existence and meaning, and often imposes a moral code according to which humans should behave.⁶ Most religions prescribe how the world or the human should be, and provide an integrated set of worldviews and practices.⁷ A common feature of all religious behaviour consists of the presence of elements that are not identifiable by the senses or can be verified by evidence.⁸ Religions distinguish themselves by involving counter-intuitive traits.⁹ Religions may include a variety of elements, such as prayer, rituals, magic, mysticism, myths, miracles, spirituality, or divine revelation, but beliefs in God and the afterlife are the most prevalent.¹⁰ Jared Diamond¹¹ assigns five major attributes to religious systems: (1) belief in a postulated supernatural agent; (2) groups of people identifying themselves as sharing deeply held beliefs; (3) presence of costly or painful sacrifices as commitment signals to the group; (4) belief in gods and other postulated supernatural agents implying how people should behave; (5) supernatural agents can be induced by prayers, donations, and sacrifices to intervene on behalf of mortal petitioners.

The above components of religion are typical for the Mediterranean religions of Judaism, Christianity, and Islam. In his comparative study of religions, Rik Pinxten¹² proposes a more general definition:

Religions can be understood as a particular way of dealing with the Whole, or of reaching for a wholeness which transcends any individual in time and space, even in substance. In religious activities and utterances people express their cognitive, emotional and evaluative relations vis-à-vis others, animals, plants, the earth and the celestial phenomena.

Indeed, religions can be theistic—including a god concept—or non-theistic; they can rely on natural spirits, dead ancestors, or supernatural forces.

This chapter approaches the study of religions as cultural instruments that underpin sociobiological functions to justify and impose values and norms that were developed in the pre-scientific era of human history and were indispensable for onto- and/or phylogenesis.¹³

3.2.2 God

In the scientific literature on religions as well as among religious believers, two major meanings of the concept of God are usually distinguished. Firstly, a personal God (=theism) is an anthropomorphic, omniscient, omnipotent, omnibenevolent, and merciful, supernatural being that created not only the universe but also life, including human life on our planet; this personal God imposes, through revelations

⁶For instance, Tremlin (2006, 5).

⁷Saroglou and Muñoz-García (2008, 97).

⁸Dennett (2007, 25), Dow (2008), Steadman and Palmer (2008, 6).

⁹Boyer (2001, 65), Teehan (2010, 54).

¹⁰Previc (2006, 501), Rossano (2010, 27).

¹¹Diamond (2012, 329).

¹²Pinxten (2010, 55).

¹³Cliquet and Thienpont (2002, 601).

via messiahs and prophets, moral rules of conduct, and judges people thereupon in a hypothetical hereafter. Secondly, an impersonal God (=deism) is divine essence who created the universe, but does not intervene in people's personal lives.¹⁴

The authors are focused on the moral imperatives imposed by organised religions in recognition of God's magnanimity or in the name of a supernatural power that is believed to have created us and intends to judge us. The concept of God is used here in the sense that organised religions such as Judaism, Christianity and Islam conceived it in their basic scriptures—the Tanakh (Hebrew Bible or Old Testament), the Christian Bible (including the Old and New Testaments) and the Muslim Qur'an. The authors are well aware of the fact that within some of the organised religions there are theological developments or theological variants that try to interpret and adapt the religious doctrines, by taking into account (some of) the findings of sciences. However, none of the organised religions have succeeded so far to fully take into consideration and assimilate the scientific achievements of evolutionary science and to reconcile or integrate those achievements into their religious belief systems.

3.2.3 Religiosity

The concept of religiosity is intimately related to religion and refers to various aspects of religious activity, dedication, and belief. Religiosity is difficult to measure, because it can include various components related to beliefs and practices of organised religions, such as belief in God and worship attendance, as well as items related to non-organised religious behaviour such as prayer and meditation.¹⁵

National or international attitudinal surveys, including questions on religiosity and other philosophical/ideological/political convictions,¹⁶ show that there exists, within many countries as well as between countries, a substantial diversity in individual religiosity. Worldwide, 85% of people experience some form of religious belief,¹⁷ or report that religion is an important part of their daily lives.¹⁸ However, there is a considerable within-country as well as between-country variation. For example, the results of the 2005–2007 wave of the World Value Study (WVS),¹⁹ about the proportion of people identifying themselves as a religious person, varies between 24% in China and 98% in Mali.

¹⁴Stark (2001, 5), Graffin and Provine (2007, 294).

¹⁵Hill and Hood (1999), Hall et al. (2008).

¹⁶Although many surveys contain relevant and interesting data about those issues, it must be noted that many of them often approach the question of ideological diversity in a superficial and/or a prejudiced, lopsided, or unbalanced way. A striking example is the otherwise highly interesting European Value Study that includes detailed questions about religious practice and religiosity, but almost completely neglects to capture the characteristics and diversity of the views of non-religious people such as apatheists, agnostics, freethinkers, atheists and humanists.

¹⁷Zuckerman (2005, 16).

¹⁸Crabtree (2009).

¹⁹<http://www.wvsevsdb.com/wvs/WVSAnalyzeQuestion.jsp>.

In particular, culturally and technologically advanced countries are characterised by more or less strong religious/ideological diversity amongst their populations. In developing countries this variation is much more limited, and may even be non-existent.²⁰ This lack of variation in individual religiosity, or the strongly skewed distribution of the religious-nonreligious attitudes in many countries, is not surprising. Religious education and indoctrination are strongly embedded in many countries in the educational systems of families, churches and schools. In contrast, information and education about non-religious ideologies, such as agnostic or atheist humanism, is virtually absent in schools in most countries. In many countries, until recently refute of religious doctrine was or is still today subject to stigmatisation, ostracism, or—worse—persecution.²¹

The theist-atheist gradient in modern(ising) societies consists of three major groups of people: (1) citizens who still adhere to one of the religious faiths and are churchgoers; (2) people who are believers but are not part of any congregation; and (3) non-religious people, agnostics, and atheists, often referred to as freethinking people. In addition, one can have a variation in moral convictions that cuts across the theist-atheist bipolarity. Varying proportions of religious people may still profess the moral teachings and follow the moral rules of their religious denomination, but many others may have become what could be called ‘modernist’ religious believers, i.e. people who in general continue to believe in the theist tenets of their religion, but who foster in many domains of life modern or secular values and norms: for instance they have premarital sex, use modern contraceptives, apply induced abortion, live in consensual unions, have small numbers of children, divorce and remarry, and apply euthanasia.

Individual differences in religiosity have been invariably found to be differentially associated with several basic personality traits²² as well as to their cultural adaptations, namely values.²³ Although the associations between religion and basic personality factors are rather weak, religious people tend to show higher degrees of agreeableness and conscientiousness, but they are less inclined towards novelty/open-mindedness.²⁴ Religious people are also more sensitive to traditional and conservative values, and are less prone to values indicating openness to change and self-enhancement.²⁵ The fundamentalist variant of religiosity, characterised by authoritarian and dogmatic religious attitudes, beliefs, and practices, is particularly adverse to openness to experience.²⁶

²⁰For instance, Inglehart et al. (2004), Pickel and Müller (2009), Haller et al. (2009), Crabtree and Pelham (2009).

²¹Edgell et al. (2006).

²²McCullough et al. (2003), Wink et al. (2007), Saroglou (2010), Kandler and Riemann (2015).

²³Hills et al. (2004), Saroglou and Muñoz-García (2008), Saroglou (2010), Lynn et al. (2009).

²⁴Personality traits are invariable patterns of responses to the exigencies of the environment, have a high heritability and are highly stable throughout adulthood. The five-factor model of personality distinguishes the factors ‘neuroticism’, ‘novelty’, ‘conscientiousness’, ‘agreeableness’ and ‘extraversion’ (Costa and McCrae 1992; 2008).

²⁵Saroglou and Muñoz-García (2008), Saroglou (2010).

²⁶Altemeyer and Hunsberger (2005).

Research in developed countries shows that there is a striking negative relation between degree of religiosity and educational level.²⁷ Also, population studies in Europe and the United States,²⁸ as well as internationally comparative studies,²⁹ point to a clear negative correlation between religiosity and cognitive ability. This means that the degree of religiosity decreases with increasing education and higher levels of cognitive ability.

Finally, comparative international studies show that religiosity is dependent upon the level of economic development: religiosity prevails most strongly among poorer nations where life-threatening, societal or physical risks are high. In contrast, secularisation has progressed most among the more wealthy in more developed countries.³⁰ On comprehensive indicators of welfare or well-being, the least religious countries perform better than the most religious: higher life expectancy, lower infant mortality, less crime, higher literacy, higher GDP, better child welfare, more economic equality, higher economic competitiveness, higher gender equality, better healthcare, more investment in education, higher rates of university enrolment, more access to telephone, TV and internet, better environmental protection, less corruption, more political stability, more assistance to poorer nations.³¹

3.2.4 Spirituality

The concept of spirituality has also been given different meanings: “the presence of a relationship with a Higher Power that affects the way in which one operates in the world”³²; “one’s focus on, and/or reverence openness, and connectedness to, something of significance believed to be beyond one’s full understanding and/or individual existence”³³; “a feeling of being connected to something larger than oneself”³⁴; “the experience of a sense of timelessness and spacelessness”.³⁵ The authors approach spirituality as a predisposition, partially embedded in the human genetic endowment, for experiencing self-transcendence.

Spirituality is also related to personality, but contrary to religiosity it is more strongly associated with openness to novelty, fantasy, and universalism. Spiritual people seem to be similar to religious people in the latter’s prosociality and conscientiousness, but not in their conservatism and authoritarianism, and their low inclination towards self-direction and hedonism. In this respect spiritual people

²⁷Glaeser and Sacerdote (2008), Schieman et al. (2010). Johnson (1997), Baker (2008), Sherkat (2008, 2011).

²⁸For instance, Verhage (1964), Poythress (1975), Wenegrat (1990, 88), Bell (2002), Lynn et al. (2009), Nyborg (2009), Kanazawa (2010).

²⁹Lynn et al. (2009).

³⁰Norris and Inglehart (2004).

³¹Zuckerman (2005), Halman and Draulans (2006), Paul (2009), Harris (2010).

³²Armstrong (1993, 3).

³³Krippner (2005, 81).

³⁴Wilson (2002, 3).

³⁵Saver and Rabin (1997, 507).

much more resemble non-religious people who highly value self-direction and universalism³⁶ and novelty.³⁷

Unfortunately, little is known about the spirituality of non-religious people who cherish modern secular ideologies such as humanism, socialism, liberalism, feminism, ecologism.

3.2.5 Relations Between Religiosity, Spirituality and Morality

Although different, spirituality and religiosity are usually strongly interrelated.³⁸ It will be seen from heritability research that spirituality has a stronger genetic component in variability than religiousness, which is primarily transmitted through learning processes.

Although spirituality is often linked to religiosity, this need not necessarily be the case. Spiritual experiences can be independent of religiosity, beliefs in gods, or adherence to religions.³⁹ Spirituality can exist outside religion; it can be embedded in many other human spheres of interest such as philosophy, ethics, politics, environmentalism, art, and even science. Spiritually driven people also differ from religious people, for instance, in showing more compassionate and altruistic behaviour towards those who differ.⁴⁰

Although interrelated, religion, religiosity and spirituality are apparently often confounded with each other. Religion is an institutional characteristic; religiosity and spirituality are personal characteristics. From heritability studies it appears that both religiosity and spirituality can be strongly influenced by environmental factors (see Sect. 3.6.1). Moreover, in comparison to spirituality, religiosity appears to be more susceptible to memetic than genetic factors.⁴¹ This implies that people with strong predispositions to spirituality need not necessarily be religious. Indeed, it should not be forgotten that religion/religiosity results from an interaction of specific cultural, economic and ecological living conditions and the evolved human mind.⁴²

As far as the relation between religion and morality⁴³ is concerned, religious people have often been made to believe that morality is contingent upon religiosity, that only religion can give meaning to life on the planet, that without the existence of a God there would be no basis for sustaining the moral order, and that non-believers and atheists lack values and are incapable of moral behaviour.⁴⁴

³⁶Barnea and Schwartz (1998), Caprara et al. (2006).

³⁷McCrae (1996).

³⁸Hamer (2005, 13), Dennett (2007, 7).

³⁹For instance, Piedmont (1999, 988), Zinnbauer et al. (1999, 899), Hill et al. (2000), Anandarajah and Hight (2001, 83), Vannelli (2001, 223), Hill and Pargament (2003, 72), Miller and Thoresen (2003, 29), Zinnbauer and Pargament (2005, 27), Harris (2014).

⁴⁰Saslow et al. (2013).

⁴¹Bouchard and Loehlin (2001), Koenig et al. (2005).

⁴²Bulbulia (2004), Whitehouse (2008).

⁴³For the definition of morality see Chap. 2 Sect. 2.2.

⁴⁴See the discussions in Holloway (1999), Buckman (2000), Wielenberg (2005), Hauser and Singer (2006), Epstein (2010).

This view is embedded in the Holy Scriptures. According to Psalm 14 of the Bible, fools who say there is no God “are corrupt”, “do abominable deeds”, “have no knowledge”, are incapable of doing any good, and “are in great terror, for God is with the generation of the righteous”. This ancient position is still well spread today, not only in the minds of religious leaders⁴⁵ but also among ordinary religious people.⁴⁶

Many survey investigations on people’s views about the relation between religiosity and morality find a positive relationship between degree of religiosity and moral behaviour. Immoral behaviour is often intuitively judged as being more prevalent among nonreligious people.⁴⁷ However, most of those studies are strongly biased because they usually consider only one part of the ideological spectrum in a population. They distinguish several grades of moral involvement on the religious side of the spectrum, but ignore completely the degree of moral involvement on the non-religious side of the ideological spectrum. It is much more challenging to measure the degree of ideological involvement/activity/participation of the non-religious part of the population. The ideological activism of non-religious people may be based on a diversity and/or combination of secular ideologies, as it may build on values of humanism, ecologism, or feminism for example.

In fact, contrary to the widespread conviction that religious believers are more moral than non-religious people, there are some indications that exactly the opposite might be the case. For instance, a recent comparative international study in six countries (Canada, China, Jordan, Turkey, USA and South Africa) on altruistic behaviour of children from religious and non-religious households showed that religiousness was inversely predictive of children’s altruism and positively correlated with their punitive tendencies: children from religious families were less likely to share with others than were children from non-religious families; and a religious upbringing was also associated with more punitive tendencies in response to anti-social behaviour.⁴⁸

Although assimilating morality with religion is a quite general belief among religious people, there is much evidence that it is an erroneous conception.⁴⁹ The idea that morality is contingent upon religiosity and that moral norms originate from a religion is a typical in-group prejudice. The moral rules among hunter-gatherers,⁵⁰ the non-theistic ethics in ancient Greece and in Confucian China,⁵¹ as well as the ethical basis and practice of many modern secular ideologies, show that morality can develop without any connection to the moral commandments of a supernatural power. Some moral standards have developed and are

⁴⁵For instance, Pope Pius XI, 1930; D. Wuerl, Archbishop of the Roman Catholic diocese of Washington, DC (<https://www.priestsforlife.org/magisterium/bishops/wuerl-2006-red-mass.htm>).

⁴⁶See, for instance, the survey by Shermer and Sulloway quoted in Shermer (2003).

⁴⁷Pew Research Center (2007), Gervais (2014).

⁴⁸Decety et al. (2015).

⁴⁹Hauser (2006, 421).

⁵⁰Wright (2009, 23–26).

⁵¹Martin (2008, 251).

being implemented despite official religious teaching, as is the case with gender equality, for example. Empirical confirmation of high moral standards is found in many strongly irreligious populations in societies which are characterised by excellent educational systems, prosperous economies, high health care and social protection systems, low rates of violent crime and corruption, and whose citizens, on average, score very high on happiness indices. This is the case in countries such as Denmark and Sweden.⁵² As Daniel Dennett⁵³ stated:

There is no reason at all why a disbelief in the immateriality or immortality of the soul should make a person less caring, less moral, less committed to the well-being of everybody on Earth than somebody who believes in “the spirit”.

As will be argued below, there is a clear causal sequence starting from the basic needs of human nature (and its evolution), then the development of morality in more complex social groups, to the religious consecration and imposition in large agrarian societies.⁵⁴ Morality does not derive from religion: rather the opposite is the case.⁵⁵ Moral principles arose in human societies long before the major world religions developed. Hominin biological evolution towards the development of genetic predispositions to cooperative behaviour and moral sensibilities preceded by eons of time the emergence of the organised religions of the agrarian era.⁵⁶

Major components of morality appear to be universal.⁵⁷ Moral principles, such as the Golden Rule, altruism, bravery, generosity, and prohibition of in-group killing, stealing and lying, evolved as a consequence of natural selection in our highly socialised species.⁵⁸ In their cross-cultural, socio-historical analysis of personality traits that are universally considered to be moral virtues, Christopher Peterson and Martin Seligman⁵⁹ identified the following: wisdom, courage, humanity, justice, temperance, and transcendence. Matt J. Rossano⁶⁰ correctly argues that religion may positively contribute to the development of such moral virtues. However, it is difficult to argue that non-religious people, and in particular atheistic humanists, are less supportive of those virtues. Even transcendence, which is believed by many to be inherently connected with religion, is not just applicable to supernatural experience.

⁵²For instance, Zuckermann (2008), see also Epstein (2010), Shults (2015).

⁵³Dennett (2007, 305), see also Aronson (2008), Norenzayan (2014).

⁵⁴Teehan (2006, 748), Lahti (2009, 69).

⁵⁵Broom (2006), Hauser (2006), Pyysiäinen (2006).

⁵⁶See also Beit-Hallahmi (2010, 130).

⁵⁷Stenger (2009, 150).

⁵⁸Broom (2004; 2006).

⁵⁹Peterson and Seligman (2004).

⁶⁰Rossano (2010, 186ff).

3.3 Origin and Evolution of Religion/Religiosity/Spirituality

All students of religion are unanimous in asserting that the prevalence of religion and religiosity is a universal characteristic of the human species.⁶¹ Some scholars have baptised the human species as *homo religiosus*⁶² because of its nearly universal belief in supernatural agents.

This universality is a strong condition, which hypothesises that religion/religiosity has played an important role in the biological evolution of humankind. It also forms an argument for presuming that such a universally shared behavioural pattern partially has a genetic basis.⁶³

Although the idea that biological (more particularly genetic and neurological) factors might be involved in forms of behaviour that lie at the basis of spirituality/religiosity and/or religious practice has strongly gained momentum in recent years,⁶⁴ this presumption is not at all new. Many anthropologists and other scientists acquainted with evolutionary science have since long fostered the idea that the human brain has been selected evolutionarily for the conceptualisation or at least the receptivity of religious beliefs and practices.⁶⁵ Its function evolved as a response to the survival challenges in a harsh natural and competitive social environment.⁶⁶ There is a view that the biological predisposition to religiosity and religious memes emerged and proliferated as a function of biological evolutionary needs related to survival and reproduction. This view has nowadays become commonplace among evolutionary scholars who address those issues.⁶⁷

Stewart E. Guthrie⁶⁸ argues that religion finds its origin in animism, an interpretative perceptive strategy “that aims too high, attributing to things and events more organisation than they have.” In the harsh and dangerous Pleistocene environment, this strategy must have had an evolutionarily advantageous pay-off, because in the case of a perceptive ambiguity—for instance, mistaking a boulder for

⁶¹For instance, Brown (1991), Armstrong (1993), James (1902; 1997), Atran (2002), Kardong (2010).

⁶²Eliade (1961).

⁶³Alper (2006, 62), Churchland (2011, 108).

⁶⁴For instance, d'Aquili and Newberg (1999), Hamer (2005), McNamara (2006; 2009).

⁶⁵For instance, Darwin (1871), James (1902), Harrison (1909), Cattell, (1938, 1972), Gallus et al. (1972), Stent (1976), Wilson (1978), Kieffer (1979), Reynolds and Tanner (1983), Baril (2006).

⁶⁶Tremlin (2006, 141).

⁶⁷For instance, Crippen and Machalek (1989), Boyer (2001), Atran (2002), McClenon (2002), Wilson (2002), Voland and Söling (2004), Dawkins (2006), McNamara (2006), Graffin and Provine (2007), King (2007), Bulbulia et al. (2008), Wolpert (2008), Ellsworth (2009), Feierman (2009), Voland and Schiefenhövel (2009), Wright (2009), Kardong (2010), Teehan (2010), Voland (2010).

⁶⁸Guthrie (1993, 39–61), see also Barrett (2000, 31–32), Atran (2006, 189), Teehan (2010, 45).

a bear—the overestimation of a potential danger would have been a life-saving decision. Hence, the animistic interpretative strategy is a more general application of Pascal's famous wager.⁶⁹

3.3.1 Earliest Signs of Religion/Religiosity/Spirituality

Some anthropologists have interpreted the occurrence of cannibalism and skull preservation amongst *Homo erectus pekinensis*, whose age is estimated to be 500,000 years, as the very first signs of a mystical belief system.⁷⁰ Also the nature of the Sima de los Huesos human remains (*Homo heidelbergensis*, estimated at 430,000 years old) was interpreted as the earliest signs of human burials.⁷¹

Ceremonial burials amongst *Homo sapiens neanderthalensis* are better established facts, indicating that this hominin devised a belief that death could be transcended.⁷²

The earliest signs of a mortuary ritual amongst *Homo sapiens sapiens* have been discovered on the Herto skulls from Middle Awash in Ethiopia, radioisotopically dated to between 160,000 and 154,000 years ago.⁷³ For *Homo sapiens sapiens* many more paleo-anthropological or archaeological findings are known to be indicative of the ancient presence of a belief system.⁷⁴ One of the most remarkable discoveries appertain to the famous Chauvet cave in the Ardèche Gorge in France, where in addition to the amazing cave paintings that are estimated to be some 32,000 years old, remains of a cave bear worship cult have been found.⁷⁵

Students of morality perceive in the history of humankind a gradual and hierarchical shift from a pre-moral sociality to a tribal morality and then towards a universal morality.⁷⁶ Even in the mid nineteenth century Charles Darwin⁷⁷ characterised the history of human morality by a gradual extension of our moral sensibility and awareness to ever larger and more inclusive social units. David C. Lahti⁷⁸ sees this extension of the circle of moral considerability in the shift from pre-religious animism to tribal religion and then towards universalising religion.

⁶⁹Pascal's wager (Pascal 1670) suggests that in a bet on whether God exists or not, a rational person should live as if God exists and try to believe in God because of the benefits to be expected in case that God really exists and has the powers attributed to him. If God does not exist, losses will only be finite.

⁷⁰Weidenreich (1943), Hayden (2003), Rossano (2007). See also Defleur et al. (1999) for cannibalism among the neanderthals.

⁷¹Carbonell and Mosquera (2006).

⁷²For instance, Louwe Kooijmans et al. (1989), Trinkhaus and Shipman (1993), Defleur et al. (1999).

⁷³White et al. (2003).

⁷⁴Hayden (2003).

⁷⁵Chauvet et al. (1995), Bocherens et al. (2006).

⁷⁶Singer (1981, 120), Lahti (2009, 70), Bellah (2011, 104).

⁷⁷Darwin (1871), Chaps. 4 and 5.

⁷⁸Lahti (2009, 70).

Based on A.F.C. Wallace's classification of cult institutions, Stephen Sanderson⁷⁹ distinguishes four major stages in the social evolution of religion: shamanic religions (containing only individualistic and shamanic cult institutions), communal religions (containing individualistic, shamanic, and communal cult institutions), Olympian religions (also containing ecclesiastical cult institutions and the worship of numerous gods), and monotheistic religions (identical to Olympian religions, but worshipping a single god). These four types can be regrouped into two major stages, namely kinship-based or tribal religions (including shamanic and communal religions) and organised world religions (including the large polytheistic and monotheistic religions).

3.3.2 Kinship-Based/Tribal Religions

Past and present hunter-gatherer populations are all characterised by the presence of kinship- or tribal-based religions, also sometimes called folk religions. They are animistic in orientation, meaning that spirits are not only present in humans but also in other components of nature. Animism attributes life to the lifeless, i.e. overvalues the real value of things and events.⁸⁰ Hunter-gatherer populations are often also characterised by the presence of belief in an afterlife, shamanism, and ancestor worship, but seldom adopt moralising high gods.⁸¹ The earliest forms of religion were strongly characterised by the prevalence of rituals and sacred narratives that strengthened bonding among members of the group and promoted the community's survival. They had little to do with matters of theology. Tribal-based religions predate the present-day organised or so-called world religions in agrarian and modern societies.⁸²

3.3.3 Organised or World Religions

Scholarly experts in the history of religions unanimously hold the view that the transition from animistic/kinship/tribal religions into organised or world religions occurred with the emergence of agrarian-pastoral stage in the socio-cultural and technological development of humankind, during which human populations established permanent settlements.⁸³ These religions developed in order to solve the social problems and conflicts that occurred as small societies based on kinship evolved into larger societies, composed of more numerous and less closely related people.⁸⁴ Hence, organised religions aim to promote broader forms of social

⁷⁹Sanderson (2008, 3).

⁸⁰Guthrie (1993, 6).

⁸¹Peoples et al. (2016). High God: is a "spiritual being who is believed to have created all reality and/or to be its ultimate governor" (Swanson 1960). High gods may "vary in their activity in human affairs and their concern with human morality" (Johnson 2005, 418).

⁸²Dennett (2007), Steadman and Palmer (2008, x), Wright (2009).

⁸³Armstrong (1993), Giovannoli (2000, 81), Dennett (2007).

⁸⁴Teahan (2010, 66), see also MacIntyre (2004), Van Schaik and Michel (2016).

cooperation beyond narrow kin-based relations.⁸⁵ Indeed, several researchers have found relationships between demographic and socio-cultural characteristics such as population size and density, the practice of agriculture, animal husbandry, and political complexity, and the development of beliefs in moralising gods or high gods.⁸⁶ Interestingly, environmental duress, either in the form of resource scarcity and/or ecological instability or aridity, also appears to contribute to the development of such beliefs.⁸⁷

However, organised or world religions are not only characterised by the belief in powerful, all-knowing, moralising, rewarding and sanctioning high god(s), but also by several additional features such as routinised rituals, 'fictive kinship' and in-group markers, elaborate value and norm ruling, mainly in the domains of self-control and sexual and reproductive behaviour. All of these are aimed at dealing with the challenges provoked by the new living conditions in order to promote the cultural, political, demographic and biological success of their communities.⁸⁸

The emergence of the agrarian-pastoral stage in human history was characterised by a large number of technological inventions. There was increasing subsistence productivity, changing living conditions and social relations within human societies, strongly characterised by increasing inequalities between the sexes, social classes, and whole societies.⁸⁹ There was also worsening of the living conditions, health, and quality of life of large portions of the population (with the exception of the ruling classes) due to increasing susceptibility to infectious diseases as a result of increasing population size and crowding, animal husbandry, and the dependence upon nutritional monocultures.⁹⁰ The early agrarian societies were strongly stratified theocracies in which elites safeguarded their social and economic privileges and reproductive advantages by suppressing and exploiting their subordinates.⁹¹

In a multi-regression analysis of the evolution of religion, Stephen Sanderson and Wesley Roberts⁹² identified two major predictors of the change of tribal to organised religion: the development of agriculture and the invention of writing.⁹³ The millennium BCE was characterised by the emergence of important new philosophical or religious innovations (Hinduism and Buddhism in India,

⁸⁵Recently Norenzayan et al. (2016) labelled the organised religions as 'prosocial religions'. Although the organised religions are characterised by a number of cultural features that strongly enhance the social relations and social cohesion within their societies, identifying them as 'prosocial' does not distinguish them from the previous stage in the development of religions, because the animistic or folk religions also had the promotion of social cohesion in their smaller communities as one of their major attributes and benefits.

⁸⁶Roes and Raymond (2003), Johnson (2005), Botero et al. (2014), Purzycki et al. (2016).

⁸⁷Snarey (1996), Botero et al. (2014).

⁸⁸Norenzayan et al. (2016, 13).

⁸⁹Lenski (1984), Heilbroner (1995, 30).

⁹⁰Veenhoven (2005), Steckel and Wallis (2009).

⁹¹Pinker (2011, 57), Peoples and Marlowe (2012).

⁹²Sanderson and Roberts (2008).

⁹³Farmer (2006) considers this transformation to be influenced by the expanded availability of lightweight reading materials.

Confucianism and Taoism in China, Israelite monotheism, philosophical rationalism in Greece) called the Axial Age⁹⁴ by Karl Jaspers.⁹⁵ One of the major religious characteristics of this change was the shift from polytheism to monotheism. Stephen K. Sanderson⁹⁶ explains this philosophical/religious transformation as the consequence of the massive increase in the scale of warfare, related to the development of iron weapons and to the rapid and large-scale urbanisation. Both of these were socially disruptive and psychologically anxiety-producing phenomena, which decreased people's attachments to close kin and other social intimates. Invoking Lee A. Kirkpatrick's⁹⁷ thesis that God or Gods are primarily substitute attachment figures for kin figures, Sanderson sees the Axial Age disruptions as the cause of the greater need for a substitute attachment figure in the person of a compassionate, all-powerful and loving God. Indeed, the technological (invention of agriculture, iron tools and writing) and socio-demographic (larger and more strongly stratified populations) changes allowed the formation of socially stratified, belligerent or war-torn states in which Axial sages tried to develop a just, equitable and compassionate ethic.⁹⁸ At the same time, rulers used the new religions as an instrument of social control and domination.⁹⁹

In their extensive evolutionary analysis of the Bible, Carel Van Schaik and Kai Michel¹⁰⁰ argue pertinently that the narratives of this Holy Scripture are largely representing cultural strategies aimed at resolving or adapting to the challenges and crises that emanated from the largest behaviour change in the history of humankind—the establishment of permanent settlements in the agrarian revolution. Indeed, this change was accompanied by multiple and more intensive calamities such as strong population growth and density (with their breeding ground for infections and impersonal relations) and ownership of real estate, land, husbandry and ... women (with its associated stronger social stratification and increased social inequalities and inequities, transference of pathogens from animals to humans, and increased intergroup violence and war).

The organised religions that emerged in agrarian cultures are usually classified into two major groups of religions: Eastern religions and Mediterranean religions. The Eastern religions consist of the religions and philosophical traditions originating in the Far East (India, China, Japan and Southeast Asia). The Mediterranean religions emerged in the Middle East and include Judaism, Christianity and Islam.¹⁰¹

Eastern and Mediterranean religions differ philosophically or theologically in a number of respects. Whereas the Mediterranean religions believe in a monotheistic

⁹⁴Ara Norenzayan et al. (2016, 24) argue that the societal and religious changes of the 'Axial Age' long preceded and even followed that period, and moreover developed very gradually.

⁹⁵Jaspers (1949, 15), see also Armstrong (2006).

⁹⁶Sanderson (2008, 153).

⁹⁷Kirkpatrick (2005).

⁹⁸For instance, Armstrong (2006, 397).

⁹⁹Wade (2009, 124).

¹⁰⁰Van Schaik and Michel (2016).

¹⁰¹Pinxten (2010).

God that is strongly involved in the daily life and afterlife of its believers, the Eastern religions and philosophical traditions have a more comprehensive conception of the divine. They also show a larger heterogeneity—some being (poly) theist such as Hinduism, Sikhism and Taoism, others being non-theist such as Buddhism and Confucianism; Shintoism is an animistic folk religion.¹⁰² Eastern religions/philosophies are either Dharmic (Hinduism, Buddhism) the goal of which is to liberate oneself from the suffering of the Earth, or Taoist (Taoism, Confucianism, Shintoism) that preaches harmony with the underlying natural order of the universe.¹⁰³ Whereas the religious-philosophical conceptualisation of the Eastern and Western traditions differ quite substantially, their ethical prescriptions or strivings show much more similarity, for instance, in commending moral virtues such as reciprocal altruism, enlightenment, austerity, familial duty, loyalty, humaneness, honesty, truthfulness, humility.

This discussion is largely limited to the three major organised religions—the so-called Abrahamic¹⁰⁴ religions (Judaism, Christianity and Islam) that emerged in the Middle East for two reasons. Firstly, the authors are somewhat more familiar with those religions, through the reading of their original scriptures—the Old and New Testaments of the Bible and the Qur'an—as well as through professional research and personal interactions and confrontations with their adherents and scholars. Secondly, and more importantly, those religions or at least two of them—Christianity (particularly Catholicism) and Islam—play currently an active role in slowing down some aspects of the modernisation process in many countries. Resistance to change is also seen at the intergovernmental level, for instance, at the occasion of the United Nations Conference on Population and Development in Cairo (1994), and the United Nations World Conference on Women in Beijing (1995) on issues such as family planning, sexuality and gender equality.¹⁰⁵

3.3.3.1 Judaism

The Hebrew Bible, which closely corresponds to the contents of the Jewish Tanakh and the Protestant Old Testament, narrates the largely mythical history of the Jewish people in ancient times—from the biblical creation of the world,

¹⁰²Nevertheless, ordinary people in these religions often believe in and pray to a series of gods and spirits that behave counterintuitively and unintelligibly to factual and logical reasoning (Atran 2006, 188).

¹⁰³For instance, Coogan (2005).

¹⁰⁴Abrahamic religions are the monotheistic faiths emphasising and tracing their common origin to Abraham, the mythical ancestor of several Middle East tribes, with whom, according to the Hebrew bible, God made a covenant about his worship, future descendants and land (Genesis, 17). Christians see Abraham as their spiritual and physical ancestor (Rom. 4:17). Muslims see Abraham as a prophet in the line from Noah to Muhammad, all to whom Allah sent revelation (Qur'an, 4:163).

¹⁰⁵At the conferences of Cairo (1994) and Beijing (1995), the Holy See, some Catholic countries and some Islamic countries, after having endeavoured and partly succeeded in watering down the conference recommendations, expressed many reservations on the conference consensus that was reached (United Nations 1994, 1995).

approximately 4050 BCE,¹⁰⁶ to the times of Nehemiah, governor of the province of Judah in the Persian Empire, approximately 450 BCE. However, scientific evidence does not support the historical actuality of the events recorded in the Old Testament, in particular for the period preceding the Babylonian captivity in the sixth century BCE.¹⁰⁷

From the Tanakh/Old Testament, it appears clearly that Judaism is an ethno-centric religion, inspired and dominated by a jealous God¹⁰⁸ who favours his chosen people¹⁰⁹ by establishing a covenant with its tribal patriarchs,¹¹⁰ by giving land to them and all of their offspring,¹¹¹ and by blotting out their enemies.¹¹² Richard Dawkins¹¹³ characterised Judaism as:

originally a tribal cult of a single fiercely unpleasant God, morbidly obsessed with sexual restrictions, with the smell of charred flesh, with his own superiority over rival gods and with the exclusiveness of his chosen desert tribe.

In a longer term historical perspective the Judaism belief system with its strong in-group genealogical identity-oriented tenets and its rigorous adherence to formalistic behaviour in matters such as sexual, nutritional and vestimentary rules, contributed considerably to maintaining the survival of its population throughout history, despite the frequent persecutions to which it was subjected. Furthermore, notwithstanding that the confession of Judaism is largely limited to Jewish people, its ideological and historical significance is more important, because of its early move from polytheism to monotheism, but also through its influence on the much more widespread Christianity and Islam.¹¹⁴

3.3.3.2 Christianity

The message of Jesus, a charismatic Jewish rabbi in early first century Palestine, was exclusively addressed to Jews¹¹⁵ and had little adherence.¹¹⁶ It was Paul of Tarsos who broadened it to all of humankind, beyond national or ethnic borders.¹¹⁷

¹⁰⁶Ussher (1650).

¹⁰⁷Thompson (2000), Lazare (2002), Silberman and Finkelstein (2002).

¹⁰⁸Exodus, 20:5: "You shall not bow down to them (i.e. *other gods*) or serve them, for I the Lord your God am a jealous God, ..."

¹⁰⁹Deuteronomy 7:6: "For you are a people holy to the Lord your God. The Lord your God has chosen you to be a people for his treasured possession, out of all the peoples who are on the face of the earth."

¹¹⁰Genesis 17:7: "And I will establish my covenant between me and you and your offspring after you throughout their generations for an everlasting covenant, to be God to you and to your offspring after you."

¹¹¹Genesis 17:8: "And I will give to you and to your offspring after you the land of your sojournings, all the land of Canaan, for an everlasting possession, and I will be their God."

¹¹²Exodus 23:22: "But if you carefully obey his voice and do all that I say, then I will be an enemy to your enemies and an adversary to your adversaries."

¹¹³Dawkins (2006, 37).

¹¹⁴Wilson (2002, 133).

¹¹⁵Matthew 10:5-6; Vermes (2004, 414), Wright (2009, 267).

¹¹⁶Stark (1997).

¹¹⁷Galatians 6:10; Sim (1997, 192), Vermes (2004, 417), Dawkins (2006, 37), Wright (2009, 267).

It became a universal belief, not constrained to any ethnic group. The only requirement for belonging was belief in the Christian God.¹¹⁸

The theme of Jesus' teaching was strongly eschatological¹¹⁹ in orientation.¹²⁰ He preached submissiveness, repentance, unconditional love, forgiveness of sin, grace, and supported morally those who were traditionally treated as the 'wretched of the earth' such as slaves, women, the poor, ethnic outsiders, children, prostitutes, the sick and prisoners. During the Roman Empire, Christianity partly thrived due to the misery and misfortune related to social inequality, oppression and slavery.¹²¹

In many respects, Christian ideology, as it appears from the Sermon on the Mount¹²² and other sections in the New Testament,¹²³ is partly at odds with some of our inborn human drives; and it contrasts strongly with the evolutionary mechanisms as they functioned in pre-modern tribal living conditions.¹²⁴ For instance, Christianity extended morality to all persons regardless of kin or tribal relatedness, thus adapting to a more complex, multi-ethnic environment.¹²⁵ However, notwithstanding its broadened vision, Christianity retained the old-time in-group/out-group bipolarity, now based on a moral divide instead of non-shared ancestry.¹²⁶ Nevertheless, from an evolutionary perspective, Christianity was really a revolutionary movement in its time and place—"a kind of mutation on the bio-cultural scene" as Philip Heffner¹²⁷ puts it, only followed and further broadened almost two millennia later by the innovative ethical principles of the Western Enlightenment.

Some of the moral concepts found in the Sermon of the Mount, in particular the ethic of reciprocity, were not original or unique in the history of humankind, but were widespread among the peoples of the Middle East.¹²⁸ The Golden Rule,¹²⁹ for instance, is virtually a universal ethical precept.¹³⁰ However, it must be acknowledged that the love message of Christianity expressed this value in a very positive and explicit way.

From the present day perspective, Jesus' teachings also include many elements that are maladaptive from a biological evolutionary perspective,¹³¹ or reprehensible from a modern evolved moral perspective.¹³² The Bible contains, not only in the

¹¹⁸Matthew 25: 31-46; Keith (1946, 73), Teehan (2006, 768).

¹¹⁹Eschatology: is the branch of theology dealing with the final events of history, or the ultimate destiny of humanity.

¹²⁰Vermes (2004, 343).

¹²¹Cattell (1972, 272).

¹²²Matthew 5-7.

¹²³For instance, John 1:9; Matthew 28:19; Gal. 3:28; Rom. 2:11; Cor. 12:13.

¹²⁴Keith (1946, 69), Teehan 2009, 244; 2010), de Duve (2009; 2011).

¹²⁵Lahti (2009, 85).

¹²⁶Lahti (2004, 143), Teehan (2010, 129, 142).

¹²⁷Hefner (1999, 495).

¹²⁸For instance, Vermeersch (2016, 62–65).

¹²⁹Golden Rule or ethic of reciprocity states that "one should treat others as one would like others to treat oneself".

¹³⁰For instance, Blackburn (2001).

¹³¹For instance, Matthew 5:17; 5:28-30; 6:7-11; 6:25-34; 10:35.

¹³²For instance, Matthew 5:32; 10:34.

Old Testament but also in the New Testament, moral directives that are unjustifiable from a modern moral perspective.¹³³ This is the case, for instance, concerning slavery,¹³⁴ non-believers¹³⁵ and women.¹³⁶

Christians appeared to be only one of the numerous new religious sects in the late Roman Empire.¹³⁷ Many scholars have pondered on why it became such a successful movement. Various explanations have been suggested, which are probably not mutually exclusive. For instance, the Christian movement appealed to the many ‘wretched of the Earth’. Pagan women in Roman times perceived the living conditions and expectations of Christian women better than their own (more faithful and less abusive husbands), and/or the fact that Christians developed communal and caretaking practices that protected them better against illnesses and epidemics,¹³⁸ allowing them to reproduce at higher rates.¹³⁹ Compared to the then existing belief systems in the Roman Empire, Christianity excelled due to its positive concepts of a commonsensical morality, salvation, and resurrection in a paradisiacal hereafter.¹⁴⁰ However, in the authors’ view, there may have been an additional and even more fundamental reason for the initial Christian success: the Christian love message agreed very well, particularly in the socially disruptive environment in which it emerged, with human innate predispositions to the needs of empathy, altruism and reciprocity. The evolutionary background of this predisposition was only scientifically discovered during the Second Darwinian Revolution (see Chap. 1, Sect. 1.1.4). In their evolutionary analysis of the Bible, Carel Van Schaik and Kai Michel¹⁴¹ also point to the importance of the intuitive moral component of early Christianity that wanted to go back to the biosocial and moral roots of the hunter-gatherer era with its stronger intimate and more equal social relations.

Of course, in the end, politics also played a crucial and even decisive role in the firm footing of Christianity: soon after Emperor Constantine I issued in 313 CE the Edict of Milan, legalising Christian worship, Emperor Theodosius declared in 380 CE Christianity to be the only legitimate religion in the Roman Empire. Although the imperial conversion to Christianity might have occurred out of sincere faith, this monotheistic religion with its hierarchical, centralised structure, preaching charity

¹³³Williams (1893, 522).

¹³⁴For instance, Ephesians, 6:5-8: “Slaves, obey your earthly masters with fear and trembling, with a sincere heart, as you would Christ, not by the way of eye-service, as people-pleasers, but as servants of Christ, doing the will of God from the heart, rendering service with a good will as to the Lord and not to man, knowing that whatever good anyone does, this he will receive back from the Lord, whether he is a slave or free.”

¹³⁵For instance, Mark 16:16: “Whoever believes and is baptized will be saved, but whoever does not believe will be condemned.”

¹³⁶In Judeo-Christian Scriptures, women are expected to be submissive to their husband and their primary role is childbearing. For instance: Timothy 2:11-15; see also Corinthians, 11:3 and 14:34.

¹³⁷Jones and Reynolds (1995, 299).

¹³⁸Kitcher (2007, 143), Richerson and Boyd (2005, 210).

¹³⁹Wilson (2002, 148).

¹⁴⁰Adams (1995).

¹⁴¹Van Schaik and Michel (2016, 334).

and docility to its submissive believers, fitted well with the worldly ambitions of the imperial Roman rulers.¹⁴² In general, autocratic regimes choose to value religious beliefs as a socially binding agent and support for their government.

Christianity became a political power that served as an instrument of rulers' divine justification of their exercise of power, religious warfare, ethnic cleansing, Crusades, torture, witch hunting, persecution and burning of heretics, Inquisition, Jewish pogroms, and intolerance towards non-believers in general.¹⁴³ In his remarkable study of violence in human history, Steven Pinker¹⁴⁴ rightly concluded that Christendom in medieval times evolved to a culture of cruelty.¹⁴⁵

In particular, it became an institution that, in opposition to the preaching of its founders, ideologically justified and politically supported the rulers of the earth (kings, emperors, and dictators of all kinds) and enriched itself at the cost of its followers.¹⁴⁶ Although at odds with some of evolutionary mechanisms in its original teaching, Christianity applied age-old evolutionary methods of in-group/out-group competition during its expansion.¹⁴⁷

In modern times, even up to today, several branches of Christianity, and in particular Catholicism, issue and impose behavioural norms in the domain of sexuality and reproduction, inspired and justified by ancient principles that are maladapted to the novel living conditions of modern culture and society.¹⁴⁸ Typical examples are opposition to birth control and the imposition of a single acceptable model of the family.

In most present-day developed countries Christianity (or at least several of its major denominations) appears as a tolerant ideology, accepting ideological pluralism and involved in inter-ideological cooperation, also at the political level. However, this is a very recent development. It is a result of a long and hard confrontation and struggle with the secular ideologies and political movements that emerged in the footsteps of the Enlightenment and the development of the sciences to which Christianity eventually largely adapted. Whenever or wherever Christianity succeeded in preserving its ideological monopoly and political power, the positions of non-believers, non-Christians or even 'deviant' Christians were/are much more precarious, often characterised by societal ostracism or exclusion. This dominant behaviour is, of course, not specific to Christianity, but can be observed wherever a dogmatic or doctrinarian ideology succeeds in seizing total power—cf. the fascist and communist authoritarian regimes of the twentieth century or the current-day Islamic theocracies.

¹⁴²O'Grady (2013, 347–352).

¹⁴³For instance, Keith (1946, 73), Harris (2004), Hitchens (2009), Nicey (2017).

¹⁴⁴Pinker (2011, 132).

¹⁴⁵For a more general discussion of religious violence, see for instance Haught (2002) or Deschner (1986–2013).

¹⁴⁶Lowell (1967), Sheils and Wood (1987).

¹⁴⁷Keith (1946, 73).

¹⁴⁸Cf. the Roman Catholic position on contraception (Pope Pius XI, 1930; Pope Paul VI 1968), abortion (Pope John Paul II, 1995), in vitro fertilisation (IVF) (Congregation for the Doctrine of the Faith, 1987), homosexuality (Catholic Church, 1993), eugenics (Pope Benedict XVI, 2009), and euthanasia (Sacred Congregation for the Doctrine of the Faith, 1980).

3.3.3.3 Islam

Muslims consider the Qur'an, revealed to Muhammad (570–632 CE) through the angel Gabriel as guidance for mankind,¹⁴⁹ as the literal word of God.¹⁵⁰

The Qur'an's main message is to believe in the monotheistic, almighty and all-knowing, but unpredictable and capricious Allah in need of worship.¹⁵¹ The Qur'an is largely influenced and referenced by the Judeo-Christian scriptures.

Its moral commandments largely reflect the male dominated social power relations in the ancient agrarian-pastoral, tribal-structured Arabian society—with the ideological endorsement of women's submissive position,¹⁵² protection of male sexual prerogatives,¹⁵³ maintenance of polygyny,¹⁵⁴ acceptance of slavery,¹⁵⁵ exclusion or even extermination of people with deviant opinions,¹⁵⁶ incentivising 'jihad' (= 'striving in the way of Allah'),¹⁵⁷ and carrying out cruel punishments.¹⁵⁸

¹⁴⁹Qur'an 2:185; see also Qur'an 25:5-7.

¹⁵⁰According to independent Islam-scientists, the Qur'an is, just as the Old and New Testaments of the Bible, the result of a long editorial process that took several centuries and in which several authors were involved (e.g. Warraq 1998; Mulder and Milo 2009; Ohlig and Puin 2009).

¹⁵¹See also Edis (2007, 153).

¹⁵²Qur'an 4:34: "... if you fear high-handedness from your wives, remind them (of the teachings of God), then ignore them when you go to bed, then hit them."

¹⁵³Qur'an 55:70-74: "There are good-natured, beautiful maidens... Dark-eyed, sheltered in pavilions... Untouched beforehand by man or jinn... Which then, of your Lord's blessings do you both deny?"

¹⁵⁴Qur'an 4:3: "If you fear that you will not deal fairly with orphan girls, you may marry whichever (other) women seem good to you, two three or four. If you fear that you cannot be equitable (to them), then marry only one, or your slave(s): that is more likely to make you avoid bias."

¹⁵⁵Qur'an 33:50: "Prophet, We have made lawful to you the wives to whom you have granted dowries and the slave girls whom God has given you as booty."

¹⁵⁶Qur'an 5:33: "Those who wage war against God and His Messenger and strive to spread corruption in the land should be punished by death, crucifixion, the amputation of an alternative hand and foot, or banishment from the land: a disgrace for them in this world, and then a terrible punishment in the Hereafter, unless they repent before you overpower them—in that case bear in mind that God is forgiving and merciful." See also Qur'an 9:73.

¹⁵⁷Qur'an 4:74: "Let those fight in the way of Allah who sell the life of this world for the other. Who so fights in the way of Allah, be he slain or be he victorious, on him We shall bestow a vast reward."

¹⁵⁸Qur'an 24:2-3: "Both the male and female who are guilty of adultery or premarital sex are to be flogged with one hundred lashes. Absolutely no mercy is to be given. It is to be witnessed by a group of Muslims. The adulterers can only marry a person who has been found guilty of the same crime or an unbeliever in the religion or Islam."

Qur'an 5:38: "Men or women who steal must have their hands cut off as a reward for their deeds. This will be an example for others."

Qur'an 8:12-14: "The hearts of the infidels will be terrorized so Muslims should attack with courage and behead them and cut off all their fingers. Maiming your victims will show that opposing Allah and Mohammed results in severe punishment. They are going to Hell."

Qur'an 5:33-34: "Those who make war on Allah and Mohammed or strive to spread disorder in the land should be killed, crucified, have their hands and feet cut off on alternate sides or be exiled. They must be degraded in this world and doomed in the afterlife except those that repent before the Muslims capture them. In their case Allah will forgive them."

Just as Jesus Christ (or his followers) evoked divine intervention to promote his (their) teachings and religious-ethical standards, Muhammad¹⁵⁹ must have been a very charismatic, intelligent and shrewd man who understood very well how to appeal to his followers with his divinely inspired revelations. Historically, it appears that evolution towards family-transcending morality required stronger coercive imposition and punishment.

From a present day ethical point of view, it must be acknowledged that the Qur'an advocates some laudable, though not original moral principles,¹⁶⁰ and sounds even quite modern in its style of theological argumentation.¹⁶¹ However, overall, it has more similarities with the Old Testament than with the quite innovative teachings of Christianity in the New Testament as expressed in the Sermon on the Mount.¹⁶²

Most puzzling to non-religious scholars is the inconsistency between the idea of an all-mighty, all-knowing and all-compassionate God who does whatever he wants¹⁶³ and the alleged freedom of people to choose between good and bad and between belief and disbelief. It may be argued that Islam's theology contains a number of features and controversies that make it difficult for Islamic believers and their societies to fully contribute to and participate in the scientific and moral innovations of modern times.¹⁶⁴ Examples are the literal reading of the Qur'an and the infallible status of Muhammad, its divinely derived fatalism, its focus on the hereafter and its glorification of martyrdom, its custom to give individuals the power to enforce Islamic law by commanding the good and forbidding evil, its reliance on the ancient Shari'ah,¹⁶⁵ and its commandment to wage jihad.

Perhaps more important than the reflections about theological subtleties of Islam is the fact that the initiators of this religion succeeded in promoting the Arabian political and cultural identity and its expansion.¹⁶⁶ Historically, Islam spread over a large part of the Middle East, Africa and Asia through conquest or migration, easy

¹⁵⁹Or his followers who drafted the Qur'anic texts in the two or three centuries after Muhammad's death (see, for instance, Rodinson 1996; Warraq 1998; Ohlig and Puin 2009; Hazleton 2014).

¹⁶⁰Apparently, Islam's initiators (Muhammad and/or his followers) felt the need to react against the thriving but ruthless capitalism in the economically booming and successful Mecca of their time, causing them to preach that Muslims ought to develop a just and fair society in which the less fortunate and more vulnerable are treated decently (Armstrong 1993, 156, 167; see also Hazleton 2014).

¹⁶¹Wright (2009, 397).

¹⁶²Matthew 5-7.

¹⁶³For instance, Qur'an 2:272: "Not upon you, [O Muhammad], is [responsibility for] their guidance, but Allah guides whom He wills..."

¹⁶⁴Hirsi Ali (2015, 34).

¹⁶⁵Shari'ah is Islamic religious law derived from the Holy Qur'an and the Sunnah. It refers to the sayings and practices of the Prophet Muhammad as recorded in a hadith. It is based on divine authority, and embodies broad, general rules that are immutable.

¹⁶⁶Armstrong (1993, 158), Kennedy (2007), Wade (2009, 622).

conversion (but difficult apostasy), strong ideological indoctrination of children¹⁶⁷ and adult believers,¹⁶⁸ and high fertility (primarily indirect, through Islamic views about the social role of women).¹⁶⁹ In recent decades, Islam has also gained a foothold in several European countries, through immigration from former colonies or recruitment of immigrant guest workers, family reunion policies, and high fertility.¹⁷⁰ In most recent years this is also occurring via refugees and asylum seekers from conflict or war areas, prompted by a variety of causes such as population pressure, climate change, oil interests, internal or regional political power struggles, and Western neo-colonialism.

Present-day countries where Islam is the predominant religion have not undergone their own Reformation or Enlightenment.¹⁷¹ As a consequence the scientific and moral benefits of modernity are difficult to achieve, such as freedom of thought and speech, the acceptance of ideological and political pluralism and tolerance, the separation of religion and state, the creation and dissemination of scientific knowledge (e.g. concerning evolution science), the realisation of sexual equality, the right to individual self-realisation.¹⁷²

An example is the difficulty to reconcile the full body of values articulated in the United Nations Universal Declaration on Human Rights by many Islamic states. In the 1990 *Cairo Declaration on Human Rights in Islam* (CDHRI), adopted by the Nineteenth Islamic Conference of Foreign Ministers of the Organisation of the Islamic Conference, Article 24 of the CDHRI states that it is “subject to the Islamic Shari’ah”, and its Article 25 confirms that Shari’ah “is the only source of reference for the explanation or clarification of this Declaration.”

The CDHRI is clearly at odds with the principles of freedom of worldviews and life stance of the UN human rights charter. The Cairo Declaration makes no mention of provisions for democratic principles, protection for religious freedom and change of religion, freedom of association and freedom of the press, as well as equality of rights and equal protection under the law.¹⁷³ In contrast, it includes a

¹⁶⁷See for instance Stamos (2008, 183).

¹⁶⁸According to David N. Stamos (2008, 183), the requirement of public prayer five times a day especially helps preserve the Islam meme complex in populations with low literacy levels.

¹⁶⁹For instance, Coleman, in Jones and Reynolds (1995, 240).

¹⁷⁰Haddad (2002), Bawer (2006), Nachmani (2009).

¹⁷¹Bruce (2002), Rushdie (2005), Pope Benedict XVI (2006), Harris (2007), Kaufmann (2011, 11), Hirsi Ali (2015), del Valle (2016).

¹⁷²Du Pasquier (1992), Lewis (2003), Manji (2003), Edis (2007), Van Rooy and Van Rooy (2010), Hirsi Ali (2015).

¹⁷³Littman (2003).

striking discrimination against non-Muslims,¹⁷⁴ women,¹⁷⁵ and non-married people.¹⁷⁶ It also restricts certain rights and freedoms of expression,¹⁷⁷ even to the extent that certain essential provisions are below the legal standard in force in a number of Islamic countries. Under the cover of the 'Islamic Shari'ah' it even legitimises corporal punishments that in some countries (e.g. Saudi Arabia, Pakistan, Iran, Somalia, Sudan and northern Nigeria) include floggings, stoning, and amputations.

The fundamentalist Islamist wave and its terrorist actions that have ravaged parts of the planet in recent years have several obvious geopolitical causes. This includes national and international political power struggles and economic inequalities, and in particular the hegemony of the United States, the developmental retardation of

¹⁷⁴The CDHRI includes several articles which are exclusive for non-Muslims, for example

Article 1:

(a) All human beings form one family whose members are united by their subordination to Allah and descent from Adam....

(b) All human beings are Allah's subjects, and the most loved by Him are those who are most beneficial to His subjects, and no one has superiority over another except on the basis of piety and good deeds."

Article 2:

(a) Life is a God-given gift...

Article 10:

Islam is the religion of true unspoiled nature. It is prohibited to exercise any form of pressure on man or to exploit his poverty or ignorance in order to force him to change his religion to another religion or to atheism.

Article 11:

(a) Human beings are born free, and no one has the right to enslave, humiliate, oppress or exploit them, and there can be no subjugation but to Allah the Almighty.

Article 23:

(b) Everyone shall have the right to participate, directly or indirectly in the administration of his country's public affairs. He shall also have the right to assume public office in accordance with the provisions of Shari'ah.

¹⁷⁵Under Shari'ah law, Islamic marriages require that a Muslim woman may marry only a Muslim man and that her guardian must give permission for a virgin female to marry. Women's testimony is only worth half that of a man, but also their freedom of movement is strictly limited. Women are not even free to choose their work. Orthodox Islam forbids women from working outside the home (Warraq 2009).

Article 6 of the CDHRI stipulates the following about women:

(a) Woman is equal to man in human dignity, has her own rights to enjoy as well as duties to perform, has her own civil entity and financial independence, and the right to retain her name and lineage.

(b) The husband is responsible for the maintenance and welfare of the family.

¹⁷⁶The CDHRI states in its Article 5 among others: " (a) the family is the foundation of society, and marriage is the basis of making a family. ...".

¹⁷⁷The CDHRI includes the following Article 22:

(a) Everyone shall have the right to express his opinion freely in such a manner as would not be contrary to the principles of the Shari'ah....

(b) Everyone shall have the right to advocate what is right, propagate what is good, and warn against what is wrong and evil according to the norms of Islamic Shari'ah.

(c) Information is a vital necessity to society. It may not be exploited or misused in such a way as may violate sanctities and the dignity of Prophets, undermine moral and ethical values or disintegrate, corrupt or harm society or weaken its faith.

the Islamic world, the Israeli-Palestinian crisis, and the power struggles for oil-control. However, it cannot be denied that the conceptual breeding ground of this movement is strongly fuelled by the controversies in the contents of the Islamic religious-political ideology.

In pluralistic environments—for instance at international conferences where people are present from different belief and ideological systems, religious and secular—Muslims often present their faith as one of peace and tolerance.¹⁷⁸ It is also striking that, in the aftermath of the terrorist attack on the French magazine ‘*Charlie Hebdo*’ early in 2015, so many western politicians, representatives of Muslim communities, and media commentators publicly denied that Islam—“a religion of peace”—had anything to do with that evil deed. This denial may be intended to appease the internal and international Muslim community, but it is not at all helpful to prevent terrorist acts or promote Muslims’ social inclusion into modernity. When one reads carefully the Islamic scriptures¹⁷⁹ or consults the national legislations of some Islamic countries, a totally different picture emerges. The Flemish philosopher Maarten Boudry¹⁸⁰ recently suggested to moderate Muslims not to use direct quotes from the Qur’an in disputes with Islamic fundamentalists. When they endeavour to evince the peaceful character of Islam and distance themselves from Islamic fundamentalists on the basis of the rare Qur’an verses expressing peacefulness or tolerance towards ‘others’, they expose themselves to quotes by fundamentalists who then highlight the uncountable number of hate verses scattered all over the Qur’an that call for jihad, or express intolerance, hate, damnation, or violence against unbelievers or apostates.¹⁸¹ The authors consider that coherent reflections rather than direct quotes from the Holy Scriptures are more appropriate in debates about values and can address better challenges of the power struggles in modernity.

3.4 Some Anthropological Questions and Paradoxes About Religions as Sources of Morality

From a human-evolutionary perspective, a question inevitably arises why the divinely inspired prophets/messiahs such as Moses, Jesus and Muhammad, and their scriptures, appeared so late in human history. These religions do not explain why the souls of the many thousands of generations of *Homo sapiens sapiens* who predated classical antiquity were not worth saving. A conservative estimate is that *Homo sapiens sapiens* is 150,000–300,000 years old.¹⁸² What about the souls of

¹⁷⁸For instance, Rauf (2004).

¹⁷⁹In addition to the Qur’an, see the Hadith collections of Muhammad Ibn Ismail al-Bukhari (810-870): *Sahih Bukhari*, and Muslim ibn al-Hajjaj al-Qushayri (821-875): *Sahih Muslim*.

¹⁸⁰Boudry (2014; 2015, 187).

¹⁸¹http://www.answering-islam.org/Quran/Themes/jihad_passages.html.

¹⁸²Vigilant et al. (1991), White et al. (2003), Trinkaus (2005), McDougall et al. (2005), Hublin et al. (2017), Richter et al. (2017).

the major hominins¹⁸³ who preceded *Homo sapiens sapiens*, namely *Homo erectus*, whose age may be estimated to be tenfold higher, namely 1.5–2.0 million of years?¹⁸⁴ Why did Jaweh/God/Allah's revelations only occur in what is from an evolutionary time perspective to be defined as the very recent past, and only in some semi-desert regions of the Middle East? Religious believers, even when they address this problem,¹⁸⁵ have never provided a convincing answer to this fundamental question. Whenever they try, as for instance Gary Emberger from the Department of Natural Sciences at Messiah College in Grantham, Pennsylvania,¹⁸⁶ the present-day scientific achievements and insights on the evolution of the cosmos, the planet, life on this planet, and in particular the hominisation process, appear to be largely misunderstood, ignored, or even distorted. To a great extent real insight is absent regarding the complexity, comprehensiveness, and cohesiveness of the present-day huge body of scientific knowledge of the broad variety of the natural, social and cultural sciences. Confronting the high age of humankind and the evolutionary continuity between modern humans and their hominin predecessors, it is understandable that theologians are desperately, and in vain, struggling to reconcile those facts with myths such as the biblical Genesis story.¹⁸⁷

Equally incoherent is the assertion that God is almighty and omniscient, creator of everything, and at the same time morally perfect, immensely benevolent and loving. Philosophers have amply shown the logical incompatibility between the alleged multiple attributes of God and, in particular, the inconsistency between those attributes and the existence of evil.¹⁸⁸ Indeed, how to explain the ruthlessness of the evolutionary mechanism (mutation, natural selection) and its biological effects (genetic impairments and infectious diseases) or natural catastrophes? An omnipotent supernatural power that produces such human and animal suffering can only be labelled a sadist. Of course, there is the narrative of original sin¹⁸⁹ that might explain human-made calamities, such as wars, famines, environmental destruction, and a variety of criminal acts, but how to explain genetic impairments or natural disasters for which the human cannot be responsible? Furthermore, how to justify the punishments of innocent people for the assumed mischiefs and vices

¹⁸³In present-day taxonomic terminology, *Hominina* is a sub-tribe (including modern humans and their extinct relatives) of the Family *Hominidae* (including the great apes and humans) (cf. Goodman et al. 1998).

¹⁸⁴Grine et al. (2009), Fleagle et al. (2010).

¹⁸⁵For instance, Miller (1999), Giberson (2008), Deane-Drummond (2012), Walton (2012).

¹⁸⁶Emberger (1994).

¹⁸⁷Moritz (2012).

¹⁸⁸Russell (1957, 1997), LaCroix (1974), Stump and Murray (1999, 153), Everitt (2004, 228, 2006), Teehan (2013). See, in particular, the excellent collection of philosophical papers in the anthology of Michael Martin and Ricki Monnier (2003), especially Part 2 (59–124): Deductive evil disproves of the existence of God.

¹⁸⁹The Augustinian notion of an angelic fall giving rise to the natural evils of our world and the corruption of an originally perfect creation (Campbell 1975; Hick 1966; Emberger 1994; Williams 2001; Haught 2004, 2010).

of their far-off ancestors? The fundamental question of *Le problème du mal*¹⁹⁰ has never been given a satisfactory religious explanation, despite the innumerable ingenious, intellectual acrobatics of apologists and theologians to explain that phenomenon.¹⁹¹ Hence, it is not surprising that most philosophers consider the existence of evil the strongest argument against the existence of the type of deity worshipped in the Abrahamic religions.¹⁹²

Moreover, why would an omnipotent, omniscient, benevolent, and merciful supernatural power only favour ‘the chosen ones’ and not the others (as in Judaism), or ‘the true believers’ and not the non-believers, the pagans, the agnostics, and the atheists, who apparently have not been granted God’s grace¹⁹³ (as in Christianity and Islam)? In particular, why would a just God have created a human species in which there are such salient, non-self-induced inequalities and inequities, either of genetic, ontogenetic, or purely social origin? Why are there these discriminations amongst its creations?

Why would a just and benevolent God be so sexist by only favouring the male gender, and ideologically and socially discriminating the female gender, as can be witnessed from the prayer of male Jews “Thank you, God, for not making me a woman”,¹⁹⁴ or from the Catholic tradition that only men can become priests, bishops, or popes,¹⁹⁵ or from Islamic customs that women, and not men, should wear a headscarf, a veil, or even a burqa, or in the hereafter serve as one of the 72 virgins for the male martyrs of Jihad?¹⁹⁶ The founding fathers of the three Abrahamic religions were awful sexists and/or driven by a psychopathological fear of femininity. In either case they faithfully reflected the mores and practices of the ancient patriarchal, male dominated type of society.

¹⁹⁰Leibnitz (1710), Teilhard de Chardin (1956, 345), Barbour (1997, 300). See also the discussions, for instance, in Stump and Murray (1999, 153), Everitt (2004, 228), Kitcher (2007, 123), Ehrman (2008) or Vermeersch (2016, 35ff), about the logical inconsistency of evil with the existence of a being which is all-powerful, all-knowing, and perfectly good.

¹⁹¹For instance, Emberger (1994), Barbour (1997, 300ff), Crean (2007), McGrath (2004), McGrath and McGrath (2007), Berlinski (2008), Haught (2008, 2010), Southgate (2008), Fleck (2011), Coakley (2013).

¹⁹²Martin and Monnier (2003, 59–124), Everitt (2004, 228), Stenger (2009, 107), Vermeersch (2016, 34ff).

¹⁹³“For by grace you have been saved through faith: and this is not your own doing, it is the gift of God—not because of works, lest any man should boast” (Eph. 2: 8-9).

¹⁹⁴The Talmud Menahoth 43b-44a says that a Jewish man should pray the following prayer each day: “Thank you God for not making me a gentile, a woman, or a slave”.

¹⁹⁵Corinthians 14:34-35: “the women should keep silent in the churches. For they are not permitted to speak, but should be in submission, as the Law also says. If there is anything they desire to learn, let them ask their husbands at home. For it is shameful for a woman to speak in church.”

¹⁹⁶“It was mentioned by Daraj Ibn Abi Hatim, that Abu al-Haytham ‘Adullah Ibn Wahb narrated from Abu Sa’id al-Khudhri, who heard Muhammad saying, ‘The smallest reward for the people of Heaven is an abode where there are eighty thousand servants and seventy-two houri, over which stands a dome decorated with pearls, aquamarine and ruby, as wide as the distance from al-Jabiyyah to San’a.’ (Imam at-Tirmidhi in his “Sunan”, Volume IV, chapters on “The Features of Heaven as described by the Messenger of Allah”, chapter 21: “About the Smallest Reward for the People of Heaven”, hadith 2687).

Why has humankind known so many Gods, almost as many (and in polytheism even more) as there were tribes or civilisations? Why was there a Brahma (Hindu), a Shangdi (Chinese), an Anu (Babylon), a Zeus (Greek), a Jahweh (Judaism), a Jesus (Christianity), a Quetzalcoatl (Aztec), a Viracocha (Inca), an Al-Lah (Islam), out of the 217 gods listed in an overview of the world's major deities?¹⁹⁷ If God exists and wanted to reveal himself to humankind as his favoured creature, why has he not been revealed everywhere as the same and, moreover, unique creator and benefactor? The authors suggest some pathways for addressing these questions in an evolution science perspective.

3.5 Biological Determinants of Religiosity and Spirituality

3.5.1 Genetics of Religiosity and Spirituality

The idea that religiosity is influenced by genetic factors is not at all new, for example in the nineteenth century Francis Galton¹⁹⁸ stated in his *Hereditary Genius* “a pious disposition is decidedly hereditary”. Nowadays, evidence for this view comes from two domains of genetic research: behavioural genetics and molecular genetics.

3.5.1.1 Heritability

Features such as spirituality and religiosity are typical characteristics that show a continuous variation within a population: there are few people with strong spiritual and religious drives and there are few people who score very weakly on these variables; most people take an intermediate position.¹⁹⁹

On the hypothesis that such behavioural characteristics might be influenced both by genetic and environmental factors, some behavioural geneticists have applied standard behavioural genetic research methods²⁰⁰ to estimate the degree to which

¹⁹⁷ancienthistory.about.com/library/bl/bl_myth_gods_index.htm.

¹⁹⁸Galton (1869, 274).

¹⁹⁹For instance, Inglehart et al. (2004), Pickel and Müller (2009).

²⁰⁰These standard methods are based on the variance analysis of different groups of people, varying in their degree of genetic similarity and differences in the environment in which they have been raised. A classical method consists of cross-comparing identical and non-identical twins, raised in the same or in different families (e.g. Plomin et al. 2008). The fraction of the phenotypic differences between individuals that can be attributed to genetic differences is called heritability and the fraction that can be identified as environmental variance is called modifiability. One of the most important subdivisions of environmental variance is the division between shared and non-shared environmental influences that can affect members of the same family. The notion ‘shared environment’ refers to between-family non-genetic differences that make siblings more similar than children reared in different families. Social class and parental differences in childrearing styles are examples of between-family variation. The concept of ‘non-shared or unique environment’ refers to within-family non-genetic variance that makes siblings in the same family different from one another. Within-family non-genetic differences include prenatal and biological conditions as well as psychosocial events that affect one sibling in a different way to another.

genetic and various environmental factors influence those differences between individuals in a population.²⁰¹

Spirituality and religiosity has been found to have a moderate heritability of around 0.40–0.60.²⁰² This means that both culture and genes play a role in the variation of spirituality and religiosity. However, genetic factors are more important for variation in spirituality, whilst variation in religiosity depends more on environmental factors.²⁰³ Whereas variation in church attendance appears to be influenced both by genetic and social inheritance,²⁰⁴ variation in religious affiliation is primarily transmitted culturally.²⁰⁵ All of the empirical data fit well in an evolutionary perspective: from this it can be assumed that variation in religion/religiosity is more strongly determined by culture than variation in spirituality, which is more linked to the basic personality traits which are more strongly influenced by genetics.²⁰⁶

Hence, a variation in individual religiosity should not be at all surprising. There may be some within-population variation due to genetic or ontogenetic factors responsible for the variation in spirituality, but within as well as between-population variation in religiosity must be largely the result of ecological, economic

In the coming years the methods to study the causes of within- and between-population variance in behaviour and measurement of the effects of genetic and environmental factors will be further refined, taking into account the new insights from molecular genetics showing that traits are not only influenced by genetic and environmental factors, but also that the effects of DNA are partly contingent on the environment. In the domain of social behaviour, some scholars already speak of an emerging new sociogenomics (e.g. Robinson et al. 2005, 2008; Roberts and Jackson 2008; Slavich and Cole 2013).

²⁰¹For instance, Loehlin and Nichols (1976), Truett et al. (1994), Beer et al. (1998), D'Onofrio et al. (1999), Kirk et al. (1999), Koenig et al. (2005; 2008), Bradshaw and Ellison (2008), Button et al. (2011), Kandler and Riemann (2013).

²⁰²Bouchard and Loehlin (2001), Koenig et al. (2005). For instance, on the basis of the Minnesota twin study (Waller et al. 1990; Bouchard et al. 1999; Koenig et al. 2005) in which the heritability of intrinsic religiousness (a proxy for spirituality) was examined, heritability was estimated at 43%. Identical results were obtained on the basis of the Australian Twin registry (D'Onofrio et al. 1999; Eaves et al. 1999a, b; Kirk et al. 1999a, b) in which the heritability of spirituality was investigated by means of a self-transcendence questionnaire: the estimated heritability was 37% for men and 41% for women. Regarding the effects of environmental factors, it appeared that the non-shared environment accounted for 42–50% of the observed variance, whilst the effect of the shared environment was insignificant. In contrast, for religious service attendance the shared environment amounted to 43% of the variance, whereas the remaining variance was due to a mixture of the non-shared environment and a limited genetic factor. In the Virginia Commonwealth University twin study (Kendler et al. 1997; 2003; 2009) differences in religious affiliation are culturally determined, whilst variation in religious attitudes and behaviour are subject to varying degrees of genetic effects. Recent findings from the National Survey of Midlife Development in the United States (Beer et al. 1998; Bradshaw and Ellison 2008) confirm this by showing that genetic influences are relatively smaller on religious attendance (32%), somewhat larger for conservative beliefs (41–44%) and religious coping strategies (42%), and quite strong for religious transformation and commitments (65%).

²⁰³D'Onofrio et al. (1999), Bradshaw and Ellison (2008).

²⁰⁴Truett et al. (1994).

²⁰⁵Boomsma et al. (1999), D'Onofrio et al. (1999), Eaves et al. (1990, 1999, 2008).

²⁰⁶Saroglou and Muñoz-García (2008, 88).

and cultural factors. Both explanations—genetic and environmental—are mutually not exclusive or contradictory.²⁰⁷ One can even imagine that people who have a strong genetic or ontogenetic endowment for spirituality, and would have become strong religious believers in pre-modern cultural stages, can end up as conscious atheists in modernity. This means that variability in religiosity and spirituality does not at all refute evolutionary theories of religion, contrary to what some scholars have argued²⁰⁸.

3.5.1.2 Molecular Genetics

Although still in its infancy, molecular genetics has already found significant relations between personality traits indicative of self-transcendence and spirituality, and specific gene variants that play a role in the brain chemistry of neurotransmitters.

David E. Comings et al.²⁰⁹ were the first to find a correlation between the self-transcendence subscore—and more particularly the spirituality subscore of the Temperament and Character Inventory (TCI)²¹⁰—and the DRD4 gene which codes for a receptor that senses the presence of dopamine²¹¹ in the brain. The researchers suggested that the DRD4 gene might be one of the genes that play a role in the personality trait of spiritual acceptance.

In his book *The God Gene*, Dean Hamer²¹² reports no association between DRD4 and any aspect of transcendence, but a clear association between the VMAT2 A/C polymorphism and self-transcendence.²¹³ People with C/C and C/A genotypes had increased self-transcendence scores compared to people with an A/A genotype. However, the VMAT2 polymorphism explained only a minor fraction of the self-transcendence variance, meaning that many more genes must be involved in this complex behavioural trait. Calling the VMAT2 the God Gene is, of course, a gross exaggeration as Hamer admits himself, but apparently such language generates interest in the book.

Meanwhile, several other research teams have established relations between personality traits related to spiritual and self-transcendent experiences and specific genes related to brain chemistry.²¹⁴

In conclusion: several studies have found significant relations between personality characteristics related to self-transcendence (and spirituality) and some genes

²⁰⁷Ellsworth (2009).

²⁰⁸For instance, Thagard (2005), Zuckerman (2005).

²⁰⁹Comings et al. (2000).

²¹⁰Cloninger et al. (1993).

²¹¹Dopamine is a neuroendocrine transmitter that performs several functions in the body. In the brain it is a neurotransmitter, which is a chemical released by nerve cells sending signals to other nerve cells.

²¹²Hamer (2005, 72).

²¹³Vesicular monoamine transporter 2 (VMAT2) is a protein that in humans is encoded by the *SLC18A2* gene. VMAT2 is an integral membrane protein that transports monoamines, particularly neurotransmitters such as dopamine, norepinephrine, serotonin, and histamine.

²¹⁴For instance, Borg et al. (2003), Ham et al. (2004), Beaver et al. (2009), Sasaki et al. (2011, 2013).

that play a role in the physiology of several neurotransmitters in the brain. Although those findings will have to be confirmed by studies replicating those results and be extended to other genes involved in spirituality-related brain chemistry, they are in accordance with the findings of behavioural genetic research as well as neurological research.

3.5.2 Neurological Basis of Religiosity and Spirituality

A first question is whether religious behaviour results from cognitive processes or from emotional predispositions. There can be little doubt that cognition plays an important role in the development of religious beliefs. This was particularly advantageous in the pre-scientific era, when people did not have exact knowledge about the physiology of life and death. Human cognition succeeded in creating ingenious narratives about supernatural forces through which natural, biological and social events were rationally explained. Nowadays, neurological and other scientific findings also increasingly point to the important role of emotions in the sensitivity to or experience of religiosity and spirituality.²¹⁵ In particular, several studies have found a link between measures of empathic concern and religious or spiritual belief. In contrast, non-believers may have personality profiles that are more conducive to analytic thinking, which is, in turn, more associated with a naturalistic/materialistic worldview.²¹⁶

A variety of neurological and neuropharmacological studies have documented associations between neurological processes and religious-mystical experiences²¹⁷; some aspects of religiosity have been found to be associated with cortical volume differences²¹⁸; electroencephalographic studies have recorded increased electric activity in the frontal lobes during various types of meditation²¹⁹; ambulatory blood pressure and stress-induced hypertension are reduced during contemplative meditation²²⁰; transcranial magnetic stimulation may cause a sensed presence of God²²¹; and neuropharmacological studies have revealed dopaminergic activation as the most important neurochemical factor related to religious activity.²²²

Certain pathological conditions (temporal lobe epilepsy, Parkinson's disease, schizophrenia, head injuries) can influence religious attitudes and behaviours.²²³

²¹⁵Hinde (1999), Fuller (2006), Oviedo (2009).

²¹⁶For instance, Jack et al. (2016).

²¹⁷See overviews in Persinger (1987), Joseph (2000; 2001), Newberg et al. (2001), Newberg (2006), Previc (2006), McNamara (2006; 2009), Jeeves and Brown (2009), Chiesa and Serretti (2010), Tiger and McGuire (2010), Shermer (2011), Wlodarski and Pearce (2016).

²¹⁸Kapogiannis et al. (2009), Miller et al. (2014).

²¹⁹For instance, Banquet (1972), Benson et al. (1990), Inzlicht et al. (2009).

²²⁰For instance, Timio et al. (1988), Wenneberg and Schneider (1997).

²²¹Persinger (2003).

²²²Previc (2006), Brugger (2007).

²²³For instance, Persinger (1987), Ramachandran and Blakeslee (1998), Siddle et al. (2002), Wuerfel et al. (2004), Rogers and Paloutzian (2006), McNamara et al. (2006), Schachter (2006), Harris and McNamara (2009), Johnstone et al. (2011).

Bipolar disorder (mania/hypomania), obsessive compulsive disorder (OCD), schizophrenia, and temporal lobe epilepsy (TLE) are all associated with frontal-temporal over-activity and elevated dopamine, and may show heightened religiosity, religious experiences, and/or religious practices.²²⁴ Some of the world's spiritual prophets, founders and leaders of major religions, such as Paul, Muhammad, and Joseph Smith, might have been sufferers of temporal lobe epilepsy.²²⁵ Some religious writings—a textbook example is *The Revelation to John* in the New Testament—are rife with fantasies, visions, and hallucinations typical of schizophrenic disorder or hallucinogenic drugs.²²⁶

Indeed, various environmental factors have also been found to induce heightened levels of religiosity—hallucinogenic drugs,²²⁷ high mountains (associated with acute and chronic hypoxia),²²⁸ and hot deserts.²²⁹

Novel neuroimaging techniques, such as positron-emission tomographic scanning (PET), single photon emission computed tomography (SPECT) and functional magnetic resonance imaging (fMRI), have shown that mental activities of a religious-spiritual nature are associated with changes in particular cortical activity levels, primarily involving the ventromedial temporal and frontal regions.²³⁰ According to Patrick McNamara²³¹ the limbic system (in particular the amygdala), portions of the basal ganglia, the right temporal lobe (especially the anterior portion of the medial and superior temporal lobe), and the dorsomedial, orbitofrontal, and right dorsolateral prefrontal cortex are important brain centres involved in religiosity.

A remarkable fact is that so-called sacred values—whether of religious or secular nature or inspiration—have been found to be associated with increased activation of several brain regions, particularly those involved in semantic rule retrieval, suggesting that sacred values affect behaviour through processing rights and wrongs (deontological imperatives) and not through evaluating costs and benefits (utilitarian concerns).²³²

²²⁴Dewhurst and Beard (1970), Previc (2006), Dein (2011).

²²⁵McKinney (1994), Saver and Rabin (1997), Newberg et al. (2001), Gazzaniga (2005), Trimble (2007), Comings (2008). Regarding Paul's experience of being blinded by a bright light in the sky on the road to Damascus, William Hartmann (2015) suggested that this might have been produced by a fireball meteor, implying that Paul's Damascene conversion and subsequent important role in the development of Christianity might have been strongly influenced by a random space rock entering the Earth's atmosphere.

²²⁶See, for instance, Wilson (2012, 263).

²²⁷For instance, Pahnke (1967), Batson and Ventis (1982), Schultes et al. (2001), Goodman (2002), Nichols and Chemel (2006).

²²⁸Arzy et al. (2005).

²²⁹Bennion (2004).

²³⁰Azari et al. (2001), Azari (2006), Borg et al. (2003), Newberg and Lee (2006), Newberg and Waldman (2007, 2009), Beauregard and Paquette (2006).

²³¹McNamara (2009, 105), see also Previc (2007, 527).

²³²Berns et al. (2012), Atran and Ginges (2015).

Relying on neuroimaging findings, some authors started to speak about neurotheology (the study of theology from a neuropsychological perspective).²³³ However, some authors, such as Armin W. Geertz,²³⁴ pertinently warn against introducing religious agendas into scientific work because of the risk of teleologically tainting such research.

Nevertheless, various indicators of neural functioning suggest that our brain has the capacity to experience or be receptive to spiritual or religious phenomena. Although most studies have been done on specific population samples,²³⁵ some neurological investigations point to the existence of a general genetic variability in spirituality or religiosity and its susceptibility to environmental factors. This is not an uncommon phenomenon, and is even to be expected for a complex human behavioural trait such as spirituality/religiosity.²³⁶

The neurological findings about brain activities related to religious experiences have raised the question about the existence of a God module in the human brain:

...cross-cultural and time immemorial beliefs in gods, soul, and after-life suggest that there is a God part in the brain, that God is an inherited characteristics hardwired in the neurophysiology of the brain.²³⁷

This idea is based on the theory of the modular architecture of the brain, meaning that the mind consists of a set of discrete and functionally specialised problem-solving modules, each one related to the management of specific adaptive problems, resulting from millions of years of natural selection.²³⁸ Although the entire brain system is involved in mental processes related to beliefs about supernatural agents, two mental tools are thought to be of great importance in this respect: the Agency Detection Device (ADD), which detects the presence and activities of other beings around us,²³⁹ and the Theory of Mind Mechanism (ToMM),²⁴⁰ which consists of the ability to attribute mental states to others and to interpret their intentions.²⁴¹

In conclusion, present cognitive science helps us to understand how and why beliefs in supernatural agents are so resilient. The capacity to develop such beliefs relies on powerful cognitive systems that developed in the course of hominin evolution and that contributed to survival and reproductive fitness.²⁴² As a result,

²³³For instance, McKinney (1994), d'Aquili and Newberg (1999), Peters (2001), Joseph (2002), Alston (2007).

²³⁴Geertz (2009, 324).

²³⁵For instance, Buddhist monks, nuns, experienced meditators.

²³⁶For instance, Vance et al. (2010).

²³⁷Albright (2000), Alper (2006, 151).

²³⁸Fodor (1983), Tooby and Cosmides (1992), Geary (1998), Gazzaniga (2005), Ellsworth (2009), Tremlin (2006).

²³⁹Guthrie (1999), Barrett (2000, 31), Boyer (2001).

²⁴⁰Premack and Woodruff (1978), Povinellia and Preuss (1995).

²⁴¹Tremlin (2006, 75, 105).

²⁴²Tremlin (2006, 132).

god concepts are extremely easy to acquire and transmit. This also explains children's sensitivity to religious indoctrination, so that three to five year olds have a predisposition to believe in an omniscient God.²⁴³

Consequently, beliefs in gods seem to be quite 'natural'. Justin L. Barrett²⁴⁴ argues pertinently that it would be preferable but more difficult to explain why people do not believe in god(s):

Being an atheist is not easy. In many ways it just goes against the grain. As odd as it sounds, it isn't natural to reject all supernatural agents.

Some authors nevertheless continue to believe that physicalism²⁴⁵ is not capable of explaining spiritual experiences by the material functioning of the brain alone. They believe that the soul²⁴⁶ remains a necessary concept for understanding the originality of the human.²⁴⁷ Sometimes, anomalies of behaviour and experience are also invoked to explain religious beliefs and spiritual practice, such as telepathy, clairvoyance, precognition, psychokinesis, near-death, out-of-body and past-life experiences, for which there currently appears to be no conclusive natural explanation.²⁴⁸

However, it is not because the neural machinery and/or environmental causes of some mental processes²⁴⁹ have not yet been completely discovered or explained that the material mechanisms of natural phenomena should be rejected or would need to be complemented by extra-natural mechanisms that are influenced by covert religious agendas. Notwithstanding rare exceptions,²⁵⁰ mainstream neurologists are of the view that there is no neurological argumentation for accepting such thing as a soul. Human mental life, including spiritual life, is a product of neurochemical and electrical activity of the brain. The neurophysiological basis of supernatural experiences is no longer a complete mystery.

²⁴³Evans (2000), Barrett (2001), Kelemen (2004).

²⁴⁴Barrett (2004, 108).

²⁴⁵Physicalism or materialism: this theory claims that reality consists entirely of physical matter which is the sole cause of every possible occurrence, including human thought, feeling, and action. (<http://en.wikipedia.org/wiki/Materialism>).

²⁴⁶'Soul' in Christian thought is a concept that has functioned in at least two ways: to designate the enduring facet of the self (that in some sense survives death), and as a label for the aspect of the human that is accountable for moral choices and capable of communication with God (Brown et al. 1998).

²⁴⁷For instance, Bulkeley (2005, 1), Jones (2005, 56).

²⁴⁸Krippner, in Bulkeley (2005, 68).

²⁴⁹For instance: meditation, hypnosis, and other fields of psychophysiology, and rare parapsychological phenomena, such as telepathy, clairvoyance, psychokinesis, near-death, out-of-body and past-life experiences.

²⁵⁰For instance, Beauregard and O'Leary (2008).

3.6 Evolutionary Advantages and Disadvantages of Religion

The universality of religious beliefs and the discovery of genetic and neurological factors being related to spirituality/religiosity means that, at the ultimate level, an evolutionary advantage must have been involved in the ancestral environment. It is highly unlikely that such a widespread and deep-seated phenomenon could have developed purely by chance. In other words, religiosity/religions must have favoured, through social cooperation and by means of natural and cultural selection, differential survival and reproduction.²⁵¹

That insight has raised the question as to whether spirituality/religiosity/religion is an evolutionary adaptation of the human species²⁵² or merely a (multiple) by-product of adaptations selected for other domains of human life, such as the human evolved cognitive capacities for cultural creation and social interaction.²⁵³

Arguments in favour of the adaptationist position are that religion is a universal phenomenon, that its acquisition occurs relatively effortlessly, and that it has an associated biology with genetic, neurological and chemical components.²⁵⁴ In the behavioural domain it generally increases individual health and well-being; and it promotes social solidarity and intra-group cooperation resulting in social selection²⁵⁵ or group selection.²⁵⁶ It often also successfully incites its adherents to produce more offspring than less religious or nonreligious people.²⁵⁷

The main arguments for the by-product view are that there are no specific genes for religious belief, that there are no evolved psychological mechanisms designed to produce religious beliefs, and that religiosity and religious adherence vary quite considerably between individuals and between cultures/societies. In this view, religiosity is a spandrel,²⁵⁸ an exaptation-like²⁵⁹ by-product of social-cognitive mechanisms that evolved for purposes other than religion itself.²⁶⁰ For instance, Newberg et al.²⁶¹ argue that the neurological basis of spirituality may have arisen

²⁵¹For instance, Grinde (1998), Saxton (2009), Volland and Schiefenhövel (2009), Daecke and Schakenberg (2000), Kardong (2010), Bellah (2011), Norenzayan et al. (2016).

²⁵²For instance, Irons (2001), Wilson (2002; 2003), Bulbulia (2004), Adams (2005), Alcorta and Sosis (2005; 2012), Dow (2008), Norenzayan and Shariff (2008), Purzycki and Sosis (2008), Sanderson (2008), McNamara (2009), Sosis (2009), Kardong (2010), Baril (2013).

²⁵³For instance, Darwin (1871), Sperber (1985), Guthrie (1993), Hinde (1999), Kirkpatrick (1999; 2006; 2008), Pyysiäinen (2001), Atran (2002), Bering (2006), Newberg et al. (2001), Boyer (2003), Atran and Norenzayan (2004), Pinker (2004), Dawkins (2006), Granqvist (2006), Hauser (2006), Pyysiäinen and Hauser (2010), Van Schaik and Michel (2016).

²⁵⁴McNamara (2009).

²⁵⁵Dow (2008).

²⁵⁶Wilson (2003, 2; 2005, 385).

²⁵⁷For instance, Cliquet and Maelstaf (1977), McQuillan (2004), Frejka and Westoff (2008), Sanderson (2008), Weeden et al. (2008, 2013), Blume (2009).

²⁵⁸Spandrel: a cognitive by-product of other adaptive systems (Gould and Lewontin 1979).

²⁵⁹Exaptation: refers to shifts in the function of a trait during evolution (Gould and Vrba 1982).

²⁶⁰Boyer (2003), Kirkpatrick (2008); see also the discussion in Boudry (2015, 198).

²⁶¹Newberg et al. (2001, 125).

from neural processes that evolved to address more basic survival needs such as mating and sexual experience.

According to Ryan M. Ellsworth,²⁶² the adaptation view is mostly found among behavioural ecologists and evolutionary anthropologists, whilst the by-product view finds most of its advocates within evolutionary cognitive psychology. However, the discussion about whether religion is an evolutionary adaptation or an evolutionary by-product of the evolved specific human cognitive capabilities is, in the authors' view, quite irrelevant for its ultimate outcome. Religiosity/religion can, via its proximate effects, indirectly but ultimately influence the differential intergenerational transmission of particular genes and memes. Even if religiosity would appear not to have originated as an adaptation in the hominin evolutionary history, it may have been subsequently co-opted for adaptive purposes.²⁶³ For instance, religious fundamentalism may be adaptive in some contexts without being an adaptation in an evolutionary sense. Moreover, it should not be forgotten that complex adaptation processes evolve from the building blocks from previous adaptation processes.²⁶⁴

Recently Ara Norenzayan and colleagues²⁶⁵ tried to reconcile the by-product and adaptationist approaches by arguing that religious elements arose originally as evolutionary by-products of ordinary cognitive functions that subsequently appeared to have great adaptive advantages, mainly in intergroup competition.

The authors tend to share the view of Robert Wright²⁶⁶ who wrote

Religion arose out of a hodgepodge of genetically based mental mechanisms designed by natural selection for thoroughly mundane purposes.

Religious faith is a natural consequence of fundamental mental functions, and its ethical tenets are the cultural extension of cognitive capacities and emotional drives and needs.²⁶⁷ From an evolutionary point of view, it is striking how strongly essential religious beliefs and practices are focused on sociobiological behavioural phenomena that result from evolutionary mechanisms such as selection in general, but also kin selection, reciprocity selection and group selection.²⁶⁸

3.6.1 Proximate Advantages of Religion in the Pre-scientific Era

The question now is which proximate advantages spirituality/religiosity and religious beliefs/religions produced favourable survival and reproductive effects in the

²⁶²Ellsworth (2009).

²⁶³Powell and Clarke (2012).

²⁶⁴Voland (2009, 11).

²⁶⁵Norenzayan et al. (2016, 5ff).

²⁶⁶Wright (2009, 482).

²⁶⁷Teahan (2006, 749–751).

²⁶⁸For instance, Reynolds and Tanner (1983), Wenegrat (1990), Jones and Reynolds (1995), Burkert (1996), Grinde (1998), Hinde (1999), Boyer (2001), Atran (2002), Wilson (2002), Steadman and Palmer (2008), Ellsworth (2009), Reiss (2009), Voland and Schiefenhövel (2009) Kardong (2010).

pre-scientific environment? In literature, a multitude of factors, not necessarily mutually incompatible but rather complementary, have been proposed: explaining life and death, coping with anxiety, stress, calamity and death, healing disease, mastering contingencies, controlling sexual and reproductive behaviour, promoting social cohesion, preventing cheating behaviour, safeguarding social dominance, defining behaviour towards strangers, justifying wars, etc.²⁶⁹

Trying to understand the emergence as well as the effects of religious beliefs, the authors think that the proximate advantages should be considered at two different levels: the individual and the societal level. Nevertheless, some basic moral principles of the major religions, such as the love messages of Buddhism, Hinduism and Christianity, are difficult to classify according to their individual or social effects, because they pertain both to individual well-being and social welfare.

At the individual level, two major categories can be distinguished: (1) understanding/explaining the facts of life and death; and (2) mastering the events of life and death. At the societal level, also two major categories can be distinguished: (1) promoting social cohesion and solidarity, mainly in view of defence against competing groups/populations, or conquering others' territories and resources; and (2) reinforcing the social dominance of the leadership.

3.6.1.1 Understanding and Explaining the Facts of Life and Death

The increasing brain capacity during hominin evolution was selected for exploring and mastering more thoroughly the properties of the environment (as well as self). These increasing capabilities also elicited interest, fascination, and wonder about the facts of nature, and the causes of life and death.²⁷⁰

It is not surprising that, in the pre-scientific stage of the cultural history of humankind in which there was still no profound knowledge of the real determinants of natural (and cultural) phenomena, humans turned to supernatural forces to explain the facts of life and death. Indeed, all religions devised ingenious stories and myths to help people understand the origin of life and death and to give meaning to life and death. This need to understand and explain is the direct consequence of the hominisation process, resulting in an increased intelligence and, above all, a stronger self-conscious awareness.²⁷¹ Matthew Alper²⁷² formulated this in a pertinent way:

In summary, what I'm suggesting is that at some point in the last two million or so years, during the emergence of the later hominids, a cognitive adaptation emerged that enabled us to cope with our awareness of death, while at the same time allowing us to maintain self-conscious awareness.

²⁶⁹For instance, Diamond (2012, 367).

²⁷⁰Dawkins (2000), Atran (2002), Bulkeley (2004), Fuller (2006).

²⁷¹See Newberg et al. (2001).

²⁷²Alper (2006, 129).

Many authors²⁷³ consider the emergence, function, and persistence of religions/religious beliefs as a coping mechanism to relieve our existential fears and anxieties, to comfort us in a contingent, bewildering, threatening and dangerous world, to alleviate pains of disease and other forms of misery,²⁷⁴ and to fight the fear of and terror about the absurdity of death, “probably the most intolerable of all absurdities”,²⁷⁵ “the ultimate indignity”.²⁷⁶ Religions provide a perspective of continuity of life, often in a heavenly hereafter as an antidote to the cold prospect of post-life nothingness.²⁷⁷

One can ask, what has the religious mysticism and myth-formation about life and death to do with evolutionary survival and reproduction? There is no direct causal relationship, but the solutions which religions devised to cope with matters of life and death (such as offering the perspective of a heavenly eternal life in an imaginary hereafter, and the existential advantages and satisfaction people experience thanks to their neural capacity for spirituality and religiosity), might have resulted in diminishing or eliminating all sorts of life anxieties, and might also have provided people with positive feelings such as optimism, altruism, action-oriented motivation, self-sacrifice. Such feelings are positively correlated with improved mental and physical health, which, in turn positively influences survival and reproduction.²⁷⁸

The same question has been raised about the evolutionary meaning of the development of spirituality and religious feelings in general. Some scholars are of the view that the evolutionary toolkit, and in particular natural selection, has no relevance to emotional predispositions for phenomena such as spirituality, mysticism, religiosity, aesthetics and art.²⁷⁹ Those phenomena should be valued in themselves, beyond survival or reproductive processes. It is granted that the human brain is capable of developing many cognitively and emotionally driven forms of behaviour, which are experienced as ontogenetically highly satisfactory. It would be a mistake to completely dissociate those multifaceted phenomena, some of which are so important for social relations, such as spirituality and religiosity or aesthetics and art, from the indirect effects they may have on survival or trans-generational processes.

3.6.1.2 Mastering the Events of Life and Death

The human brain wants not only to understand life and death, and to buffer the anxieties they evoke, but also and even mainly to control those phenomena.

²⁷³For instance, Newberg et al. (2001), Spilka et al. (2003), Voland and Söling (2004), Ostow (2006).

²⁷⁴Boyer (2003, 121).

²⁷⁵Klarsfeld et al. (2003, 184).

²⁷⁶FM-2030, 1989, 199.

²⁷⁷McGuire and Tiger (2009, 132).

²⁷⁸For instance, Hamer (2005, 143), Inglehart and Welzel (2005), Alper (2006, 104), McGuire and Tiger (2009, 132).

²⁷⁹For instance, Thagard (2005), Oviedo (2009, 146–148).

Religious ruling in this respect pertains to four main domains—death, health, self-oriented innate drives, and especially sexual and reproductive behaviour.

Regarding death control, religions could not do very much in the pre-scientific era of human evolution and history. People had no realistic insight into the real causes of disease and deterioration, but devised a multitude of magical practices that were supposed to master or counteract contingency and life-threatening events. Above all, they invented comforting narratives about beliefs in an eternal life in a hypothetical hereafter, thus mentally extending the basic drive for survival into eternity. At the same time they were creating hope for a better life than the one they experienced on earth, with its threats of disease, famine, accidents, crime and war, and other calamities.²⁸⁰ Victor Stenger²⁸¹ explains the popularity of Christianity and Islam “because of their appeal to our most selfish instinct with the promise of eternal life”.

Improving health is another important action domain of religions,²⁸² not only practiced via hygienic habits²⁸³ and health care but also by means of spiritual healing practices and rituals, food prohibitions, and above all miracles.²⁸⁴ Many authors are of the view that the religious promotion of physical and mental health had important adaptive benefits.²⁸⁵ Indeed, already and especially in ancestral times, fertility was positively correlated with good health.²⁸⁶

Regarding self-oriented innate drives, Donald T. Campbell²⁸⁷ has argued pertinently that religions have traditionally played an important biosocial role in trying to master and counteract a multitude of innate ego-centred drives, such as selfishness, greed, aggression and spite, with the view to promoting social cohesion and cooperation. By imposing moral standards, among others, via the authority of a supernatural power (and the threat of supernatural punishment²⁸⁸), religions tried to deal with the important problem of countering free-riding and cheating by internalising social control.²⁸⁹

Last but not least, religions are particularly involved in controlling sexual and reproductive behaviour. From reading scriptures and other basic documents of the three Abrahamic religions, the authors perceive three concerns that dominate the sexual and reproductive rulings of those religions: (1) facilitate males, with their strong, regular ejaculation pressures, sexual accessibility to the precious source of

²⁸⁰Gailliot et al. (2008).

²⁸¹Stenger (2009, 16).

²⁸²Chatters (2000), Koenig et al. (2002), Sloan and Bagiella (2002), Kardong (2010, 36ff).

²⁸³Cleaning practices evolving into religious rituals may, without a conscious knowledge about their hygienic effects, nevertheless have caused a positive relation between such religious customs and health promotion (Kardong 2010, 36; see also Van Schaik and Michel 2016, 160ff).

²⁸⁴Theologians define miracles as phenomena that do not obey laws of nature.

²⁸⁵McNamara et al. (2006), McClenon (2002), Newberg et al. (2001), Rossano (2010), Van Schaik and Michel (2016).

²⁸⁶For instance, Easterlin (1975), Porter (1999), Grundy and Tomassini (2005).

²⁸⁷Campbell (1975).

²⁸⁸Johnson (2005), Johnson and Kruger (2004), Johnson and Bering (2006), Schloss and Murray (2011), Laurin et al. (2012), Johnson (2013).

²⁸⁹For instance, Wilson (2002).

female bodies; (2) protect the transmission of male genes against those of potential competitors; and (3) promote the spreading of the faithful's genes and memes.

A broad diversity of religious commandments and taboos, such as women's veiling²⁹⁰ and sequestration, sexually differential mating rules, but also anti-contraception and anti-abortion stands and campaigns must be understood in that way.²⁹¹ They are all the result of the interaction of some human-specific sexual dimorphic characteristics. They include such diverse features as the larger female role in reproduction, the presence of concealed ovulation, and male-male competition for young fecund mates. Furthermore, the social and ideological conditions in male-dominated patriarchal societies with their sexual power divisions were

²⁹⁰In recent years several Western countries have experienced a hot debate about whether and in what circumstances Islamic women are to be allowed or forbidden to wear a headscarf, or even a niqab or burqa. In the headscarf debate all sorts of arguments for and against are used which typically only cover superficial elements. Rarely, if ever, are the root causes of this behavioural phenomenon addressed, which some consider to be insignificant—'a futile detail'! Headscarves, hijabs, chadors, niqabs and burqas are, along with many other discriminatory behavioural phenomena towards women, ultimately a result of what biologists call 'sperm competition' or the somewhat less distant 'male-male competition'. In male-dominated patriarchal societies, as male property women were socially repressed, sexually segregated or monitored, possibly even veiled, and so protected (!) against the genetically cuckoo risks arising from possible contacts with male competitors. The headscarf is a cultural relic of the male cuckoo syndrome and the derived masculinist dominance urge that culminated in the agrarian-pastoral era in the biosocial and cultural oppression and exploitation of women. In the agrarian-pastoral cultural phase, the masculinist sexism was conveniently justified, confirmed and strengthened in the religions that developed in that era. Although female subordination and sequestration is a general feature of agrarian-pastoral religions, it has been maximised in Islam with its harem culture, veils, hijabs, chadors, niqabs and burqas. The headscarf—historically one of the symbols of female oppression and sexual chastity—is nowadays often represented as an expression of personal identity, comparable to the Christian crucifix, the humiliating origin of which also became the mark of exquisite identity. However, this is a fallacy! Why do only Muslim women have to wear headscarves, hijabs, chadors, niqabs or even burqas, while Muslim males are relieved from such forms of cover? Advocates in the West of the sexually differential vestimentary Muslim codes should visit fundamentalist Islamic countries to observe and experience how this difference is an expression of the fundamental sexual discrimination existing in those countries. Hence, the importation of sexually differential vestimentary codes, expressing sexual discrimination, should not be favoured, particularly for female compatriots with an immigrant background who need to integrate culturally and socially in modern host societies. Any form of cultural, religious, social, or political sexism should be discouraged, if not fought. It should not be forgotten that behind the claimed right to cultural identity, there often exists a hidden agenda to slow down the upward emancipation and social mobility of minority groups, and especially of the female members of those groups. Women in general are still struggling to fight the 'glass ceiling': this ceiling often lies much lower for immigrant women. All modern secular ideologies—liberalism, socialism, feminism, humanism, etc.—implicitly or explicitly reject inequity and inequality between the sexes and are also in favour of a clear separation of church and state. Whilst they have more or less succeeded in neutralising the social and political dominance of the Christian churches, they should avoid reversing this process with respect to the Islam or other religious belief systems that, via immigration, try to get foothold in modern societies. Accepting the headscarf or other behavioural manifestations that originated in the oppression and exploitation of women is—in the modern, secular society that resulted from the scientific revolution and the Enlightenment—an example of a regressive evolution.

²⁹¹Batten (1994).

sanctified by the organised religions that emerged and evolved in those societies. Paradoxically, the religious doctrines aimed at protection against sexual infidelity may not only have been in the genetic interest of males by avoiding cuckoldry²⁹²; they may also have had advantages for females by the avoidance of the male partner investing his resources in other females and their children.²⁹³

The strong religious rulings about realising a high fertility—"be fruitful and multiply, and fill the earth and subdue it..."²⁹⁴—has a direct effect on the multiplication of the religious followers—their memes and genes. Hence, the memetic religious rulings about sexual and reproductive behaviour are ultimately strongly genetically oriented and explain the reproductive and evolutionary success of those belief systems. Even in modern times, practicing religious people usually realise higher fertility than non-religious people.²⁹⁵ However, this is a recent phenomenon, because nearly everybody was religious in earlier times.²⁹⁶

All three major incentives for the religious control of sexual and reproductive behaviour—guaranteeing males accessibility to female bodies, protecting males against cuckoldry, and spreading the faithful's memes and genes—are the ultimate causes for women's profound social oppression in human evolution and history. Traditionally, both in matters of sex and reproduction, religions see women as the precious resource, as subjects for men's sexual gratification and as producers and carers of offspring.

3.6.1.3 Promoting Social Cohesion and Cooperation

Many scholars believe that religion is adaptive because it favours 'fictive kinship', fostering family-like cooperation between non-family members. It supports group living in larger communities,²⁹⁷ and promotes altruistic and cooperative behaviour within the in-group.²⁹⁸ Moreover, religious groups appear to cooperate more within themselves than nonreligious groups—religion is a typical in-group marker²⁹⁹ and in-group reinforcer. This need for increased cooperation, solidarity and commitment, especially in larger, genetically less or non-closely related groups of individuals, resulted in the invention and imposition of costly signaling religious practices.³⁰⁰ Cross-cultural and even experimental research suggests that beliefs in a

²⁹²Strassmann et al. (2012).

²⁹³Harris (2010, 147).

²⁹⁴Genesis 1:28; Deuteronomy, 7:13-14; see also the discussion in Betzig (2005).

²⁹⁵For instance, Cliquet and Maelstaf (1977), McQuillan (2004), Weeden et al. (2008), Frejka and Westoff (2008), Zhang (2008), Blume (2009), Vaas and Blume (2009), Rowthorn (2011), Weeden and Kurzban (2013).

²⁹⁶Vaas and Blume (2009, 220).

²⁹⁷Roes and Raymond (2003), Shariff and Norenzayan (2007), Norenzayan et al. (2016).

²⁹⁸For instance, Sosis (2000), Irons (2001), Wilson (2002), Sosis and Ruffle (2004), Voland and Söling (2004), Alcorta and Sosis (2005), Johnson (2005), Johnson and Bering (2006), McNamara (2006), Norenzayan and Shariff (2008), Steadman and Palmer (2008), Bulbulia et al. (2008), Soler (2008), Bulbulia (2012), Preston and Ritter (2013).

²⁹⁹Yamamoto et al. (2009, 225).

³⁰⁰Cronk (1994), Sosis (2003, 2006), Bulbulia (2004), Alcorta and Sosis (2005), Sosis and Alcorta (2008).

supernatural punishing agency and in an afterlife may have been important promoters of in-group social cooperation.³⁰¹

In the past religious prosociality, supported by divine revelation and ‘In-God-We-Trust’ institutions, contributed considerably to the phenomenon of in-group identity and its distinction from belonging to out-groups.³⁰² In this respect it must also have been a powerful instrument in intergroup confrontation and competition that was a predominant phenomenon in human evolution and history.³⁰³ The religious aversion or even enmity towards out-groups is a striking phenomenon that has initiated, justified and fuelled wars and genocides throughout human history.³⁰⁴ Apparently, beliefs in the supernatural have a strong social uniting effect on individuals³⁰⁵ even for the annihilation of ‘others’.

3.6.1.4 Reinforcing the Social Dominance of the Leadership

Several authors have also stressed that religions, especially when they become the official societal or state ideology, not only favour in-group cohesion but also strengthen in particular the power and prestige of society’s leadership—males, kings, emperors, popes, and kleptocracies in general—facilitating them to control or even to submit their subjects.³⁰⁶ Religions took advantage of the ancient (primate) tendency of obedience and submission to dominant alpha-males in order to support ideologically and socially the power position of social leaders,³⁰⁷ resulting in what Friedrich Nietzsche³⁰⁸ once referred to as ‘*Sklavenmoral*’ (‘slave morality’) for the populace. Indeed, as Stanley Milgram³⁰⁹ showed in his bewildering experiment on obedience to authority, most people are intuitively very obedient to authority. However, the degree to which authority is blindly obeyed varies cross-culturally.

It must also be acknowledged that a religiously supported and justified leadership may also have had a positive organisational effect in society. It enabled protection against criminals and especially defence against out-group enemies and the conquering of others’ territories and resources—particularly female mates.³¹⁰

³⁰¹Shariff and Norenzayan (2007), Atkinson and Bourrat (2011), Keltner et al. (2014).

³⁰²Voland (2009, 16).

³⁰³Divale (1972), Ember (1978), Alexander (1979, 1987), Diamond (1992), Van der Dennen (1995), Keeley (1996), LeBlanc (2003), Dunbar (2004), Gat (2006), Pinker (2011).

³⁰⁴Van der Dennen (1995), Juergensmeyer (2001), Haught (2002), Avalos (2005), Diamond (2012, 367).

³⁰⁵Gorelik et al. (2012).

³⁰⁶Marx (1867), Alexander (1987), Cronk (1994), Diamond (1997, 277), Stenger (2008, 246).

³⁰⁷Grinde (1998), Glass (2007).

³⁰⁸Nietzsche (1887, 267).

³⁰⁹Milgram (1974).

³¹⁰Dennett (2006, 56).

3.6.2 Ultimate Advantages of Religion in the Pre-scientific Era

This book's classification of proximate advantages of religion in the pre-scientific era is the basis for an answer to Daniel Dennett's³¹¹ pertinent question: "*cui bono?*" Individuals, elites, or society as a whole?" Clearly, the advantages of religion concern all three.

Although based on fantasy, as Richard Dawkins³¹² pertinently argues in his book *The God Delusion*, religiosity and religions must have had considerable advantages in the pre-scientific era of human evolution and history, even though they involved high material, emotional and cognitive costs for individuals.³¹³

It helped individuals to understand incomprehensible facts of nature in a simple way: it was a support to cope with anxiety and accept death and hope for a better and eternal life in the mythical hereafter; it stimulated spiritual experiences, it incited people to ethical behaviour; and it facilitated better endurance of misfortunes such as the loss of beloved ones, hereditary impairments, infectious diseases and natural catastrophes.

Regarding elites, religions were particularly advantageous for individuals and groups who occupied dominant positions in society, because religious institutions usually gave them a divine justification for their leadership and related privileges.³¹⁴

At the societal level, religions reinforced sociality, solidarity, and mutualism, and strengthened group cohesion in the combat with rival populations, and conquering new territories and resources.³¹⁵

Furthermore, religious beliefs not only had advantages at the proximate level, but through those effects may also have had ultimate advantages. For many people the proximate effects may have had 'fitness'-enhancing effects.³¹⁶ The increase of the number of descendants over many generations may be ultimately the most important effect of religious behaviour.³¹⁷ Hence, Richard Alexander³¹⁸ and Bernard Crespi and Kyle Summers³¹⁹ rightly interpret the origin and maintenance of

³¹¹Dennett (2007, 90).

³¹²Dawkins (2006, 165–166).

³¹³Atran (2002); see also Vaas and Blume (2009, 115–126).

³¹⁴For instance, Marx (1867), Alexander (1987).

³¹⁵For instance, Batson (1983).

³¹⁶For instance, Jones and Reynolds (1995), Alper (2006, 239), Dennett (2007, 69), Harris (2004, 15), Steadman and Palmer (2008, ix), Blume (2009, 119).

³¹⁷The celibacy, and consequently the zero reproductive fitness of Catholic priests seems, at first sight, to contradict the proposition that religions are strongly focused on the reproduction of their adherents, but this is not necessarily so. If non-reproducing priests succeed in motivating their kin and non-kin adherents of their faith to strongly reproduce in order to spread their faith and the growth of their church—as everybody knows who has ever heard priests delivering sermons at the occasion of baptism ceremonies—one can witness the reproductive effects of a kind of kin selection by the indirect transmission of genes and memes of the celibatarians via their fellow believers (Livi-Bacci 1971; Crook and Crook 1988; Hill 1999; Deady et al. 2006).

³¹⁸Alexander (2013).

³¹⁹Crespi and Summers (2014).

religion and the concept of God as the function of maximising inclusive fitness “through serving the interests of one’s circle of kin and one’s larger-scale social and cultural groups.”

From a biological evolutionary viewpoint, in the pre-scientific era, religious-magic systems had to be considered as vehicles for the development, justification, imposition and transmission of ethical systems of vital importance for developing and transmitting human life. From a psychological as well as a social point of view, they were a ‘natural security system’.³²⁰ In those living conditions they fulfilled the function of an exo-somatic developmental and survival mechanism of the same importance as biological organs.³²¹

Considering all of the foregoing—at the proximate level: the genetic and neurological determinants of spirituality/religiosity, the individual and societal advantages of religious adherence, the on-going religious indoctrination in many societies; and, at the ultimate level, the evolutionary effects regarding the multiplication of genes and memes favouring religious adherence and obedience—it becomes understandable why religiosity and religious beliefs continue to endure. It is not difficult to understand *Why god won’t go away* as Andrew Newberg, Eugene d’Aquili and Vince Rause³²² put it—as religions maintain their power positions in modern society, despite the fact that science has completely undermined their ideological narrative about origin and source of moral authority.³²³

3.6.3 Place of Religious Beliefs and Religions in Modernisation

Whilst religions may have had proximate (ontogenetic) as well as ultimate (phylogenetic) advantages in pre-scientific living conditions, a quite different picture emerges in modern culture. Notwithstanding that religious beliefs and religions still can and do have several important advantages for many individuals, overall, neither their foundations nor much of their rule-giving and practices, are well adapted to the novel environment that is being created by the modernisation process. In many respects, religious beliefs, Holy Scriptures or prophecies on which they build, and religious institutions are maladapted to modern culture. Belief in supernatural beings is a typical example of a phenomenon that had adaptive advantages in the environment in which our ancestors evolved, and the same can be said about organised religions in the pastoral-agrarian era, but this may no longer be the case in the novel environment of modernity.³²⁴

³²⁰For instance, Wiebe (2013).

³²¹Cliquet and Thienpont (2002, 601).

³²²Newberg et al. (2001).

³²³For instance, Dawkins (2000; 2003; 2006), Edis (2002), Stenger (2003; 2008; 2011), Dubessy et al. (2004), Hitchens (2008), Isaacson (2012), Krauss (2012).

³²⁴Wenegrat (1990), Roele (1993), Reynolds (1995), Bulbulia (2004), Dennett (2007), Davis (2009), Coyne (2012), Wiebe (2013).

However, the ‘maladaptationist hypothesis’ does not imply that all of religious morality is retrograde or maladaptive. The reason theretofore is that much of the religious moral rulings are the result of evolutionary selective processes that have survival value, not only in pre-scientific living conditions but also in the novel environment of modernity.³²⁵ As will be argued in Chap. 5 on the contents of an evolutionary based ethics, many religiously inspired or supported moral rules fit with the logic of evolutionary morality.

3.6.3.1 Advantageous Religious Spillovers in Modernity

Today, religions have some persisting advantages, at least for their adepts, at the individual level, the religious in-group level, and the societal level.

At the individual level: for many individuals who have genetically or neurologically strong predispositions to spirituality/religiosity, religious adherence and practice may still be very satisfactory for coping with the anxieties of misfortune and death.³²⁶ Religious beliefs may give those people a meaning to life and death.³²⁷ It may help people who have not acquired much education and knowledge to behave morally, and motivate them to be socially cooperative members of their society.³²⁸ Deeply religious people may enjoy the considerable emotional and cognitive pleasurability of their religiosity/spirituality.³²⁹ Increased religiosity is associated with increased agreeableness and benevolence.³³⁰

People with low personal control or insecure attachments may find relief in the belief in God.³³¹ Some research indicates that people who believe in a loving, caring, forgiving, and approving God report having or show signs of higher self-esteem,³³² positive mood,³³³ better psychological well-being,³³⁴ more life satisfaction and higher quality of life,³³⁵ stronger self-improvement,³³⁶ and show fewer symptoms of anxiety and depression, and other psychiatric symptoms.³³⁷

At the religious in-group level: many studies have found that religious involvement is correlated with decreased morbidity and mortality.³³⁸ However, some critical appraisals of the relevant literature show that there is little empirical evidence for the proposition that religiosity has more beneficial health outcomes.³³⁹

³²⁵For instance, Teehan (2006, 769).

³²⁶For instance, Vail et al. (2010).

³²⁷For instance, Hogan (2004, 738.7).

³²⁸For instance, Newberg et al. (2001, 81).

³²⁹For instance, Grinde (1998), Purzycki and Sosis (2008), McGuire and Tiger (2009).

³³⁰Saroglou (2002), Saroglou et al. (2004).

³³¹Kay et al. (2010), Granqvist et al. (2010).

³³²Benson and Spilka (1973), Francis et al. (2001).

³³³Levin (2001), Krause (2005).

³³⁴Bradshaw and Ellison (2008), Heinemann and Wörmann (2010), Flannelly and Galek (2010), Sasaki et al. (2011).

³³⁵Kirkpatrick and Shaver (1992), Pargament et al. (1998), Flannelly et al. (2010).

³³⁶Sedikides and Gebauer (2010).

³³⁷Phillips et al. (2004), Bradshaw and Ellison (2008), Flannelly et al. (2010), Levin (2010).

³³⁸Koenig et al. (2000), Miller and Thoresen (2003), Newberg and Lee (2006), Hall et al. (2008), Levin (2010), Waldron et al. (2011).

³³⁹For instance, Sloan and Bagiella (2002).

As is often the case in research into religious attitudes or behaviour—and this probably applies to all of the above mentioned findings—few investigations have been undertaken in which control groups of people with secular ideological convictions such as humanists were involved. The risks of social assortment bias in the composition of the researched population samples in most studies of religious attitudes and behaviour are not carefully taken into account. This is especially true for the United States where the majority of the above cited findings come from and where the overwhelming part of the population believes in God.

It is generally believed that religiosity fosters cooperative and altruistic behaviour.³⁴⁰ Whoever has had intense contacts with religious officeholders—priests, monks and nuns—is, in most cases, struck by their kindness, humane concerns, and sociability in general. However, here again comparative investigations about the social behaviour of people with other ideological convictions are lacking. People committed to social justice or equity in education, embedded in values of humanism, may equally have highly humane concerns and be generous. In addition, like any other ideology, religious adherence and practice, even when not explicitly articulated, may have important social or financial benefits and facilitate the acquisition of wealth and power, either via social status/prestige, social identity³⁴¹ or via in-group nepotism.³⁴²

At the societal level: religions contribute substantially to justify and legitimise morality, which is an important factor promoting the viability of groups.³⁴³ Religion also fosters social cohesion through its shared values, meaning systems, rituals and lifestyles.³⁴⁴ Moreover, religious institutions are well known for organising social initiatives, which implement altruistic behaviour.³⁴⁵ In general, religions have a positive and durable effect on the establishment and maintenance of social capital.³⁴⁶ Finally, religions may strongly contribute to controlling socially disrupting forms of behaviour.³⁴⁷ To sum up, potentiality for doing good is undeniably present, albeit predominantly directed towards believers.

3.6.3.2 Disadvantageous Effects of Religious Beliefs in Modernity

Notwithstanding persistent advantages, the maladaptation of religious beliefs and religious adherence in modernity pertains to many issues, not only concerning non-believers but also for the population and society as a whole.

Scientific knowledge has largely discredited the basic foundations of religious beliefs and ideologies embedded in sacred texts. Many religious beliefs about the origin and evolution of the cosmos, about the origin and evolution of life (and in

³⁴⁰Sosis (2000), Sosis and Ruffle (2004), Finkel et al. (2010).

³⁴¹Ysseldyk et al. (2010).

³⁴²Bellow (2003).

³⁴³Atran and Norenzayan (2004).

³⁴⁴Hogan (2004).

³⁴⁵For instance, www.caritas.org.

³⁴⁶Putnam (2000, 65–79).

³⁴⁷For instance, Johnson (2005).

particular about human evolution), about the sense of life and death, about the source and content of some values and norms guiding behaviour, are incompatible with the findings of the natural and human sciences. In many respects religious beliefs even prevent people from acquiring knowledge and understanding of the facts of life and death.³⁴⁸

In matters of education, religions indoctrinate children³⁴⁹ and adolescents³⁵⁰ one-sidedly at an early age. Their sense of reality is distorted, introducing serious confusion into their minds between what has to do with religious narratives from the sacred texts and what has to do with science. In terms of pedagogics religious indoctrination is imprinting children and adolescents with feelings of shame, remorse, or guilt over their own development and growth that reverberate for many years in adulthood.³⁵¹ The paradoxes of modern times are present in human rights conventions issued as result of compromises between states having different worldviews. Indeed, one can go as far as to argue that the early religious indoctrination of children is in contradiction with Article 14.1 of the United Nations Convention on the Rights of the Child³⁵² which stipulates “States Parties shall respect the right of the child to freedom of thought, conscience and religion”.³⁵³ Freedom of thought and religion do not go hand in hand within religious communities and faith organised states. A specific educational problem concerns pressures from some religious denominations in countries such as the United States, Islamic states, or Christian and Islamist groups in Europe, to eliminate biology and other natural sciences from the school curricula. There are also pressures to counterbalance scientific education with narratives about creationism or intelligent design, which reject the scientific theory of evolution.³⁵⁴

In matters of mental and physical health, religions have largely lost their credibility for healing practices and have been replaced by the knowledge acquired by the modern biomedical sciences. The selective anti-interventionist ideology of religions in matters of life and death (e.g. anti-contraception; anti-abortion; anti-euthanasia; even general anti-medical intervention in some denominations, such as the Christian Scientists) is counter to the progress in medical life saving and caring achieved in modern culture. The right to die in dignity is not a life saving strategy. However, it may be considered as a caring strategy at times when modern

³⁴⁸For instance, Kitcher (1982, 2007), Godfrey (1983), Tiffin (1994), Larson and Witham (1998), Stenger (2003; 2008; 2011; 2012), Dawkins (1986; 2000; 2003; 2006), Russell (1997), Edis (2002), Harris (2004), Scott (2005), Skybreak (2006), Young and Edis (2006), Fuller (2007), Hitchens (2008), Coyne (2009), Isaacson (2012).

³⁴⁹Harris and McNamara (2008), Heimlich (2011).

³⁵⁰Alcorta and Sosis (2005).

³⁵¹Dawkins (2006, 315), Council of Europe (2007), Dennett (2007, 56).

³⁵²United Nations (1989).

³⁵³However, it should be mentioned that, as is often the case in UN charters, the same Article 14 includes in its §3 a restrictive condition, worded as follows: “Freedom to manifest one’s religion or beliefs may be subject only to such limitations as are prescribed by law and are necessary to protect public safety, order, health or morals, or the fundamental rights and freedoms of others.”

³⁵⁴Scott (2005), Numbers (2006), Jalajel (2009), Hameed (2010), Riexinger (2010).

medical and pharmaceutical industry produces the means for prolonging the dying process without enhancing the potential for life (See also Chap. 6, Sect. 6.2.2.2).

The sexist tenets of the organised religions that emerged and flourished in the agrarian-pastoral cultural era were either based on masculine domination and devised as a function of what biologists call ‘sperm competition’,³⁵⁵ or resulted from psychopathological (male) fears of the female gender³⁵⁶—these have become obsolete in modern culture. The biological knowledge about the sexes, the generalisation of education and access to information, technological advances, and ideological emancipation movements, have thoroughly, albeit not yet completely, changed the power relations between the sexes in modern societies.³⁵⁷ Religious rulings about sexual and reproductive behaviour have induced several forms of sexual repression that are incompatible with knowledge acquired by science and/or by present-day secular ethical standards. Well-known examples of such repression are: the rejection of non-marital sex (in some regions or social environments leading to the practice of honour killings³⁵⁸ or stoning³⁵⁹), the condemnation of masturbation,³⁶⁰ the belief that sex serves only as a function of fertilisation, the condemnation of homosexual behaviour,³⁶¹ and the practice of ritual genital mutilation (male circumcision,³⁶² female genital cutting such as clitoridectomy or infibulation³⁶³).

At the societal level, the religious ideological support of social dominance by a hereditary ruling class is scientifically unjustified because of the scientific knowledge about segregation and recombination of genes in a sexually reproducing species such as *Homo sapiens sapiens*.³⁶⁴ Due to Mendelian genetics, children do not necessarily show the same capabilities as their parents and cannot be expected to be able to assume the same responsibilities. Moreover, the maintenance of a hereditary ruling class contradicts all modern emancipatory ideologies and thus it is in sharp contrast to newly emerged moral standards.

³⁵⁵Baker and Bellis (1995), Shackelford and Pound (2006).

³⁵⁶Augustine of Hippo, 398; 426.

³⁵⁷Cliquet (1984).

³⁵⁸For instance, Meeto and Mirza (2007).

³⁵⁹For instance, Terman and Women Living Under Muslim Laws (2007).

³⁶⁰For instance, Cornog (2003).

³⁶¹For instance, Siker (2007).

³⁶²For instance, Denniston et al. (2010).

NB. In May 2012, in a historical and sensational verdict the district court of Cologne (Germany) ordered that boys who are circumcised for religious reasons is an offense because it is an irrevocable physical injury, arguing that the right of the parents nor the constitutionally enshrined freedom of religion justifies impeding the child’s right to bodily integrity and self determination. The Jewish and Muslim communities condemned the ruling as antireligious, and by the end of 2012, not surprisingly, the German Parliament voted, in opposition to its own constitution that guarantees bodily integrity, a law protecting religious circumcision (<http://dipbt.bundestag.de/dip21/btd/17/112/1711295.pdf>). For a detailed discussion of this issue, see Aurenque and Wiesing (2015).

³⁶³For instance, Skaine (2005), Odeyemi (2008).

³⁶⁴Cliquet (2010, 406–416).

The ‘in-group’ orientation of religions (‘the chosen ones’, ‘the illuminated ones’) is resulting in the strengthening of intolerance towards ‘others’ and is easily supported by instruments of modern mass media, leading to ethnocentric, racist and xenophobic attitudes and practices, including social ostracism of apostates and non-believers, as well as justifying war and genocide. Religions claim universality but in fact their institutions are in-group oriented and concerned with winning over and enlarging the pool of faithful. In an increasingly globalising world, and with the presence of weapons of mass destruction, such an ideological divide between ‘true’ believers having the monopoly to the true word and ‘out-groups’ has not only become obsolete but is also a danger to our survival as a species. Hence, it may be affirmed that organised religions and religiosity based on beliefs and in-group morality transmitted through religious institutions are no longer instruments of human survival.³⁶⁵ They ceased to be adaptive to human survival and have become maladaptive instruments.

In the history of humankind the organised religions have systematically been a source and cause of intergroup violence and war, resulting from their in-group oriented morality that, in turn, is rooted in our evolutionary heritage.³⁶⁶ Religiously inspired authors evidently refute this finding.³⁶⁷ However, in-group favouritism and out-group aversion or even out-group enmity of religions towards non-believers is a quite general phenomenon. It accompanied Christianity particularly during Crusades and Inquisition times and nowadays, it is particularly pronounced in jihad ideology and among Islamic fundamentalists who openly foster a culture of death, with salvation for its martyrs in a hypothetical hereafter.³⁶⁸

The reproductive ideologies of organised religions—“be fruitful and multiply, and fill the earth and subdue it, ...”³⁶⁹—aimed at spreading their own beliefs are, in the presence of overpopulation and over-exploitation of available resources in many parts of the world, in direct conflict with the necessity to limit births, and to diminish the population size and density through birth control.³⁷⁰ The current economic and ecological problems, which many countries and regions are struggling with, are in part the direct consequences of the norm systems of religions that did not succeed soon enough in changing their reproductive-growth ideologies into responsible birth control ideologies. The consciously sustained drive by some religious denominations to further expand their memes (and genes of their followers) through high(er) fertility remains highly visible in present times.

Several decades ago Julian Huxley³⁷¹ argued that theistic religions, with their divine revelations and dogmatic theologies, are not only an impediment to scientific

³⁶⁵For instance, Huntington (1996), Haught (2002), Harris (2004), Dennett (2007), Saxton (2009), Graham and Haidt (2010).

³⁶⁶Nelson-Pallmeyer (2003), Teehan (2010, 147).

³⁶⁷For instance, Armstrong (2014).

³⁶⁸See the argumentation in, for instance, Du Pasquier (1992), Jansen (1997), Lewis (2003), Manji (2003), Van Rooy and Van Rooy (2010).

³⁶⁹Genesis 1:28.

³⁷⁰For instance, Cohen (1996), Ehrlich and Ehrlich (2008), Ewing et al. (2010).

³⁷¹Huxley (1964, 108); see also Stenger (2009, 47).

and social progress but are also obstacles to the emergence of new forms of belief systems that are compatible with our present knowledge and that are necessary for the future survival and progress of humanity.

In his recent book, *The Folly of Fools*, about the evolutionary logic of deceit and self-deception in human life, Robert Trivers³⁷² pertinently argues that certain features of religion provide a recipe for self-deception, disregarding any rational thinking. For instance, this is the case with the presence in many religions of a unified, privileged view of the universe for the own group (supporting the in-group/out-group syndrome), the belief in a series of interconnected phantasmagorical things (e.g. afterlife, God, miracles, immaculate conception, last judgment, resurrection of the dead), the deification of prophets, the theistic revelation of Holy Scriptures, the prevalence of faith over reason, and the conviction about the moral superiority of the own in-group.

3.6.4 Is God Redundant?

On the basis of the current knowledge in the natural sciences (in particular physics, geology and cosmology), the life sciences (in particular evolutionary biology, anthropology, sociobiology, evolutionary psychology, genetics and neurology), and some cultural sciences (in particular ethnology and archaeology), there can be no doubt that religions are man-made. They are products of human evolution and the human need, in the pre-scientific era of human history, to master the human fears of finiteness (death), to control human evolution (destiny), to deal with diseases and natural catastrophes, to strengthen social cohesion, to submit the masses, and to defeat the enemies.³⁷³ The authors acknowledge that “absence of evidence is not necessarily evidence of absence”.³⁷⁴ They maintain that, to the best of their knowledge, there is no scientific evidence of the anthropomorphist, creationist, interventionist, omnipotent, omniscient, omnibenevolent, miracle-wreaking God, as worshipped by Jews, Christians, and Muslims. It may be affirmed beyond a reasonable doubt that such a supernatural agent does not exist.³⁷⁵ Science has no need to resort to a creator to explain the origin and evolution of the cosmos, or the origin and evolution of life in general and of the hominins in particular. It also does not need to rely on supernatural forces to explain spirituality and justify morality.³⁷⁶ As Matthew Alper³⁷⁷ wrote:

... humankind can no longer be viewed as a product of God but rather God must be viewed as a product of human cognition.

³⁷²Trivers (2011, 282).

³⁷³Tremlin (2006, 6).

³⁷⁴Mark Bekoff, quoted in Moritz (2012).

³⁷⁵Philippe (1995, 2012), Martin and Monnier (2003), Everitt (2004), Dawkins (2006), Stenger (2007, 11; 2009, 12; 2012, 78), Paulos (2008), Krauss (2012), Vermeersch (2016).

³⁷⁶Stenger (2012, 78).

³⁷⁷Alper (2006, 97).

Or as Michael A. Persinger³⁷⁸ concluded:

God is an artefact of the brain.

As Stephen Hawking and Leonard Mlodinow³⁷⁹ conclude in their recent synthesis *The Grand Design*:

But just as Darwin and Wallace explained how the apparently miraculous design of living forms could appear without intervention by a supreme being, the multiverse concept can explain the fine-tuning of physical law without the need for a benevolent creator who made the universe for our benefit.

Or as Lawrence M. Krauss³⁸⁰ concluded in his impressive *Why there is Something rather than Nothing. A Universe from Nothing*:

I find oddly satisfying the possibility that, in either scenario (a unique universe or a multiverse of universes), even a seemingly omnipotent God would have no freedom in the creation of our universe. No doubt because it further suggests that God is unnecessary – or at best redundant.

The writers of the Holy Scriptures, as well as their divinely inspired messiahs and prophets, had no idea of the real causes of human life, death and disease, or of the determinants of natural events and processes. The contents of the Tanakh, the Bible and the Qur'an on origins and causes of life, death and natural events are contradictory to the real knowledge sciences are acquiring at last.³⁸¹

However, one can only express admiration for the ingenious ways in which faiths, in the absence of knowledge, have designed myths about the origin of life and humankind, about the reasons for man's finiteness, about the causes of diseases and disasters, and about the rewards and punishments in a promised hereafter.

Reading the basic scriptures of Judaism, Christianity and Islam is extremely revealing, not only from a cultural-historical point of view but also from an evolutionary-biological point of view. They provide a lot of reflection and divine justification of the cultural-technological stage of development in which they emerged and thrived, namely the patriarchal, male dominated agrarian-pastoral stage of cultural development. Nevertheless, the non-believer is overwhelmed by inconsistencies in their narratives, the awkwardness of their superstitions and taboos, and the lack of knowledge about the real origins of morality.

The evolutionary biologist is especially struck by the ambiguity of the Abrahamic religions regarding biological evolutionary matters. On the one hand, those religions are in some respects going against evolution in their conceptualisation of the creation of the cosmos and life.³⁸² On the other hand, many of the moral rules are in accordance with the necessities of evolutionary processes, and are compatible

³⁷⁸Persinger (1987), quoted in Murray (2008).

³⁷⁹Hawking and Mlodinow (2010, 165).

³⁸⁰Krauss (2012, 185).

³⁸¹For instance, Godfrey (1983), Tiffin (1994), Wilson and Dolphin (1996), Pennock (1999, 2003), Moore (2002), Forrest and Gross (2004), Young and Edis (2004), Stenger (2008, 2011), Krauss (2012).

³⁸²See the Genesis discourse in the Bible, even when this is not taken literally.

with the biological needs of individuals and the functioning of societies in pre-modern times.³⁸³ They applied evolutionary strategies to maintain their tribal in-group integrity through endogamic rules governing sexuality and reproduction (as in Judaism), and/or to spread their beliefs by conquering, converting or exterminating other populations (as in Christianity and Islam).³⁸⁴

3.7 Science and Religion

Some further reflection is needed about (in)compatibility between religions and science with respect to the origin of morality.

First of all, it must be acknowledged that the scientific community is divided in that respect³⁸⁵: there are compatibilists and incompatibilists.³⁸⁶ Some are of the view that science and religion are intrinsically ‘non-overlapping magisteria’.³⁸⁷ Many others believe that there is no conflict between religion and science (and in particular evolution science)—as long as religion does not make quasi-scientific claims about the factual nature of the world³⁸⁸—and make considerable intellectual efforts to reconcile or integrate both domains.³⁸⁹ However, others think that science and religion are totally incompatible.³⁹⁰

Regarding the question as to whether science and religion are non-overlapping magisteria, the authors share the position taken by Victor Stenger³⁹¹ who refutes, for instance, the standpoint of the US National Academy of Sciences³⁹² which states that:

Science is a way of knowing about the natural world. It is limited to explaining the natural world through natural causes. Science can say nothing about the supernatural.

³⁸³Hinde (2002), Teehan (2006, 2010).

³⁸⁴Keith (1946).

³⁸⁵For instance, Barbour (1990), Kurtz (2003), Lüke et al. (2004), Graffin and Provine (2007), Viney (2008), Reiss (2009).

³⁸⁶Clayton and Schloss (2004, 320), Feierman (2009, xv).

³⁸⁷Non-overlapping magisteria: a concept proposed by Gould (1997, 1999), defined as different domains of inquiry, each one of which based on specific and non-overlapping domains of teaching authority. (See also, for instance, Anderson and Peacocke 1987; Barbour 1997; National Academy of Sciences 1998; Wilson 2002, 41; American Association for the Advancement of Science 2006; Ayala 2007; Reis 2009; Grassie 2010).

³⁸⁸Miller (1999, 169), Shermer (2004, 6), Ruse (2000; 2001; 2008; 2010), Rolston (1999), McGrath (2004), Collins (2006), Roughgarden (2006), Pope (1994; 2007), Lüke et al. (2004), Armstrong (2009).

³⁸⁹For instance, Teilhard de Chardin (1956), Sharpe (1991), Hefner (1993), Williams (1996, 2001), Haught (2000, 2010), Collins (2006), Pope (2007) Feierman (2009).

³⁹⁰For instance, Huxley (1894), Dewey (1922), Huxley (1927), Monod (1970), Russell (1997), Edis (2002), Dawkins (2006), Dennett (2007), Stenger (2008; 2012), Harris (2010), Philipse (2012), Valdecasas et al. (2013).

³⁹¹Stenger (2007, 28; 2012, 290).

³⁹²National Academy of Sciences (1998, 58).

Victor Stenger correctly argues that the supernatural can be studied by science if it is alleged to be able to affect natural phenomena and play an important role in the functioning of the universe and human life. Religions as a rule make claims about the natural world. They devised creation myths and express views on the origin of life and the cosmos, and prescribe rules about human moral conduct. These all relate to matters that belong to the realm of science. Furthermore, religion is an aspect of human culture that can be observed and studied by scientific methods.³⁹³ This means that rejecting this approach would imply the acceptance of a dogmatically naturalistic nature of science. Hence, Mark Perakh and Matt Young³⁹⁴ state correctly:

Science is neither based on methodological naturalism nor restrained by it: it is restrained by one and only one requirement: it requires evidence.

Also the assertion of the US National Academy of Sciences³⁹⁵

Whether there is a purpose to the universe or a purpose for human existence are not questions for science

is, in the authors' view, totally wrong. It is understandable that the American National Academy of Sciences does not want to wage war on its population, 90% of which believes in a personal God. The view that the existence of purpose is not amenable to scientific study is quite widespread, especially in religious quarters.³⁹⁶ However, since the question of purpose of (human) life is an essential aspect of (and might be of fundamental importance for) the ontogenetic development and phylogenetic evolution of humanity, it must be a fully legitimate research subject of science. It might be that science will discover that there is no purpose for human existence, but that is another problem for which the implications would also have to be investigated.

There may be several reasons why so many scientists prefer to consider science and religion to be two different ways of knowing and think that there is no inherent conflict but also no meeting point between science and religion.

Some are of the view that science is unable to deal with the challenges of human existence, because it is believed that science can only describe but not prescribe. It would only be able to study what is but not what ought to be. (This matter was discussed in more detail in Chap. 2, Sect. 2.2.1.1). In contrast, religion would be able, because of its divine revelations, to address individuals' and societies' moral needs forever. Robert N. McCauley³⁹⁷ even argues that "no development in science will ever seriously threaten the persistence of religion" because religion would be a "natural" phenomenon while science would be "unnatural".

³⁹³Stenger (2012, 290); see also Rachels (1991, 99ff), Feierman (2009, xvi).

³⁹⁴Perakh and Young (2006, 191).

³⁹⁵National Academy of Sciences (1998, 58).

³⁹⁶For instance, Mix and Masel (2014, 2444); Delhez (2015, 35ff).

³⁹⁷McCauley (2000).

Some scientists may not have thoroughly reflected on the substantive differences and incompatibilities between scientific findings and religious teachings or are, in particular, not sufficiently informed about evolutionary science or natural sciences in general. Indeed, present-day science has become so voluminous and complex that it needed to be organised in many specialised disciplines: however, the deplorable result is that many practitioners are losing touch with what should be generalised knowledge. Others may not want to consider those issues, either because of their strong religious socialisation and heritage³⁹⁸ or loyalty to family traditions, or fear of losing their nepotistic or social privileges (status, prestige, job, promotion, funding), or simply for political reasons or even physical dangers or bullying in religiously dominated societies or environments. Still others may foster religious beliefs, which have a substantially different content from the tenets of the organised religions with their creationist, interventionist, personal God. Some may believe that “the great masses of humanity are best kept sedated by pious delusions”.³⁹⁹ Finally, a few may be so overwhelmed by their spiritual drive—or simply because their belief is consoling⁴⁰⁰—that all other considerations fade away and they continue to cherish the old dualistic conception of human existence—“immaterial soul versus material body”—in their way of double thinking and living. They compartmentalise their scientific activity and religious beliefs, although one may argue that in fact they compromise their scientific principles.⁴⁰¹ This double thinking can even be perceived in the way some authors continue to contrast natural sciences to the social sciences and humanities, ignoring the unity of scientific methodology.⁴⁰² Indeed, it is not impossible that the evolutionarily based predispositions for religious beliefs even play tricks on some scientists whose religious beliefs continue to satisfy them emotionally and intellectually, or who perceive evolution science as antagonistic to the way in which they conceptualise their existence.⁴⁰³ Indeed, it must be admitted that scientific approaches to sense of purpose and morality appear to be emotionally less attractive and satisfactory to many people than mysticism, myth, ritual, magic, or religion.⁴⁰⁴ Thus, some authors argue that the ambiguous position of scientists who continue to cherish their theistic beliefs is a prime example of the manifestation of self-deception.⁴⁰⁵ Indeed, in their efforts to reconcile religious doctrines with scientific facts or theories, religious scientists risk corroding or usurping scientific truths in unverifiable ways.

Let us take the example of Francis S. Collins,⁴⁰⁶ the renowned head of the Human Genome Project, currently director of the US National Institutes of Health, and co-discoverer of the genetic misspellings that cause cystic fibrosis,

³⁹⁸Ecklund and Scheitle (2007).

³⁹⁹This issue is discussed in Harris (2010).

⁴⁰⁰Martin Gardner (1996), quoted in Shermer (1997, 133).

⁴⁰¹For instance, Miller (1999), Collins (2006), Giberson (2008); see also Ashton (2001).

⁴⁰²See, for instance, several contributors to the edited book of Lüke et al. (2004).

⁴⁰³For a discussion of this issue, see Tremplin (2006).

⁴⁰⁴Shermer (1997, 277).

⁴⁰⁵Trivers (2011, 279).

⁴⁰⁶Collins (2006).

neurofibromatosis and Huntington's disease. Collins has recently written a successful popularising book: *The Language of God. A Scientist Presents Evidence for Belief*. Notwithstanding his excellent acquaintance with the natural sciences, Collins believes that there is "still the possibility of a richly satisfying harmony between the scientific and spiritual worldviews." He believes that "God cares for us and can intervene in human affairs—on rare occasions even miraculously." Originally an agnostic, or even an atheist, Collins became a believer after reading *Mere Christianity* by the Christian apologist Clive S. Lewis⁴⁰⁷ in which this author discusses the universal morality or natural law commonly known throughout humanity. In his book Collins raises all the right questions, accepts major findings of the natural sciences—origins of the universe, evolution of life (and rejection of creationism and intelligent design), and molecular genetics—but fails to provide plausible, convincing religious answers to the philosophical and moral questions he raises. In his acceptance of the great monotheistic religions of the world, he is, among others, strongly influenced by the "powerful evidence provided by human altruism". Apparently, Collins did not consider adequately the achievements of the Second Darwinian Revolution in which the evolutionary causes and mechanisms of altruistic behaviour were more thoroughly searched and explained.

Another recent example is the edited book of Martin A. Nowak and Sara Coakley,⁴⁰⁸ entitled *Evolution, Games and God* in which several contributors⁴⁰⁹ try to reconcile or justify Christian belief components with the more recent sociobiological and evolutionary game theoretical findings about cooperative and altruistic behaviour. Although several of those contributors raise the right questions and seem to be acquainted with more recent achievements of evolutionary science, their religious preconceptions prevent them from interpreting the philosophical implications of the new knowledge in a scientifically correct and comprehensive way. Their theologically-inspired answers to pertinent questions, such as the origin of prehuman dimensions of creation, the arena of human freedom and creativity, and the problem of evil,⁴¹⁰ are, from a scientific point of view—with its toolkit of logic, considerable body of empirical observations, experiments and derived theories—remarkably and disappointingly poor, vague, or meaningless. For instance, there is no reason why some aspects of altruistic behaviour, particularly those some authors refer to as 'moral altruism',⁴¹¹ 'sacrificial altruism',⁴¹² or 'intentional altruism',⁴¹³ could not be explained by the current evolutionary toolkit. It is not evident why theological reasoning has to be involved, as a *deus ex machina*, for phenomena which are fully explainable within the current evolutionary framework. Finally, theologically inspired scholars easily disregard the overall picture that evolution

⁴⁰⁷Lewis (1952).

⁴⁰⁸Nowak and Coakley (2013).

⁴⁰⁹See in particular the contributions of Johnson (2013, 168–185), Schloss (2013, 201–219), Pruss (2013, 329–342), Clayton (2013, 343–361), Rota (2013, 362–374), and Coakley (2013, 375–386).

⁴¹⁰Coakley (2013, 375).

⁴¹¹Pruss (2013, 332).

⁴¹²Rota (2013, 364).

⁴¹³Schloss (2013, 212).

science has acquired about the evolutionary mechanism and process. This is shown in their assertions that the scientific findings and theories about the evolution of cooperation and altruism would provide some evidence or arguments for God's existence.⁴¹⁴ Indeed, contrary to the tenet of some parts of this book that suggests a causal link from theology to evolution processes, in particular regarding cooperation and altruism, present evolution science suggests the opposite causal link: namely science provides explanations as to why hominin evolution incited religions to invent, in pre-scientific living conditions, moral rules and codes supporting the cooperative and altruistic needs of the evolving hominins.

Compared to religious belief indicators in the general population, the prevalence of religiosity among scientists is much lower, although not inexistent.⁴¹⁵ For instance, whilst more than 90% of Americans believe in God, a survey among a sample of eminent scientists, namely members of the US Academy of Sciences (NAS), resulted in quasi opposite figures: the highest percentage of belief in God was found among NAS mathematicians (14%), the lowest rate among biological scientists (5%).⁴¹⁶ However, most scientists who continue to believe in a supernatural agency appear to be methodologically secularists or naturalists.⁴¹⁷

Science and religion are, of course, similar in some respects concerning questions they address. First of all, religious behaviour and abstract reasoning may have co-evolved, both being concerned with abstract concepts and comprehensive frameworks, for which the aim is to understand and influence reality.⁴¹⁸ Historically, science arose from religious and theological thinking.⁴¹⁹ Both try to understand/explain life and death, and both try to control life and death, but their methods (and sometimes also their ends) are completely different. Nevertheless, in many areas of basic morality they may arrive at identical conclusions and solutions. Since the divinely inspired moral rulings of religions are in fact man-made, many of them may be largely the result of rational thinking (and natural selection).

As F. March rightly pointed out:

Religion and science are the products of reflective thought.⁴²⁰

However, whatever the origin of religious memes, in the same way as genes they are subject to Darwinian selection,⁴²¹ resulting in the maintenance and reproduction of moral prescriptions that make sense from an evolutionary point of view.⁴²² Indeed, many of the moral precepts that can be observed in (successful) religions are compatible with the biological needs of individuals and the social viability of societies.⁴²³

⁴¹⁴Pruss (2013, 333), Rota (2013, 364), Clayton (2013, 347), Coakley (2013, 383).

⁴¹⁵Ecklund and Scheitle (2007).

⁴¹⁶Larson and Witham (1998, 313).

⁴¹⁷Shults (2015, 736).

⁴¹⁸Previc (2006, 525); see also Wilson (2002, 41).

⁴¹⁹Van Schaik and Michel (2016, 392).

⁴²⁰March (2009, 16); see also Stanley (2014).

⁴²¹Cziko (1995), Dawkins (1983), Corning (1997; 2005).

⁴²²Miller (1999), Clayton and Schloss (2004), Teehan (2006).

⁴²³Hinde (2002), Volland and Söling (2004, 53).

In that respect, religion and science may seem to be compatible, but this apparent compatibility is, from a conceptual and methodological point of view, an intellectual mirage. Conceptually and methodologically, religion and science are fundamentally different and irreconcilable: religions draw and justify their worldview and moral rulings from alleged, albeit unproven or ungrounded, divine revelations, whilst science builds its knowledge on empirical and measurable observation, corroboration, experimental testing, hypothesis and theory formulation, following the laws of logic. Moreover, science changes or refines its theories, explanations and predictions as soon as new evidence contradicts or complements earlier findings or views. Religions are constrained by their Holy Scriptures.

Divinely revealed myths about the origin and evolution of the cosmos and life, and in particular human life, such as can be found in Holy Scriptures like the Bible and the Qur'an, or even the current-day more sophisticated theological interpretations about evolution,⁴²⁴ are completely at odds to and incompatible with the present-day knowledge of the natural and human sciences, and in particular with biological evolution science.⁴²⁵ Religious apologists defend their faith by arguing that the Holy Scriptures should not be literally interpreted: however, this is a very weak position that resembles the semantic relativistic approach of the Humpty Dumpty character in Lewis Carroll's famous 1871 novel *Through the Looking Glass*.⁴²⁶

The incompatibility between science and religion is particularly salient with regard to the origin and evolution of morality.⁴²⁷ Theologies have not been able to explain, through empirically observable or experimentally controllable means, any phenomenon, be it natural or supernatural. In contrast, notwithstanding their short-lived existence, sciences have made huge and consistent progress in unravelling facts about the origin and evolution of life and the cosmos, and in recent decades have even developed plausible explanations for the origin and evolution of phenomena such as gods, spirituality, religiosity, religion, and morality—domains that were traditionally considered to be the exclusive territory of organised religions.

⁴²⁴For instance, Teilhard de Chardin, 1950; Pope John Paul II, 1996; Haught (2004; 2010).

⁴²⁵On the basis of the present-day scientific acquisitions, it is fully justified to speak about 'evolution science', and no longer about evolutionary theory. The innumerable empirical observations and experiments of the present-day natural sciences show that biological evolution is a fact, and not just a theory, let alone a hypothesis. Allegations that evolution is a myth or a religion, e.g. "Evolution is sometimes the key mythological element in a philosophy that functions as a virtual religio" (Harrison, 1974, 1007) result from an incredible lack of knowledge and insight into sciences such as cosmology, geology, genetics and bioanthropology, cultural anthropology and archaeology. Indeed, evolution science includes not only knowledge from the life sciences but also involves knowledge from many other scientific disciplines, natural sciences as well as social sciences and humanities.

⁴²⁶See, for instance, the pertinent critique of Paul Cliteur (2010, 248–254) of the liberal interpretation of the Holy Scriptures by Karen Armstrong (1993; 2007; 2009).

⁴²⁷Stenger (2012, 45).

Given the fact that so many people, even in developed countries and particularly in the United States,⁴²⁸ do not accept the findings of evolutionary science, and in particular of anthropology, and continue to believe in fantastical stories about divine creationism and, more recently intelligent design, it is necessary to briefly address these issues. The reader will mainly be referred to the extensive relevant scientific literature about the present-day scientific achievements concerning those issues.

The development of science, with its many and complementary discoveries in various disciplines, has been a challenge for religious believers; this is because crucial elements of religious belief have been gradually and systematically refuted and replaced by scientific explanations. It started with the replacement of the geocentric cosmic model by the heliocentric one of Copernicus-Keller-Galilei in the Renaissance. It was followed in the nineteenth century by the replacement of the anthropocentric and creationist model (in which humankind is considered to be the central focus of the universe) by the evolutionist model of Darwin and Wallace, further supported by the nineteenth and twentieth century shift from an organism-centrist to a gene-centrist view of life,⁴²⁹ and completed in the twentieth century with the progress of physics and cosmology which are able to explain the evolution of the cosmos without the need for anything beyond physical laws.⁴³⁰

Darwinism, or more generally evolution science, is a painful thorn in the side of religious believers. John Micklethwait and Adrian Wooldridge⁴³¹ are probably right in pointing out that for religious believers the controversy about Darwinism is not only or not so much natural descent but also the theorem of survival of the fittest. This is considered as amoral or even immoral, as the idea of the interaction between random variation and natural selection is impossible to reconcile with an all-knowing, benevolent God.

Nevertheless, every new scientific discovery, in domains as different as astronomy, physics, chemistry, geology, palaeontology, anthropology and archaeology, molecular genetics, neurology, sociobiology and evolutionary psychology, has confirmed or even strengthened the scientific approaches and refutes the religious belief systems.⁴³² The common feature of the findings in those scientific disciplines is that the supernatural, immaterial or spiritual approaches and explanations of religions have been refuted and are replaced by natural and material

⁴²⁸In an analysis of recent survey results on adults in 31 European countries, Japan, Turkey and the US, in which the question was asked whether it is true that "Human beings, as we know them, developed from earlier species of animals", it was found that 50–80% of the respondents in European countries answered positively (the highest percentages were obtained in Iceland, Denmark, Sweden, France, Japan, UK and Norway); in the ranking of the countries included in the study the US took the penultimate place (with 40%), only followed by Turkey with 25% (Miller et al. 2006). A Gallup Poll of 2005 revealed that 53% of US adults still believe that God created man exactly how the Bible describes it.

⁴²⁹Galton (1865; 1869; 1883; 1889), Weismann (1868; 1892; 1902), Dawkins (1976), see Tanghe (2013) for a general overview of the shift in the organismcentrist-genecentrist paradigm.

⁴³⁰Hawking and Mlodinow (2010), Stenger (2011; 2012), Krauss (2012).

⁴³¹Micklethwait and Wooldridge (2009, 40); see also Edis (2007, 142).

⁴³²For instance, Dawkins (1996; 2006), Miller (1999), Stenger (2007).

approaches and explanations, even for behavioural phenomena such as altruism, reciprocity, sociality, love, spirituality, and religiosity.

Contrary to what, for instance, Alister E. McGrath⁴³³ argues on the basis of the analysis of the writings of authors such as Richard Dawkins⁴³⁴ and Daniel Dennett⁴³⁵ about the inadequacy of their atheist apologetic “Darwinian worldview”, the refutation of religious belief systems is not only based on nineteenth century Darwinism, and not even on the whole of the twentieth century ‘Modern Evolutionary Synthesis’, but it is also founded on the whole body of scientific findings, including those of anthropology, archaeology, neurology, geology, physics and cosmology. Most interesting in this scientific development is the enormous coherence and complementarity of the findings of the different relevant scientific fields going from natural sciences, then biosocial sciences, to cultural sciences. Hence, it is incomprehensible why some scholars, for instance John Caiazza,⁴³⁶ continue to speak about the evolutionary mystique.

The recent literature in defence of theistic worldviews by authors who simultaneously accept the findings of science,⁴³⁷ notwithstanding its ingenious efforts, is fundamentally disappointing and unconvincing in its defence of the God concept. Furthermore, the arguments put forward concerning the alleged convergence or reconciliation between the findings of science and religious belief systems are weak, even when explicitly intended to be based on hard science approaches to transcendental grounds for existence.⁴³⁸ In fact, they only illustrate the ever widening of the fundamental cleavage between the scientific and religious approaches. Admittedly, many of the current-day theological writings take into account modern achievements in the physical sciences (physics, geology, cosmology), and take Darwinism into consideration; but they often fail to fully acknowledge the current Modern Evolutionary Synthesis, and in particular the Second Darwinian Revolution (sociobiology and evolutionary psychology), especially with respect to their implications for morality and religiosity.

3.7.1 Creationism, Creation Science and Intelligent Design

As the theme of this book deals with evolutionary ethics, it is necessary to elaborate briefly on the controversy between evolution science and (neo)creationism.

⁴³³McGrath (2010).

⁴³⁴Dawkins (2000; 2003; 2006).

⁴³⁵Dennett (1995; 2007).

⁴³⁶Caiazza (2005, 105).

⁴³⁷For instance, McFague (1993), Johnson (1996), Barbour (1997), Van Till (1998), Peacocke (1998), Miller (1999), Haught (2000; 2004; 2010), Kaufman (2001), Schroeder (2001), Hunter (2003), McGrath (2004; 2007; 2010); Collins (2006), Cornwell (2007), Crean (2007), D’Souza (2007), Flew and Varghese (2007), McGrath and McGrath (2007), Holloway (2008), Armstrong (2009), Dowd (2009), Delhez (2015), Wilcox (2016).

⁴³⁸For instance, Davis (2016) in the ‘Scientific God Journal’ (<http://scigod.com/index.php/sgj/index>).

Creationist views are not at all new. They were also generally accepted among scientists before the Darwinist revolution. Creation narratives have been elaborated in almost all religions and cultures of the world.⁴³⁹ The creationist views of the three Abrahamic religions are partly based on the Babylonian creation myth⁴⁴⁰ and go back to the Hebrew Old Testament. God is reported to have created in six days “the heavens and the earth”, “the living creatures”, and “man in our image, in our likeness”.⁴⁴¹ According to the Ussher chronology,⁴⁴² based on the analysis of the biblical genealogies, the biblical creation occurred 4004 BCE,⁴⁴³ a viewpoint that is still being shared by one of the variants of the present-day creationist movement, namely the ‘Young Earth Creationists’ (YECs).⁴⁴⁴

However, it must be stressed that many mainline religions or denominations declared that they see no conflict with evolution,⁴⁴⁵ although some of those statements have to be taken with a grain of salt as, for instance, can be seen from the position of some of the recent Roman Catholic popes.⁴⁴⁶ The situation is much worse in the Muslim world where most people believe that the Qur’an is the direct word of God, implying belief in a creationist view of life.⁴⁴⁷

3.7.1.1 Creationism and Neo-creationism in the United States

Soon after Darwin’s *On the Origin of Species* appeared, evolutionary theory became almost entirely generally accepted in the global scientific community. That success, and its perceived threats to a religious interpretation and guidance of human life (and death), probably caused religious fundamentalists to severely oppose evolutionary theory. A revival and popularising of creationist beliefs started early in the twentieth century, mainly by fundamentalist Protestants in the United States. Inspired by George McCready Price’s⁴⁴⁸ pseudoscientific book *New Geology* in which the Genesis flood was considered to be the central geological event in the history of the earth, Harold W. Clark⁴⁴⁹ introduced the term creationism in 1929.

⁴³⁹Sproul (1979), Leeming (2009).

⁴⁴⁰Stenger (2009, 165).

⁴⁴¹Genesis 1:1-31.

⁴⁴²Ussher 1650.

⁴⁴³According to the present stage of scientific knowledge, the Earth is approximately 4.6 billion years old (Prothero and Dott 2009) and, according to the evidence of earliest fossils, life appeared on Earth at least 3.8 billion years ago and evolved gradually (http://en.wikipedia.org/wiki/Timeline_of_evolution), with the appearance of the first hominins 7 million years ago, and the present *Homo sapiens sapiens* between 150,000 and 300,000 years ago (Stringer and Andrews 2005; McDougall et al. 2005; Hublin et al. 2017).

⁴⁴⁴Whitcomb and Morris (1961), Ham (1987), Ashton (2001), Morris (2007).

⁴⁴⁵Matsumura (1995).

⁴⁴⁶Pope John Paul II (1996), Pope Benedict XVI (2007).

⁴⁴⁷See, for instance, the discussion in Edis (2007, 115ff).

⁴⁴⁸George McCready Price (1870–1963): Seventh-day Adventist and amateur geologist; see McCready Price (1923).

⁴⁴⁹Harold W. Clark (1891–1986): prominent creationist in the middle of the twentieth century.

Several creationist organisations were founded such as The Religion and Science Association,⁴⁵⁰ The Deluge Geology Society,⁴⁵¹ the American Scientific Affiliation,⁴⁵² the Geoscience Research Institute,⁴⁵³ and the Creation Research Society (CRS).⁴⁵⁴

The American creationists succeeded temporarily to get the teaching of evolution banned from public schools in several states (mostly in the southern 'Bible Belt'). It was only in 1968 that the US Supreme Court decided that State statutes banning the teaching of evolution are unconstitutional because they violate the constitutional separation between Church and State.⁴⁵⁵

In response to this ruling, the creationist movement decided to implement another strategy and began to argue that creationism is a science, just like evolution science.⁴⁵⁶ In 1970, the Creation-Science Research Center (later changed to Institute for Creation Research)⁴⁵⁷ was established as the research division of Christian Heritage College in San Diego. Creation science attempts to provide scientific support for the Genesis story of the Bible and to refute the scientific evidence for evolution. Due to the instigation of the scientific creationists, Balanced Treatment

⁴⁵⁰The Religion and Science Association (RSA), founded in 1935, was the first antievolutionary organisation in America (Numbers 2006, 123).

⁴⁵¹The Deluge Geology Society (1938–1948) was a creationist organisation promoting flood geology.

⁴⁵²The American Scientific Affiliation (www.asa3.org), created in 1941, is a Christian religious organisation the purpose of which is to investigate any area relating to Christian faith and science.

⁴⁵³The Geoscience Research Institute (1958) (<http://www.grisda.org/>) is an official institute of the Seventh-day Adventist Church established to address the scientific evidence concerning origins.

⁴⁵⁴The Creation Research Society (CRS) was founded in 1963. The statement of belief of the Creation Research Society (CRS) (<http://www.creationresearch.org/>) includes: "(1) The Bible is the written Word of God, and because it is inspired throughout, all its assertions are historically and scientifically true in the original autographs. To the student of nature this means that the account of origins in Genesis is a factual presentation of simple historical truths. (2) All basic types of living things, including man, were made by direct creative acts of God during the Creation Week described in Genesis. Whatever biological changes have occurred since Creation Week have accomplished only changes within the original created kinds. (3) The great flood described in Genesis, commonly referred to as the Noachian Flood, was an historic event worldwide in its extent and effect. (4) We are an organisation of Christian men and women of science who accept Jesus Christ as our Lord and Savior. The account of the special creation of Adam and Eve as one man and one woman and their subsequent fall into sin is the basis for our belief in the necessity of a Savior for all mankind. Therefore, salvation can come only through accepting Jesus Christ as our Savior."

⁴⁵⁵Supreme Court of The United States (1968), *Epperson v. Arkansas*. No. 7. 393 U.S. 97. Argued October 16, 1968. Decided November 12, 1968; see also Flank (2006).

⁴⁵⁶For instance, Whitcomb and Morris (1964), Morris (1985; 2007).

⁴⁵⁷The scientific creationist principles of the Institute for Creation Research (<http://www.icr.org/>) include among others: "The physical universe of space, time, matter, and energy has not always existed, but was supernaturally created by a transcendent personal Creator who alone has existed from eternity; The phenomenon of biological life did not develop by natural processes from inanimate systems but was specially and supernaturally created by the Creator; The first human beings did not evolve from an animal ancestry, but were specially created in fully human form from the start. Furthermore, the "spiritual" nature of man (self-image, moral consciousness, abstract reasoning, language, will, religious nature, etc.) is itself a supernaturally created entity distinct from mere biological life."

bills mandating equal classroom time for creation science and evolution science were passed in several southern states of the United States (Tennessee 1973; Arkansas 1981; Mississippi 1981; Louisiana 1987). Other moves by the scientific creationists consisted of arguing that evolution is a ‘religion of secular humanism’, or requiring that all science textbooks contain a printed disclaimer stating that ‘evolution is only a theory, not a fact’ (Alabama 1995; Washington 1998). However, all of these moves were rejected by federal courts or the Supreme Court of the US, arguing that creation science is a religious issue whilst evolution science is a matter of science.⁴⁵⁸

Unfortunately, the US courts used the wrong argument to reject the teaching of creationist science or intelligent design theory: those theories should not be rejected because of their religious nature (which they are), but because they are bad science⁴⁵⁹ or pseudoscience.⁴⁶⁰

Finally, following their legislative defeats, the creationist movement tried to adapt and further evolved in the early 1990s with a new and subtler variant of creationism, namely Intelligent Design⁴⁶¹—the view that is historically the original explanation for the remarkable adaptations of living beings to their environment.⁴⁶² Intelligent Design organisations emerged such as the Discovery Institute⁴⁶³ and the Intelligent Design and Evolution Awareness Center.⁴⁶⁴

The Intelligent Design movement is a neo-creationist endeavour that fights the modern evolutionary synthesis with pseudo-scientific arguments. It seeks to explain evolution as the result of the intervention of a so-called superior intelligence or intelligent designer, without explicit references to God or the Bible. In this way it strives to avoid the constitutional opposition which occurred in the past.

Intelligent Design advocates demand that their ideas be taught in school science curricula alongside, and as a scientific alternative, to evolution science. They are strongly supported by public opinion in America. A recent survey of the Pew Research Center⁴⁶⁵ shows that 64% of Americans favour the teaching of intelligent design theory and 38% would support the total removal of the teaching of evolution in schools. Hence, public opinion in America is largely at odds with the scientific knowledge of its scientific community.

⁴⁵⁸For an overview of the judicial events procedures, see Flank (2006).

⁴⁵⁹See Stengers (2009); footnote 84.

⁴⁶⁰See Perakh and Young (2006, 195).

⁴⁶¹Johnson (1991; 1997), Davis and Kenyon (1993), Behe (1996), Dembski (1998, 2003, 2004), Dembski and Witt (2010).

⁴⁶²Miller (1999, 99), Young and Edis (2006, 1).

⁴⁶³The Discovery Institute (<http://www.discovery.org>) wants “to promote, as a scientific theory, the idea that life was designed by an intelligence”. Its “work includes a belief in God-given reason.”

⁴⁶⁴The Intelligent Design and Evolution Awareness Center (<http://www.ideacenter.org>) “believes that life is not the result of purely natural processes, but that it was in some way designed by an “intelligence” and “that the identity of the designer is the God of the Bible”.

⁴⁶⁵Masci (2009).

Creationist science theory and Intelligent Design theory are totally absent in the publication record of recognised and peer-reviewed scientific journals.⁴⁶⁶ These theories are considered by the mainstream scientific community as bad science, anti-science, dead science,⁴⁶⁷ or pseudoscience.⁴⁶⁸ Evolution science is based on sound scientific evidence whilst the theory of intelligent design is not.

Morton M. Hunt⁴⁶⁹ expressed very well the current mainstream scientific view about creationism and Intelligent Design:

Creationists and intelligent designers are one of the 'New Know-Nothings' in modern culture.

Excellent and critical historical overviews of modern creationism can be found in Edward J. Larson, Robert T. Pennock, Eugenie C. Scott, and Ronald L. Numbers.⁴⁷⁰ For the history of modern creationism from a creationist point of view, see Henry M. Morris.⁴⁷¹ For the ubiquitous creationist obscurantism in the Muslim world, see the excellent overview in Taner Edis⁴⁷² *An Illusion of Harmony*.

In numerous scientific publications, scientists have properly refuted the creationist and/or intelligent design theses or have tried to popularise evolutionary science.⁴⁷³

An interesting publication in this perspective is Kenneth R. Miller's⁴⁷⁴ *Finding Darwin's God* in which the author, biologist and Christian, criticises and scientifically refutes in a well documented and pertinent way the arguments of the so-called scientific creationists and intelligent design advocates, such as Henry M. Morris, Phillip E. Johnson and Michael J. Behe,⁴⁷⁵ arguing that 'God' is neither a charlatan, a magician or a mechanic. However, Miller himself leaves the evolutionary path when he deals with issues of social and moral values, which he considers to be fundamentally different from evolution, not willing or able to see that spirituality, religiosity, and morality are—just as morphological and physiological features—subject to and the result of evolutionary processes and mechanisms. Miller raises the right questions, but does not apply his biological knowledge to produce the scientific answers; therefore he remains caught in the traditional dualistic thinking about material and spiritual matters.

Reputed scientific organisations, such as the National Academy of Sciences (1999) and the Association for the Advancement of Science (2006) in the US, and

⁴⁶⁶Young and Edis (2006, 1).

⁴⁶⁷Kitcher (2007, 8).

⁴⁶⁸Lecointre et al. (2004), Perakh and Young (2006, 185).

⁴⁶⁹Hunt (1998).

⁴⁷⁰Larson (1985), Pennock (1999), Scott (2005), Numbers (2006); See also Gonzalez (2009).

⁴⁷¹Morris (1984).

⁴⁷²Edis (2007, 115–151).

⁴⁷³For instance, Alexander (1978), Godfrey (1983), Kitcher (1982, 2007), Dawkins (1986), McKown (1993), Wilson and Dolphin (1996), Pennock (1999), Moore (2002), Manson (2003), Perakh (2003), Forrest and Gross (2004), Shanks (2004), Skybreak (2006), Young and Edis (2006), Shermer (2007), Coyne (2009).

⁴⁷⁴Miller (1999).

⁴⁷⁵Morris (1974), Johnson (1991; 1997; 2002), Behe (1996).

the Royal Society (2006) in the UK, rejected the non-science of the creationists and Intelligent Design advocates. On 21st June 2006, the InterAcademy Panel on International Issues (IAP)⁴⁷⁶ issued a statement, signed by the academies of sciences of 70 states, on the necessity to teach evidence-based facts about the origins and evolution of the Earth and of life, and to reject the concealment or denial of evolution science, or the creation of confusion with theories not testable by science.

However, given the perseverance (and financial resourcefulness) of the (neo) creationists,⁴⁷⁷ and the persisting lack of access to scientific knowledge in large parts of the population, especially in the United States, the scientific and educational community as a whole has, so far, largely failed to respond adequately to the spreading of the (neo)creationist myths and the implications for educational politics.

It is striking that a country that has produced breakthrough scientific achievements perpetuates a dual educational system and large shares of its population lack access to good education.

How is it possible to explain the following paradox? In this country, which is at the vanguard of scientific innovation and progress, not the least in philosophically and ethically relevant scientific domains (such as bioanthropology, sociobiology, evolutionary psychology, molecular genetics and neurology), 92% of its population continues to believe in the existence of God or a universal spirit, 74% believes in the existence of a heaven, 63% believes that their faith's sacred texts are the word of God, 60% of adults believe in a personal God, 59% believes there is a hell, and only 48% agrees that evolution is the best explanation for the origins of human life on earth.⁴⁷⁸

Several explanations have been given for this remarkable phenomenon. Some scholars link the American 'exceptionalism', in one or another way, to the process of immigration. For instance, Richard Dawkins⁴⁷⁹ hypothesizes that immigrants might have embraced religion as a kind of kin-substitute for the loss of the stability and comfort of their extended family in the country of origin. Another possibility is that immigration into the US was selective with regard to strong religious beliefs, so that these beliefs were transmitted, culturally or even genetically, to subsequent generations.⁴⁸⁰ Other scholars point to the fact that religiosity is strongly coupled to societal insecurity and societal dysfunction—a phenomenon that is particularly striking in the United States with its excessive economic inequalities, dual education systems, lack of a trustworthy social protection⁴⁸¹ at times of unemployment,

⁴⁷⁶InterAcademy Panel on International Issues (IAP) (2006).

⁴⁷⁷For instance, in 2013, public indignation arose about the decision of the Texas state Board of Education to appoint a review team consisting of a majority of scientifically unqualified creationists to review the science textbooks to be used in public schools for the next decade. (http://www.slate.com/articles/health_and_science/science/2013/09/texas_science_textbooks_creationists_try_to_remove_evolution_from_classrooms.2.html).

⁴⁷⁸Pew Forum on Religion and Public Life (2007).

⁴⁷⁹Dawkins (2006, 40).

⁴⁸⁰Alper (2006, 195), Lynn et al. (2009); see also Bruce (2002, 219).

⁴⁸¹For instance, Mickelthwait and Wooldridge (2009, 150) refer in this respect to the internationally well-known inverse relationship between the generosity of the welfare state and the success of religion: the more generous the secular welfare state, the less important become religious-based charities and the demand for religion in general.

sudden or prolonged ill health, lack of general long-term care for elderly, high crime and other social pathologies.⁴⁸² According to Steve Bruce⁴⁸³ the key factor regarding the exceptional religious situation of the USA is the federal and diffuse structure of its polity: this allows its people to create their own subcultures in which their faith strongly retains features of pre-modern times. Finally, one wonders to what degree the ideological-religious pillarisation in the United States with its strong 'in-group' ethnic-racial splits has also contributed to maintain and nourish the religious-ideological divide in the country.

3.7.1.2 Creationism Goes Global

In the recent expanded version of his classic historical account of American creationism, Ronald L. Numbers⁴⁸⁴ included a chapter on the global spread of antievolutionism, showing that the American creationists are making serious efforts to go global and to spread their unscientific views abroad—to Asia, Africa, Europe and South America. They are doing this with some considerable success in some regions of the world that are lagging behind in quality education for all.

In Europe, people generally seem to be better informed on evolutionist matters or have been less subject to fundamentalist indoctrination by the creationist lobby.⁴⁸⁵ Nevertheless, some American Creationist organisations, such as the Institute for Creation Research and Answers in Genesis,⁴⁸⁶ are increasingly and not completely unsuccessfully making efforts to bring their non-science ideas to Europe.⁴⁸⁷ It is even more disquieting that in several European countries ministers of education, belonging to certain Christian denominations, have supported creationist movements in their efforts to get creationism and/or intelligent design, along with evolutionary theory, to be taught in biology classes.⁴⁸⁸

Efforts to disseminate creationist beliefs and disavow evolution science in Europe are also coming from the Islamic immigrant community supported by Islamic countries. For example, in 2007 the prolific Turkish creationist Harun

⁴⁸²For instance, Paul and Zuckerman (2007), Stenger (2009, 231), Delamontagne (2010), Harris (2010), Coyne (2012).

⁴⁸³Bruce (2002, 219).

⁴⁸⁴Numbers (2006, 399).

⁴⁸⁵For instance, Anderson and Peacocke (1987), Miller et al. (2006), Blancke (2011), Blancke et al. (2013).

⁴⁸⁶Answers in Genesis (<http://www.answersingenesis.org/>) is the notorious creationist ministry, founded in 1993 by the Australian Ken Ham, that, as part of its aggressive creationist dissemination strategy, has set up a Creation Museum near Petersburg, Kentucky, which gives an overview of the origins of the universe, life, and mankind based on a literal interpretation of the chapter Genesis in the Bible. The exhibits show that the Earth and all its life forms were created 6000 years ago, over a period of six days and that humans and dinosaurs once coexisted!

⁴⁸⁷Examples of creationist organisations in European countries: UK: The Biblical Creation Society (<http://www.biblicalcreation.org/>); Netherlands: Mediagroep in Genesis (<http://www.scheppingofevolucie.nl/>); Belgium: Creabel (<http://www.creabel.org/>); Germany: Studiengemeinschaft Wort und Wissen (<http://www.wort-und-wissen.de/>); Italy: Centro Studi Creazionismo (<http://www.creazionismo.org/>); Russia: Russian Creation Science Fellowship; Poland: Polish Creation Society (www.creationism.org.pl).

⁴⁸⁸See Blancke et al. (2013, 2014).

Yahya⁴⁸⁹ sent copies of his pseudoscientific book *The Atlas of Creation*, which tries to refute the theory of evolution, to a large number of schools in several European countries.

It was probably such developments that incited the Parliamentary Assembly of the Council of Europe to adopt in 2007 Resolution 1580 on *The Dangers of Creationism in Education* in which it

firmly opposes the teaching of creationism as a scientific discipline on an equal footing with the theory of evolution by natural selection and in general resist presentation of creationist theories in any discipline other than religion.

Valuable but complex concepts, such as cosmic and biological evolution, need to be guarded and duly protected, by formal, informal and non-formal education, against attacks by zealots who want to curb or reverse the development of the human species.

The missionary actions of the (American) creationists or creationist organisations⁴⁹⁰ found fertile soil in the Islamic world where, traditionally, the Qur'anic tenets are interpreted literally and supernatural design is a common tenet in the Muslim world of thoughts.⁴⁹¹ Although Muslims are very much aware of the importance of science and technology, because of its considerable contribution to development and welfare, they adopt scientific knowledge very selectively. Parts considered acceptable mainly concentrate on applied science, and much less, if at all on basic natural or social and human sciences. In this way they try to avoid the inherent conflicts with their creationist Qur'anic beliefs.⁴⁹²

Wherever Muslim scholars deal with fundamental issues of origin and evolution of life, they take an inherently creationist position.⁴⁹³ In fact, they are intelligent designers *avant la lettre*, because in their view everything is ultimately explained by divine providence. In this domain, whenever they borrow ideas from the West and in particular from the United States, it is not the advanced American knowledge about evolution science and related matters, but the non-science clutter from the Christian (neo)creationists.⁴⁹⁴ Hence, it is not surprising that the Islamic scientific contributions in the fundamental domains of natural and social and human sciences, even in the oil-rich Arab countries, is virtual nil.⁴⁹⁵

⁴⁸⁹Yahya (2006–2007); see also Yahya (1999).

⁴⁹⁰According to Numbers (2006, 425), also the above mentioned Turkish prolific writer Harun Yahya and the Turkish Science Research Foundation (the Bilim Araştırma Vakfı, or BAV) are playing an active role on the international scene, particularly in the Islamic world, in propagating creationist beliefs and fighting evolution science.

⁴⁹¹Edis (2006, 11; 2007, 115.)

⁴⁹²Edis (2007, 2009); Hameed (2010), Riexinger (2010).

⁴⁹³For instance, Nasr (1989, 1994), Bakar (1987, 2003), Shanavas (2005), Yahya (2006–2007), Ghafouri-Fard and Akrami (2011).

⁴⁹⁴For instance, Yahya (2006–2007).

⁴⁹⁵Edis (2007, 23).

3.7.1.3 Why Persistent and Even Expanding Creationism?

One wonders how it is possible that so many people, some of whom have had a scientific education, continue to believe in creationist and Intelligent Design narratives, which have so evidently been falsified and refuted by an overwhelming body and variety of scientific findings in virtually every relevant scientific discipline that has something to say about origins of life, Earth and the cosmos. To date, the natural sciences, and in particular evolution science, show that the idea of a grand design as a driving force in (human) evolution must be given up. Nevertheless, many people, in particular religious believers, even among social scientists, have difficulty accepting this fallacy. Several, mutually non-exclusive determinants probably contribute to the explanation of this denial.

First, it is possible that our homocentric vanity plays tricks on us and pushes us to assume that there is purpose behind all natural phenomena and that we are part of an ultimate design. Unfortunately, this teleological thinking is merely wishful thinking.⁴⁹⁶

Scholars such as Christopher P. Toumey and Robert T. Pennock⁴⁹⁷ are probably right in pointing out that a key element for understanding creationist and Intelligent Design consists of the fundamentalist ethical concerns of strongly conservative citizens. They are worried about the path that modernisation is taking with its alleged or supposed increase in sexual laxity, marriage breakdown, abortion, homosexuality, euthanasia, pornography, etc.⁴⁹⁸ It will not come as surprise that evolution science—‘a satanic invention’ according to Henry M. Morris, one of the prominent American creationists⁴⁹⁹—is often added to that hideous list of so-called degenerate phenomena. However, the scientific progress which has been made in recent decades in fields such as sociobiology and evolutionary psychology, cognitive science, molecular genetics, and even cosmology, increasingly enlarges the gap between science and the creationist and Intelligent Design prejudices about a divinely imposed, invariably natural morality.⁵⁰⁰

A more fundamental explanation for the strong urge to believe that we are part of a grand design—and that there is pre-determined purpose in our existence—follows from our cognitive capacity to observe and experience our strong innate drive for survival and development, as well as our evolved neurological receptivity for supernatural agencies. Moreover, with the development of science, people were able to observe and understand the evolution of life on our planet, the complexity and directionality of which is so tempting to be mistakenly explained as orthogenesis⁵⁰¹ or designed evolution.

⁴⁹⁶For a discussion of this issue, see Vannelli (2001, 1).

⁴⁹⁷Toumey (1993), Pennock (1999).

⁴⁹⁸See for instance, Johnson (1991; 1997), Wiker (2002); for the Muslim world, see the discussion in Edis (2007, 143).

⁴⁹⁹Morris (1984, 110).

⁵⁰⁰Edis (2007, 154).

⁵⁰¹Orthogenesis is a nineteenth century theory that life evolves in a unidirectional fashion on the basis of an innate driving force (Haacke 1893; Eimer 1898).

Although it would be perfectly legitimate to scientifically investigate whether hypotheses such as creation or intelligent design can be supported by empirical and experimental findings, the problem with the creation and Intelligent Design ‘research’ institutes is that they formulate their ‘research’ aims not as hypotheses, but as (revealed) dogmas that they want to document by ‘scientific’ facts. However, so far, present-day reliable scientific knowledge does not support the revealed tenets: on the contrary, it refutes them.

3.7.2 Challenges for Replacing Religion by Science as the Source of Morality

Religious ideologies with their moral dogmas fulfilled an important survival function in the evolution and history of humankind in the pre-scientific era. However, in many respects these are no longer well adapted to the novel environment of modernity and its exigencies for further human and cultural development and evolution. Is it today possible, desirable or even necessary to replace religious dogmas about origin of morality by scientific knowledge about human source of morality?

The development of science has shattered all traditional worldviews.⁵⁰² It questions the logic and coherence of the assertion that God is almighty and omniscient, creator of everything, and at the same time immensely benevolent and loving.⁵⁰³ The alleged revealed role of supernatural beings or forces as presented in religious ideologies cannot be confirmed by scientific observations: there is no empirical basis for the existence of the personal God of the Abrahamic religions. Last but not least, all observations about the origin and evolution of the cosmos, life in general and the hominins in particular, are explicable by natural mechanisms, without the necessity for intervention by divine powers. They contradict the basic tenets of the religious revelations.

There is no doubt that all successful religions and philosophical traditions share, together with many secular ideologies, a large number of ethical principles. Although usually strongly in-group oriented, they are important for human ontogenetic development, intergenerational continuity, and societal cohesion. Examples are the Golden Rule; in-group solidarity; reproductive continuity and parental care; control of sexual drives; and health protection. This is, in the authors’ view, the reason why differences in their social engagement between religious and non-religious people are often less important than the divide between conservative and progressive (religious and non-religious) people.

As a result of the development of science and the emergence of modern secular ideologies, most religious orientations and philosophical traditions have adapted or

⁵⁰²Huxley (1927), Dawkins (1986), Russell (1997), Dennett (1995, 2007), Stenger (2008), Stewart (2008).

⁵⁰³In this respect Robert Wright (2000, 319) deserves to be quoted: “The kind of God that is hardest to find evidence of is the kind most people seem to believe in: a God that is infinitely powerful and infinitely good.”

rather were forced to adapt (more or less) to the exigencies of the scientifically driven and ideologically pluralistic modernisation process. Still a major exception to this trend is Islamic countries that still need to separate religious belief from state organisation and governance.

The human brain was selected, either as an adaptation or as an exaptation, to be sensitive and receptive to spiritual and religious phenomena. In most societies powerful religious institutions continue to influence religious and moral thinking, and many people, even in the predominantly secular societies, continue to draw their motivation for individual and societal action from their religious beliefs. At the same time, it must be acknowledged that science has not been particularly successful in communicating and popularising its findings about the origin of morality to motivate people to adapt their worldviews: at first sight these findings appear difficult to understand and may be emotionally unappealing to so many people.⁵⁰⁴

Hence, when reflecting on a new, global ethic that would overcome the in-group morality in a further modernising and globalising world, it will be a challenge to examine how and to what degree religious beliefs and secular knowledge can contribute to the future development and evolution of the human species.

⁵⁰⁴See also Wilson (2002, 230).

Abstract

This chapter briefly discusses the major secular ideologies that developed in the wake of the scientific revolution and the Enlightenment: liberalism, socialism, feminism, nationalism, ecologism, and humanism. The main purpose is to look at and evaluate those secular ideologies from an evolutionary perspective and their significance for the development of evolutionary ethics. It is concluded that all of the major ideologies appear to include moral principles and practices that can be considered to be useful for evolution-based ethics. Albeit, they are only partial building stones for the design of a viable universal, evolutionarily grounded ethics in a further progressing modernisation. None of the secular ideologies have succeeded so far in elaborating a comprehensive worldview comparable to the major organised religious traditions. They excel as a result of their fragmented nature and, in most cases, short-term perspective.

4.1 Introduction

In the course of modernisation numerous secular ideologies emerged and contributed strongly to shaping the nineteenth and twentieth centuries.¹ Do they, or at least some of them, replace the out-dated ideologies of the pre-scientific era? Are they better adapted to the novel environment of modernity? Do they have better chances to guide the future evolution of humankind?

This chapter briefly deals with, and characterises from an evolutionary point of view, what is perceived to be the major secular ideologies in modern culture. Some of them, like humanism, are predominantly of a philosophical nature; most of them,

¹Ebenstein et al. (1999).

like liberalism, socialism, feminism, nationalism, and ecologism, are also or mainly political in nature. However, all of them have a fundamental ethical basis.

All of the secular ideologies that emerged and developed in modern times were or are endeavours which aimed to culturally adapt human societies to the challenges and opportunities of the scientifically driven and evolving modernisation process. The question is to what degree they can be considered as successful cultural adaptations. Unlike faith based aspirations and expectations that require belief but not necessarily evidence of outcomes as much is to occur in afterlife, secular knowledge-based ideologies must provide evidence of effectiveness which makes them inherently transient.

There are two ideological phenomena of a more general nature—secularisation and atheism—which are typical of modernising societies, but cannot be considered as ideological systems per se. However, both interact with many of the specific modern ideologies. They require some preliminary comments.

4.1.1 Secularisation

Religious values and norms predominated in the pre-scientific era, often justified and imposed by an alleged supernatural power; but with the advent of science and its manifold applications, human societies gradually started secularising. The sense of empowerment that humans are acquiring through the mediating role of science and technology is conducive to shared values and is having a transformative role in society. This sense of empowerment is also associated with a growing awareness that humans need to assume responsibilities regarding the species' future, instead of delegating choices to the supernatural.

Secularisation is the societal transformation from a situation in which religious beliefs, values, norms and institutions dominate within a context in which non-religious convictions, values and norms, mainly based on autonomous human reason, prevail and secular institutions rule.² The social process of secularisation must be distinguished from the ethical or political principle of secularism. Ethical or political secularism means that a society should not be based on the values and norms of a particular worldview, but on a morality that can be shared by all citizens of whatever theist, deist, agnostic, or atheist conviction.³ Hence, the secular state is not necessarily an atheist one, but encapsulates and often even guarantees philosophical and political pluralism.⁴

Secularism can best be understood as a multi-dimensional phenomenon occurring at three levels: the societal level, the institutional level and the individual level.⁵ At the societal level, secularism implies separation of church and state; at the institutional level, it covers the adaptation of ruling bodies to secularised society; at

²For instance, Berger and Luckmann (1966, 74), Bruce (2002, 3), Hunter (2015, 1).

³Cliteur (2010, 3–4).

⁴Halman and Draulans (2006), Beekman (2012).

⁵Dobbelaere (2002).

the individual level, it refers to the decline of private piety.⁶ Hence, secularism does not imply that a society is homogeneously non-religious.

In culturally and technologically more advanced countries, such as the Scandinavian countries, large parts of the population became just formally religious or plainly non-religious—‘apatheistic’,⁷ freethinking, agnostic or atheist. These various groups of non-religious people, but also many perhaps most religious believers, adopted societal or political ideologies that emanated from the development of science and its applications in technology and governance. They are embedded in movements or events such as the seventeenth-eighteenth century Enlightenment and liberalism, the French revolution (1789–1799), the United States Bill of Rights (1791), Marxism (1848), the feminist waves of the nineteenth and twentieth centuries, the United Nations Universal Declaration of Human Rights (1948), the Council of Europe Convention for the Protection of Human Rights and Fundamental Freedoms (1950), and the ecology movement that emerged at the end of the 1960s.

Representative surveys in modern(ising) countries all show a gradual decrease in religiosity over the course of the twentieth century.⁸ Even in the United States, a modest decrease in religious belonging can be observed since WWII.⁹ The secularisation process in developing countries is less well documented and has yet to take off in many cases.¹⁰

Some scholars believe that they perceive a renaissance or resurgence of religiosity or a desecularisation of the world, and even an upswing of religious fundamentalism,¹¹ because of people’s disenchantment with science and modernity.¹² However, the resurgence of religiosity is only part of the picture and is often badly or incompletely explained.¹³ Apparently, several factors may be at work in different parts of the world. Probably the most important factor, more particularly in modernising countries or regions still characterised by a cultural lag, is the effect of a conservative reflex against the modernisation process itself; this is mainly aimed at maintaining traditional sexist or classist power positions in the family or society. In many countries, especially those characterised by diversity in religions or other traits of group identity, religion may serve as a mark of cultural or national identity. Another phenomenon is the return to democratic rule in former authoritarian regimes who tried to constrain the power position of churches, resulting in an (temporary?) upsurge of religious and nationalistic feelings and aspirations. Furthermore, the asynchronic development of the demographic transition and cultural

⁶Kaufmann (2011, 5).

⁷‘Apatheism’, a contraction of ‘apathy’ and ‘theism’: indifference or lack of interest towards belief or disbelief in a supernatural being.

⁸For instance, Inglehart (1990), Clark and Schellenberg (2008).

⁹Gallup Polls (1948–2008), Bruce (2002, 204ff).

¹⁰Zuckerman (2005, 12–15).

¹¹Fundamentalism: ideological convictions in which literal beliefs in ancient myths and legends, whether religious or not, predominate (e.g. Longman 2004, xi).

¹²For instance, Berger (1999), Almond et al. (2003), Micklethwait and Wooldridge (2009).

¹³Bruce (2002), Barna (2007), Rainer (2007), Paul and Zuckerman (2007), Paul (2010), Stonawski et al. (2015), Pew Research Center (2015).

emancipation in many modernising countries, as well as the migration flows to developed regions, result in the numerical growth of populations that are still under the spell of traditional religions. Withal, it is also a fact that in advanced modern societies, religious people have, on average, a higher number of children than non-believers. In some countries this fertility differential was neutralised and compensated for a long time by an increasing secularisation, but in recent years this balance may have been tilted in favour of the religious part of the population.¹⁴ Finally, it is also not impossible that deep believers continue to respond to their neurologically-based sensitivities and receptibilities for spiritual/religious phenomena, especially when disenchanting with the materialistic and libertarian orientation of some components of the modernisation process and its excessive social inequalities.

Notwithstanding those diverse topical trends in the resurgence of religiosity, the twentieth century and beginning of the twenty-first century are mainly and overwhelmingly characterised by a further progressing gradual secularisation of modern (ising) societies¹⁵—statistically or qualitatively¹⁶ much more important than the phenomena supporting the resurgence thesis.¹⁷ Steve Bruce¹⁸ sees no reason to expect secularisation trend to be reversed, given the presence of opportunities for ideological diversity and pluralism, effective social equity, economic prosperity, and societal progress.

4.1.2 Atheism

The atheist-theist divergence is one of the two¹⁹ major groups of antagonisms over ideas that divide modern(ising) societies. Although some authors have assigned a number of values to an atheist life stance,²⁰ most scholars consider atheism not to be an ideology, i.e. a comprehensive normative system of ideas about how the world and life should be understood and society should be organised. Theism and atheism may be part of particular religious and secular ideologies respectively, but taken by themselves they are not ideologies. Atheism is simply absence of theism.²¹ It is a way of conceiving the world and desiring to change the world on the basis of

¹⁴Kaufmann (2011), Meisenberg (2011).

¹⁵Bruce (2002, 241).

¹⁶An example of a qualitative shift in religiosity appears from US statistics: whereas 90% of the American population believes in a personal God, only 10% of the members of the US National Academy of Sciences—who are obviously at the vanguard of modern culture creation—does so (Larson and Witham 1998).

¹⁷The alleged religious resurgence is due to the increased visibility of religious activities through modern means of communication, the immigration flows from developing to developed countries, and the increased vocalisation of religious authorities against the spreading secularisation (FM-2030 1989, 174).

¹⁸Bruce (2002, 241).

¹⁹The second divide is between left wing and right wing socio-economic models.

²⁰For instance, Stebbing (1941), Robinson (1964).

²¹For instance, Cline (2016).

autonomous reasoning, and making use of acquired scientific knowledge instead of relying on the authority of supernatural agents. As such, it forms a method that partly lies at the basis of many if not all of the secular ideologies. To the extent that this approach or method is based on reasoning and use of scientific knowledge, atheism is also an underlying principle in the development of evolutionary ethics. In this respect, F. Leron Shults²² refers to the crucial role of atheism as a cultural adaptation in response to the crises of the Anthropocene,²³ which are produced by the impact of human activity on the Earth's environment mainly since the onset of the industrial era.

4.2 The Major Secular Ideologies of Modernity

4.2.1 Liberalism

This secular ideology is undoubtedly the first among the major modern non-religious ideologies that emerged in the age of the Enlightenment at the very beginning of the modernisation process, in the seventeenth and eighteenth centuries. It evolved in the course of modernisation to one of the most important political movements worldwide.

Liberalism—from the Latin *liberalis* ‘of freedom’—is the belief in the importance of liberty, individual autonomy and rights, private property, freedom of choice, pluralism and tolerance, and democratic governance. It challenged the authority of absolutist rulers, who were grounded in divine right and supported by established religions. John Locke,²⁴ generally considered to be the father of liberalism, introduced the idea that people should be governed by the governing authorities, not by supernatural authorities.

In order to understand and evaluate liberalism as an ideology correctly, one has to distinguish its ideological tenets in relation to the socio-economic/capitalist realm and ideological convictions that pertain to other spheres of life, more particularly to various aspects of individual rights. This includes freedom of expression, sexual behaviour (e.g. premarital sex, consensual union, divorce, homosexuality), reproductive behaviour (e.g. contraception, abortion, IVF) and end of life decision making (euthanasia, palliative care). This is, for instance, important in order to understand the differences in meaning of the concept of liberalism in the United States from that in most European countries, more particularly since the late twentieth century. In the United States, liberalism is in the socio-economic realm more identified with welfare state policies comparable to the socio-democratic and socialist orientations in Europe, whereas in most European countries liberalism is still associated with its original historical goals, namely laissez-faire economics and

²²Shults (2015, 726).

²³Anthropocene is defined as the Earth's most recent geologic time period as being human-influenced (Crutzen and Stoermer 2000, 17; Steffen et al. 2011).

²⁴Locke (1690).

limited state intervention. In non-economic domains, such as ethical questions related to sexual behaviour, reproductive behaviour and end of life decision making, American liberals are taking rather similar, i.e. progressive, positions as European liberals do.

In the course of its history, economic/capitalist liberalism has diversified quite strongly in the domain of views on socio-economic issues concerning the conflict between labour and capital. Broadly speaking, three major subdivisions can be distinguished: classical liberalism, social liberalism and neoliberalism.

Classical liberalism, the roots of which go back to the seventeenth century, stressed the importance of civil liberties, free markets and free trade; it supports a world that is relatively free from government intervention. Classical liberalism is in favour of a '*laissez-faire*' economics²⁵ and, consequently, a capitalist organisation of society.

However, in late nineteenth century, the failure of *laissez-faire* economics (and its associated raw capitalism) to produce social justice resulted in the emergence of a new conception of liberalism, called social or modern liberalism.²⁶ This variant of liberalism views the freedom of the individual as being in harmony with the good of the community; it assigns a greater role to the state for promoting equal opportunities and decent social living conditions. Social liberalism contributed strongly to the development of the welfare state in the twentieth century.

Economic developments in the late twentieth century—the capitalist crisis, with its shrinking profit rates, the collapse of the state planned economies, and the emergence of the developing world—led to the development of economic policies that are neoliberal in nature. Neoliberalism pushes for “a market-driven approach to economic and social policy, and seeks to maximise the role of the private sector in determining the political and economic priorities of the state.” It advocates deregulation, privatisation, and withdrawal of the state.²⁷ Neoliberalism fosters a market fundamentalist capitalism, including monetarist “economic policies and a reduction in government provision of services”, resulting in an increase in income variance once again, namely the rich grow richer and the poor grow poorer. Indeed, the main achievement of the recent neoliberal wave has not been an increase in worldwide growth, but in the restoration of power and wealth to the economic upper class.²⁸

Evaluating liberalism from an evolutionary point of view is not an easy matter because liberalism can, as explained in the previous paragraphs, have such very different meanings: classical and neoliberalism on the one hand, social or embedded liberalism on the other hand, are almost the opposite of each other. Nevertheless, the various forms of liberalism do have some common aspirations: individual emancipation and rights, equality of opportunities, freedom of thought and enterprise.

²⁵Smith (1776), Mill (1863), see also Gray (2002).

²⁶Green (1884).

²⁷Harvey (2007).

²⁸Harvey (2007), Duménil and Lévy (2011), Steger and Roy (2010), McQuaig and Brooks (2013).

From an evolutionary point of view, these liberal characteristics must be evaluated positively because they accord with major ontogenetic developmental needs of human specificity. In addition, the social liberal variant of liberalism also pays attention to community development and has a more balanced approach to individual-societal relations and interactions.

On the contrary, classical liberalism (with its *laissez-faire* economics, driven by capitalistic profit acquisition) and more particularly neo-liberalism (with its one-sided market-fundamentalist driven approach), are neither very responsive to individual developmental needs nor to well-balanced individual-societal interactions.

In general, the liberal ideology is strongly focused on the individual (freedom, rights), pays less attention to societal phenomena, and keeps silent on phylogenetic matters and human-environmental interactions.

Therefore, the authors can follow neither the older so-called Social Darwinist adherents of liberalism, who presumed that their *laissez-faire* economics was supported by and founded upon Darwinian competition and selection theory,²⁹ nor more recent authors such as Larry Arnhart³⁰ who advocate a Darwinian liberalism:

I have argued that Darwinian science is compatible with a classical liberal understanding of how moral order in a free society arises from natural desires, cultural traditions, and individual judgments... Evolution provides a purely naturalistic grounding for liberal thought, so that there is no necessity to appeal to the supernatural.

Arnhart largely misses the sociobiological findings on the important shift from competitive to cooperative behaviour in the evolution of the hominins, and the need for its implication in order to evolve social morality, so as to enhance hominisation in the context of a further progressing modernisation.³¹

From an evolutionary point of view, in the liberal ideologies and their associated variants of capitalism there are found only a very minimal, if any, response to the future needs of a further evolving humanity in a progressively modernising and globalising world.

4.2.1.1 Capitalism

In some of the paragraphs above the concept of capitalism was mentioned, but it requires some additional discussion, not only because it is the major economic system in the world but also because it is sometimes related to evolutionary biology.

According to some authors, capitalism is a highly complex economic system of social cooperation, competition and conflict on the one hand, and on the other hand it is an 'ideology' with a particular set of values and norms.³² In the authors' view, capitalism is not an ideology comparable to modern societal ideologies such as

²⁹Spencer (1851), Sumner (1883).

³⁰Arnhart (2010), see also the response essays of Myers (2010), Tiger (2010), Gintis (2010).

³¹See also Gintis (2010), Dilley (2013).

³²For instance, Corning (2010).

liberalism and socialism which aim to develop an ethical and political system that guides and stimulates human development and societal progress. Capitalism is an economic system that uses particular means to achieve the production and keep control of distribution of goods. Those means are owned or controlled by a small minority of people who produce and distribute those goods for a profit, in particular their own profit.

Capitalism is valued very differently from various ideological points of view: among mainstream liberals, the view predominates that capitalism is a method that allows entrepreneurs to innovate and produce goods that meet people's needs which resulted in the material prosperity of modern society³³; on the contrary, among mainstream socialists one will rather find the view that the main capitalist drive for producing goods is to invent needs and sell goods for a profit.³⁴

Indeed, both assertions are partly true. The capitalist drive to invent and produce goods which meet the needs of people cannot be adequately and efficiently performed when there is no prospect for making a profit. The capitalist motive for profit cannot function when, in the end, the goods produced do not meet at least some needs, or in some cases artificially-induced needs.

However, some liberal and socialist inspired discourses about capitalism both often forget that in the most advanced countries, where successful capitalist production coexists and interacts with high standards of welfare and well-being at the population level, this success story is the result of a mixed, socially controlled market economy, slowly evolving towards what some have called an inclusive capitalism.³⁵ Nevertheless, modern culture still has to go a long way in order to fine tune its capitalist economic system, so that it avoids or limits the persistent disadvantages of unbridled economic competition; for example extreme stress at work, disrupted family life (particularly work-parenthood incompatibility), overproduction, environmental disruption and pollution, unsustainable production, and international conflict over access to resources and markets. A particular cause for concern is the recent recurrence of a fundamentalist capitalism with its unrestrained drive towards profit, without much intervention by institutions or public policies aimed at the common good.³⁶

Before reflecting on capitalism from an evolutionary point of view, it must be recalled that the interweaving of biology and capitalism has a long history, resulting in theories that aimed to 'naturalise' capitalism, so as to justify the capitalist social and economic order (and their numerous social evils).³⁷ This view believes that capitalism is rooted in biological-evolutionary processes, in particular inter-individual or intergroup competition resulting in 'natural' selection and survival of the fittest—the latter being the most successful economically. This theory,

³³For instance, Thompson (1993).

³⁴Marx (1867), Piketty (2013).

³⁵See, for instance, Esping-Andersen (1990), Goodin et al. (1999), Prahalad and Hammond (2002).

³⁶Piketty (2013), Izaka et al. (2015).

³⁷Kortright (2008).

sometimes called ‘Social Darwinism’,³⁸ was used as a ‘natural’, perhaps divine, justification of ‘*laissez-faire*’ economics with its ruthless business practices.³⁹

The American steel magnate Andrew Carnegie⁴⁰ articulated this ‘biological-evolutionary’ (‘Darwinist’) theory eloquently:

the law of competition, be it benign or not, is here; we cannot evade it; no substitutes for it have been found; and while the law may be sometimes hard for the individual, it is best for the race, because it ensures the survival of the fittest in every department.

Furthermore, the American oil magnate John D. Rockefeller⁴¹ declared in a Sunday-school address:

The growth of a large business is merely a survival of the fittest... The American Beauty rose can be produced in the splendor and fragrance which bring cheer to its beholder only by sacrificing the early buds which grow up around it. This is not an evil tendency in business. It is merely the working-out of a law of nature and a law of God.

The idea that capitalism is grounded in deep-seated genetically based drives and functions leading to economic mechanisms which are analogous to evolutionary processes, such as differentially selecting, retaining and multiplying genes, is still very much with us today, although current day adherents of ‘bionomics’ are much more nuanced in their discourse than the earlier ‘Social Darwinists’. Nevertheless, many still hold the view that capitalism is a biological inevitability. For instance, Michael L. Rothschild⁴² argues that capitalism is the natural state for an economic system, because biology and economics are both systems for organising and retaining knowledge. Nevertheless, Rothschild is not blind to some of the blatant weaknesses of the capitalist system, as appears in his valuation of ‘corpocracies’ that he describes as “parasites feeding on the energy of a system, but not contributing to the vitality of that system”. Rothschild concludes: “bionomics is to find the economic incentives to encourage socially desirable behaviours (reducing poverty, eliminating homelessness, environmental responsibility, etc.) and then letting the self-organising free market determine the ways in which the business ecosystem will encourage those behaviours”.

How can capitalism be evaluated from an evolutionary point of view?

First of all, it should be acknowledged that the capitalist doctrine, which seeks to base and justify its practice in evolutionary science (mainly Darwinism), has grossly and lopsidedly misinterpreted the evolutionary mechanism and process as being relentless individual and intergroup competition and ‘survival-of-the-fittest’ theory. In contrast, Charles Darwin⁴³ and many evolutionists after him, particularly from the recent sociobiological and evolutionary psychological schools, have always developed a comprehensive evolutionary theory in which individual and intergroup competition was well balanced with, but not overpowered by, mutually

³⁸See e.g. Hofstadter (1955), Jones (1980), De Tarde (1984), Tort (1992).

³⁹Josephson (1934), Bergman (2001).

⁴⁰Carnegie (1920).

⁴¹Rockefeller, quoted in Hofstadter (1955, 45), Huber (1971, 66).

⁴²Rothschild (1990).

⁴³Darwin (1871).

beneficial cooperation based on altruism, reciprocity, and mutual aid. (See Chap. 2, Sect. 2.1.2). More particularly, the successful evolution of the hominins, especially of *Homo sapiens sapiens* in its most recent cultural stage—the present modernisation process—is largely due to ever-increasing levels and degrees of socialisation. As Peter A. Corning⁴⁴ wrote:

We did not, most likely, evolve as isolated individuals pitted in relentless competition with one another.

Admittedly, the human biogram is embedded with several individual needs and drives—greed for resource and property acquisition, hierarchical social status seeking, nepotistic and in-group, envious zero-sum thinking—that easily turn into ‘capitalist’ forms of behaviour, particularly in some economic and ecological living conditions.⁴⁵ However, in the human species social cooperation and mutual aid are extremely important factors in meeting the basic human needs that guarantee survival and intergenerational continuity and evolution. Economic activity is undoubtedly an essential factor in satisfying human basic needs: however, this should not be done using ever increasing growth rates and the maximisation of profits, but in a socially well balanced and environmentally sustainable way.⁴⁶

Advocates of the Social-Darwinist or bionomic discourse often misinterpret the essence of the evolutionary mechanism. Evolution is about the long-term differential reproduction of genes in an evolving but sustainable environment, and not necessarily about maximising financial profits by means of (over)production of goods in an environmentally unsustainable way. In other words, the millionaire is, contrary to what William Sumner⁴⁷ presumed, not necessarily the fittest survivor. (See Chap. 2, Sect. 2.2).

In conclusion, from an evolutionary point of view, capitalism alone is unfit to serve as a guiding principle for the future development and evolution of humankind. As Peter A. Corning⁴⁸ stated in his enlightening paper on the indispensability of an evolutionary ethics:

...capitalism has been an engine of economic growth and progress; it is a proven system. However, the megathreats and the severe economic challenges that almost certainly await us in the future require the development of a more enlightened capitalism.

The biological basis of human economic behaviour⁴⁹ easily leads to a capitalist organisation of society. However, in the context of modernity with its powerful means of influencing and harming the Earth’s biosphere, that economic system may no longer be a well adapted system needed to guarantee long-term progressive development and evolution of humankind.

⁴⁴Corning (2010, 5).

⁴⁵Wilkinson (2005).

⁴⁶Corning (2010).

⁴⁷Sumner (1914, 90).

⁴⁸Corning (2003, 16).

⁴⁹Robson (2001).

4.2.2 Socialism

Modern socialism started as a response to *laissez-faire* liberalism and its devastating effects on the living conditions of labourers in the nineteenth century. It opposed the brutal and exploitative working conditions of the Industrial Revolution in the late eighteenth and early nineteenth centuries.⁵⁰ For example, Count Henri de Saint Simon (1760–1825) endorsed an economy that would restrain the immoderation of capitalism and would be based upon equal opportunities.

Karl Marx (1818–1883),⁵¹ as the most important theorist of socialism, and Friedrich Engels (1820–1895),⁵² his co-author and friend, are considered to have developed the scientific approach to socialism, explaining human history through the clash of classes. They saw the control over means of production by the proletariat as the key aim for achieving social justice.

Just as early Christianity stood for universalism as it broadened its religious concerns to all of humanity, Marxism is a secular ideology that built on the idea of universalism that transcends national borders and continents. With its slogan “*Proletarier aller Länder, vereinigt Euch!*”⁵³ Marxism was the initiator of a new aspiration for global social justice to emerge from the class struggle.

Marx and Engels⁵⁴ also made, on the basis of their general theory of society, a pertinent analysis of the role of religion, as a man-made instrument in the suppression of the masses, so well expressed in Marx’s⁵⁵ famous metaphor “*Die Religion ist der Seufzer der bedrängten Kreatur, das Gemüt einer herzlosen Welt, wie sie der Geist geistloser Zustände ist. Sie ist das Opium des Volks.*”⁵⁶

Socialism evolved into an ideology that aims to democratically control or even publicly own natural resources and means of production; and it strives for the distribution of wealth in the interest of the whole community.

In the course of its development, socialism was split up into several branches, the two most important being the revolutionary Marxism-Leninism and reformist socialism. Marxism-Leninism strived for the establishment of centrally planned economies, under the control of a single political party that owns the natural resources and means of production. Reformist socialism tried to gradually reform and control the capitalist economic system in order to make it more equitable and humane.

4.2.2.1 Marxism-Leninism

The first variant evolved into dictatorial communist regimes which, after initial remarkable progress in achieving more social equality and equity, evolved to

⁵⁰Corning (2010).

⁵¹Marx (1867).

⁵²Engels (1878).

⁵³Marx and Engels (1848): “Proletarians of all countries, unite!”

⁵⁴Marx and Engels (1958).

⁵⁵Marx (1844).

⁵⁶“Religion is the sigh of the oppressed creature, the heart of a heartless world, and the soul of soulless conditions. It is the opium of the people”.

become societies in which an inefficient central planning economy failed to produce progress in sustained welfare. Furthermore, the original ideal of creating a classless society did not materialise. In their competition with the more successful capitalist economies, communist regimes disintegrated, metamorphosed, or disappeared from the world scene.

Although in their *Manifesto of the Communist Party* of 1848, Marx and Engels⁵⁷ contrast in a simplistic way ‘proletarians’ and ‘bourgeois’, it must be acknowledged that the crude capitalism of the industrialising nineteenth century produced horrendous living conditions for the working class—the proletarians who possessed nothing but their ‘*proles*’. Hence, it is not surprising that a revolutionary branch emerged in the bosom of the socialist movement, which wanted to use radical methods in order to provoke fundamental societal changes in social status and political power relations, leading to the replacement of the ‘dictatorship of the bourgeoisie’ by the ‘dictatorship of the proletariat’.⁵⁸ Unfortunately, contrary to the idealistic vision of Rosa Luxemburg and notwithstanding the initial realisation of new life opportunities and more humane work conditions for the oppressed masses, the communist movement evolved in the communist countries, in the direction of the dictatorship of abusive, parasitical, bureaucratic, hypocritical and inefficient communist participacies, unable to guide their societies into sustained economic and social progress.

Just as Christianity undermined its social ideology through its later alliance with the power structure of the establishment, Marxism, when implemented at the level of nation-states, did not result in establishing a classless society and failed to establish global social justice transcending national borders.

4.2.2.2 Reformist Socialism

The second major socialist movement evolved into a variety of democratic socialist regimes advocating social reforms which were intended to alleviate the more harsh facets and intrinsic defects of the capitalist economic system. The aim was to establish partially controlled market economies. Modern democratic socialism aims to create a more humane society by reducing the inequalities and eliminating the injustices partly embedded in human nature, which had been reinforced and inherited from the feudal and early industrial eras. Despite its success in controlling or limiting the most disastrous side effects of an unbridled capitalism, democratic socialism, as well as its ideological cousins—social liberalism and Christian democracy—is still far away from having designed adequate universal policies. They are struggling to preserve the advantages of the capitalist economy for the national (or regional) general welfare enhancement through technological innovation thanks to free entrepreneurship. At the same time they are struggling with dependence upon international financial speculation, free-riding multinational enterprises, exploitation of workers, exorbitant competition, overproduction, and environmental pollution.

⁵⁷Marx and Engels (1848).

⁵⁸Marx (1875), Luxemburg (1918), Kautsky (1918).

Socialism is difficult to discuss from an evolutionary point of view, because of the wide range of different ideological and political agendas it embraces, the many different meanings it has acquired in the course of history, and the diversity in views and approaches by which it is still characterised today.

The early socialist writers—Karl Marx and Friedrich Engels—were delighted with the emerging biological evolutionary theory, mainly because it provided a materialistic, non-teleological explanation for change in the natural world. In a letter dated December 12, 1859, to Marx, Engels wrote:

Darwin, whom I am just now reading, is splendid.⁵⁹

In a letter to Engels on December 19, 1860, Marx wrote about Darwin's book on natural selection:

Although it is developed in the crude English style, this is the book which contains the basis in natural history for our view.⁶⁰

In addition, a month later, on January 16, 1861, he wrote to Lassalle:

Darwin's book is very important and serves me as a basis in natural selection for the class struggle in history.⁶¹

However, Marx and Engels only partially supported Darwinism. They rejected population pressure as a selecting agent—Malthus' contribution to the theory of natural selection—and believed instead that adaptive modifications due to environmental effects were inherited.⁶² They were total environmentalists and believed in Lamarckism—the inheritance of acquired characteristics—not realising that this would have implied that the economically less advanced peoples and classes would have become inferior in their heredity.⁶³ The environmentalist and Lamarckian beliefs of the Marxists became a dogma amongst their followers in the communist countries, in particular the Soviet Union. In the first half of the twentieth century, this led to the rejection of Mendelian genetics, the development of a disastrous Soviet agricultural policy, and the elimination and even physical liquidation of many Russian geneticists, the most famous of whom was Nikolai Vavilov. Genetic science was exchanged for quack genetics, promoted by the fraudulent Trofim Lysenko who remained in his post as director of the Institute of Genetics at the Academy of Sciences until 1964.⁶⁴ In 1964, physicist Andrei Sakharov⁶⁵ spoke out against Lysenko in the General Assembly of the Academy of Sciences:

He is responsible for the shameful backwardness of Soviet biology and of genetics in particular, for the dissemination of pseudo-scientific views, for adventurism, for the degradation of learning, and for the defamation, firing, arrest, even death, of many genuine scientists.

⁵⁹Engels, quoted in Zirkle (1959, 85).

⁶⁰Marx, quoted in Zirkle (1959, 86).

⁶¹Marx, quoted in Zirkle (1959, 86).

⁶²Zirkle (1959).

⁶³Muller (1948), quoted in Zirkle (1959).

⁶⁴Medvedev (1969), Joravsky (1970), Soyfer (1994).

⁶⁵Sakharov (1964), quoted by Joravsky (1970).

Many Marxist theoreticians reject(ed) the view that genetic factors are involved in matters such as social stratification and social mobility in capitalist society. In their view, the explanation for social differentiation, as well as any cultural development, can be reduced to differences in economic production. The works of Karl Marx and Friedrich Engels do not include propositions about the role of natural selection in society.⁶⁶ Nevertheless, they declare themselves openly in favour of the view that environmental factors cause social differentiation. Even among many present-day enlightened socialists, the 'Blank Slate' view of human nature is a doctrinarian tenet and human nature is a taboo. Sociobiology, evolutionary psychology, behavioural genetics, and cognitive neuroscience are often assimilated into conservative, rightist political views.⁶⁷ As Edward Wilson⁶⁸ pertinently wrote:

Marxism is sociobiology without biology.

Paradoxically, the refusal to recognise genetic variation as an important factor in social relations and economic production—simplistic egalitarianism/blank slate theory—is strikingly in contradiction with the principles advanced by early socialist writers, as for instance Saint Simon's position on equal opportunities and Louis Blanc's/Karl Marx's⁶⁹ well-known famous slogan

From each according to his ability, to each according to his needs.

Peter A. Corning⁷⁰ has listed several other biosocial shortcomings of the present-day socialist doctrine: (1) socialist indifference to merit as well as the rewards for merit is linked to its neglect or denial of the importance of genetic variation in societal matters; in this regard socialists often confuse equity with equality; (2) socialists often disregard elements of 'reciprocity'—duties and responsibilities that need to balance benefits and rights—and hence allow or even favour abuses by cheaters and free riders⁷¹ at both extremities of the social stratification, including the disproportionate, and in fact unmerited excessive salaries and bonuses of corporate CEOs and managers, or the profits of unproductive rentiers, as well as the unjustified milking of the social protection systems in welfare states; (3) socialists often underestimate the importance of capital and entrepreneurship; (4) finally, socialism usually takes a too simplistic negativistic attitude towards competition, the socially acceptable forms of which can play a vitally important

⁶⁶Woltmann (1899).

⁶⁷Pinker (2002, 279–284). The blank slate view of human nature is not only a view which predominates in socialist quarters: it was the dominant theoretical approach in much of the twentieth century sociology and cultural anthropology and even today it can be perceived among many social scientists who have not succeeded in becoming acquainted with the present-day state of the art of the biological sciences, particularly evolutionary science. (For a discussion of these issues see, for instance, Van den Berghe 1990; Ellis 1996; Lopreato and Crippen 1999; Pinker 2002; Niedenzu et al. 2008; Corning 2011).

⁶⁸Wilson (1978, 191).

⁶⁹De Saint Simon (1819), Blanc (1840), Marx (1875).

⁷⁰Corning (2010).

⁷¹A free rider is someone who enjoys the benefits of cooperation without reciprocating for its costs.

positive role in our complex societies and economies, firstly by the ability to energeise innovation; and secondly by safeguarding against the abuses from holding a monopoly.

Overall, socialist ideology is strongly focused on societal structural matters, has lopsided and obsolete views about causes of individual development and the role of genetic factors in social relations, and often lacks a comprehensive view of societal processes or is commendably but one-sidedly focused on the least advantaged in society. It is characterised by a striking absence of long-term genetic and ecological concerns. In contrast, it rightly stresses the overwhelming importance of the social dimension and solidarity factor for harmonious individual development as well as for adequate relations between individuals and groups of individuals.

From an evolutionary point of view, socialism lacks—just as its big opponent liberalism—a broad and holistic vision about the future needs of a further evolving humanity in a progressively modernising and globalising world. As Peter Singer⁷² put it:

The left needs a new paradigm.

4.2.3 Feminism

Feminism stands for a broad range of movements that, in general, aim to achieve equal political, economic and social rights and equal opportunities for women compared to men. Feminism is mainly focused on women's issues, but some feminists are of the view that feminism should also consider men's emancipation because many aspects of sexism involve interactions between the two sexes.⁷³

Just as the liberal and socialist ideologies discussed above, the feminist movement also developed into different branches: major subdivisions are radical feminism,⁷⁴ equality feminism,⁷⁵ and difference feminism.⁷⁶ However, many more 'feminisms' are distinguished in the feminist literature, according to their ideological adherence (e.g. socialist feminism,⁷⁷ liberal feminism⁷⁸) or their specific

⁷²Singer (1999, 5).

⁷³For instance, Daly (1978), Freedman (2003, 2007).

⁷⁴Radical feminism considers the old-time and still persisting patriarchal domination and its related male supremacy as the major and universal cause of women's oppression (e.g. Koedt et al. 1973; Willis 1984; Radical Women 2001).

⁷⁵Equality feminism emphasises, notwithstanding the biological differences, the strong similarity between the sexes. Human nature would be 'androgynous, neutral and equal' (e.g. Young 1999).

⁷⁶Difference feminism stresses that men and women are 'ontologically' different versions of the human being (e.g. Zinn and Dill 1996).

⁷⁷Socialist feminists see the cause of women's oppression to be in the capitalist system, and in order to win equality women workers must stand in solidarity with each other. Socialist feminism interprets women's oppression as the result of the class structure in society (e.g. Bebel 1879; Boxer and Quataert 1978; Radical Women 2001).

⁷⁸Liberal feminism pursues gender equality through political and legal reform without altering the structure of society (e.g. Wollstonecraft 1792; Friedan 1963; Walker 1996).

domain of interest (e.g. ecofeminism,⁷⁹ lesbian feminism,⁸⁰ individualist feminism,⁸¹ gender feminism,⁸² new feminism⁸³). There is even a conservative feminism⁸⁴—which is obviously a *contradictio in terminis*.

The history of women's emancipation goes much further back in time than the two or three waves of the modern feminist movement suggest.⁸⁵ It was influenced by societal processes and events such as the emergence of capitalism and Renaissance in the fourteenth century, the Reformation in the sixteenth century,⁸⁶ the Enlightenment in the eighteenth century,⁸⁷ the French Revolution (1789), the Industrial Revolution, and, last but not least, the Women's Rights Movement, first in the US and later in Europe in the nineteenth century, which is now identified as the first major feminist wave.⁸⁸ This first feminist wave was principally concerned with equality. Participants in the movement devoted themselves to achieving equal legal rights, general suffrage, equal access to higher education, and equal entry into the professions in order to achieve self-determination and independence.

The second feminist wave in the second half of the twentieth century, the origin of which is said to be associated with Simone de Beauvoir's⁸⁹ *Le deuxième sexe* and Betty Friedan's⁹⁰ *The Feminine Mystique*, and has shown an accelerated development since the 1960s, shares the first wave's politics of legal, educational, and economic equal rights for women, but surpasses it in the breadth of its concerns and the depth of its critiques. This second wave, known as the women's liberation movement, concentrates on more subtle issues such as women's rights to bodily integrity and autonomy and reproductive rights, struggle against domestic violence,

⁷⁹Ecofeminists consider men's control and destruction of the natural environment as the main cause of the oppression of women (e.g. Mies and Shiva 1993; Diamond and Orenstein 1990; Ruether 1993).

⁸⁰Lesbian feminism focuses on the discrimination of lesbians and women in society. It refutes 'heteronormativity'—the assumption that everyone is 'straight' (e.g. Faderman 1998).

⁸¹Individualist feminism aims at protecting individual women by legal measures that eliminate male privileges. It wants women to take full responsibility for their own lives and bodies (e.g. McElroy 2002).

⁸²Gender feminism: a 'gynocentric' and 'misandric' variant of feminism (e.g. Sommers 1994).

⁸³New feminism: a form of difference feminism, mainly from Catholic inspiration, that emphasises the complementarity rather than the hierarchy of men and women. It acknowledges the biological specificity of both sexes, while recognising their equal worth and dignity. It stresses women's "obligation to give birth to and raise children" (e.g. Pope John Paul II 1995). Given its ideological origin, it is understandable that *bona fide* feminists are quite suspicious about 'feminist' variants such as 'new feminism' or conservative feminism, albeit those variants sometimes remind us rightly of the importance of some important biological facts to be taken into account in the design of a transgenerational morale.

⁸⁴Conservative feminism rejects a feminism that "adopts a male model of careerism and public achievement as female goals, thereby denying women's need for intimacy, family, and children." It believes that promoting gender equality leads to the ruin of the family (e.g. Stacey 1983).

⁸⁵Weisbord (2011).

⁸⁶For instance, Agrippa (1529).

⁸⁷For instance, Wollstonecraft (1792), von Hippel (1792).

⁸⁸Jaggar (1983).

⁸⁹De Beauvoir (1949).

⁹⁰Friedan (1963).

sexual harassment, sexual assault, sexual stereotypes, sexism and patriarchy in all spheres of life, and on more general societal problems such as armed conflict, environmental pollution, and Third World development.

Some feminists also distinguish a third wave that would have developed since the early 1990s as a response to the perceived failures of the second wave. Third-wave feminism objects to the second wave's essentialist definitions of femininity, which would be too strongly focused on privileged women.⁹¹ In addition, the emergence of a so-called 'post-feminism', which consists of a wide range of viewpoints that challenge previous feminist discourses, largely coincides with the third wave. Some post-feminists even claim that feminism has lost its relevance in present-day modern society.⁹²

All the major modern political emancipatory ideologies—Marxism (with its socialist and communist variants), liberalism and Christian-democracy—eventually included principles and policies with a view of restoring—or perhaps better put, of establishing at last—social equity and equality between the two sexes. Wherever these societal ideologies gained political power, they usually contributed more or less to female emancipation, but they never succeeded in realising full gender equity and equality. Thus, it is not surprising that a specific women-oriented ideology—feminism—emerged to accelerate the gender emancipatory process.⁹³

In the course of modernisation, particularly in the second half of the twentieth century, feminist ideology has had substantial successes as can be seen from the trends in the educational, social, economic, cultural and political participation of women. However, feminism still has a long way to go.

4.2.3.1 Biosocial Obstacles to Sex Emancipation

Due to the evolutionary heritage of the human sexual dimorphism, as well as the cultural survival of maladapted ideologies dating from the pre-modern eras, women and men suffer from a number of biosocial obstacles to a profound sex emancipation⁹⁴ with which the feminist movement did not cope very well.

In modern societies, men still have or take advantage of some of their secondary sexual characteristics which they have retained from their adaptation to the hunting-gathering phase of human evolution: namely their biologically selected physical strength and drives for risky, agonistic and competitive behaviour, allowing them to acquire dominance socially, also towards women.⁹⁵ By exacerbating socio-economic competition in many domains of modern social life, modernisation enhanced the opportunities for fully indulging those drives.

⁹¹For instance, Heywood and Drake (1997), Baumgardner and Richards (2000), Henry (2004), Krollokke and Sorensen (2005), Gillis et al. (2007).

⁹²For instance, Cott (1987), Modleski (1991), Jones (1994), McRobbie (2004).

⁹³Humm (1992).

⁹⁴Cliquet (2010, 223–238).

⁹⁵Miller and Hoffman (1995), Whitmeyer (1998), Forthun et al. (1999), Sherkat and Ellison (1999), Stark (2002), Miller and Stark (2002), Freese (2004), Gove (1985), Udry (1988, 2000), Julian and McKenry (1989), Dabbs and Morris (1990), Gottfredson and Hirschi (1990), Booth and Dabbs (1993), Collaer and Hines (1995).

Whereas men are undoubtedly the greatest obstacle to the emancipation of women, the evolutionary heritage of the latter has encumbered them with a number of biological features, mainly in the domain of reproduction and caring, that puts them in a socially weaker position in the competitive and mobile environment of modernity. Moreover, powerful conservative forces try to preserve the old male-dominated system with its prerogatives and advantages.⁹⁶ They are supported by traditional religions that ideologically codified the ancient biosocial dominance-subordination relations between the sexes and ascribed them to a divine origin and justification. However, the well-known finding that women are more religious than men, especially regarding the degree of personal piety, may not just be the result of religious indoctrination, but may also partially be the effect of evolved sex differences in brain functioning in general. Indeed, there are a number of female behavioural characteristics that can be seen as the direct effects of specific female brain features: women have higher abilities to empathise; are more intuitive; have a higher emotional intelligence; are more socially oriented, more friendly and more care taking; are better in emotional bonding; more easily recognise facial expressions and emotional overtones in others; have a more inward directed demeanour; display a more selective mating behaviour; have stronger parental impulses; display heightened social and personal concerns; experience more often anxiety; and show more interest in art, aesthetics, linguistics, and literature.⁹⁷ Evolutionarily, the sex differences in brain structure and functioning are the result of selective processes related to the sexual differences in mating and parenting strategies that developed in the ancient hominin environment of evolutionary adaptedness. The progressing hominisation—with its increasingly slowly maturing offspring and its increasing socialised hunting-gathering culture and intergroup competition—required sexually differentiated biosocial specialisations, mainly characterised by the evolution of male features adapted to hunting and war making, and female characteristics more strongly focused on reproduction, nurturing and socialising. Some scholars have expressed the view that women's greater existential vulnerability, related to her larger reproductive and parental investments, may have made her more sensitive than men to the social and psychic comfort of spirituality and religiosity.⁹⁸

4.2.3.2 Biosocial Opportunities for Sex Emancipation in Modernity

Notwithstanding some sex emancipation-inhibiting features, such as its persisting and even increasing pressure for competition, modernisation entails a much larger number of positive emancipatory forces which create previously unseen new opportunities for achieving sex equality in rights and equity in opportunities.

⁹⁶Sharma (1987).

⁹⁷For instance, Geary (1998), Baron-Cohen (2003, 21ff), Jausovec and Jausovec (2005), Ellis (2011), Moir and Jessel (1992), LeVay (1994), Blum (1998), Schulte-Rüther et al. (2008).

⁹⁸For instance, Blum (1998), Geary (1998), Mirola (1999), Baril (2006), Campbell (2008), see also DesAutels (2010).

In the first place modern sex emancipation is due to the new knowledge furnished by science in general, and the application of this new knowledge to many domains of social life. Ancient beliefs about innate female inferiority can no longer be successfully sustained. Biology simply swept away the traditional views on the nature of the sexes and destroyed the ideological foundations of sex inequality and inequity. A completely different picture has emerged from present-day (social) biology about women's biological nature. The development and application of science have not only altered the objective social position of women in society, but have also had a considerable impact on their subjective perceptions and experiences. Psychologically, women are moving into a completely different position of power and negotiating position in what some authors call 'the battle of the sexes'.⁹⁹

Biomedical progress induced a revolutionary level of mortality control, the ultimate condition for women's new opportunities. Not only has it largely freed women from the risks of infant and maternal mortality and morbidity, but also the control of mortality allowed—and in the end even imposed—fertility control. This has liberated women from virtually permanent reproductive functions and allowed for the establishment of new balance between reproductive, productive, and recreational functions in modern society. The development and availability of safe and effective methods of birth control is of considerable importance in this respect, not only from a social but also from a psychological perspective.

The transition from agrarian-pastoral to industrial and post-industrial economy caused a shift from a family-based economy towards family-transcending types of economic production, increasing educational opportunities, female paid labour and financial independence. Finally, modern technology is increasingly eroding the traditional male physical advantage with respect to muscular strength and speed. Thanks to modern technological means of replacement or aid, women can now perform tasks for which men were, on average, better adapted in pre-industrial living conditions.

Lastly, the development of democratic societal organization with its pacification ethos and suppressive effect on internal and external violence¹⁰⁰—ranging from domestic violence to group brutality or even war—is an important social-environmental condition that strongly contributes to enabling female emancipation movements leading to more substantial equality and equity between the sexes.

4.2.3.3 Biosocial Challenges to Feminism

One of the major challenges feminism faces is precisely how to integrate the biosocial dynamics of sex in various domains of social life such as the combination of productive, reproductive and recreational activities, the active participation of both sexes to political life and decision-making, and the disciplining and peaceful management of male drives for competition and dominance.

Many feminists have the tendency to minimise, if not ignore, the biological sex component, because of the classical misapprehension that biology is synonymous

⁹⁹Van der Dennen (1995).

¹⁰⁰Rummel (1994; 1995; 2002).

with unchangeability, determinism and reductionism. It is a shortcoming that is present both among equality feminists and among difference feminists.¹⁰¹ The egalitarians completely miss the biological dimension in the sex controversy; they think that biological differences simply do not matter in social matters. However, many difference feminists overreach themselves. According to Maggie Humm,¹⁰² for example, second wave feminism has focused on the specifications of women's differences from men and from each other: thus, it has turned to psychoanalytic and social theories about sex difference in order to explain such issues as the increase in sexual violence and to construct a fresh feminist ethics. It is not surprising then that this feminist theory has failed to completely succeed in developing appropriate strategies to change sex relations in modern culture, as it so blatantly neglects the fundamental background of the sex divide, namely the biosocial basis of sexual dimorphism.

Neglect of the biosocial factor in sex relations makes this feminist approach non-productive. From an analytical standpoint, making the transition from facts to norms, but also from norms to facts is a delicate matter.¹⁰³ Although some situations are considered undesirable, this does not mean that underlying facts should be ignored or underestimated. Undesirable social situations can only be changed when their real causes are adequately understood and addressed.

Moreover, some feminist ideological standpoints suffer from a certain contradiction. On the one hand it is asserted that men and women are equally suited to all jobs, but on the other hand it is argued that if women did particular jobs they would be done differently. For instance, compassionate values would predominate, more cooperation and less competition would be promoted, and there would be less war.¹⁰⁴

From an evolutionary point of view, the feminist movement must be seen very positively, despite the fact that many—if not most—branches of feminism misinterpret or underestimate the relevance of biological evolutionary factors and their importance for the achievement of the feminist goals.¹⁰⁵ The feminist movement is contributing considerably to the development of the genetic potentialities present in 'the other half' of the human species.

Many feminist goals can be integrated into an evolutionary ethics for the future development and evolution of the human species in a further modernising world. However, feminism remains focused on one single aspect of human development and fails to provide a broader ethical framework for the long-term evolution of humankind.

¹⁰¹Gatens (1996).

¹⁰²Humm (1992).

¹⁰³Zeiss (1982).

¹⁰⁴Ridley (1993).

¹⁰⁵For instance, Cliquet (1984; 2010), Roede (1988), Segerstraele (1988), Gowaty (1997), Vandermassen (2005), Campbell (2006).

4.2.4 Nationalism

Nationalism is a political ideology in which a group of individuals, belonging to a particular genetic, ethnic, cultural or religious community, strongly identify with that community, and take actions to achieve or preserve cultural or political autonomy, self-determination, or sovereignty of that community.¹⁰⁶

Although nationalism goes far back in history, the concept was only coined late in the eighteenth century by the German philosopher Johann G. Herder.¹⁰⁷ It was an important driving force in the emergence of many modern states in nineteenth century Europe, fuelled by the French and American revolutions, the liberal ideals of popular sovereignty and dated, deep-seated urges for in-group bonding.

In the twentieth century, many thought that nationalism would decrease in importance or disappear as a result of modernisation, industrialisation, individualism, and globalisation. However, the contrary came about to some extent: nationalism has increased in political importance in the world, either as emancipatory movements against former dominant or colonial states, or as a reaction against economic or political upscaling or capitalist globalisation. In the last case, some authors speak about the emergence of ‘neo-nationalism’.¹⁰⁸

History has shown that nationalism can take two major and antagonistic forms: it can be an emancipatory or even revolutionary movement, or it can be an imperialistic-protectionist movement.

4.2.4.1 Emancipatory Nationalism

As an emancipatory movement, nationalism means that an underdeveloped or suppressed community—a genetic, linguistic, religious, or otherwise identifiable population—strives to achieve self-determination, either in the form of cultural autonomy within a multicultural state, or in the form of political independence.

Nationalism is often associated with ethnocentrism—the care of the community’s own ethnic, cultural or religious identity. In principle, there is nothing wrong with ethnocentrism, as long as it only fosters own healthy community development and is not accompanied by the contempt or suppression of ‘others’.¹⁰⁹ It is, indeed, extremely important that the organic communities in which people live together, at the local, regional, national, continental and also finally global level, function properly, for the *bonum commune communitatis*—the common good of the community.

Hence, from an evolutionary perspective, nationalism is to be valued positively in its variant of emancipatory cultural community development. As such, nationalism as a liberation movement contributes to the development of the potentialities and talents present within a cultural entity. In the evolution and historical development from tribal-sized populations consisting of narrowly related people, to

¹⁰⁶For instance, Smith (1991; 1995; 1999), Hutchinson and Smith (1995).

¹⁰⁷Herder (1774–1787).

¹⁰⁸Gingrich and Banks (2006).

¹⁰⁹Salter (2003).

massive populations consisting of millions of unrelated people, the concern for and care of community identity is probably needed in order to foster the sense of group belonging, solidarity and security.

Clearly, despite the positive community developmental effects emancipatory nationalism may have, it is also only a very fragmented ideology. This falls short of the comprehensive evolutionary ethics necessary for the sustained future evolution of the human species as a whole in the context of a further progressing modernisation.

4.2.4.2 Imperialistic Nationalism

As an imperialist-protectionist movement, imperialist nationalism strives for domination over other populations or expansion into their territories, based on its own perception of cultural, religious or even biological superiority. This form of nationalism often leads to inter-ethnic or international conflict, war, and even genocide.

A particular form of imperialist nationalism, fascism,¹¹⁰ is a form of totalitarian ideology that glorifies its own community above all others. It governs by the means of an authoritarian, dictatorial leadership, usually based on a single party system.¹¹¹ In the domain of economics, fascist regimes favour an autarkic, self-sufficient state planned economy, albeit via indirectly controlled private owners.¹¹²

Fascist regimes are ultra-conservative in many respects. They support the traditional, male-dominated family system and favour pronatalist policies. They fight signs of what they perceive as moral decay such as modern arts, individualism, and materialism.¹¹³ They are usually notoriously xenophobic, and sometimes overtly racist, or imperialist expansionist.¹¹⁴

Nazism—the abbreviation for ‘National Socialism’—was a unique variant of fascism in Germany in the 1930s and 1940s. It included a salient pseudo-scientific form of racism and anti-Semitism. The Nazis believed in the supremacy of an alleged Aryan¹¹⁵ race and strived to extend its power, territory and resources mainly in the east of Europe at the cost of the local populations.¹¹⁶

¹¹⁰The term fascism derives from *fascis*, the Roman symbol of collectivism and power: a tied bundle of rods with a protruding axe.

¹¹¹Lyons and Berlet (1996), Morgan (2002), Paxton (2005).

¹¹²Richman (2008).

¹¹³Boyanowski (2002), Britt (2003), Richman (2008).

¹¹⁴Britt (2003).

¹¹⁵The so-called Aryan race is not a biological subdivision within the human species. The Aryan concept is an English language loanword derived from the Sanskrit Arya (‘Noble’), which refers to the Indo-European languages in general and their speakers. Hence, it is a cultural concept that has, in principle, nothing to do with genetic differentiation in the population. The Nazis usurped the term to identify their racial ideal, namely the ‘Nordic variant of the European racial stock’.

¹¹⁶The holy scripture of the Nazis was of course Hitler’s (1925–1926) *‘Mein Kampf’* which is, apart from its fateful ideology, a monument of incoherent, distorted, pseudoscientific semi-truths, but it is very clear in its political intentions and predictions. It is still an enigma how the German population, with its sophisticated intellectual background and rich cultural heritage in general, could have been seduced by the superficial and irrational clutter of ideas that is bundled into that writing.

Nazism was not only responsible for one of the most odious genocides in history—the Holocaust on six million Jews¹¹⁷—but also carried out massive massacres in many Eastern European countries, not the least in the Soviet Union which suffered more than 20 million World War II casualties.¹¹⁸

Fascist regimes tend to have a relatively short life because they are usually soon overthrown by democratically inspired movements or neighbours. They are, at the population level, fundamentally adverse to basic human needs and aspirations. From an evolutionary point of view, fascism clearly has nothing valid and promising to contribute to the ethical system, since it fundamentally ignores or challenges the mental and social potentialities of the human species as a whole.

Imperialist variants of nationalism are—particularly in modern culture—anti-evolutionary obstacles to future international cooperative development. They build on only one component of our evolutionary past, namely intergroup competition, and leave no space for the second indispensable component of evolution which is cooperation. They are parasitic on others and suppress potentialities of other population groups.

4.2.5 Humanism

Historically, the word ‘humanism’ has been used with different meanings; for instance, the classical curriculum in education, the Renaissance movement to revive classical learning, the Enlightenment idea of a human-focused ethical alternative to the traditional religions, and finally the modern humanist movement.¹¹⁹

Here, this section will focus on humanism as the current-day secular ideological movement that fosters a humanist life stance. It is rooted in rational and free thinking, understanding our universe in scientifically based naturalistic rather than in revealed supernatural, superstitious and pseudoscientific terms. It provides a secular ethics grounded in human values such as individual rights and social responsibilities, social justice, human solidarity, tolerant pluralism and social, political and economic democracy, and cosmopolitanism.¹²⁰ A significant feature of the humanist movement is that it is focussed on the human species as a whole, meaning that its moral concerns transcend narrowly defined in-groups.¹²¹

Intellectually, humanism has roots in ancient China (Buddhism), India (Hinduism), Greece and Rome, early Christianity, fourteenth century Renaissance, eighteenth century European Enlightenment, the French Revolution, and nineteenth

¹¹⁷Gilbert (1986), Gutman (1990), Hilberg (2003).

¹¹⁸Russian Academy of Science (1995).

¹¹⁹Giustiniani (1985), Lamont (1996), Walter (1997), Norman (2004), Kurtz (2007), Pinxten (2007), Slembrouck (2010), Grayling (2014).

¹²⁰Gasenbeek and Gogineni (2002).

¹²¹Teahan (2010, 218).

century evolutionary theory,¹²² atheism,¹²³ liberalism¹²⁴ and Marxism.¹²⁵ However, humanist organisations are a recent phenomenon, the result of the search for an alternative to the out-dated religious traditional institutions.¹²⁶

Nowadays, there are more than 100 humanist, rationalist, secularist, ethical, atheist and free-thought organisations in over 40 countries. They are internationally organised by the International Humanist and Ethical Union (IHEU) which was founded in 1952 in Amsterdam and is the umbrella organisation around the world.¹²⁷

Bert Gasenbeek and Babu Gogineni¹²⁸ distinguish four successive waves of modern humanism, originating around 1850, 1890, 1918 and 1945 respectively. The oldest wave originated in the mid-nineteenth century in Western Europe and the United States: it consisted of atheists including freethinkers, rationalists and secularists, who explicitly reject all religion.¹²⁹ The second wave emerged in the final decades of the nineteenth century and consisted of free-religious or ethical culture groups.¹³⁰ The third wave emerged in the interbellum and consisted of the US humanists that considered themselves to be religious humanists¹³¹ who founded the American Humanist Association. In 1933, a group of these humanists produced a first *Humanist Manifesto*,¹³² later amended in second¹³³ and third versions.¹³⁴ Finally, in the aftermath of the Second World War the present wave of humanism arose and led to the foundation of the current IHEU, a result of a synergic action from English-speaking associations (American Ethical Union, American Humanist Association, British Ethical Union), European continental associations (Vienna Ethical Society, Dutch Humanist League and Flemish Humanist League), and the Indian Radical Humanist Movement.

In its Amsterdam Declaration of 1952, updated in 2002, the IHEU affirms “the worth, dignity and autonomy of the individual and the right of every human being

¹²²Darwin (1859).

¹²³Feuerbach (1841).

¹²⁴Smith (1776), Mill (1859), Green (1884).

¹²⁵Marx (1867), Engels (1878).

¹²⁶Gogineni (2006), Grayling (2014).

¹²⁷www.IHEU.org.

¹²⁸Gasenbeek and Gogineni (2002).

¹²⁹World Union of Freethinkers, WUFT (1880).

¹³⁰International Ethical Union, IEU (1896).

¹³¹It is difficult to call Humanism a religion, at least when it is conceived in its present common meaning as a life stance that is rooted in rational and free thinking, understanding our universe in scientifically based naturalistic terms rather than in revealed supernatural, superstitious and pseudoscientific terms. It is exactly the opposite to religion, the specificity of which consists of the belief in super- or extra-natural phenomena. Nevertheless, some people do consider humanism a religion, probably for a variety of reasons. Indeed, humanism as understood by modern humanist organisations fulfils social roles that are similar to those performed by traditional religions. However, whenever or wherever it is necessary to refer to ideological diversity in society, it would be more respectful towards non-religious citizens to refer to, for instance, ‘religions and other philosophical convictions’, as is done in some United Nations documents.

¹³²Sellars and Bragg (1933).

¹³³Kurtz and Wilson (1973).

¹³⁴American Humanist Association (2003).

to the greatest possible freedom compatible with the rights of others". Humanism is stated to be democratic and aims "at the fullest possible development of every human being", but at the same time insists that "personal liberty must be combined with social responsibility". Humanists are said to "have a duty of care to all of humanity including future generations" and are expected to "use science creatively, not destructively, and to value artistic creativity and imagination". Humanism is considered to be "an alternative to dogmatic religions which claim to be based on revelation on the one hand, and totalitarian systems on the other".

Paul Kurtz¹³⁵ summarised the modern humanist paradigm admirably into six main characteristics: (1) a scientific method of inquiry; (2) a naturalistic cosmology; (3) a nontheistic orientation; (4) a commitment to naturalistic ethics; (5) a commitment to democratic forms of governance; and (6) a commitment to international cooperation.

Although the national humanist associations are usually small organisations with a limited membership, in many countries they have a much greater influence than their numerical strength would suggest, because their ideas are supported by a number of authoritative people, as well as by political movements such as liberalism and socialism. At the international level, the IHEU has consultative status with intergovernmental organisations such as the United Nations, the UN Human Rights Council, UNESCO, and the Council of Europe. As an NGO it has an important influence and sometimes succeeds in preventing the intergovernmental organisations from taking out-dated ethical positions that are inspired by religious or authoritarian ideologies.¹³⁶

Looking at the humanist movement from an evolutionary point of view, this ideology most closely approaches an evolutionarily-based ethics for the future development and evolution of humankind. Humanism is based on a rational, scientific analysis of the human condition, and rejects the divinely revealed religious mythologies as a foundation for well-adapted ethics to modern living conditions. It advocates the fullest possible development of all human individuals, at the same time taking into account the necessity to promote social life and solidarity, within as well as between communities.

Overall, modern humanism stresses fewer long-term evolutionary goals, although some of its most prominent initiators explicitly developed and justified the humanistic ideology from a long-term evolutionary perspective. The most well known amongst them is undoubtedly the renowned evolutionary biologist Julian Huxley.¹³⁷ In his *Essays of a Humanist* he wrote:

This new idea-system, whose birth we of the mid-twentieth century are witnessing, I shall simply call Humanism, because it can only be based on our understanding of man and his relations with the rest of his environment. ... It must be organized round the facts and ideas of evolution, taking into account of the discovery that man is part of a comprehensive evolutionary process, and cannot avoid playing a decisive role in it.

¹³⁵Kurtz (2007).

¹³⁶For instance, Cherry and Brown (2009), Jeffrey (2011).

¹³⁷Huxley (1942; 1957; 1964).

This view is more explicitly and extensively developed by a variant of modern humanism which is called transhumanism—a term also coined by Julian Huxley in 1957. Transhumanism aims to reach a posthuman stage in human evolution which would have characteristics such as higher-than-current intellectual heights; resistance to disease; increased longevity; unlimited youth and vigour; increased capacity for pleasure, love, artistic appreciation, and serenity; and experience novel states of consciousness. The transhuman is seen as an intermediate form between the present human and the posthuman. (See Chap. 5, Sect. 5.3.2.4).

A critique that is sometimes made against modern humanism is its too narrow focus on the human species, whilst neglecting the relations with other species and the planetary environment in general.¹³⁸ However, this critique is not fully justified. Indeed, many prominent modern humanists were/are ecologically very motivated and play(ed) an important role in raising and disseminating awareness about the environmental problems resulting from the world population explosion and unsustainable modern consumption patterns. For instance, one of the major founders of the Flemish Humanistic League in the 1950s, the biologist Lucien De Coninck,¹³⁹ was one of the earliest protagonists raising awareness about ecological issues; this influenced a whole generation of students and followers in their thinking and actions regarding environmental matters. Nowadays, several humanist associations pay a lot of attention to ecological matters, which can also be seen from the appearance of the term *ecohumanism*.¹⁴⁰

Some authors¹⁴¹ have expressed scepticism about the humanistic goals and strategies, arguing that too much attention is paid to deviant forms of behaviour, e.g. support for permissive education, permissive attitudes to crime and against punishment, non-acceptance of genetic and other individual and group differences, narcissistic demand for rights without duties, advocacy of free love and sexual satisfaction in or out of marriage, opposition to engendering guilt, and moral relativism in general. It is noted that these authors are not making preposterous religious imputations that secular humanists are “those who believe in no morals”¹⁴² and that they are responsible for alleged social evils such as pornography, homosexuality, drug addiction and abortion.¹⁴³

Although there is some truth in the observation that the humanist movement sometimes focuses one-sidedly on minority forms of behaviour—e.g. homosexuality instead of heterosexuality, birth control instead of fertility, divorce instead of partnership, criminals instead of victims—and that it is too deeply involved in fighting the traditional religions instead of developing its own humanistic principles and actions, there is an obvious and excusable explanation for those orientations. When looking at the sociological and legal positions of non-religious people in many countries, many inequalities and inequities between religious and

¹³⁸Badmington (2000), Wolfe (2009).

¹³⁹Decraemer et al. (2010).

¹⁴⁰For instance, Tapp (2002).

¹⁴¹For instance, Cattell (1972).

¹⁴²Whitehead and Conlan (1978).

¹⁴³For instance, LaHaye (1980).

non-religious people and institutions continue to prevail. This occurs not only in the developing world—particularly in the Islamic world where religion and State are not separated—but also in advanced countries, where free thought and freedom of life stance are constitutionally guaranteed. Hence, it is understandable that the humanist associations have the priority to deal with abolishing existing inequalities and inequities, if not discriminations, in the domain of worldviews and life stances.¹⁴⁴

Another weakness of the humanist movement is its relative silence about economic matters and societal policies in general. This is probably due to the fact that its membership largely consists of people who profess either a socialist or a liberal ideology and consequently may foster quite fundamentally different views on these matters.

Another critique that could be levelled against humanists and free-thinking citizens in general is that, compared to religiously motivated people, they may be less committed to and involved in personal actions and interventions in daily human and social relations and interactions. Of course, humanists and humanist organisations are not subject to pressures to deal with such matters by a clergy. In addition, they do not have the advantage of the long historical organisational tradition, and also often generous state support that organised religions can rely upon. However, in general, secular ideologies may have succeeded less in evoking the required drives for active personal involvement in dealing with the individual problems of ‘others’.

A judgment that is sometimes verbalised is that, according to the humanists’ vision of life, every person would himself determine his own values and norms, and there would be no body from outside or above who can or would be allowed to do this.¹⁴⁵ Although this seems to be a somewhat lopsided and too simplistic assessment, it is nevertheless true that the freethinking, atheist, humanist part of humanity has not yet achieved the rich and well developed formal institutional structures that can or want to display moral authority. Whereas, for instance, the Pope regularly expresses—*urbi et orbi*—on behalf of the Roman Catholic Church moral positions on major social, economic, and political problems the human species or some of its deprived groups are struggling with, the international humanist community remains largely silent. There are several explanations for this striking difference in expressing and disseminating moral stances. The Roman Catholic Church has the advantage of being a historically well-established institution, not only with ample financial and intellectual resources but above all a hierarchical structure and ideology which facilitates its fast and adequate positioning in crisis situations. In contrast, the international humanist community undoubtedly has the intellectual resources, it lacks the financial means and institutional structures to systematically make its voice heard. However, it is an even more important question as to whether

¹⁴⁴Consult, for instance, the table of contents of the major periodic publication of the International Humanist and Ethical Union: International Humanist News.

¹⁴⁵For instance, Demaerel (2015).

the humanist community, because of the present state of its ideology, would want or allow its organisation(s), such as the IHEU, to take up that role.

In conclusion, notwithstanding some weaknesses, modern humanistic principles constitute a most important ideological input into an evolutionarily inspired ethics for the future development and evolution of humankind.

4.2.6 Ecologism

Ecologism is a political ideology that resulted from the confluence of the scientific discipline of ecology and awareness about increasing environmental threats in the second half of the twentieth century. Ecology—a term originally coined by the German evolutionist Ernst Haeckel (1834–1919)—refers to the study of the interaction between living organisms and their environment. As a political ideology, ecologism suggests that the biosphere and physical environment on our planet, which are of fundamental importance for our existence, should be the subject of moral concern and, hence, should be taken into account in policies.¹⁴⁶

The ecologist movement was virtually non-existent in the first half of the twentieth century. Environmental issues were of primary concern for very few people, even among the scientific community. However, in the second half of the twentieth century, due to the accelerating population explosion at the global level on the one hand, and the increasing environmental pollution due to the invention and massive use of ever more artificial and environmentally detrimental molecules, on the other hand, environmentalist concerns and actions gradually emerged. In the United States, for instance, Rachel Carson's¹⁴⁷ publication *Silent Spring*, in which she denounced environmental pollution induced by pesticides, was a milestone in the growing public environmental awareness.

In the last quarter of the twentieth century, the ecological movement deepened and radicalised its approach to the need to preserve the environment. Arne Naess,¹⁴⁸ the Norwegian founder of deep ecology philosophy, made the distinction between shallow ecology which he defined as just environmentalism, the aim of which is to protect the environment against inadequate human interventions, and genuine or deep ecology which concerns the biosphere as a whole. Deep or fundamentalist ecologism fosters a shift from anthropocentric environmental values towards biocentric or ecocentric values, and from short-term to long-term goals.¹⁴⁹

Politically, the ecological/environmental movement led to the establishment of national Green parties and continental Green federations or networks.¹⁵⁰ This development started in 1972 with the creation of Green parties in Tasmania and New Zealand, followed by France and UK in 1973 and many other European

¹⁴⁶For instance, Baxter (1999).

¹⁴⁷Carson (1962).

¹⁴⁸Naess (1973).

¹⁴⁹Dobson (1990), Smith (1998), Baxter (1999).

¹⁵⁰Blakers (2001).

countries in the 1980s. In the 1990s many countries in other continents followed. Currently there are Green parties in more than 100 countries worldwide.¹⁵¹

The political platforms of the Green parties are not only focussed on environmental issues with the view to achieving a sustainable ecological future, but also foster socially oriented policies, health protection, social cohesion, globalisation based on solidarity that is ecologically sustainable, changing lifestyles and patterns of consumption, energy efficiency, energy saving and the development of renewable energies, and democracy and diversity.¹⁵²

Although the Green parties are still a small minority in most countries, they are having a positive influence on the ecological agenda of other political ideologies. Several modern ideologies now have an ecological offshoot—cf. ecosocialism,¹⁵³ ecofeminism,¹⁵⁴ ecohumanism¹⁵⁵—or have even largely integrated the ecological agenda into their platforms for action. A weakness of the ecological movement is that its policy proposals seldom have a sufficient systems-theoretical view that would replace the traditional approaches to environmental matters.¹⁵⁶ So far, they have not elaborated more concrete policy proposals to change or replace the capitalist, liberal or socialist approaches to economic production without fundamentally disrupting the welfare and well-being of citizens in modern(ising) societies.

However, civil society with numerous national and international environmental and nature organisations,¹⁵⁷ has probably had even more influence on recent policy making than the Green parties themselves.

In this context, it is appropriate to refer in particular to the work being done by the United Nations Intergovernmental Panel on Climate Change.¹⁵⁸ It is not only remarkable in its important climate assessment reports (1990, 1995, 2001, 2007, 2013) but also the massive (voluntary) contribution and cooperation of the world's scientists in the endeavour to commonly investigate and advise policy makers on the anthropogenic climate effects and their consequences for the environment and the biosphere, including human well-being.

In contrast to its remarkably rapid take off that the ecological movement achieved in raising public awareness about the environmental deterioration in modern times, the movement has produced a very limited practical result until now. It is sufficient to look at the major indicators of environmental degradation: the unprecedented further increases in atmospheric CO₂ levels with its threat of climatically warming the planet; the still increasing species extermination (the sixth

¹⁵¹<http://www.globalgreens.org/parties>.

¹⁵²For instance, European Greens (2006).

¹⁵³For instance, Wall (2010).

¹⁵⁴For instance, Hobgood-Oster (2005), Gaard (2011), Sturgeon (2016).

¹⁵⁵For instance, Tapp (2002).

¹⁵⁶Wijkman and Rockström (2011, 18).

¹⁵⁷For instance, Spiro (2007), Tava (2013).

¹⁵⁸IPCC (2013).

extinction)¹⁵⁹; the on-going environmental pollution; and the continuing deforestation of the tropical rainforest.¹⁶⁰ This is not completely surprising, given the short period of time in which the ecological awareness emerged and evolved, the exponential population growth that many developing countries are still experiencing, the desire of those countries to further develop, the insufficient motivation of people to change their consumption patterns, the financial interests of well-established economic sectors such as the oil industry, and related to all this, the insufficient action taken by policy makers to change those trends.

Evaluating ecologism from an evolutionary point of view is much easier than assessing liberalism or socialism with their diverse subdivisions. Indeed, both major subdivisions of ecologism—shallow environmentalism and deep ecologism—have much more in common with each other in reality and moreover, they both connect much more closely, although partially, with an evolutionary ethical perspective.

Advocates of ecologism—shallow or deep—are undoubtedly right in stating that the human species is part of the biosphere on this planet. It is not possible to isolate ourselves from the rest of nature. We profoundly depend for our well-being, and even for our mere existence, on the planet's biosphere and physical environment.¹⁶¹

However, by imposing moral duties towards the earthly biosphere as a whole, an essential feature of biology should be taken into consideration: the interdependence between species is largely based upon competition between species. Whether we like it or not, the human species is part of this interdependent and competing system. Humans are dependent upon other species—microorganisms, plants and animals—but at the same time we are in competition with many of them, either because they are deathly menaces to us, or because they are life-sustainable resources for us as providers of oxygen, basic nutrients or symbiotic support. Consequently, contrasting a biocentric view of life with an anthropocentric one, as advocates of deep ecologism do, is quite an artificial or unrealistic approach. As a dependent and competing species, humans cannot afford to take an indiscriminate or absolutely altruistic position towards other life forms. We can value them and protect them, provided we can protect ourselves from disease and death, as long as biodiversity gratifies our existential, aesthetic, or other mental needs and to the extent we depend on them—for breathing, nutrition or symbiosis. Indeed, the intrinsic value (deep) ecologists attach to nature and biodiversity, independent of the practical usefulness for the human, probably responds to important mental pleasure functions of an existential, aesthetic, scientific, or other perceptual nature.

¹⁵⁹Since the origin of life on Earth, life has experienced five mass extinction events, all caused by natural phenomena. The sixth extinction is the result of human interventions. It began some 100,000 years ago when the anatomical modern human emigrated from Africa and dispersed all over the planet; it accelerated about 10,000 years ago when humans developed agriculture, and has further intensified since the onset of modernisation 400–500 years ago. The biodiversity in the planet is currently being diminished at a rate that parallels the five natural extinctions of the past (see Leakey and Lewin 1995; Novacek 2001; Kolbert 2014).

¹⁶⁰For instance, Chew (2001, 2008).

¹⁶¹Dobson (1990).

Hence, the bio- or ecocentrism of the deep ecologists is, in fact, an expression of an enlightened anthropocentrism.

Indeed, where does our admiration for nature come from? Why does nature appeal so strongly to our aesthetic feelings or other mental needs? How can the extension of our altruistic feelings and concerns to (some) other species be explained? How did ecologism emerge in present-day modern culture?

The authors' hypothesis would be that the psychological satisfaction and pleasure felt in the presence of a rich, diversified nature results from the evolved disposition and experience that such a nature guarantees the existence of rich and abundant (nutritional) resources. The aesthetic and altruist feelings towards (some) other species may also have developed in civilisations that acquired more knowledge about nature or reflected more thoroughly about the meaning and future of life on this planet. The ecological concerns in present-day modern societies are undoubtedly evoked by the observations and experiences about the environmental harm modern culture produces, and are facilitated by the nutritional security that modern societies could achieve: however, ecological concerns are, alas, much more difficult to cherish under conditions of undernourishment or starvation.

In conclusion, ecologism brings an extremely important dimension to an evolutionary approach to ethics. It emphasises not only the strong dependence of the human species on other living forms but also guards against the destruction of natural ecosystems, depletion of natural (renewable and non-renewable) resources, and the reduction or elimination of biodiversity. It fosters a long-range time perspective and helps to recognise the importance of intergenerational processes. Finally, it reminds us of the aesthetic or other mental pleasures a rich nature provides us with. Overall, ecologism is one of the essential building blocks of an evolutionary ethics that envisages a long-term progressive future for the human species and life on this planet in general, despite its utopism of wanting to replace an anthropocentric ethics by an eco- or biocentric one.

4.3 Constraints of Secular Ideologies as Sources of Universal Morality

Modernisation is characterised by the development of a number of secular ideologies that incorporate many moral norms that were also part of religious teachings, but on the whole they do not draw on the sacred texts. Due to their relatively recent origin, in general they are philosophically less well substantiated, often lack a holistic approach, and many are not yet embedded in well-structured secular institutions.

Almost all secular ideologies include or highlight partial ethical elements that are valuable components for an evolutionarily inspired, universal ethics that might guide the future of the human species.

However, compared to the religious traditions that consist of comprehensive ideological systems responding to all major questions and challenges of life and death, they show three major shortcomings: (1) their fragmented nature; (2) their short-term approach; (3) their macro-level approach.

4.3.1 The Fragmented Nature of Secular Ideologies

The most striking characteristic of all major secular ideologies is that they approach and deal with humanity's presence and future in a very fragmented way. Moreover, several of those ideologies often seem to be mutually incompatible. In contrast to the traditional religions that provide an all-encompassing, cohesive and overarching worldview designed by a superpower,¹⁶² so far the modern man-made secular ideologies have been unable to design a holistic worldview. They do not add up to a set of guiding values and norms for the solution of humanity's present day challenges and do not offer a coherent inspiration for its long-term evolutionary future. Most are primarily focussed on a limited target group: liberalism emphasises the development of the individual and neglects collective impacts; socialism concentrates on societal issues often at the expense of individual self-realisation; feminism is mainly focused on gender issues; ecologism is environmentally and ecosystem oriented; nationalism is mainly, perhaps only, concerned about national in-group interests. The only modern ideology that has a somewhat broader and more comprehensive approach is humanism. From an evolutionary point of view, transhumanism is particularly inspiring. However, overall, modernity lacks a secular worldview that gives meaning and purpose to human existence and continuity. The fragmented modern secular ideologies lack a grand and holistic vision leading to an inclusive morality.

Modern secular ideologies, philosophically and scientifically of Western origin, mainly concentrate on material welfare and the individual's well-being—they often lack ethical depth and spiritual inspiration. Some argue that they are characterised by ethical decline and regression in values and norms compared to religious morality. However, notwithstanding their fragmented nature, as a whole those secular ideologies constitute the multi-faceted and mature components of an ethical system with the potential for the highest development of individual emancipation and societal organisation ever achieved. Nonetheless, the modern secular ideologies still need to acquire a holistic perspective, an overall integration, and a longer-term vision about intergenerational goals. If it becomes well integrated and with a longer-term view, the Western ethical system could form a superior system to any of the religious-civilisational ethical systems with their religiously dogmatic, classist, sexist, and in-group oriented values and norms. At first sight this conclusion may sound Western-centric biased and naively optimistic. It is in fact a call for assuming responsibility that is proportionate to the opportunities opened up by modernity. A comparison of the various ideological-ethical systems that the human

¹⁶²See also, for instance, Saroglou and Muñoz-García (2008, 97), Stewart (2008).

species has developed so far, their merits and limitations and their implications at the population or species level, leaves us with no other choice than to shape the future of our species based on choices to the best of our knowledge.

A major problem associated with the fragmented nature of modern secular ideologies is their mutual conflicting nature. Although most secular ideologies share some common philosophical propositions, such as emancipatory and democratic objectives, a number of their specific characteristics also differentiate them and often bring them in mutual competition and conflict.

Hence, modern ideological controversies and conflicts not only result from the clash between traditional religious beliefs systems (and their institutions) and modern secular ideologies but also, if not even more, between some of the modern ideologies themselves. Examples of such conflicts are: the opposition between capitalism and the various forms of socially-oriented ideologies (socialism, communism, social liberalism, social-christianism); the opposition between various forms of in-group favouritism and globalism; the opposition between the economic interests and aspirations of the developed and the developing world; and the opposition between unbridled capitalist growth ideology and ecological sustainability ideology.

A factor which further complicates the life stance and worldview profile in modern societies is that the theist-atheist opposition and the modern secular ideological diversity partially intersect with each other. This has led to theist and atheist views permeating the nascent modern worldviews in various combinations.

4.3.2 The Short-Term Approach of Secular Ideologies

Modern secular ideologies are not only characterised by their fragmented nature but usually also by their short-term perspective. They mostly lack, perhaps with the exception of humanism and ecologism, a vision about the long-term future. They are quite reserved, if not totally silent, about intergenerational goals. From an evolutionary point of view, their short-term approach is an inherent shortcoming.

Life is essentially an intergenerational process that should be duly taken into consideration and shaped by morality. This is of particular importance in modernisation because of its possible harmful effects on future generations and a lasting detrimental influence on the biosphere and even the physical environment.

4.3.3 The Macro-level Approach of Secular Ideologies

Most modern secular ideologies strive to address morality at the macro-level in an effort to respond to the immensely increased population size. They devise principles and practices to deal with human, societal, or ecological challenges at structural levels. They deal with the innovative traits of the modern world, and form a justified replacement for the alms-like charitable approaches of the past. However, most or all secular ideologies have miserably failed or neglected to deal equally well with

the modern challenges at the individual levels. They have wrongly assumed that efforts in devising and implementing well-intentioned systemic or structural solutions for societal challenges would automatically meet the human needs at the individual level.

Modern secular ideologies have neglected to strongly enhance educational and agogic efforts to apply ‘The Golden Rule’ or the need for a message about solidarity in the anonymous and anomic modern societies with their millions of citizens. Several modern secular ideologies—in particular humanism—have broadened the moral rules related to altruistic, reciprocal, and mutual and spontaneous helping behaviour to all of humanity, regardless of race, ethnicity, religion or ideology: but they have mainly applied them at an abstract global level and much less at the level of individuals. Modern ideologies have forgotten to respond efficiently to the old-time profound needs for interpersonal relations, assistance, care and love, to which the human was genetically adapted in Pleistocene times, when it lived in small communities. Humans are still not very effective in bonding in the global world.

Abstract

This chapter highlights first the rationale for evolution-based ethical choices in modernity and proposes the main arguments in favour of this position. The core of this chapter concerns the identification and justification of evolution-based general ethical goals for the future. Two evolutionary-based prerequisites for the further development and evolution of the human species are distinguished: ecological sustainability and cultural progression of the modernisation process. The main aim is defined as the phylogenetic enhancement of the hominisation process; from this main aim five major derived objectives are inferred: the ontogenetic development of human-specific potentialities, the promotion of quality of life, the promotion of equity, the shift from competitive toward cooperative efforts, and the promotion of universalism. The rationale for each one of those general ethical goals for the future development and evolution of humankind is explained and justified on the basis of the confrontation of the long-term hominisation process with a further progressing modernisation. As far as the future of the hominisation process is concerned, four alternative scenarios are discussed: extinction, regression, stabilisation and progression.

5.1 Need for a Universal and Inclusive Morality

In modernity the human no longer needs a traditional religion as a source of moral norms but does need a well adapted morality—progressive, inclusive and universal ethics. World challenges are global in nature and traditional moral norms, which are strongly in-group oriented, are slowing down or obstructing further progress of the species. Many of the traditional moral norms are exclusionary as they propose, for example, different standards for men and women, and for believers and non-believers. Indeed, numerous authors call for a new global ethic, a new global

morality, a new Enlightenment, a cosmopolitan humanism, a universal secular morality, and a new evolutionary worldview, just to mention a few.¹

This idea of the development of a universal or autonomous morality, independent of religious beliefs and faith based institutions, is not at all new. In fact, it has its roots in ancient Greece and became the central idea of the eighteenth century European Enlightenment.² Since then many authors have advocated the development of a universal morality. For instance, Paul Cliteur,³ a Dutch jurist and philosopher, pertinently argues in his recent book *Moral Esperanto* in favour of the need for an autonomous ethics. He sees the separation of morality from religious divine command belief systems as the only way to make modern(ising) multicultural societies, consisting of a broad range of religious and secular ideologies, peacefully living and working together for the benefit and happiness of all, believers as well as non-believers.

In recent decades, considerable concrete impetus to such a new global ethics has been given by the United Nations. It is sufficient to mention the Universal Declaration of Human Rights (1948),⁴ the many topic-specific charters, for instance on population (the World Population Plan of Action 1974⁵; the Cairo Action Plan, 1994⁶), women (the Beijing Declaration and Platform for Action, 1995),⁷ climate (the United Nations Framework Convention on Climate Change, 1992),⁸ and environment (the Rio Declaration on Environment and Development, 1992).⁹

The same applies to the many charters of the Council of Europe; in the first place its Convention for the Protection of Human Rights and Fundamental Freedoms (1950–2010),¹⁰ but also its topic-specific documents such as the European Social Charter (1965), the European Convention on the Exercise of Children's Rights (2000),¹¹ and the Convention for the Protection of Human Rights and Dignity of the Human Being with regard to the application of Biology and Medicine: Convention on Human Rights and Biomedicine (1999).¹²

Modern international charters dealing with ethical and policy issues are a giant stride forwards in the development of a new global morality. However, they are often partially or even largely influenced or curbed by traditional religions and are strongly dominated by national, in-group interests. Often they do not sufficiently

¹For instance, Huxley (1927; 1964, 84), Keith (1946, 10), Manenschijn (1987), Global Ethic Foundation (1993), Küng and Kuschel (1993), Katz (1999, 237), Loye (1999), Katz (2000), Peters (2003, 334), Dawkins (2006, 262), Kwame (2006), Young (2006, 44), Cliteur (2007, 219ff.), Stewart (2008), Hitchens (2009, 277), Haught (2010), Hinde (2011), Wilson (2012, 287).

²Cliteur (2007, 223ff.)

³Cliteur (2007).

⁴United Nations (1948); see also Meloni (2016, 137).

⁵United Nations (1975).

⁶United Nations (1994).

⁷United Nations (1995).

⁸United Nations (1992a).

⁹United Nations (1992b).

¹⁰Council of Europe (1950).

¹¹Council of Europe (2000).

¹²Council of Europe (1999).

deal with the issues on a global level and in a long-term evolutionary perspective. They are frequently more focused on the preservation of the *status quo* rather than adjusting to new and laying grounds for future developments.¹³ They generally build on the lowest common denominator of rights already proclaimed or achieved in the most powerful states. In that respect they preserve the status quo in these countries but set their worldviews as norms for other countries.

While acknowledging the tough negotiations and compromises made in order to pass intergovernmental charters, it can be observed that many—and in particular the Universal Declaration of Human Rights—are focused on individuals whilst individual-transcending issues such as collective rights are not addressed. They also mainly focus on rights whilst neglecting to address responsibilities. They fail to address many socio-economic rights while focusing primarily on the political ones.

The charters that resulted from the UN World Population Conferences of 1974, 1984 and 1994 referred to rights *and* responsibilities in several places¹⁴; but when policy makers or activists use those documents, they mostly focus on rights—sexual rights, reproductive rights, abortion rights, developmental rights, etc.—and forget the related responsibilities. For example, abortion rights also entail the responsibility to avoid unwanted pregnancy; reproductive rights need to be associated with responsibilities to provide effective socialisation and education for both boys and girls.

Those global charters are the result of intergovernmental negotiations and consensus, resulting in qualified compromises. Often the underlying issues at stake are not even considered, particularly those resulting from the clash between our evolutionary and cultural heritage and the challenges of the novel environment of modernity. The salient political weakness of those intergovernmental institutions, in particular the United Nations, is the lack of implementation of those instruments. This implies that moral principles in the fields of population control, environmental protection, economic inequalities, gender inequities, climatic regulations, and international conflicts for example, are believed to have a moral weight but are applied *à la carte* by states.¹⁵

Efforts by the intergovernmental bodies to promote universal values clearly lack the authority of the word of God and the fear of God. They can be relativised. Most importantly, over past half a century or more the community of nations has not set up enforcing mechanisms with a set of rewards for compliance and sanctions for breaches and free loaders.

Both the traditional religions and the nascent secular ideologies are partly deficient in dealing effectively with the ethical problems of humankind in modernity, and to safely guide the human species through new subsequent stages of biological evolution and cultural development. Broader reflections are needed to adapt and develop our values and norms for the future development and well-being of humans and humankind, as well as of the future of our planetary environment.

¹³See also Cattell (1972, 439).

¹⁴For example, in the ICPD Action programme of the Cairo conference (1994, 10).

¹⁵See also Baofu (2010, 229).

The thread of thought throughout this book is that the existential challenges facing the human species in a further modernising and globalising world can only be effectively engaged through a confrontation of the biological hominisation process and the opportunities and challenges of the scientifically driven modernisation. The authors want to give impetus to the idea that evolution science can provide, in the context of a further progressing modernisation, a framework for elaborating global ethics to guide humanity to higher levels in the hominisation process. The authors want to examine the degree to which the traditional and modern ideologies can contribute to and fit into this endeavour. Whereas it is not a new idea, it is a grand challenge around which people from very diverse ideological origins might want to unite.

The authors are well aware that such an endeavour is a daring enterprise. Indeed, when defining ethical goals for the future of humankind, there are fundamentally two possible strategies one can choose: looking for directions in which way humanity should go or identifying directions in which we should not go. Considering that science and technology are evolving at an extremely fast pace, the renowned evolutionary scientist Edward O. Wilson¹⁶ believes that it is quite precarious to make predictions and precepts about the longer-term future course humanity should take. Hence, in his recent book *The Social Conquest of Earth*, he opts for the goal where *not* to go. By contrast, in this book, it is opted for the choice where to go, although it does not exclude the identification of future directions to be avoided. Moral choices, indeed, inevitably include positive as well as negative recommendations.

5.2 Rationale for Evolution-Based Ethical Choices

In previous chapters, some arguments have already been advanced to justify the derivation of values and norms from evolution science. However, it is necessary to address this issue more explicitly and in a more comprehensive and nuanced way. Why, indeed, evolutionary ethics? Why not simply ethics based on biology, since so many basic needs are so clearly of a biological nature? Or even on culture, as so many scientists, even some evolutionists, argue?¹⁷

The authors see three major reasons for the omnipresent importance of ethics in human life: (1) the incomplete genetic programming of human development, requiring complementary, exo-somatic, cultural intervention in order to achieve optimal biological functionality; (2) the social character of human nature, requiring cultural ruling to master inter-individual and inter-group relations; and (3) the cultural evolution of the human species, resulting in the modernisation process with its considerably increased capacity to master the environment and address

¹⁶Wilson (2012, 287).

¹⁷For instance, Ehrlich (2001), Ayala (2009).

traditional human adversities—ignorance, superstition, disease, hunger, war and environmental destruction.

The fundamental argument in favour of evolutionary ethics, based on an evolutionary consciousness,¹⁸ is that life is an intergenerational phenomenon and, even more important, an evolving phenomenon. Knowledge about the evolutionary history of the hominins allows, by means of the comparative method of analysis, the identification of the biological originality and specificity of present-day humankind.¹⁹ It also allows the detection of the dominating trend(s) in the hominin evolution and extrapolates those trend(s) into the future and possibly identifies desirable future goals.²⁰ Acknowledging the considerable biological variability within the hominin tribe, and the cultural variability within the present *Homo sapiens sapiens*, the evolutionary approach provides a standard against which human variability (and adaptability) can be measured and evaluated.²¹ Due to its broad, intergenerational time dimension, an evolutionary biological account of human values and norms can be so much better identified and evaluated than a static, intragenerational biological account, or even a comparative cultural account, the time dimensions of which are so much more limited. The specificity of a species is the result of a very long-term process of phylogenetic evolution, resulting in the assemblage of a large number of inter-depending traits (morphological, physiological and behavioural) which define the originality and identity of a species and make it possible to capture the limits and range of the natural security of a species.²²

Evolutionary consciousness may be “a romantic idea of the highest calibre” as Gregory Gorelik and colleagues²³ positively evaluate it. It might sound romantic at first glance, but the evolutionary approach is a much better basis for developing a universal morality than any other value-based account about God, reason, emotion, nature, individuals, or society²⁴ that humans have ever devised. It can be a holistic approach that takes into account genetic and environmental factors, individual and group elements, emotion and reason, biological and cultural factors, and above all, long-term intergenerational processes. It makes it possible, because of its holistic and long-term time dimension, to deal with all of the major philosophical issues ethicists raise, such as the question of intentionality (“how people ought to act toward one another”), the authoritative question (“why ought one be moral?”), the distributive question (“whose interests ought to be promoted?”), and the substantive question (“which interests ought to be promoted?”).²⁵

The evolutionary paradigm also allows the identification of mismatches between our biological evolution and our cultural development. This mismatch is evident for two reasons: (1) partly because of biological maladaptations to the novel

¹⁸Gorelik et al. (2012).

¹⁹For instance, Chapais (2013, 53).

²⁰For instance, Huxley (1957), Cattell (1972), Kaufman (1997); see also Kelly (2016).

²¹For instance, Cattell (1972), Richards (1986), Masters (1989).

²²Sagarin and Taylor (2008, 261).

²³Gorelik et al. (2012, 353).

²⁴See, for instance, McShea and McShea (1999, 310).

²⁵See, for instance, Gewirth (1993, 245–248).

environment of modernity; and (2) partly because of the fact that some moral codes and conventions which were developed and well adapted to life in the hunter-gatherer, and particularly the agrarian-pastoral era, are now no longer appropriate to resolve biosocial or biocultural challenges in modernity. Regarding biological maladaptations, it may well be that they not only apply to some physical traits but also to evolved emotional predispositions that generate intuitive moral judgments.²⁶

The identification of evolutionary mismatches between biological and cultural developments which Julian Huxley²⁷ called “challenging monsters on our evolutionary path” and Paul R. Ehrlich²⁸ named “evolutionary hangovers”—“structures or behaviours that once were adaptive but whose positive influence on reproductive performance has declined or disappeared”—can help to develop, in an informed way, better adapted human values, social structures, and/or technological means to accommodate the mismatches. We are better placed to develop alternative, viable and long-term strategies to cope with the biological-cultural maladaptations that arose in the process of modernisation.²⁹

The evolutionary approach to ethics in modernity can also contribute to resolving conflicting ethical choices, e.g. freedom of speech, right to privacy, individual versus societal interests, intragenerational versus intergenerational care, and help to rank values and norms which, at first sight, all seem to be equally important.³⁰

The evolutionary perspective—focused on an intergenerational and long-term perspective—is also needed to evaluate and take advantage of new opportunities that scientific inventions have created. This is the case not only in the domain of the biomedical sciences but also in the domain of within- and between-group relations, and ecological relations, to consciously lead human biological development (ontogeny), human evolution (phylogeny), human society and ecology in the desired direction.

Finally, evolutionary ethics can replace the traditional religious ideologies which rely upon fantastical revelations that made sense in pre-modern eras but have become obsolete—if not downright dangerous—in a modern context. A typical example of a threat is the in-group ideology which is inherently built into religious thinking. An evolution-based ethics might also complement the fragmented modern ideologies that have failed to design holistic goals for future progress. Evolutionary ethics exceeds by far traditional ethics or modern fragmented ideologies because of its holistic approach, including not only individuals and populations but also past, present and future generations.³¹ Evolutionary ethics is not just a competitor or complementary to traditional ethics, but it is its successor.³² It is especially

²⁶Hauser (2006, 418).

²⁷Huxley (1964, 82); See also Hinde (2002).

²⁸Ehrlich (2000, 34); See also Keith (1946), Burnham and Johnson (2005).

²⁹Huxley (1957), Cattell (1972), Hinde (2002).

³⁰Richards (1999), Corning (2003).

³¹See also Shermer (2004, 10).

³²Bradie (1994, 7).

important in this perspective that one of the major achievements of evolutionary science, and hence one of the major tenets of evolutionary ethics, is that any notion of a supernaturally inspired or determined ultimate design and purpose in life and human history has to be abandoned.³³ Thanks to science and reason, it is now known that we humans have to define for ourselves the design and purpose we want to see in life and history. This new phase implies that humans can and ought to take up the responsibility for identifying needs and the instruments for the implementation of evolving values.

In the introductory chapter, it was stated that the goal of this book is to address the necessary value and norm changes, with the prospect of evolving to higher levels of hominisation, adapting humanity and its culture to the opportunities and challenges of the modernisation process, and in particular enlightening or maturing modernity. Hence, the intended evolutionary ethics is not just based on evolutionary science, but on the confrontation of the knowledge about the evolutionary process with the modernisation process. The ethical choices that will therefore be suggested and justified in the following sections and chapters are: (1) a further progressing hominisation; and (2) a further progressing enlightened modernisation.

5.3 Evolution-Based General Ethical Pursuits

In this chapter a number of basic ethical goals of a more general nature are addressed that apply to several, if not all, specific domains of human life.

Three types of more general ethical goals to be pursued are addressed: two prerequisites, the main aim and five derived goals. The two evolutionarily-based prerequisites for the further development and evolution of the human species are: (1) ecological sustainability; and (2) cultural progression of the modernisation process.

The main aim of an evolutionarily based ethics is the phylogenetic enhancement of the hominisation process. From this main aim five major derived objectives are inferred: (1) the ontogenetic development of human-specific potentialities; (2) the promotion of quality of life; (3) the promotion of equity; (4) the shift from predominantly competitive towards cooperative social relations; and (5) the promotion of universalism.

5.3.1 Ethical Prerequisites

5.3.1.1 Ecological Sustainability

The present variant of the hominins, *Homo sapiens sapiens*, emerged some 150,000–200,000 years ago in East Africa and initially included only a few thousand individuals. Since then the human species spread all over the planet, settled in

³³See, for instance, Vannelli (2001, v).

practically all possible environments, and considerably increased its numbers, particularly during the twentieth century. The human species is nowadays seven billion people and will, probably before the end of the present century, reach a maximum of eleven billion before stabilising at or decreasing to a lower but still very large world population size.³⁴

The population increase of the human species has, in all of its major cultural stages, provoked ecological catastrophes. It resulted in the eradication of many other species, as for instance in the Upper Palaeolithic, or turning arable land into (semi-) deserts in the agrarian-pastoral era. It is producing multiple ecological disasters in the current industrial phase.³⁵ The human species, with its apparently insatiable drive for possession and power, is not by nature a cautious and provident conservationist. Contrary to earlier romantic views, neither hunter-gatherers nor agriculturalists-pastoralists developed a substantial conservation ethic and achieved long-term conservation.³⁶ The abuse of the planet's resources and environment has become markedly worse in modern times. Humankind is now producing an anthropogenically caused 'sixth extinction'.³⁷ Many so-called advanced nations ravaged not only their own resources and environment but also usurped the resources of other populations through imperialist (neo)colonial domination and exploitation. In addition, they have now started to prey on their own children and grandchildren by making and accumulating debts to be covered by future generations.³⁸ Hence, the fully justified conclusion of Matt Ridley³⁹:

... there is no instinctive environmental ethic in our species - no innate tendency to develop and teach restrained practice. Environmental ethics are therefore to be taught in spite of human nature, not in concert with it. They do not come naturally.

It is only in the second half of the twentieth century that the disastrous effects of industrial culture on the environment elicited an ecologically grounded ethical and political awareness: however, the impact is still very limited.⁴⁰ As Paul R. Ehrlich⁴¹ pertinently stated:

Until recently, people have not paid much attention to the long-term environmental effects of their behaviour but rather have focused on the satisfaction of their immediate needs.

The current ecological track record of the human species is lamentable: due to its population growth and production and consumption patterns, humankind is decimating the planet's biological abundance and diversity at an accelerating pace. Humans are overusing natural resources, producing habitat loss and environmental degradation, depleting non-renewable resources, polluting sea, air and soil,

³⁴United Nations Population Division (2015).

³⁵For instance, Ehrlich and Ehrlich (1981), Goudie (2005), Wijkman and Rockström (2012).

³⁶Low (1996), Wilson et al. (1998).

³⁷Leakey and Lewin (1996), Novacek (2001), Kolbert (2014).

³⁸For instance, General government gross debt in EU countries (2002–2013). <http://epp.eurostat.ec.europa.eu/>.

³⁹Ridley (1996, 225).

⁴⁰Vermeersch (1988), Penn and Mysterud (2007, 28).

⁴¹Ehrlich (2000, 320).

aesthetically defiling the environment, anthropogenically changing the climate, and damaging several other critical planetary ecosystems.⁴² As Warren M. Hern⁴³ thoughtfully noted:

The human species is a rapacious, predatory, omnivorous species engaged in a global pattern of converting all available plant, animal, organic, and inorganic matter into either human biomass or into adaptive adjuncts of human biomass....In this respect, the human species is an example of a malignant ecotumor, an uncontrolled proliferation of a single species that threatens the existence of other species in their habitats.

In 1980, William R. Catton⁴⁴ stated pertinently that the post-exuberance age in human history has been reached and that there is an urgent need to change our ecological paradigm from exuberance to sustainability. There is a gradual increase in public awareness of the long-term devastating effects of the dominant type of economy and especially its current variant—the neoliberal fundamentalist free market capitalism—on the planet's ecosystems and in particular its climate. Nevertheless, there is a risk that remedial measures will only deal very superficially with the fundamental causes of the ecological demise. As Naomi Klein⁴⁵ argues so well in her recent book *This Changes Everything. Capitalism vs. The Climate* that we will need a fundamental alternative worldview based on mutual dependency instead of hyper-individualism, reciprocity instead of dominance, and cooperation instead of hierarchy.

One may even argue that there is, behind the ecological concerns of some states, a hidden agenda to preserve the status quo in power and developmental opportunities. Therefore, the authors believe in the notion of ecological justice which requires more thorough reflection and the setting up of institutions which have powers of action.

The authors consider the commitment to ecological sustainability a *sine qua non* for the survival, the long-term development and the further evolution of the human species on this planet. There is a need to preserve crucial components of the physical environment such as inhabitable and arable land, water, and climate. On the one hand we are in competition with many other life forms; on the other hand the human species vitally depends on the existence of other life forms for breathing, nutrition, digestion, and even for more subtle psychological needs. The priority ranking of the ecological goal as one of the two ethical prerequisites for the future development and evolution of humankind is fully justified from an evolutionary perspective. We are in the critical stage of humans having a disruptive impact on life and the environment of this planet.

In technologically developed countries many of the basic biological needs of the vast majority of the population are largely met. Under these circumstances, the preservation of the diverse life forms and landscapes may have become an element in satisfying our cognitive/emotional/spiritual needs, appealing to our aesthetic and

⁴²Rockström et al. (2009).

⁴³Hern (1993, 16).

⁴⁴Catton (1980, 58).

⁴⁵Klein (2014, 513).

exploratory needs. Although the ugliness of many human settlements often takes unimaginable proportions and there are few individual and even group concerns for cleanness and a pristine environment, it is also true that people experience extraordinary pleasure from green spaces, natural landscapes and beautiful habitats,⁴⁶ as well as from leisure travel. Our modern environmental aesthetics may be the result of our affluence culture in which basic survival needs are covered and leave room for other needs. However, as mentioned in Chap. 4, it is not impossible that the sense of environmental beauty may also be partially related to remnants of ancient drives which developed for survival purposes in the hunter-gatherer era of human evolution: a spacious environment with a diverse and lush flora and fauna which guaranteed feeding and safety needs.⁴⁷

5.3.1.2 The Enhancement of the Modernisation Process

The fundamental feature of modernisation is the development of science, which brought not only a more thorough knowledge and understanding of reality but also made possible more effective ways of inter-vening in life, society and the environment. This interventionist nature of science is embedded in modern culture and has fundamentally changed humankind's biosocial and biocultural relationships. It is not only offering new opportunities for the future but also bringing about new challenges.

On the one hand the achievements of science and technology increasingly allow humans to master their environment and their life; on the other hand modernisation has been, and is being, accompanied by a number of unfavourable and potentially catastrophic effects. The challenges and choices for the future are essentially of a moral nature. The authors argue that, in combination with the humanistic principles of the Enlightenment, modernisation may result in a sustained enhancement of quality of life, provided that maladaptive practices are countered by an evolutionary-based ethics.

The increased capacity for intervention in modern culture is characterised by the potential to gradually replace the major mechanisms of biological evolution by cultural mechanisms. The perceived inhumane mechanism of natural selection can be replaced by cultural forms of selection, and natural chance events can be replaced by consciously chosen acts.⁴⁸ With modernisation we witness a transition from trial and error to what John Stewart⁴⁹ calls 'intentional evolution'. This capacity for intervention is the basis of a new evolutionary worldview.

Given its important achievements in acquiring scientific knowledge about nature, its enormously enhanced opportunities to influence natural processes, and its tremendous improvement in the quality of life, the authors consider the modernisation process to be a positive achievement by humankind. They do acknowledge risks and challenges and negative side effects, but consider them transient and

⁴⁶See, for instance, the 'Biophilia Hypothesis' of Wilson (1984) or the 'Savanna Hypothesis' of Orians and Heerwagen (1992, 557).

⁴⁷Wilson (1984), Kellert (1996), Falcichio and Barbiero (2015).

⁴⁸For instance, Galton (1883), Huxley (1894), de Duve (2009).

⁴⁹Stewart (2008); see also Harris (2007, 4).

amenable.⁵⁰ This is why it is argued that the furthering of the modernisation process, in its enlightened or matured form, is the second prerequisite of an evolutionarily based ethical approach.

This implies that evolutionary founded values and norms cannot simply be derived from a narrow Darwinian calculus in a vacuous space. They can only be elaborated on the basis of the interaction of our evolved dispositions with the essential characteristics of modern culture.⁵¹

In emphasising the modernisation goal, the authors do not imply the superiority of the Western culture. However, it is assumed that if people are given a real choice based on adequate knowledge about alternative living conditions, no one—apart from romantic unworldly dreamers or religious zealots—would prefer constant confrontation with risks of early death, disease, starvation, poverty, inter-group conflict, and the misery of ignorance and superstition.⁵²

From discussions at world assemblies of the United Nations, such as the World Population Conferences,⁵³ it appears that all governments want to develop, particularly those from developing countries. They seem to want to join what Joseph Henrich and colleagues have labelled WEIRD—Western, Educated, Industrialised, Rich, and Democratic—societies.⁵⁴ However, pathways to development build on different values. Technological achievements seem to appeal to many conservative regimes who want also to preserve their traditional patriarchal, sexist, and oligarchic cultural and religious values. These states are committed to leaving their women in the pre-scientific era. Some authors see in this endeavour a desperate attempt to maintain acquired power positions in male-dominated families and societies at large.⁵⁵

Praise for the modernisation process should not make us blind to its disastrous ecological effects: the loss of biodiversity, the destruction of natural ecosystems, the depletion of natural resources, pollution, and the aesthetic degradation of the natural environment.⁵⁶

Equally disastrous is the ruthless economic exploitation of developing nations. Colonisation practices enriched ‘advanced’ nations at the expense of oppressed peoples, thereby setting the standard for developing nations’ ‘elites’ who, in turn, often exploit(ed) their own populations to an even larger degree.⁵⁷ Modernisation was also accompanied by ideologies which conflict fundamentally with the ethical ideals of the Enlightenment (liberty, equality, and fraternity).

⁵⁰See also Häggström (2016).

⁵¹Kitcher (1985), Levy (2004).

⁵²See also Kurzweil (2005).

⁵³United Nations (1975, 1984, 1994).

⁵⁴Henrich et al. (2010).

⁵⁵Cliquet and Thienpont (1995).

⁵⁶Ehrlich and Ehrlich (1981, 2008), Goudie (2005), Carlson and Lintott (2008).

⁵⁷For instance, Sklar (1979), Sachchidananda and Lal (1980), Bakre (2008).

There are also the exponentially increasing risks of a technogenic catastrophe and the self-annihilation of our species in advanced technologies⁵⁸ of the ABC weaponry development⁵⁹ and the GNR revolution.⁶⁰

However, just as the crimes committed in the name of Christianity or Marxism are no ground for rejecting the positive messages these ideologies contain, so should the detrimental ecological and humanitarian effects of modernity not lead us to abandon the principles of modernisation, as done by some critics of modernity.⁶¹

Although it may not be possible to anticipate the effects of future inventions in a modernising world, the authors are of the view that humanity is only at the beginning of the modernisation process. Great scientific innovations in genetic engineering, robotics and nanotechnology will lift the quality of life to unprecedented heights. Those inventions will radically change our perceptions about the exhaustion of limited material resources to sustain human life.⁶² Forecasters have generally failed dismally to foresee the drastic changes brought about by completely unpredictable discoveries.⁶³

In addition to science and technology, modernisation embraces tolerance toward variation and even deviance from mainstream cultural characteristics.⁶⁴ This is a wise response toward the factual variation which exists in human populations with respect to drives, aspirations, and behaviours—provided they do not harm others (cf. The Golden Rule). However, just as is the case with genetic variation, it is a safety valve to allow adaptations in altered environmental conditions. Furthermore, it appears from research that culturally important inventions and innovations, whether of a technological or moral nature, have only been made in societies that tolerate deviance.⁶⁵

Multiple Modernities/Multiculturalism. Some scholars have challenged the idea of a further progressing modernisation that would spread all over the world. They hypothesise that the future of modernisation will express itself in the form of multiple modernities that are based on fundamentally different cultural values.⁶⁶ It is a view that lies in the prolongation of Raymond Cattell's⁶⁷ idea of cooperative competition among culturally diverse civilisations and Samuel P. Huntington's⁶⁸ Clash of Civilizations. Given the importance people give to cultural—and more particularly religious values—it is not inconceivable that the modernisation process will, at least during some of the time, show some differentiation between major geographical areas of the globe. Indeed, differences may nowadays be observed between the more individualistically and religiously oriented United States and the more social(ist)- and

⁵⁸Bostrom (2002), Verdox (2009), Bostrom and Cirkovic (2011).

⁵⁹ABC weaponry: atomic, biological and chemical weapons of mass destruction.

⁶⁰GNR revolution: the explosion of knowledge of genetics, nanotechnology and robotics.

⁶¹For instance, Vaknin (2009).

⁶²Kurzweil (2005).

⁶³Rees (2003).

⁶⁴Jones and Reynolds (1995).

⁶⁵Goldstone (1987), Mokyr (1990).

⁶⁶See, for instance, Eisenstadt (2000), Taylor (2007), Haynes (2013).

⁶⁷Cattell (1972, 105).

⁶⁸Huntington (1996).

secular-oriented European Union, or between the more individualistically oriented West and the more community-focused Far East. Another example of an even more fundamental cultural divide is the opposition between the West and the Islamic world where religion and state organisation have not yet been clearly separated. There are still very strong attempts by some religious communities to accentuate their uniqueness and monopoly on the divine truth.

In recent years the discussion about multiculturalism is linked to the idea of multiple modernities. It started to take a more prominent place in many European countries with the arrival of numerous immigrants from more distant countries with religious backgrounds typical of the agrarian-pastoral cultural stage in human history. These immigrants were more recognisable phenotypically or in clothing and decoration, manifested their cultural features more explicitly, and were given fewer opportunities or were less willing to integrate into the receiving society. In some cases the pressure on recent immigrants to maintain distinct cultural/religious features, while living in European countries, may be traced back to the policies and financial support of some mono-cultural and anti-democratic theocracies that want to support and further spread their own religion in the world.⁶⁹ Immigrants with such cultural and ideological backgrounds bring values and norms acquired during their socialisation in their native country which can, in various ways, be extremely different from and clash with the mainstream normative basis of the receiving country. Examples may include the discriminatory perception and treatment of women, arranged or forced marriages, physical punishments, honour crimes, genital mutilation, polygyny, fatwa's against persons who hold different opinions, and attempts to censor teachings about evolutionary biology. Such opinions and practices are considered incompatible with the level of emancipation reached by modern culture, which highly values science, rights related to sex/gender equality, freedom of expression, norms promoting individual development, and human rights—all of which are embedded in the legal systems of virtually all modern democracies.⁷⁰ Countries that were tempted into an improvident, if not naïve, multiculturalist policy are now reaping the bitter fruits of their sloppy endeavours—the presence of a demographically growing, socially and culturally insufficiently integrated, rancorous religious minority, worshipping values that run counter to the achievements of modern society and re-assurgency of right-wing aversion to diversity as a reaction by significant shares of natives. In some cases, modest but largely insufficient efforts are being made to reorient the earlier policies.⁷¹

However, the modernisation process is mainly driven by the progress of the modern sciences which, *de facto*, have advanced much more in a uniform globalisation than other aspects of human culture. Science transcendent religious, social, or national in-group drives, even in the most powerful groups and nations, tend to ripe benefits only for themselves. The authors believe that eventually the sciences will, like a cosmic black hole, swallow up the remaining maladaptive cultural

⁶⁹Safa (1997), Van Rooy (2008).

⁷⁰Avramov and Cliquet (2005, 201ff).

⁷¹For instance, Carle (2006).

differences, most of which are hangovers from earlier cultural stages in human evolution and history. With this point of view, once people are fully confronted with and aware of the achievements of sciences, is unlikely that they will be inclined to cling to pre-modern values and norms, and reject ideas such as freedom of expression, individual self-actualisation, social solidarity, tolerance towards diversity, sexual equality, global responsibility, and ecological sustainability. If a future multiplicity in the modernisation process develops, in the long run it will certainly not evolve in contradiction with the achievements of science or the universal values which evolved in the footsteps of the European Enlightenment.

5.3.2 The Main Aim: The Phylogenetic Enhancement of the Hominisation Process

The phylogenetic future of humankind can, in principle, evolve in four possible directions: (1) extinction of the human species; (2) regression of human-specific characteristics; (3) stagnation of evolution at the present level of development; and (4) the further progression of the hominisation process (Fig. 5.1).

In addition, one can imagine combinations between some of those alternative paths, as for instance suggested by Nick Bostrom⁷² who also distinguishes a recurrent collapse path, a future fluctuating evolution with alternating stages of progression and regression. However, such a future scenario might fit more into a framework of alternative possible ontogenetic developments.

In this section the discourse is concentrated on the genetic changes, namely on the phylogenetic future of the present representative of the hominins, whilst matters related to the ontogenetic enhancement of human characteristics will be discussed below in Sect. 5.3.3.1.

5.3.2.1 Human Extinction: Possible but Avoidable Future

Evolutionary extinction is a common phenomenon. It has been estimated that 99.9% of all species that ever existed on Earth are already extinct.⁷³ Catastrophic events are menacing events that can extinguish a species. Examples include the impact of a planetoid 65 million years ago in the Chicxulub region (Yucatan Peninsula, Mexico)⁷⁴ that led, probably in combination with massive volcanism,⁷⁵ to the extinction of the dinosaurs, and the major eruption of the Toba volcano on Sumatra some 74,000 years ago that produced an important demographic bottleneck for *Homo sapiens sapiens* in the Upper Pleistocene era.⁷⁶

⁷²Bostrom (2009, 551).

⁷³Hallam and Wignall (1997), Newitz (2013).

⁷⁴Alvarez et al. (1980), Hildebrand et al. (1991).

⁷⁵For instance, Keller (2014).

⁷⁶Ambrose (1998).

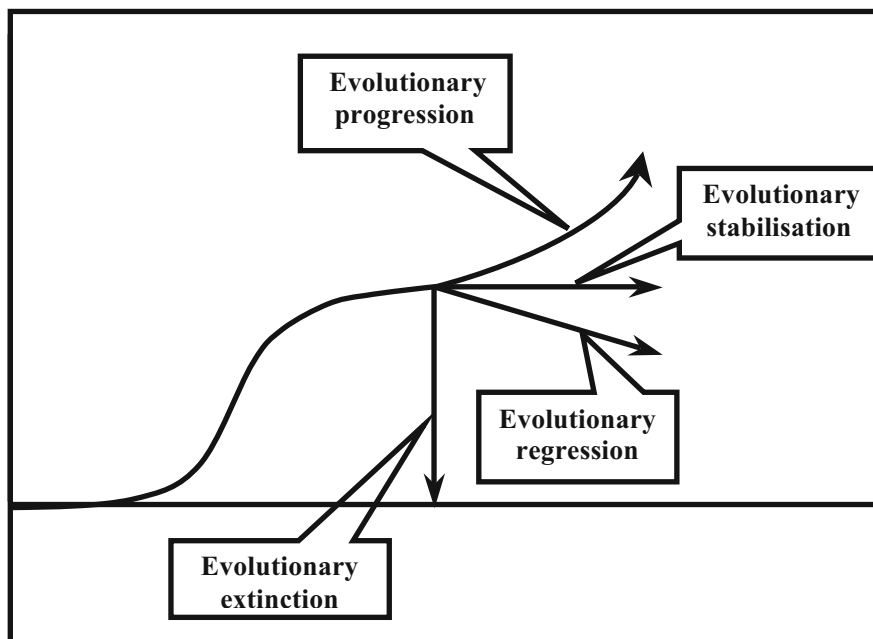


Fig. 5.1 The long-term genetic future (Cliquet 2010, 611)

Human extinction means the disappearance on this planet of the hominin phyletic line, namely the disappearance of the present *Homo sapiens sapiens* and any further hominin stage that might evolve in the hominisation process.⁷⁷ If humanity does become extinct the hominisation process would have to restart from one of the extant primate species: this path would, if it ever came so far, take many million years. We should be aware that the emergence of the hominin phyletic line on this planet was a singularity due to the unique sequence and convergence of a series of environmental conditions and biosocial preadaptations, which has an extremely low probability of being repeated.⁷⁸

Several scholars have examined the probability and the possible causes of a sudden human extinction.⁷⁹ They unanimously reach the conclusion that there is a serious risk that humanity's future is under threat of a premature end. This is mainly

⁷⁷In order to distinguish some scenarios in which the human species would go extinct because it evolves to a new stage in the hominin evolution from a scenario in which the hominin phyletic line disappears from this planet, Bostrom (2002) devised the 'existential risk' concept which he defined as "an adverse outcome that would either annihilate Earth-originating intelligent life or permanently and drastically curtail its potential".

⁷⁸For instance, Wilson (2012, 45).

⁷⁹For instance, Joy (2000), Posner (2005), MacKenzie (2008).

due to technical advances which in themselves render society more vulnerable to disruption, either by error or terror. For instance, Nick Bostrom⁸⁰ believes that the risk of extinction due to existential disaster lies above 25%. Also John Leslie⁸¹ estimates that the humanity has a 30% chance of annihilation by war, disease, or some other catastrophe in the next 500 years. Sir Martin Rees⁸² is even more pessimistic and fears that the chance of humanity surviving the twenty first century is only 50%. The latter author considers that it is a miracle that humanity survived the twentieth century without a major catastrophe for the species.

A broad variety of possible extinction causes have been suggested, ranging from natural disasters such as a comet, asteroid or planetoid impact, solar flares, supernovae, black hole explosions or mergers, gamma-ray bursts, galactic centre outbursts, or supervolcanoes, to an extreme Ice Age due to passage through an interstellar cloud. Extinction may result from a pandemic with high virulence and 100% mortality rate among infected individuals, or an essentially unpredictable breakdown of a complex system—annihilation by extraterrestrials—as investigated by chaos theory. It may occur due to man-made disasters such as a world-wide nuclear war, chemical or biological warfare, bioterrorism, destruction of the atmospheric ozone layer, the production of designer pathogens, a runaway global warming, poisoning by pollution, the development of high-energy particle accelerator experiments, destructive uses of advanced molecular nanotechnology, self-enhancing artificial intelligence, or badly programmed superintelligence.⁸³ Nick Bostrom⁸⁴ is of the view that, currently, the greatest existential risks are of an anthropogenic nature, namely those that derive from the application of present or anticipated modern technologies.

Many of those possible disasters might, as an existential risk, only lead to a considerable population decrease or a fundamental societal collapse. A worldwide nuclear war, a massive meteorite impact, a supervolcano eruption, or a deadly pandemic might decimate the human world population, but some remote populations might survive, as was the case after the Toba supervolcanic eruption 74,000 years ago.⁸⁵ However, in extreme conditions such global disasters might annihilate the total human species, leaving no survivors (and cultural knowledge) to rebuild modern culture. There would be no next hominin stage. Therefore, the authors agree with John Leslie⁸⁶ who concluded his well-known book on *The End of the World: The Science and Ethics of Human Extinction* with:

...we have a strong duty not to risk the extinction of the human race, and above all not to risk it for utterly trivial benefits.

⁸⁰Bostrom (2002).

⁸¹Leslie (1998, 146).

⁸²Rees (2003; 2004).

⁸³Leslie (1998), Bostrom (2002; 2014), Lorenc (2015), Stroeckens (2016).

⁸⁴Bostrom (2002); see also Bostrom and Cirkovic (2008).

⁸⁵Rampino and Self (1992), Ambrose (1998).

⁸⁶Leslie (1998, 155).

Contrary to the somewhat otherworldly Voluntary Human Extinction Movement⁸⁷ which sees the voluntary extinction of *Homo sapiens sapiens* as an alternative to the extinction of millions of species of plants and animals, the authors consider avoiding or reducing the risk of human extinction as a moral obligation which should be pursued purposefully, deliberately and actively.⁸⁸ Although some scholars are of the view that the moral obligation to preserve the human species cannot be derived from purely biological premises,⁸⁹ the authors think, on the contrary, that our innate survival drive constitutes the natural basis for that moral choice. Admittedly, in a very distant future, when the physical living conditions on this planet will have become unbearable due to the evolution of our sun, and emigration to other planets or solar systems might prove to be impossible, our then living successor in the hominin tribe might indeed decide—or rather have to decide—otherwise.

5.3.2.2 Evolutionary Regression: Possible but Undesirable Future

Whereas human extinction is a matter that concerns the human species as a whole, human regression is a process that has to be considered at the individual level, as well as at the species (or population) level.

As far as the species (or population) level is concerned, many of the potential existential risks mentioned in the previous section on human extinction also apply—perhaps even more appropriately—to a possible biological and/or cultural regression. Indeed, many of the above-mentioned risks might considerably reduce human numbers, break down our complex global society, and regress human culture far below the most advanced levels that have been reached in modernity. Apart from unexpected disasters, such as a sudden new pandemic or the impact of a giant meteorite, the current anthropogenically caused ecological degradation is probably the most imminent threat due to overpopulation, overconsumption and pure mismanagement of the Earth's natural resources.⁹⁰ Moreover, some scholars fear that the degree of complexity acquired by modern society inherently implies the risk or danger of an inevitable collapse.⁹¹

Biological regressive processes may also manifest themselves at the individual level. The knowledge that we have about the evolutionary mechanism and the hominisation process suggests that, in the absence of conscious human intervention, in the future humanity will experience a number of regressive phenomena that are consistent with the loss-mutations experienced in the past for features in which a functional loss occurred. Humans retain features such as rudimentary ear muscles, the appendix, regressing wisdom teeth, and a reduced coat of hair. Continued evolution along these lines of loss of usefulness could lead to atrophied lower limbs, non-lactating mammary glands, weakened auditory and visual powers, and a

⁸⁷<http://www.vhemt.org/>.

⁸⁸See also Matheny (2007), Newitz (2013).

⁸⁹For instance, James (2011, 141).

⁹⁰For instance, Eckersley (2001).

⁹¹For instance, Tainter (1988), MacKenzie (2008).

further reduced and degenerated set of teeth. Humans could see an increase in all possible physical and mental disorders for which replacement therapies are developed or relaxation concerning selection is made possible.⁹²

In modern culture humans have succeeded in efficiently intervening against contagious disease and early death, with the result that a considerable part of modern populations reaches a much higher age than in pre-scientific living conditions. The successful phenotypic care provided in modern culture leads to a relaxation of natural selection. Numerous less favourable alleles, which in pre-scientific living conditions were rapidly barred from the gene pool, can at present be preserved thanks to replacement therapies or other protecting factors; in many cases their carriers are also able to reproduce. Because of this, the frequency of such less favourable alleles is increasing.⁹³

Furthermore, the relaxation of selection caused by morbidity and mortality control may be reinforced by an increase in reproductive fitness. Surviving individuals may find a partner or partners and produce children. This effect has already been shown for several impairments, such as diabetes,⁹⁴ schizophrenia,⁹⁵ and phenylketonuria,⁹⁶ for which replacement therapies or other types of medical treatment have been effectively developed. The reproductive fitness of such patients has been enhanced, so that an increase in the frequency of the alleles responsible for these conditions may be expected to increase. Although many congenital defects are known to result in lower marriage rates, in infertility or are associated with low fertility,⁹⁷ the effect of modern culture is that, through replacement therapies, mating and reproductive opportunities for those with genetic disorders are improving.⁹⁸

Another contraselective effect of modern culture may result from differential reproduction with respect to cognitive abilities. The transition from chance to planned fertility has been accompanied by social differentials in fertility that can affect the genetic composition of the population. In the United States, Robert D. Retherford and William H. Sewell⁹⁹ calculated that the generational change in measured intelligence was a decline of 0.8 of an IQ point, resulting in a generational genotype decline of about one-third of an IQ point. On the basis of a negative correlation between IQ and fertility ($r = -0.73$) across nations, Richard Lynn and John Harvey¹⁰⁰ estimated that the world's genotypic IQ declined by 0.86 IQ points from the year 1950 to 2000 and they project a further decline of 1.28 IQ points in the world's genotypic IQ between the years 2000 and 2050.

⁹²Glass (1966).

⁹³Dobzhansky (1962), Thibault (1972).

⁹⁴Aschner and Post (1956/57), Post (1971).

⁹⁵For instance, Erlenmeyer-Kimling and Paradowski (1966), Lane et al. (1995), Avila et al. (2001).

⁹⁶Howell and Stevenson (1971).

⁹⁷Reed (1971), Slater et al. (1971).

⁹⁸Teitelbaum (1972).

⁹⁹Retherford and Sewell (1988).

¹⁰⁰Lynn and Harvey (2008).

Overall, medical interventions and changes in reproductive behaviour in modern society seem to have a slight dysgenic effect. Some argue that the present course of human evolution is not going in a desirable direction. However, this is probably only a temporary consequence of a major shift in cultural change and its associated demographic regime. In the near future—namely in the course of this millennium—this dysgenic effect might be neutralised, if not reversed, by future improvements in genetic knowledge and genetic modification, and by the adaptation of behavioural norms to the new genetics and demographics.

5.3.2.3 Evolutionary Stabilisation: A Conservative Illusion

Evolutionary stabilisation means that the present human gene pool is maintained in future generations. In evolutionary terms this would mean stagnation. The ideal of maintaining the status quo is a position taken by bioconservatives and religious believers. They think that human nature should not be changed either because it has been created by a supernatural power and/or because change would corrode human dignity.¹⁰¹ However, this position is based on misapprehension. It does not take into account the Red Queen¹⁰² Effect, which means that life must constantly evolve in order to preserve the survival of a species. This race is determined by the biological competition between and within species.¹⁰³ It also has an effect on the intergenerational processes causing the accumulation of unfavourable mutations.

Indeed, evolutionary stabilisation would require the avoidance of the accumulation of unfavourable mutations that occur throughout generations. In the context of modernisation, the elimination of unfavourable mutations implies the application of eugenic engineering, either via manipulation of genes or via differential reproduction (see Chap. 8, Sect. 8.3.3.3). In order to avoid evolutionary regression, a commitment to achieve evolutionary stabilisation requires purposeful intervening in the production and multiplication of deleterious genetic variants.

The avoidance of evolutionary regression, namely the accumulation of mutations which are considered to be unfavourable, can in the first place be achieved by preventing culturally induced mutations. Mutagenic radiation or chemicals are to be avoided or applied in such a way that they cannot have a harmful effect on the human gene pool. Secondly, the reproductive behaviour of the carriers of genes that are regarded as unfavourable can be restricted or regulated in such a manner that unwanted genes are not transferred to future generations. Such strategies would maintain an evolutionary stabilisation of the human species. As di Lampedusa¹⁰⁴ wrote in *‘Il Gattopardo’*:

Se tutto deve rimanere *com'è*, è necessario che tutto cambi.

Hence, it is an illusion that human stabilisation would mean non-intervention. On the contrary, stabilisation would require major human interventions. People

¹⁰¹For instance, Kass (2002), Sandel (2007), Tirosh-Samuelson (2011).

¹⁰²Carroll (1872).

¹⁰³Van Valen (1973), Dawkins and Krebs (1979).

¹⁰⁴di Lampedusa (1958: “...if everything is to remain the same, everything will have to change.”).

often think that maintaining the *status quo*, i.e. undertaking no action, is on the safe side of the action-inaction antagonism, but as John Harris¹⁰⁵ pertinently argues, such a belief is without foundation.

From an evolutionary perspective, humans are clearly in a too early stage in human evolution to strive towards stabilisation. Opportunities for further development and evolution of human cognitive and physical capacities and new forms of social relations that match human potentialities are still significant.

5.3.2.4 Evolutionary Progression: The Sensible Option

In principle, there are two major ways to enhance the hominisation process, namely (1) the enhancement of specific human characteristics through cultural influences upon ontogenetic development; and (2) change the genetic composition of the human species, eventually leading to a next stage in the evolution of the hominins. For the latter development, several names have been suggested for the successor of the present *Homo sapiens sapiens*, e.g. *Homo sapientior*,¹⁰⁶ *Homo superior*,¹⁰⁷ *Homo cyberneticus*,¹⁰⁸ *Homo provectus*,¹⁰⁹ *overhuman*,¹¹⁰ *posthuman*,¹¹¹ or even *Homo deus*.¹¹²

Friedrich A. Hayek's observation in his remarkable book *The Political Order of a Free People* that "to pretend to know the desirable direction of progress seems to me to be the extreme of hubris"¹¹³ is pertinent. Nevertheless, reflecting on the desirable future is an imperative. Indeed, the authors define the central aim of evolutionary ethics as the active advancement of the hominisation process for the long-term future of humanity. Further hominisation is not just a possible futuristic scenario but also an ethical choice. This implies that humanity should steer its own future evolution through the means of conscious genetic and ontogenetic interventions, namely by promoting human-specific features directed at a continuing hominisation.¹¹⁴ The 'natural' Darwinian evolution mechanism, based on random genetic mutations and natural selection, would be replaced by what Simon Young¹¹⁵ calls Designer Evolution. Indeed, actively and deliberately pursuing the furtherance of the hominisation process comes down to what Steve Fuller¹¹⁶ calls the achievement of a "secular sense of intelligent design"—a formidable moral innovation and challenge. As Edward O Wilson¹¹⁷ recently stated:

¹⁰⁵Harris (2007, 80).

¹⁰⁶Overhage (1977, 228).

¹⁰⁷Stapledon (1935), Kirk (2002).

¹⁰⁸Young (2006, 21) (*Cyberneticus*: from the Greek *kubernetes* = the steersman of a ship).

¹⁰⁹Mulhall (2002, 85) (*Provectus*: from Latin = more advanced, more highly developed).

¹¹⁰Nietzsche (1883–1885), More (2010, 1).

¹¹¹Nichols (1988), Braidotti (2013).

¹¹²Harari (2017).

¹¹³Hayek (1979, 169).

¹¹⁴Cliquet (1961, 59; 1996–1997; 2010, 524ff).

¹¹⁵Young (2006, 38); see also Harris (2007, 4), who speaks about "enhancement evolution".

¹¹⁶Fuller (2007, 153).

¹¹⁷Wilson (2014, 14).

We are about to abandon natural selection, the process that created us, in order to direct our own evolution by volitional selection – the process of redesigning our biology and human nature as we wish them to be.

This idea of seeking to actively advance the hominisation process is not new. It can be found as a constant in the thoughts or writings of evolutionary ethicists, although formulated in somewhat different terms, for instance, by J.B.S. Haldane as science and the future,¹¹⁸ by Julian Huxley as evolutionary humanism,¹¹⁹ by Hermann Muller as guidance of human evolution,¹²⁰ and Raymond Cattell as Beyondism.¹²¹

For the authors of this book inspirational was the view of Sergius G. Kiriakoff, at Ghent University who in 1955 argued that the aim of ethics is the promotion of the hominid phyletic line, and C.H. Waddington's¹²² *The Ethical Animal*:

The biological function of ethics is to promote human evolution.

The human drive to improve oneself is a fundamental characteristic of our species. The desire to acquire new capacities is as ancient as our species,—“a natural outgrowth of our human intelligence, curiosity and drive”.¹²³ Progressive aspirations are already present in the earliest recorded human cultures, from the Babylonian Epic of Gilgamesh (eighteenth century BCE), the Buddhist millennial mythos (fifth century BCE), to the Jewish and Christian traditions. Whereas in pre-modern times, religions mostly channelled those aspirations into a heavenly hereafter, the Enlightenment, to start with Frances Bacon's *New Atlantis*,¹²⁴ pushed these desires

¹¹⁸Haldane (1924).

¹¹⁹Huxley (1942, 576) saw evolutionary progress “as consisting in a raising of the upper level of biological efficiency, this being defined as increased control over and independence of the environment”. Aware that it is not possible to discover a purpose but only a direction in evolution, Huxley proposed that the past human direction serves as a guide to formulating our purpose for the future: “The future of progressive evolution is the future of man. The future of man, if it is to be progress and not merely a standstill or a degeneration, must be guided by a deliberate purpose.” (577).

In later publications Huxley (1964) called this new purpose “evolutionary humanism”: “... because it can only be based on our understanding of man and his relations with the rest of his environment. ... It must be organized round the facts and ideas of evolution, taking into account of the discovery that man is part of a comprehensive evolutionary process, and cannot avoid playing a decisive role in it. ... Such an Evolutionary Humanism is necessarily unitary instead of dualistic, affirming the unity of mind and body; universal instead of particularistic, affirming the continuity of man with the rest of life, and of life with the rest of the universe; naturalistic instead of supernaturalistic, affirming the unity of the spiritual and the material; and global instead of divisive, affirming the unity of all mankind.”

¹²⁰Muller's (1960) ‘Guidance of Human Evolution’ is an extremely well-developed paper that deals with all of the essential issues related to the steering of humankind's future course.

¹²¹Cattell's (1972) “A New Morality from Science: Beyondism” pursues in great detail the development of a new moral value system derived from (evolutionary) science, calling for the cultural and genetic progress of man to be equal, and paying equal importance to individual self-realisation, societal development and intergenerational change.

¹²²Waddington (1960, 69).

¹²³See also Bostrom (2005), Naam (2005), Harris (2007, 16).

¹²⁴Bacon (1626).

into scientific discoveries and their applications in technology and societal organisation for improving our earthly welfare and well-being.¹²⁵

From *Homo sapiens sapiens* to *Homo sapientior*? The authors define human-specific potentialities that should be further developed as characteristics that are: (1) specific for the hominisation process; and (2) conducive to further progressing modernisation. They distinguish them from human potentialities in general, which cover all human capacities made possible by the human genome at the individual level, and the human gene pool at the population or species level. Not all human potentials that developed during the hominisation process merit further promotion. For the future, it is valuable to have the human-specific cognitive and emotional capacities and the human-specific potentialities toward high levels of sociability. Potentialities associated with strong drives for inter-group competition and conflicts in the context of the novel environment of modernity are maladaptive remnants of the evolutionary past that do not merit promotion.

Human-specific features find their highest expression in the singularity of the human brain, which is responsible for human's high cognitive performances, refined emotional life and strong sociability. The active advancement of the hominisation process may need to correct our current genetically or environmentally caused weaknesses. Intervention may need to be directed towards preventing the spread of evolutionary regressive phenomena, and to lead future human evolution in the direction of an improvement in human-specific features.¹²⁶ They encapsulate cognitive abilities (including biological instruments of communication, memory, information-processing, reasoning), emotional personality characteristics that facilitate sociability, altruism, reciprocity, mutualism and cooperation, and other desirable human attributes such as creativity, health, immunity to diseases, longevity, physical vigour (speed, strength, endurance), sexual arousal and orgasm, euphoria, and physical attractiveness.

In the realm of mental powers, Hermann Muller¹²⁷ specified more profound analytic abilities, multi-dimensional thinking, more creative imagination, and the development of new mental faculties such as telepathy. In the physical realm he added qualifications such as reduction in the need for sleep, better management of the effects of sedation and stimulation, and a general increase in physical tolerance and aptitudes.

From a historical point of view two major evolutionary enhancement movements can be distinguished, namely the eugenics movement and the transhumanist movement. In the writings of some of the earlier proponents of eugenics, a prefiguration of some of the transhumanist aspirations can be found.¹²⁸ Indeed, in 1939

¹²⁵Hughes (2012, 757).

¹²⁶See, for instance, Huxley (1957), Muller (1960), Cattell (1972), Ettinger (1972), FM-2030 (1973), Parens (1998), Thornhill (1998), Grammer et al. (2003), Bostrom (2004), Hughes (2004), Glannon (2007), Harris (2007; 2009), Furnham and Swami (2008), Jordan (2008), Savulescu et al; (2011), Buchanan (2011).

¹²⁷Muller (1960).

¹²⁸For instance, Haldane (1924), Muller (1935), Huxley (1957).

in the journal *Nature* the joint statement published by a group of prominent American and British biologists, called *Social Biology and Population Improvement*, widely referred to as *The Eugenic Manifesto*,¹²⁹ is in its objectives and wording rather modern and in many respects still valuable today.

The Eugenics Movement. The eugenics movement emerged in the wake of Darwin's evolutionary theory and builds on the explanation of the evolutionary mechanism. Its aims were usually articulated as the improvement of the physical, mental and social capacities of the human species.¹³⁰ It can be argued that the essence of the movement boils down to the furtherance of the hominisation process. As such, the eugenic movement is not fundamentally different from some aspects of the more recent transhumanist movement. The more specific aims and methods of eugenics are extensively discussed in Chap. 8, Sect. 8.3.3.3.

The Transhumanist Movement. Recent advances in various biomedical sciences (e.g. molecular genetics, medically assisted reproduction, (psycho)pharmacology, cosmetic surgery) have elicited an abundant—positive as well as negative—scientific literature on bioethics and biophilosophy.¹³¹ They also address the biological future of humankind,¹³² dealing with the prospects for influencing the future ontogenetic development of humans and steering the future evolution of *Homo sapiens sapiens*. In particular, the World Transhumanist Association¹³³ and its adherents have advocated the idea of enhancing human intellectual, physical and psychological capacities, more specifically by the means of modern technologies.¹³⁴ Meanwhile, in the last two decades Transhumanism has evolved into a number of subdivisions such as extropian libertarianism, liberal democratic World Transhumanist Association/Humanity+,

¹²⁹Crew et al. (1939). [This document is reproduced as Appendix 1 in Glad (2006, 108–112)].

¹³⁰See, for instance, Galton (1883), Pearson (1909), Crew et al. (1939), Osborn (1940), Sutter (1950), Blacker (1952), Huxley (1962), Bajema (1976), Lynn (2001).

¹³¹For instance, Ramsey (1970), Fletcher (1974), Kieffer (1979), Reiss and Straughan (1996), Walters and Palmer (1997), Mataré (1999), Skene and Thompson (2001), Kass (2002), Holland (2003), President's Council on Bioethics (2003), Engelhardt (2006), Zycinski (2006), Glannon (2007), Sandel (2007), Lindsay (2008).

¹³²For instance, Roslansky (1966), Graham (1970), Ettinger (1972), Howard and Rifkin (1977), McFaul (1978), Diamond (1992), Leakey and Lewin (1995), Kitcher (1996), Silver (1999), Joy (2000), Glannon (2001), Ward (2001), Fukuyama (2002), Mulhall (2002), Stock (2002), Habermas (2003), Kilner and Mitchell (2003), Mehlman (2003), Baillie and Casey (2004), Bostrom (2004; 2009), Hughes (2004), Gerdes (2006), Glad (2006), Garreau (2006), Stewart (2008), Agar (2010), de Duve and Patterson (2010), Gordijn and Chadwick (2010), Savulescu et al. (2011), Palme (2012), Persson and Savulescu (2012), Hurlbut and Tirosch-Samuels (2016).

¹³³The World Transhumanist Association was founded in early 1998 by Nick Bostrom and David Pearce (Bostrom 2005; www.Transhumanism.org).

¹³⁴Bostrom (2003; 2014), Hughes (2004), More and Vita-More (2013); see also the special issue of the *Journal of Medicine and Philosophy* (2010, 35, 6: 617–720) that provides an overview of the origin, the nature, and the aims of the transhumanist movement as well as a critical assessment.

Singularitarian millennialism, religious transhumanism,¹³⁵ and radical democratic transhumanism or technoprogressivism.¹³⁶

Transhumanism, a term coined by Julian Huxley¹³⁷ in 1957 and re-introduced by Max More¹³⁸ in 1990, aims to improve existing human capacities or to create new capacities.¹³⁹ It endeavours to reach human stages characterised by higher-than-current intellectual heights; resistance to disease; increased longevity¹⁴⁰; unlimited youth and vigour; increased capacity for pleasure, love,¹⁴¹ artistic appreciation, and serenity; experience of novel states of consciousness; and heightened capacity for sociability,¹⁴² etc. The prefix ‘trans’ in transhumanist implies that humans should transcend their present-day capabilities.¹⁴³ Transhumanists understand by enhancement: improvements in the current performances of the human organism or creation of new abilities or faculties as, for instance, suggested by Hermann Muller in the early 1960s.¹⁴⁴

Hence, the ideas of the transhumanists relate both to the ontogenetic and phylogenetic enhancement of the human species. For the moment this section will only dwell upon their ideas and strategies about the (phylo)genetic improvement of humanity.

One of the merits of the Transhumanism Movement is that it distinguishes two stages in the future evolution of humankind: the transhuman stage and the posthuman stage. The enhancement of specific human qualities which transhumanists want to achieve does not just imply the promotion of variants that lie at the higher tail-end of their present frequency distributions—the traditional eugenic goal. The transhumanists want more. They also want to promote the physical, intellectual, emotional and social abilities to such an extent that they come to lie outside the upper margin of the present variation, and greatly exceed the mental,

¹³⁵ Although transhumanism is inherently secular, some authors (for instance, Tirosch-Samuelson 2012, 721) are of the opinion that this ideology shares several features with traditional religions such as “the pursuit of perfection and focus on human improvement; the concern for the betterment of society by eliminating social ills such as poverty, sickness, and suffering; the progressive understanding of human history that sees the future as necessarily better than the past; and the preoccupation with transcendence”. This is undoubtedly true, and there is no reason why religious people would not be able to share the ideals of the transhumanist movement (see, for instance, Garner 2005). Nevertheless, this does not imply that transhumanism is a religion the essence of which is, in the authors’ view, the belief in a supernatural being who created us, cares about us, imposes moral rules, and judges us.

¹³⁶ Hughes (2012, 757).

¹³⁷ Huxley (1957, 17).

¹³⁸ More (1990; 2010).

¹³⁹ Buchanan (2011, 23).

¹⁴⁰ The idea of pursuing substantial human enhancement and longevity is not an entirely new proposition. According to Stambler (2010), it can be traced back to several authors at the end of the nineteenth/early twentieth centuries.

¹⁴¹ For instance, Earp et al. (2015), Giubilini (2015).

¹⁴² Increasing sociability implies that some human potentialities, for instance, in the domains of violence and aggression, should be reduced instead of enhanced (e.g. Bostrom 2003).

¹⁴³ Wood (2006, 109), Naam (2005, 5), Harris (2007, 44).

¹⁴⁴ Bostrom and Roache (2008).

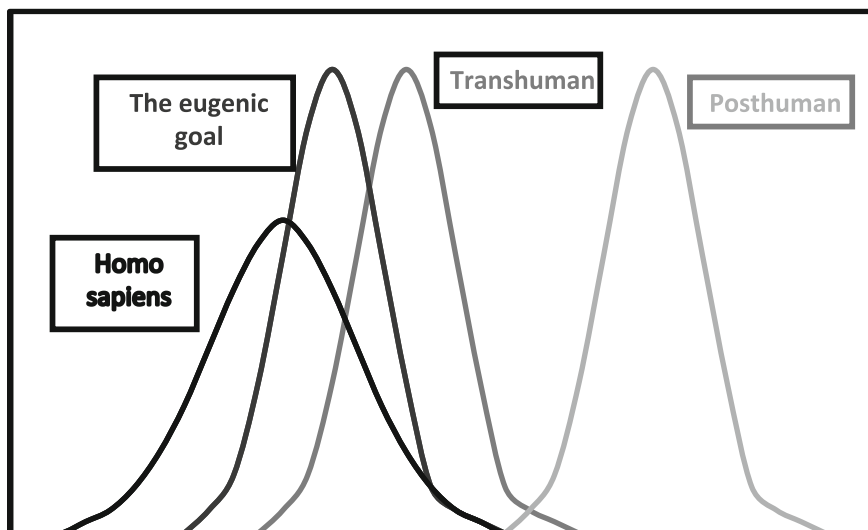


Fig. 5.2 Frequency distribution of a hypothetical human variable in the present, the transhumanist and the posthumanist stages

physical and social capacities of the present *Homo sapiens sapiens*¹⁴⁵ (Fig. 5.2). The latter goal ultimately aims to achieve a posthuman or overhuman¹⁴⁶ stage, the *Homo sapientior* as Paul Overhage¹⁴⁷ named it.

Homo sapientior or the posthuman stage could, in principle, be seen as the successor to the present *Homo sapiens sapiens*, just as *Homo sapiens sapiens* was the successor of *Homo erectus* in the hominin phyletic line. The transhuman may be seen as an intermediate form between the present human and the posthuman, and would form the evolutionary link to the coming era of posthumanity.¹⁴⁸

On the basis of the exponential velocity of science, some futurologists are of the view that the transition from the present human to the transhuman and to the posthuman might be imminent. This idea is well expressed in the title of Ray Kurzweil's book *The Singularity is Near*.¹⁴⁹ He argues that contrary to the earlier hominin transitions (for instance, from *Homo erectus* to *Homo sapiens sapiens*) which took many thousands of generations, the future transition might take only a few generations.¹⁵⁰

¹⁴⁵Bostrom (2008).

¹⁴⁶Present-day transhumanists have divergent views about the degree to which Nietzsche's (1883; 1901) concept of the 'overhuman' ('Übermensch') corresponds to the 'posthuman' ideal of the Transhumanists. For instance, Sorgner (2009) sees strong similarities between those two concepts, but Bostrom (2005) claims that Nietzsche cannot be seen as an originator of transhumanism.

¹⁴⁷Overhage (1977, 228) coined the term, but as a theologian he was against pursuing a more advanced hominin.

¹⁴⁸FM2030 (1973), Sorgner (2009).

¹⁴⁹'Singularity'—a concept first used by the famous mathematician John von Neumann (1950)—is a period of such fast and profound technological change that it will irreversibly transform human life (Kurzweil 2005, 7); See also Vinge (1993), de Garis (2005).

¹⁵⁰Kurzweil (2005), Rees (2003).

Transhumanism has rightly been viewed as an outgrowth of the Enlightenment and secular humanism.¹⁵¹ For instance, James Hughes¹⁵² calls the transhumanist movement a modern form of Enlightenment techno-utopianism. It seeks to improve the condition and performance of humans by differential reproduction, and cultural means, such as education and cultural refinement, but also by using high-tech biomedical interventions to transcend the human's natural attributes in health, life-span, and physical and mental performances.¹⁵³

Transhumanists strongly promote individual rights and liberties in making decisions about whether to reproduce, how to reproduce, and which technological methods to use in reproduction. They condemn coercion and fiercely reject racist and classist approaches. Transhumanists are of the view that human enhancement technologies should be within the reach of everyone, and that individuals should have, on the basis of informed consent,¹⁵⁴ the right and freedom to apply these technologies to themselves (morphological freedom)¹⁵⁵ and to use them for having children (reproductive freedom).¹⁵⁶ In the mind of many transhumanists, individual

¹⁵¹Tiresh-Samuelson (2012), Beland and Patenaude (2013).

¹⁵²Hughes (2012, 757).

¹⁵³Bostrom (2003; 2005; 2007), Hughes (2004, 156).

¹⁵⁴Gunderson (2008, 86).

¹⁵⁵Morphological freedom: the fundamental right of people to decide for themselves the constitution of their physical make-up (Sandberg 2001).

¹⁵⁶The Transhumanist Declaration of the World Transhumanist Association (<http://www.transhumanism.org>, 1998–2009) was originally crafted in 1998. It been modified over the years. It was adopted by the Humanity+Board in March 2009 (<http://humanityplus.org/learn/transhumanist-declaration/>): “Humanity stands to be profoundly affected by science and technology in the future. We envision the possibility of broadening human potential by overcoming aging, cognitive shortcomings, involuntary suffering, and our confinement to planet Earth. We believe that humanity’s potential is still mostly unrealized. There are possible scenarios that lead to wonderful and exceedingly worthwhile enhanced human conditions.

1. We recognize that humanity faces serious risks, especially from the misuse of new technologies. There are possible realistic scenarios that lead to the loss of most, or even all, of what we hold valuable. Some of these scenarios are drastic, others are subtle. Although all progress is change, not all change is progress.
2. Research effort needs to be invested into understanding these prospects. We need to carefully deliberate how best to reduce risks and expedite beneficial applications. We also need forums where people can constructively discuss what should be done and a social order where responsible decisions can be implemented.
3. Reduction of existential risks and development of means for the preservation of life and health, the alleviation of grave suffering, and the improvement of human foresight and wisdom should be pursued as urgent priorities, and heavily funded.
4. Policy making ought to be guided by responsible and inclusive moral vision, taking seriously both opportunities and risks, respecting autonomy and individual rights, and showing solidarity with and concern for the interests and dignity of all people around the globe. We must also consider our moral responsibilities towards generations that will exist in the future.
5. We advocate the well-being of all sentience, including humans, non-human animals, and any future artificial intellects, modified life forms, or other intelligences to which technological and scientific advance may give rise.
6. We favour allowing individuals wide personal choice over how they enable their lives. This includes use of techniques that may be developed to assist memory, concentration, and mental

freedom is considered to be of paramount importance for deciding about their own body and the characteristics of their children.¹⁵⁷

Transhumanists are well aware that the future technological manipulation of genes should be undertaken with great care and gradually in order to avoid adverse side-effects, at the individual as well as at the population or societal level. They also realise that currently broad social support does not exist for such a venture. This has always been the case with innovative ideas, as the recent history of major social or moral movements such as shown by the pristine Christian movement, the early labour movement, the first feminist wave, the ecological movement, the family planning movement, and the right to euthanasia movement. Since humanity currently faces severe current challenges, such as overpopulation, socio-economic imbalances and inequalities, environmental pollution, depletion of natural resources, and reduction of biodiversity, it is understandable that longer-term concerns are not perceived as an urgent priority. Nevertheless, it is also important that current challenges are addressed from the perspective of a longer-term vision and objective.¹⁵⁸

The narrative about the freedom of individual rights and choices concerning themselves and their offspring may be appealing at first sight. However, they impose a number of ethical concerns. From an evolutionary ethical point of view, which would aim at the furtherance of the hominisation process and progressing modernisation, there can be no absolute morphological and reproductive freedom without responsibilities.

A distinction should be made between the freedom of adults, able to take up responsibility for their choices about their own morphological freedom, and their freedom to make choices for their offspring. Able and informed adults can have morphological freedom with regard to their own features (= morphological freedom/rights), on the condition that their choices do not harm others or induce unfavourable effects on society (= morphological responsibility). Able and informed adults can have the choice to apply or not apply enhancing procedures for their children (= reproductive freedom/rights). However, choosing whatever feature they want to impose upon their (future) children needs to entail reproductive responsibility. Here, their choices need be embedded in new moral standards that are supported by socially responsible institutions.

Stefan L. Sorgner,¹⁵⁹ in his discussion of a deaf couple's wish to have a deaf child, argues that this couple makes use of their right to procreative freedom, that a deaf person can lead a good life, and that a culturally accepted subculture shares the concept in question. According to Sorgner there is nothing wrong with such a wish

energy; life extension therapies; reproductive choice technologies; cryonics procedures; and many other possible human modification and enhancement technologies.”

¹⁵⁷For instance, Naam (2005, 7), Young (2006, 67).

¹⁵⁸Muller (1935), Elgin (1993), Muhlhall (2002), Stock (2002), Hughes (2004), Glad (2006), Dvorsky (2008), Stewart (2008), Savulescu and Bostrom (2009), Persson and Savulescu (2012).

¹⁵⁹Sorgner (2010); see also Sandel (2007, 1), Glannon (2007, 60) or Scully (2008, 60) about a lesbian deaf couple who wanted (and got) two children through artificial insemination from a donor who also had a heritable form of deafness.

and no one is harmed. On the other hand, one can argue that hearing is a useful faculty of the human species that was not only of crucial importance in the EEA but is still very useful for social life and for functioning effectively in modern society. Human culture, and in particular modernity, has created a multitude of rich cultural and technological products—music, theatre, opera, cinema, TV, radio and several other listening devices—which can only fully be enjoyed by means of a hearing capacity. Consciously choosing to deprive future children from this potentiality could be considered unethical and even cruel.¹⁶⁰

In designing enhancement strategies/policies, the rights of children to optimal conditions and perspectives for developing human-specific potentialities should be embedded in the new ethics and be given priority over the wishes of self-centred parents.¹⁶¹

As Francis Crick¹⁶² correctly emphasised:

If we can get across to people that the idea that their children are not entirely their own business and that it is not a private matter, it would be an enormous step forward.

In principle, there are two major strategies through which the genetic composition of the human population could be enhanced in the direction of a progressing hominisation: eugenic engineering and behavioural changes in (differential) reproduction, although in some interventions both approaches will be involved (see Chap. 8, Sect. 8.3.3.3). However, transhumanists seem to be more interested in the (future) technological manipulation of genes (eugenic engineering—the new eugenics) than in traditional behavioural differentiation of reproduction (sometimes called the old eugenics). This is comprehensible in view of their goal to transcend the genetic capabilities of the present *Homo sapiens sapiens* beyond the present natural human range. Changes in reproductive behaviour can only affect the distribution of genetic variants within the present genetic range, whilst biotechnological innovations might exceed that range.

Indeed, the transhumanists' idea is to change, by means of biotechnological interventions, the genes of our future children and to create so-called designer babies. Thus, future generations would savour genetic dispositions which allow them to reach higher than present levels of health, physical attractiveness, libido, artistic experience, sociability, longevity, and physical and intellectual performance in general.¹⁶³

In this respect, Julian Savulescu¹⁶⁴ defends the principle of procreative beneficence, by which parents-to-be would have the moral obligation to select that child who can be expected to have the best life, not only by avoiding the reproduction of disease genes but also by choosing genes that enhance the child's prospects for

¹⁶⁰See also relevant counterarguments against consciously imposed deprivations in Hughes (2004, 140) and Singer (2009, 278).

¹⁶¹Feinberg (1992, 77).

¹⁶²Crick, quoted in Cattell (1972, 349).

¹⁶³Bostrom (2003, 2008), Steinbock (2008).

¹⁶⁴Savulescu (2001); see also Glannon (2001, 76).

normal (= non-disease linked) life opportunities and performances in matters of health, intelligence, emotional satisfaction and sociability.¹⁶⁵

From the available transhumanist literature, the impression is gained that many transhumanists are enthusiastic about the progress to be expected from future technological innovations, and want to avoid any association with the dysgenism of the twentieth century authoritarian ideologies, in particular Nazism.¹⁶⁶ However, they neglect the possible eugenic measures and procedures to improve the genetic composition and structure of the present human population(s) by means of differential reproduction, i.e. a differential by which carriers of genes considered as favourable would produce a more numerous offspring than others.

This traditional eugenic strategy, as may be seen in Fig. 5.2, would not exceed the upper bound of the present genetic variation. Nevertheless, it would move the distribution of desirable traits in the domains of health, cognitive abilities and sociability: the population average would be increased and the genetic variance would be reduced, particularly at the lower end of the existing variation. Of course, this strategy raises the ethical questions of reproductive rights and responsibilities of individuals and societies. However, the preoccupation with the perspective of future technological inventions and innovations should not make us blind to delicate and difficult decision-making about present-day opportunities and necessities. (This matter is discussed more extensively in Chap. 8, Sect. 8.3.3.4).

Some authors are of the view that the individual freedom in reproductive choices should be restricted in case of possible unfavourable societal effects.¹⁶⁷ The question of possible unfavourable effects of individual reproductive choices at the population or societal level has to be carefully evaluated. Insufficiently thought considerations or short-term perspectives might easily lead to restrictive, conservative measures that are contrary to the longer-term progressive hominisation goals.

A particularly interesting, but highly disputed question is whether the transhumanist enhancement should also be applicable to moral predispositions or behaviours.¹⁶⁸ The specificity of the transhumanist approach is that, in addition to the traditional educational and training efforts to develop moral behaviour, modern biomedical means would also be used to influence or change the underlying biology or genetics of moral behaviour, not only in the case of extreme socio- or psychopathologies but also in general.¹⁶⁹ Some of the transhumanist advocates of moral enhancement are even of the view that this type of enhancement should be a

¹⁶⁵Harris (2007, 19) went even a step further in claiming that ‘enhancement is a moral duty’. See also in this respect to the discussion in Brassington (2010).

¹⁶⁶See Lynn (2001), Cliquet (2010, 535–537).

¹⁶⁷For instance, Buchanan et al. (2001, 183), Harris (2007, 74), Gyngell and Douglas (2016, 249).

¹⁶⁸Hopkins (2008, 4), Persson and Savulescu (2010), Savulescu et al. (2011), Persson (2012), Tennison (2012), Eberl (2014), Rakić (2014), de Melo-Martin and Salles (2015), Douglas (2015), Hughes (2015), Murphy (2015), Tonkens (2015), Harris (2016). See also the discussion forum in the 2010 volume of *Politics and the Life Sciences* (Bucy 2010) about Walker’s (2009) proposal for developing a ‘Genetic Virtue Program (GVP)’, and the open peer commentaries on Shook’s (2012) target article in *AJOB Neuroscience*.

¹⁶⁹For instance, Douglas (2008), Persson and Savulescu (2008; 2012), Kabasenché (2012), Shook (2012), Gyngell and Eastale (2015).

precondition for applying enhancements in other domains, particularly in the domain of cognitive capacities.¹⁷⁰

Moral enhancement advocates, such as Mark Walker,¹⁷¹ are fully aware of the conceptual, scientific (and moral) difficulties of endeavours to induce genetic changes and improvements on personality characteristics which may change (im)moral behaviour, as formulated by the forum discussants in the 2010 volume of *Politics and the Life Sciences*.¹⁷² Advocates of moral enhancement usually emphasise the need for a general, population-focused approach,¹⁷³ a holistic, multi-virtues approach,¹⁷⁴ or a problem-focused cost-benefit-analytic approach.¹⁷⁵

Many authors oppose the idea of biotechnologically induced moral enhancement, either because of the insufficiently thought out implications, or because of philosophical or theological objections.¹⁷⁶ It is interesting that many opponents of genetic enhancements of moral behaviour do not object to moral improvements through socialisation.

There are some important differences between (genetic) enhancements targeted at physical and mental health characteristics which require further reflection in the context of ethical challenges of modernity and transhumanist aspirations. Individuals choosing to enhance their athletic ability or increased intelligence may do so primarily for their own benefit. Choices to enhance personality characteristics which are related to (im)moral behaviour affect relations with others more profoundly.

Bioconservative Counter-Arguments about Human Enhancement.

Bioconservatives¹⁷⁷ oppose the use of technology to modify human nature, and are particularly against enhancements that involve germline interventions¹⁷⁸ in human beings.¹⁷⁹ However, strong opposition not only exists regarding genetic enhancements but moral indignation also often arises when ontogenetic interventions are suggested, not for therapeutic reasons but to reach higher levels of 'normal' physical, emotional or cognitive capacities.¹⁸⁰ Hence, bioconservative opposition to enhancement concerns genetic features as well as (some) phenotypic characteristics.

¹⁷⁰Persson and Savulescu (2008; 2012), Rakić (2015).

¹⁷¹Walker (2009, 2010); see also Hughes (2015), Murphy (2015).

¹⁷²Andreadis (2010), Agar (2010), Arnhart (2010), Blackford (2010), Bronstein (2010), Sprinkle (2010).

¹⁷³For instance, Murphy (2014).

¹⁷⁴For instance, Hughes (2015).

¹⁷⁵For instance, Carter and Gordon (2015).

¹⁷⁶For instance, Jotterand (2014), Jebari (2012), Beck (2015), Carter and Gordon (2015), Douglas (2014), Tonkens (2015), Wiseman (2016).

¹⁷⁷Bioconservatism is a modern movement which opposes specific or general technological development and emerging technologies (e.g. Hughes 2004). Opposing bioconservative positions to transhumanist goals is a somewhat too simplistic classification. In fact three main positions can be distinguished: permissive, restrictive and conservative positions (see, for instance, Giubilini and Sanyal 2015).

¹⁷⁸Germline interventions: biotechnologically induced changes in the molecular structure of genes in reproductive cells, so that the change can be transmitted intergenerationally.

¹⁷⁹For instance, Habermas (2001), Annas et al. (2002), Fukuyama (2002), Kass (2002).

¹⁸⁰Sandel (2007, 8, 12).

Bioconservatives are found among religious apologists and many religious believers¹⁸¹ who think that God is the engineer of humanity and that it is preposterous to try to replace him. Bioconservatism is also supported by some secular allies.¹⁸² Some leftists¹⁸³ fear that technological enhancements will make society more unequal. Fundamentalist feminists¹⁸⁴ are suspicious of the patriarchal appropriation of the female body. Deep environmentalists¹⁸⁵ think that human beings are not smart or wise enough to be able to improve nature.¹⁸⁶ Several authors¹⁸⁷ have extensively refuted the often superficial and badly substantiated bioconservative objections. This book will briefly discuss the major bioconservative counter-arguments from the pertinent literature and propose some ways forward.

Many objections have been formulated against transhumanism or some of its propositions or methods. Some objections pertain to particular aspects of the transhumanist goals or the specific proposals of some transhumanist proponents. This is not surprising given the diversity in transhumanist approaches that already exists, or the large number of its productive and sometimes imaginative adherents. It is beyond the scope of this book to deal with all of the criticisms that ever have been advanced about human enhancement. The discussion will concentrate on what the authors perceive to be the major general objections to the transhumanist paradigm, namely human enhancement technologies that: (1) undermine human dignity and dehumanise humanity; (2) challenge the wisdom of nature and pervert the God-given natural order; (3) damage the human species; (4) increase inequalities; and (5) provoke conflicts between humans and posthumans.

Human Dignity/Human Nature. Regarding the bioconservative objection¹⁸⁸ about the subversion of human dignity,¹⁸⁹ there is lack of robust arguments to demonstrate how the enhancement of specific human abilities could undermine human dignity or have a dehumanising effect. Apart from the fact that the use of the concept of dignity—also in international charters on bioethics¹⁹⁰—is very vague and weak, the authors think that biotechnical interventions to ameliorate human potentials mean exactly the opposite—at least that is the purpose of enhancement goals. In contrast to what the anti-meliorists fear, improving human-specific features will, by definition, also enhance human dignity and increase the humane

¹⁸¹For instance, Council for Biotechnology Policy (2002), Kilner and Mitchell (2003), Colson and Cameron (2004).

¹⁸²For instance, Fukuyama (2002), McKibben (2003).

¹⁸³For instance, Rifkin (1983), Winner (1989).

¹⁸⁴For instance, O'Brien (1981), Corea (1986), Raymond (1994).

¹⁸⁵For instance, Kimbrell (1998).

¹⁸⁶See the extensive discussion in Hughes (2004, 107–153).

¹⁸⁷See, for instance, Hughes (2004), Harris (2007), Jackson (2008), Bostrom and Savulescu (2009), Buchanan (2011), Temkin (2013), Murphy (2014).

¹⁸⁸For instance, Lewis (1943, 2001), Giesen (2004), de Rus (2006).

¹⁸⁹Dignity, etymologically derived from the Latin term 'dignitas' (= worthiness, elevation, excellence, distinction) is a concept that is usually understood to be that a human being has an innate right to respect and ethical treatment. For a modern 'naturalistic' view of human dignity see, for instance, McClelland (2011).

¹⁹⁰For instance, the Universal Declaration on Bioethics and Human Rights by UNESCO (2005) <http://unesdoc.unesco.org/images/0014/001461/146180e.pdf>.

nature of our species.¹⁹¹ Also, the bioconservative reproach that transhumanist endeavours are an expression of human vanity¹⁹² is ill-placed. Attempts to enhance one's aptitudes in domains such as health, physical and mental performances, libido, and longevity have little to do with vanity or *hubris*, but are directed towards better functioning, well-being and happiness.¹⁹³ Even strivings for enhancing features such as physical attractiveness and libido are, from an evolutionary point of view, instrumental in mating behaviour and ultimately in reproduction.¹⁹⁴

Bioconservatives often cherish an idealistic biological folk view of human nature.¹⁹⁵ As a rule it is based on a lopsided intuitionism or theological doctrine. The concerns that bioconservatives raise about human dignity mainly originate from religious beliefs about the divine creation of humanity and are reflections of a conceited view of ourselves. A more modest attitude would be appropriate, considering the trail of humane and ecological disasters that the present human species has marked in its history, as well as the accelerated destructive way in which it is currently managing this planet. Overpopulation, overconsumption, environmental pollution, depletion of natural resources, and decimation of the planet's biodiversity and volume have yet to be addressed by bioconservatives. The present human species can pride itself on many merits, but is still far from a résumé that guarantees a long-term survival and further evolvment toward higher stages of biological evolution and cultural development as anticipated by Duane Elgin¹⁹⁶ in his book *Awakening Earth: Exploring the Evolution of Human Culture and Consciousness*.

There are indeed risks of producing unfavourable side effects when technically intervening and changing essential features of humanity which are part of evolved complex interdependencies between large numbers of features. Enhanced features of any nature will require adaptations for many other morphological, physiological and psychological characteristics. For example, it is known how our present cognitive capabilities are related to brain size, energy expenditure, body height, pelvis size, pregnancy duration, emotional personality characteristics, sociability, etc. Such complex interdependencies will have to be cautiously taken into consideration in enhancement efforts, which will probably have to evolve along paths of gradualness in order to avoid undesired side-effects or outcomes.¹⁹⁷ Thus, some aspects related to enhancement are predominantly of a technical nature.

Advocates of human enhancement are usually very well aware of the risks and dangers of (onto)genetic interventions such as accidents, imbalance of complex interdependencies, decrease of genetic variability, social misuse or political abuse, and commercial exploitation.¹⁹⁸ Hence, it is incorrect when the meliorist

¹⁹¹See also Bostrom (2005), Murphy (2014), Chan (2015).

¹⁹²For instance, Habermas (2003), Sandel (2004, 2007).

¹⁹³For instance, Caplan (2006, 35).

¹⁹⁴Grammer et al. (2003).

¹⁹⁵Mameli and Bateson (2006), Linquist et al. (2011).

¹⁹⁶Elgin (1993).

¹⁹⁷See also the argumentation of Glannon (2001, 39), Agar (2004; 2010) and Baylis and Robert (2004) against radical enhancement and in favour of moderate enhancements and the need to proceed with caution in this endeavour.

¹⁹⁸For instance, Glover (1984), Hughes (2004), Buchanan (2011).

opponents¹⁹⁹ evoke the doomsday scenario of Aldous Huxley's²⁰⁰ dystopic *Brave New World* to use it in arguments against the transhumanists' enhancement goals. What the transhumanists want to achieve is exactly the opposite to the *Brave New World*. Rebecca Roache and Steve Clarke²⁰¹ document that many transhumanists are in fact biomoderates rather than bioliberals.²⁰²

The objections of the bioconservatives against technical interventions on human nature, resulting in alterations which would repair or enhance the humane character of the human species,²⁰³ are also rather superficially thought out. The choice of non-interference with natural processes, such as mutation and natural selection, would mean that we would have to abandon the achievements of biomedicine and even many environmental and social interventions which have resulted in heightening the quality of life and happiness.²⁰⁴ We would need to return to 'natural' levels of morbidity and mortality. However, it must be admitted that most bioconservatives do not object to therapeutic interventions, but are only opposed to enhancement goals. However, it is not always clear how they distinguish between the two practices and objectives.

A pertinent question advanced by bioconservatives is whether the future transhuman, and particularly the future posthuman, will still be a human. From an evolutionary point of view, it can be argued that the posthuman will be a hominin, but a higher evolved hominin than the present one. He will represent a more advanced stage in the hominisation process, with characteristics that surpass the ones seen in our cognitively, socially, artistically or physically most distinguished current conspecifics.

Bioconservatives often also evoke objections to enhancements because of the fear of loss of freedom and autonomy.²⁰⁵ Assuming that the present non-enhanced human has an unlimited freedom and autonomy in moral choice, they choose to ignore that the present human condition, with its current limited degree of freedom and autonomy, is the result of our phylogenetic heritage which has been moulded by natural selection in the EEA. Here, the religious secular divide acquires a central position in ethical choices regarding the future of the human species. Religious believers humbly glorify the God-given blessings of life. However, for non-believers freedom and autonomy are not a priori being threatened by enhancement efforts. They argue that religious-based refusal of human enhancement stems from a romanticised, but unrealistic, view of the 'unbidden giftedness' of human nature, which ignores the resulting hazardous genetic gambling in the natural lottery. Non-believers argue that genetic enhancements will contribute to

¹⁹⁹For instance, Kass (2002, 5), Fukuyama (2002, 3ff), Mehlman (2003).

²⁰⁰Huxley (1932).

²⁰¹Roache and Clarke (2009, 2).

²⁰²Roache and Clarke define bioliberals as people "who don't view enhancement as unusually risky, and believe that enhancement should generally be permitted", whereas biomoderates would be "more aware of the potentially undesirable consequences of particular enhancements as reason to restrict their use".

²⁰³For instance, Kass (2002, 22).

²⁰⁴For instance, Glover (1984).

²⁰⁵Mehlman (2003), Sandel (2007), Blackford (2010).

amplify choices, enrich lives, and further liberate the human from the armour of natural constraints. In fact, transhumanists aim for genetic enhancements which are the extension of the social, educational and current medical efforts that modern societies make in order to improve the living conditions and well-being of their citizens.

Genetic enhancement is also often objected to because children would not have the freedom/autonomy/self-determination to decide upon their enhanced features.²⁰⁶ This is, of course, true. However, do children now have the right to choose their 'natural' predispositions, which are largely the result of chance combinations of genes present in the reproductive community from which they emerge? It is clear that they do not. Children do not have the possibility to consent to their genetic endowment, which shapes their physical characteristics and hereditary health issues and may include physical and mental disabilities. If children did have a choice it is not difficult to imagine that they would choose to be born in good health.

Wisdom of Nature/Playing God. The possibilities for enhancing human potentials, particularly by replacing the forces of mutation and natural selection by more humane procedures in order to avoid the reproduction or multiplication of unfavourable characteristics or improve human-specific traits, are certainly challenging the ethics that builds on the wisdom of nature. They are, no doubt, shaking up the notion of God-given natural order.²⁰⁷

Religious believers consider the human species to be the result of a divine creation. They believe that life is sacred. The principle of the sanctity of life implies that human life starts at conception and does not end with death. Consequently, interventions such as contraception, induced abortion, eugenics, and euthanasia are usually rejected. Intervening in human life, and more particularly in the creation of life, is considered a form of *autopoiesis* (self-creation). Playing God is considered to be the supreme form of *hubris* (haughtiness, arrogance) and a sign of disrespect for our supposed creator.²⁰⁸ Efforts of self-creation and self-expression are considered as non-natural rights.²⁰⁹

Scientifically based interventions to push humanity to higher levels of consciousness and performance are, indeed, tantamount to humanity Playing God.²¹⁰ Such interventions are based on the principle of quality of life, which defines human life in terms of psychological, cultural, intellectual, moral, and relational indicators of personality.²¹¹ Here, the choice to intervene in life is not assessed on the basis of the sense of purpose given at conception and life after death, but rather on the basis of the extent to which intervention promotes quality of life.

Evolutionary scientists are usually impressed by the miraculous effects of the evolutionary mechanisms (mutation, natural selection) on the evolution of life and in particular the hominisation. However, they also acknowledge the roughness,

²⁰⁶For instance, Habermas (2001), Mehlman (2003, 81).

²⁰⁷Peters (2002), Council for Biotechnology Policy (2002), Colson and Cameron (2004).

²⁰⁸For instance, Overhage (1977), Knapp (1989), Peters (2002), Zycinski (2006).

²⁰⁹Kass (2002, 226).

²¹⁰Campbell and Walker (2005), Harris (2007, 35).

²¹¹For instance, McFaul (1978), Holland (2003).

cruelty and defectiveness of the evolutionary system, which is based on chance events. It is proceeding at a very slow tempo, using and wasting enormous amounts of energy, and resulting in far-from-perfect adaptations, senescent degeneration, morbidity and mortality.²¹² If life was planned and designed by a supernatural power, it is a bad and wasteful planner and designer. Allan Buchanan²¹³ picturesquely suggests that the evolutionary mechanism is the tool of a tinkerer, not of a Master Engineer.

When rethinking about the natural evolutionary mechanism there is reason to suppose that the human enhancement aimed at intentional genetic modification may be much more efficient, time- and energy-saving, and especially more humane in procedure and result. It could be more effective at promoting reproductive fitness and human well-being and quality of life up to an old age. As Christian de Duve²¹⁴ rightly noted:

Natural selection has not privileged the foresight and wisdom needed for sacrificing immediate benefits for the sake of the future.

Some authors argue that the religiously inspired opposition to the enhancement aspirations of the eugenics and transhumanism movements is quite amazing, if not outright odd. Transcendent religions traditionally tried to surpass sickness and death, and even often devised ingenious narratives about the eternal prolongation of an ideal life after death, freed from the earthly miseries, or some other form of current-life transcendence. In several respects, transcendent religions and transhumanist goals are quite identical in aspirations, but strongly different in methodologies and the take up of responsibility.²¹⁵ In fact, as Steve Fuller²¹⁶ pertinently points out, an enhanced humanity would bring us closer to the divine aspirations of many religions.

The genetic enhancements goals of the eugenic and transhumanist movements lie not only in the extension of many efforts in non-genetic domains, but also constitute more consciously pursued influences in the domain of human genetics, which humans have exerted since time immemorial.²¹⁷

Incompetence and Maleficence of Humankind. There are complementary beliefs or fears about human's incompetence and maleficence which are related to the bioconservative objections concerning the wisdom of nature or the magnificence of its supernatural creator. The historical record on human-caused social and ecological disasters provide the bioconservatives with strong arguments against the development of innovative technologies, such as genetic engineering, robotics and nanotechnology, which are considered to be too invasive and dangerous.²¹⁸

²¹²See e.g. Darwin (1871), Huxley (1894), Galton (1883), de Duve (2009).

²¹³Buchanan (2011, 184).

²¹⁴De Duve (2011, 148).

²¹⁵See also Hopkins (2005), Jordan (2008).

²¹⁶Fuller (2011, 209).

²¹⁷Murphy (2014, 338).

²¹⁸Joy (2000), McKibben (2003).

Advocates of enhancement technologies are well aware of the dangers and entrapments of scientific inventions and applications that can be used for good or evil.²¹⁹ Indeed, some of the newest technologies, for instance, in the field of genetic engineering, might create deadly synthetic pathogens against which no defence is available or could be developed.²²⁰ In the domain of nanotechnology, the erroneous production of out-of-control irreversibly self-replicating nanobots leading to an end-of-the-world ‘grey goo’ scenario is also mentioned.²²¹ Some go as far as to suggest the relinquishment of research areas such as biotechnology and nanotechnology.²²² The authors, together with many researchers, argue that it would be much wiser, as precautionary measures, to develop and enforce strict ethical guidelines for the future development of such fields.²²³

Should planes have been abolished after the 9/11 event in the United States, when terrorists made use of modern technology to promote their religiously inspired ideals? A similar comment can be made about bad governance. The governments of US President George W. Bush and UK Prime Minister Tony Blair mislead their population and the world community by applying sophisticated technologies for military purposes in order to preserve or enlarge their national economic and political power positions.²²⁴ Is that a technological or an ethical challenge? Humanity will have to make considerably enhanced efforts in order to avoid the misuse of future advanced technologies for selfish or malicious religious, nationalistic, economic or political goals. In the authors’ view, the choices to be made are not technical/technological but inherently ethical.

Increasing Inequality. The inequality argument is a tricky one: theoretically, the differential application of enhancement efforts could, indeed, increase inequalities between people, especially if the enhancement enterprise is market instead of socially driven. Although Maxwull J. Mehlman’s²²⁵ fear about the emergence of a genobility, or a genetic overclass, a caste of enhanced humans who would rule over the rest of us, the unenhanced underclass²²⁶ is useful basis for reflection, this fear falls within the domain of science fiction. It is in complete contradiction with the Hardy-Weinberg law. However, there is of course a possibility, albeit unlikely, that the enhanced people would succeed in establishing a separate reproductive community that would aim at dominating the unenhanced.

It is more likely that richer or better informed people might, in the absence of socially distributive ethics and policies, initially have better opportunities to take more or earlier advantage of the new enhancement techniques.²²⁷ In fact, innovations that improve the quality of life—whether in the domain of education, health,

²¹⁹Rees (2003, 75), Kurzweil (2005, 396).

²²⁰For instance, Tucker and Zilinskas (2006).

²²¹Drexler (1986), Drexler et al. (1991).

²²²McKibben (2003).

²²³For instance, Jacobstein (1999), Mehlman (2003, 155ff), AusBiotech (2005).

²²⁴Rich (2006); http://en.wikipedia.org/wiki/Iraq_and_weapons_of_mass_destruction.

²²⁵Mehlman (2003); see also Fukuyama (2002, 157).

²²⁶Wolbring (2006, 125–128).

²²⁷Baylis and Robert (2004, 11), Mehlman (2003, 108ff), Sandel (2007, 15), Fukuyama (2002, 16, 157).

well-being, or comfort in general—have initially always advantaged privileged individuals and groups in society before socially-driven policies resulted in reaching the population(s) as a whole. Hence, as John Harris²²⁸ argued, this fact should not be used as an argument to ban enhancement innovations before they become available to everyone because they might not become available at all. However, *bona fide* enhancement adherents have never made propositions to limit enhancing innovations to the privileged alone. On the contrary, enhancement advocates always propose that the enhancement enterprise should be socially-driven, democratically controlled and regulated,²²⁹ and that the first efforts to be made would consist of: (1) the decrease of well-being-harming genetic impairments; and (2) the increase in the mental, social or physical capabilities of those at the lower end of the current normal range, instead of interventions aimed at raising the upper bound of the normal distribution of desirable characteristics first.²³⁰ Such efforts would diminish the genetic variance and increase the population average in the variables aimed at, moving the Gauss distribution of biological characteristics to the higher parts of the current range (Fig. 5.2). This means that the problem is not one of eugenic engineering, but of social morality. The genetically impaired or less able would have equal opportunities to take advantage of the new enhancement technologies.²³¹ This is quite unlikely in the present, but probably temporary, climate of intensified capitalist competition and the decline of a more socially oriented economy. However, it is incorrect and highly unfair to link the transhumanist endeavours with capitalist practices. That is what Katherine Hayles²³² does by stating that all versions of transhumanism “carry into the new millennium some of the most questionable aspects of capitalist ideology.”

The transition toward a more evolved stage of hominisation can only be achieved when accompanied by a more highly developed sense of social morality. In fact, the egalitarian and equal opportunity problems raised by (genetic or ontogenetic) enhancement technologies are not different from the societal challenges in those domains. Modern human societies are currently facing challenges of excessive inequalities with varying success. It should not be forgotten that a societal commitment to high quality and equity in education produces more knowledgeable adolescents, as the OECD Programme for International Student Assessment (PISA) of 15-year-old school pupils’ scholastic performance on mathematics, science, and reading shows year in and year out. There is a relatively high degree of consensus that social engineering which produces better educated citizens is socially desirable.

In his *Case against perfection* Michael J. Sandel²³³ formulates in this respect some social concerns that should be seriously taken into consideration. First of all, this author fears that a genetic enhancement policy would weaken efforts for social engineering. This is possible, but not inevitable. On the contrary, genetic

²²⁸Harris (2007, 31).

²²⁹For instance, Hughes (2004, 233).

²³⁰For instance, Buchanan (2011, 198).

²³¹Hughes (2004, 233), Singer (1999, 60), Lindsay (2008).

²³²Hayles (2011).

²³³Sandel (2007, 52, 97); see also Mehlman (2003), Zanc et al. (2010).

enhancement efforts could reinforce social amelioration policies, provided that the transhumanism or new eugenics is socially, and not individualistically, driven. Second, Sandel also draws attention to the increasing competition in various domains of modern life, already resulting in several unhealthy practices of hyper parenting.²³⁴ Indeed, the currently increasing educational overuse practices might invade the genetic domain—again if future policies in this domain are merely individually and not socially oriented. Hence, let us recall wise advice by earlier, prominent scholars, such as Hermann J. Muller, Julian Huxley, and Frederick Osborn,²³⁵ that genetic enhancement policies can only be societally successful if pursued within the framework of a perspective that envisages the *bonum commune communitatis* (common good of the community). A further evolved humanity is only possible when accompanied by higher levels of social morality.

Bona fide eugenic and transhumanist goals have always included the strengthening of the social fabric of our societies—in addition to enhancements of individual characteristics such as intelligence and mental and physical health. This implies that future humans should be enhanced to be genetically more sensitive and adaptable to social life, and to cooperation with larger numbers of individuals and groups of individuals. Hence, the promotion of sociability, ontogenetically as well as genetically, is a *conditio sine qua non* for reaching higher levels of hominisation and humanisation.

Another concern of the anti-meliorists is that the eugenicist or transhumanist enhancement goals and procedures would worsen the moral and social status of disabled people and lead to their discrimination.²³⁶ This is really turning the argument upside-down. The efforts of humanitarian and egalitarian oriented societies to provide care and assistance for disabled people, and to promote solidarity between the more and less gifted, should not be an argument against efforts to prevent the formation or development of disability as much as possible. Denying parents the possibility to prevent disabilities before conception or birth of a child, or deny people the freedom to have healthy children does not appear to be ethical.²³⁷ The hope is that the currently limited biomedical toolbox—contraception, artificial insemination by donor (AID), ovum donation, in vitro fertilisation (IVF), embryo transplant, embryo selection, and selective abortion—will soon be extended to higher performing eugenic engineering of gametes or embryos, namely germinal gene therapy. This is the technique in which sex cells are treated with recombinant DNA in order to genetically alter germ-line cells in order to replace unfavourable genes with wanted genes.²³⁸

However, there can be no doubt that the goal of the furtherance of the hominisation process includes, in a longer-term perspective, not only the prevention of genetic impairments but also enhancement efforts to create genotypes which transcend the upper side of the present variability of desirable features. In time, such a

²³⁴Rosenfeld and Wise (2001).

²³⁵Muller (1934), Huxley (1936), Osborn (1940).

²³⁶For instance, Kass (2002, 130).

²³⁷See also Harris (2007, 95ff).

²³⁸Wheale and McNally (1988), Friedmann (1998), Stock (2002).

shift might result in the evolvment of the present human, over the transhuman, to the posthuman or *Homo sapientior*.

In the modernisation process it is not only the eugenic and transhumanist enhancement movements that are driven by a particular normative view about the future of humankind. The dynamics of the modernisation process itself, with its fast evolving and increasingly complex attributes, forms a strong incentive for highly valuing and socially rewarding particular abilities. As a consequence an increasing proportion of ‘normal’ people risk becoming less well adapted or less competitive and start considering themselves—and are seen by others—as disadvantaged, if not socially disabled.²³⁹ The biological future of humankind cannot be contemplated in a cultural or ecological vacuum, but must be considered in the context of the modernisation process we are experiencing and the future that we are aspiring for.

Conflicts between Humans, Transhumans and Posthumans versus Hominin Advancement. Risks of increased inequalities due to enhancements evoke the danger of possible outbreaks of conflicts between co-existing humans, transhumans and posthumans. One scenario is that posthumans, as a superior (sub)species, could use its enhanced abilities to suppress and exploit the unenhanced, the Left Behind²⁴⁰ and thus perpetuate or even increase human insecurity.²⁴¹ An alternative scenario would be that a further progressing hominisation would be accompanied by increasing levels of tolerance of diversity, thus avoiding the threat of human-posthuman conflicts.²⁴² However, given the past hominin practice of provoking or at least contributing to the extermination of earlier, less evolved hominin variants, the former scenario is not an impossible doom scenario for present-day humanity and its moral standards which strongly favour competition. The *Homo erectus* might not have been so happy with the more advanced *Homo sapiens*.

Given our knowledge of hominin evolution, we should be aware about our own limitations and potential for failures. Knowledge of history reinforces the need for further hominin advancement which is not only desirable but might be necessary for the long-term survival of the hominin phyletic line.²⁴³ Hence, we should embrace humility and accept, promote and welcome a future replacement of our own species by a more advanced one. It would honour present-day humanity to have contributed to the evolvment of our descendants to higher levels of hominisation, namely higher levels of physical, mental, social and moral capabilities. As Ramez Naam²⁴⁴ anticipates, we may be the prospective parents of “new and unimaginable creatures, ... initiators of a new genesis”.

A more imminent conflict-related concern is the military or counter-intelligence development and application of biotechnological enhancement procedures²⁴⁵ in the in-group/out-group conflicts. American scholars write openly about that aspect and

²³⁹Fuller (2011, 110, 157).

²⁴⁰For instance, Closson (2006), Agar (2010), Oderberg (2014).

²⁴¹For instance, Fukuyama (2002), McIntosh (2008).

²⁴²Hughes (2004, 179).

²⁴³See, for instance, Harris (2007).

²⁴⁴Naam (2005, 234).

²⁴⁵For instance, Armstrong (2010), Royal Society (2012), Tennison and Moreno (2012).

refer to US governmental institutional and financial support of research in that domain for military purposes. It would be highly surprising if other countries did not have the same intentions.

The Rationale for a Progressing Hominisation. The rationale for a progressing hominisation as an ethical objective is that the past direction in human evolution is characterised by a process of increasing evolutionary complexity; this has resulted in an increased potential to understand the world, to adapt better to environmental diversity and challenges, to master our biology and environment, to satisfy our needs and desires, and to reach higher levels of quality of life and happiness. The authors are of the opinion that the continuation of this process could further increase the human-specific potentials and further welfare and well-being of humans. This goal is completely in line with the strivings and aspirations that have characterised the human species all along the course of its evolution and history.²⁴⁶ As Gordon D. Kaufman²⁴⁷ wrote:

In the hope that our biohistorical trajectory may move creatively toward a more humane and ecologically well-ordered world, we can be motivated to give ourselves in strong commitment to its continuing growth and development.

Although the evolutionary process is not necessarily a synonym for progress,²⁴⁸ in the case of the hominisation process, overall a progression toward increasing abilities to control natural processes can be observed, resulting in increasing survivability and well-being. The hominisation process is a teleonomic process²⁴⁹ characterised by directionality in its evolution, albeit not a teleologic process resulting from a preplanned intelligent design.²⁵⁰

Thanks to the acquired insight into the evolution of life, we can now consciously choose to push the hominisation process in the direction of ontogenetic and phylogenetic developments beyond the limits of the present human condition. Such a goal may lead us to a better understanding of the universe, further improve our quality of life and happiness, and even help us, as Simon Young²⁵¹ states, to “discover a new sense of purpose, direction, and meaning to life”. Hence, whereas we are, so far, not the result of an intelligent design, we might decide to become our own intelligent designer.²⁵²

Some authors go even further and believe that the next step of human progress will be to inhabit and eventually transform the universe, and ultimately even save the universe from the Big Chill or the Big Crunch.²⁵³ Whereas it is true that the emergence of human consciousness and intelligence is—at least on our planet—a novel and

²⁴⁶See also van Niekerk (2012).

²⁴⁷Kaufman (1997, 187).

²⁴⁸Huxley (1942, 535); see also Ayala (1988), Ruse (1996), Bregman (2013).

²⁴⁹Teleonomy: the apparent purposefulness of living organisms that results from their evolutionary adaptation; it stands in contrast with teleology which applies to processes that are purposefully designed by an agent.

²⁵⁰See, for instance, Gould (2008, 336).

²⁵¹Young (2006, 19).

²⁵²Young (2006, 32); see also Fuller (2007, 153).

²⁵³See for instance Zey (2001; 2006), Stewart (2008).

unique evolutionary development, the belief that the human might also evolve to imbue the whole cosmos is an interesting—but quite a bold, if not over-ambitious—idea that considerably transcends the capabilities of the present human species.

Nevertheless, now that the human species has acquired insight into the evolutionary process and mechanism, it is fully understandable that it contemplates and speculates about the cosmic significance of its existence and future. Reflections are no longer in terms of a hereafter, as was done in the pre-Darwinian era, but in terms of its possible far future evolution.²⁵⁴ We have not yet been able to observe whether intelligent life exists elsewhere in the universe.²⁵⁵ The scientific community is strongly divided about the question as to whether intelligent life is a unique phenomenon limited to our planet²⁵⁶ or if it might be a quite common phenomenon in the universe.²⁵⁷ However, the questions of our uniqueness and our far future destiny are a fascinating challenge.²⁵⁸

One can obviously question the meaningfulness of the furtherance of the hominisation goal when considering the extremely long time perspective in which the known universe emerged, evolved and will, in the end, disappear. The creation of our present universe 13.82 billion years ago²⁵⁹—the Big Bang—is either a unique cosmic event or is the latest stage in a cosmic oscillation: big bang followed by big crunch, in turn followed by another big bang, etc.²⁶⁰ In both cases, the evolution of organic life in our present universe is, as far as can be ascertained today, doomed to end in the far future.²⁶¹

It is estimated that our sun will collapse within 7 billion years, after having evolved to a red giant (in about 5 billion years) and ending as a white dwarf (in about 7 billion years), and a black dwarf, trillions of years later. It is expected to absorb our planet, after it has entered the red giant phase and expanded beyond the Earth's current orbit.²⁶²

However, life on our planet will probably end much earlier because the gradually brightening sun will cause the decrease of carbon dioxide levels in the atmosphere, thereby rendering it insufficient to support photosynthesis in about 600 million years,²⁶³ and the evaporation of the Earth's oceans into space by about 1.1 billion years from the present.²⁶⁴ On the basis of another method of calculation, Andrew J. Rushby and colleagues recently estimated that our planet would have an additional habitable zone lifetime of 1.75 billion years.²⁶⁵

²⁵⁴For instance, Rees (2003; 2004).

²⁵⁵Stenger (2007, 144).

²⁵⁶For instance, Ward and Brownlee (2000).

²⁵⁷For instance, Darling (2002).

²⁵⁸See also Elgin (1993), Chaisson (2001).

²⁵⁹http://www.esa.int/Our_Activities/Space_Science/Planck/Planck_reveals_an_almost_perfect_Universe

²⁶⁰For instance, Schröder and Smith (2008).

²⁶¹For instance, Ward (2001).

²⁶²For instance, Sackmann et al. (1993), Schröder and Smith (2008).

²⁶³Caldeira and Kasting (1992).

²⁶⁴Kasting (1988).

²⁶⁵Rushby et al. (2013).

In the course of the gradual heating of the sun other celestial bodies, such as Mars, and later Jupiter's moon Europa²⁶⁶ or Saturn's moon Titan,²⁶⁷ may become temporarily habitable (or may be made habitable) for the human species or its successor. However, before our sun collapses into a white dwarf, our descendants will have to migrate to habitable planets of other solar systems or galaxies. Would such migration ever become possible? Our present knowledge of the laws of physics does not support such a hypothesis and some consider it to be a delusion.²⁶⁸

The distant time horizon of the uninhabitability of our present planet (let us say, 600–1.100 million years), compared to the past life span of the human species (say 200,000 years), and the extremely short time lapse of the present scientific era (say 400–500 years) leaves our descendants ample time to think and prepare for inter-planetary, intersolar, intergalactic, or even inter-universe migrations. The human species is facing short-term—let us say this millennium—challenges and risks, such as a nuclear disaster, a deadly pandemic, environmental pollution and ecological destruction, climatic change, unsustainable population growth and size, persistent, perhaps increasing inequality levels, and dysgenic trends. These are serious enough to absorb our attention and effort, in order to avoid extinction or regression long before our present planet becomes uninhabitable because of cosmic events.²⁶⁹ This millennial perspective gives ample justification for effort to sustain progressive hominisation.

Even mid-term (e.g. 100,000 years) risks, such as the next Ice Age, the possible impact of another giant asteroid, the inability of the human species to reach higher levels of social integration and cultural creation, should already be subject to reflection and preparatory action.²⁷⁰ It sense to consider such threats, not only because they may endanger the far future trajectory of humanity or its hominin successor but also because some of these catastrophes could occur in the near future.²⁷¹

In any case, the assumption is that a further-evolved hominin than the present *Homo sapiens* might be in a better position to cope with the cosmic, biological and socio-cultural challenges with which it will be confronted in the future. We have to be aware not only of the present limitations of our ability to understand the universe²⁷² but also of our appalling inability to resolve our present problems of population control, ecological management, inequality reduction, and in-group/out-group conflicts. The wise words of Julian Huxley should be remembered²⁷³:

²⁶⁶For instance, Mendez (2009).

²⁶⁷For instance, Lorenz et al. (1997).

²⁶⁸For instance, Wilson (2012, 296).

²⁶⁹Bostrom (2002), Matheny (2007).

²⁷⁰See, for instance, Elgin (1993).

²⁷¹Baum (2015).

²⁷²Glover (1984, 179).

²⁷³Huxley (1964, 254).

(The human) is not merely exceedingly young; he is also exceedingly imperfect, an unfinished and often botched product of evolutionary improvisation.... The process of hominisation is very far from complete.

5.3.3 General Ethical Derivations from a Progressing Hominisation

5.3.3.1 The Ontogenetic Development of Human-Specific Potentialities

A first general derived objective from the hominisation goal concerns the ontogenetic development of human individuals.

Knowledge about the hominisation process enables us to identify the human-specific features and potentialities, and also to understand why the ontogenetic development in the human is only very partially genetically programmed. It will also help us understand why environmental factors, including cultural values and norms, are needed to complement the genetic endowment to fully develop the human-specific potentialities.

Indeed, as explained in Chap. 2, Sect. 2.2.3, the hominisation process was characterised on the one hand by a major shift in the genetic programming of ontogenetic development, from a predominantly instinctive behavioural control toward a more conscious control of behaviour through the development of the large brain hemi-spheres; on the other hand it is marked by the relatively short human pregnancy duration which caused women to give birth prematurely, before the baby's brain had fully matured. These changes in the evolved ontogenetic development of humans necessitate the development of culturally developed and transmitted values and norms, co-steering the ontogenetic development of the individual. The helplessness of the human infant requires many years of intensive social care and culturally determined learning and socialisation. Even the motivation for social care, cultural learning and socialisation must be stimulated by means of value and norm systems. In many respects, the human no longer knows instinctively what and how to teach his offspring.

The progressive hominisation goal in an evolutionarily based ethics inherently implies the development of cultural values and norms supporting the development of human-specific ontogenetic potentialities in the life stage that Joseph Henrich referred to as the Environment of Ontogenetic Adaptiveness (EOA).²⁷⁴

The ontogenetic development of the human individual needs not only environmental and in particular socio-cultural intervention to complement the genetically determined human-specific biogram, but it also needs also the fixation of the degree of ontogenetic development. Indeed, human-specific features can be developed at varying levels: the development of physical, mental and social potentialities of humans can vary along a broad range, from a minimal to a maximal

²⁷⁴Henrich (2008).

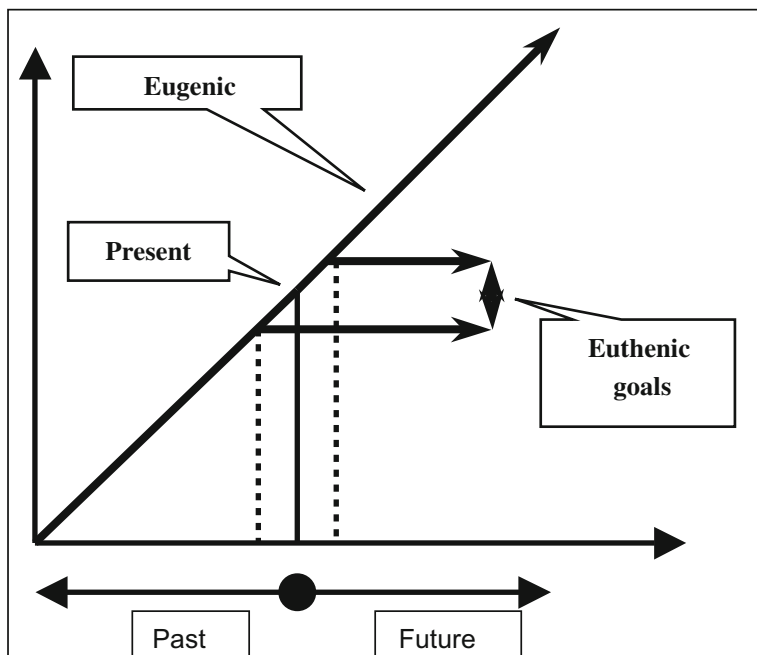


Fig. 5.3 Euthenic and eugenic goals for future ontogenetic and phylogenetic development (Cliquet 2010, 524)

level (Fig. 5.3). In other words, the ontogenetic development of the human species can be realised at different levels of quality of life.

The authors are well aware of the difficulty in defining the concept of quality of life, since it includes not only objective, material elements of the development of human potentialities, but it also embraces subjective elements of what people consider and value as quality (of life). Nevertheless, the evolutionary approach can help us to identify major characteristics of what is to be understood by quality of life.

Indeed, the central goal of evolutionary ethics—the furthering of the hominisation process—implies not only that the ontogenetic development of human-specific potentialities is to be achieved at its highest possible level (the euthenic goal in Fig. 5.3) but also that the human-specific ontogenetic potentialities are to be further enhanced beyond the current biological range.

Transhumanists advocate that the ontogenetic enhancement of human-specific features—bodily capacities, health characteristics, cognitive abilities, emotional personality characteristics and sociability—are to be pursued not only by means of the currently known educational and biomedical procedures but also by the development of new technological means.²⁷⁵ It is believed that such interventions

²⁷⁵Bostrom and Sandberg (2007), Bostrom and Roache (2008), Bostrom and Savulescu (2009).

could improve us more profoundly than the traditional procedures produced by beliefs, habits, culture and education.²⁷⁶ Moreover, we should be aware that many biotechnological forms of human enhancement are already currently applied in various domains of human physical and mental performances,²⁷⁷ such as muscle enhancers (e.g. anabolic androgenic steroids) which influence the structure and function of skeletal muscle, sexual enhancers (e.g. Viagra and Cialis) which enhance erectile function, and cognitive enhancers (e.g. Ritalin and Adderall) which influence cognitive functions including short-term memory, concentration, comprehension and alertness.²⁷⁸ Many therapeutic and preventive therapeutic interventions are even more important: they succeed not only in healing or preventing disease but also prolong longevity and maintain or even improve the physical and mental functionality of many citizens up to an old age.

An important aspect for enabling a sound ontogenetic development concerns the avoidance of existential risks, particularly of an anthropogenic nature.²⁷⁹ Some of those risks are already well known—population explosion, natural resource depletion, environmental pollution, human-induced climatic change, global nuclear war—but the existential risks of other technological innovations—e.g. designer pathogens, experiments with high-energy particle accelerators, advanced molecular nanotechnological inventions, self-enhancing artificial intelligence—will also have to be considered in a relatively nearby future.²⁸⁰ The occurrence of an existential disaster might only cause a temporary regression, with time allowing for a resurrection and regeneration, but it would, in addition to the reappearance of dated hardships, considerably delay further progression.

5.3.3.2 The Promotion of Quality of Life

The discussion about the ontogenetic objectives in an evolutionary founded ethics, led us to the conclusion that quality of life should not only be fully maximised but should, in a longer-time perspective, also be further enhanced, even above currently achievable levels.

This brings us to the delicate question of the relationship between quality and quantity. Indeed, the promotion of quality of life should be weighed not only against the holiness of life as argued above but also against the quantity of life. Due to the scarcity of resources that humans have almost constantly had to cope with in the course of our evolution, the pursuit of high quantity was often a guarantee for promoting quality. This quantity-quality relationship has run like a thread throughout human history: high fertility was a protection against high mortality, provided a large number of workers in family businesses, and more security for

²⁷⁶Bostrom (2007).

²⁷⁷For instance, Rothman and Rothman (2003), Carter (2016).

²⁷⁸<https://humanenhancementdrugs.com/>.

²⁷⁹Bostrom (2002).

²⁸⁰For instance, Bostrom (2002; 2010), Mulhall (2002), Diamond (2005).

parents in their old age; a bountiful harvest preserved people from dreaded starvation in winter; a large number of soldiers were a barrier to possible conquerors or formed an instrument for the conquest of new territories.²⁸¹

The development of modern culture tends to turn the former positive association between quantity and quality into a negative one. High fertility leads to a demographic explosion under conditions of efficient mortality control. Ultimately this could lead the population to exceed the carrying capacity of the environment and create intolerable conditions for humans. Moreover, in modern living conditions the human predisposition to maximise the inclusive fitness or the related greed can easily lead to various forms of overconsumption with pernicious consequences for quality of life. For example, high production/sale/use of all kinds of weaponry leads to high rates of murder and/or war. Overconsumption creates epidemics of obesity, abuse of stimulants, high rates of traffic accidents, environmental pollution, and resource depletion.

Assuming that modern culture will keep on developing, it can be argued that the relationship between quantity and quality will have to be reconsidered and, especially, be redefined in the light of concern for sustainable growth. Given the finiteness of the planet and its limited capacity to sustain life, the exploitation of the Earth's resources will eventually reach a point at which the further improvement of quality of life will become inversely proportional to the growth in population size. After all, quality and quantity both require escalating use of the restricted amounts of available raw materials, space, and energy, which imposes a growing burden on the environment and Earth's ecosystems. This relationship is stated in Ehrlich and Holdren's well-known formula: $I = P \times A \times T$.²⁸²

Such a vision unequivocally promotes the improvement of the human quality of life, if necessary at the expense of the decreased pace of population growth in numbers. In modern culture, we cannot continue indefinitely to "...be fruitful and multiply and fill the earth...".²⁸³ We may need to take up the responsibility for controlling growth and achieving better sharing of resources. This matter will be discussed in more detail in Chap. 8, Sect. 8.2.3.

5.3.3.3 The Promotion of Equity

Genetic variation is, from an evolutionary-biological point of view, an extremely significant phenomenon. At the population level, and in a long-term perspective, it is a relative safety valve for adaptation to changing living conditions; at the individual level, and in the short-term, exceptional biological capabilities are the engine for cultural achievements and innovations.

However, there is another side of the coin: unfavourable genetic mutations, ontogenetic accidents, infectious diseases, natural disasters, adverse life course events, and social inequities can all produce psychophysical differences in individual potentialities, competences and performances. For many individuals such

²⁸¹Parsons (1999).

²⁸²Ehrlich and Holdren (1971): I = impact; P = population; A = affluence; T = technology.

²⁸³Genesis 1:28.

traumatic events lower their quality of life, their life satisfaction, and their chances for happiness. From an egalitarian ethical point of view, biological variation is, in many respects, a nightmare.

Most value systems, particularly in modern times, try to reconcile the facts of biological diversity with the ideals of equality and equity by promoting these values without completely excluding diversity. In modern democratic societies the concepts of equality—likeness or sameness in quality, status, or degree—and equity—encompassing ideals of justice and fairness under conditions of heterogeneity—are usually understood as equality of opportunity. Given individual differences in abilities and work effort, it is generally assumed that equality of opportunity provides each person, regardless of ascribed characteristics such as family background, worldview, ethnicity, race, or gender, the same chance of acquiring a favourable cultural or socio-economic position.²⁸⁴

However, the establishment of equal opportunity does not necessarily imply that people will end up culturally, socially or economically equal, since differences in abilities or work effort normally result in differences in performance and are usually differentially valued and rewarded. Some people are in a more vulnerable situation, either because of genetic heritage or due to life course events: for instance people who are mentally challenged, physically less able, long-term diseased, less skilled or unemployed. In order to safeguard such people from social exclusion or misery, modern advanced democracies have developed social protection systems.²⁸⁵

As a consequence of increasing knowledge and its dissemination via education and modern means of communication, it is no longer possible to justify extreme forms of social inequity and inequality or other forms of social exclusion and exploitation.²⁸⁶ Wherever such social forms of inequity/inequality still exist, eventually they are or will be vehemently challenged, and it can be expected that they will attenuate due to social pressure, especially as societies modernise. Nevertheless, even in the future human societies will have to deal with the discrepancy between biological diversity, due to genetic or environmental causes, and the necessity to create equal opportunities for all and avoid the social exclusion and indigence of people with weaker abilities or competencies. In this respect Friedrich A. Hayek's view should be taken seriously into consideration²⁸⁷:

It is just not true that humans are born equal;... if we treat them equally, the result must be inequality in their actual position; ...thus, the only way to place them in an equal position would be to treat them differently.

Clearly, the ideal would be that modern societies would develop to the fullest the potential of individual students with different backgrounds and talents. Torsten Husén²⁸⁸ referred to this vision of equal educational opportunity in these terms:

²⁸⁴Schaar (1967), Rawls (1971), Parelius and Parelius (1987), European Commission (2011).

²⁸⁵For instance, Deleeck (1992).

²⁸⁶For instance, Avramov (2003).

²⁸⁷Hayek (1960, 76–77).

²⁸⁸Husén (1972, 26).

...every student should have an equal opportunity to be treated unequally.

In conclusion, an evolutionarily-based ethic will, in the living conditions and opportunities of modernity, simultaneously have to positively value genetic diversity, favour—depending on the ecological, economic or cultural circumstances—particular genetic variants, enhance equity and equality of opportunities, and, in order to facilitate the social inclusion of disadvantaged population categories,²⁸⁹ develop adequate social protection systems. These matters will be discussed in greater detail in Chap. 8, Sect. 8.2.3.

5.3.3.4 The Shift from Competitive Towards Cooperative Efforts

Biological evolution proceeds mainly via one of its major basic mechanisms—natural selection—and it functions on the basis of competition between individuals.²⁹⁰ However, one of the most salient trends in the hominisation process is the increasing importance of social cooperation.

As explained in Chap. 1, Sect. 1.1.3, in the second half of the twentieth century sociobiologists discovered specific biological mechanisms, namely kin selection, various forms of reciprocity selection and group selection, that explain the presence and evolution of altruistic behaviour in social animal species and humans; these form the biological basis of social bonds that transcend parental-offspring relations.

In the same period, anthropological causal explanations of the hominisation process shifted from ecological theories²⁹¹ and technological theories²⁹² to biosocial theories.²⁹³ The biosocial theory of the increase in (social) intelligence during the evolution of the primates, and in particular of the hominins, states that (social) intelligence is selected not only on the basis of the group size but mainly as a function of the complexity of the social interactions between the group members with whom one lives. Our brain has been selected to cope with the challenges raised by increasingly complex social interactions.²⁹⁴

Due to the recent development of modernity (in evolutionary terms) with its incredibly increased number of anonymous interactions, within and between large populations, our genetic predispositions (selected and adapted to deal with social interactions in and between small populations) are not in equilibrium with the cooperative requirements in our novel modern environment.²⁹⁵

Humans remain endowed with drives toward both competition and cooperation. Human social life originally evolved to support the survival of the individual and it still continues to serve that purpose. However, human societies gradually

²⁸⁹For instance, Avramov (2003).

²⁹⁰Williams (1966), Dawkins (1976).

²⁹¹For instance, Clutton-Brock and Harvey (1980).

²⁹²For instance, Oakley (1959), Washburn (1960).

²⁹³For instance, Humphrey (1976), Byrne and Whiten (1988; 1997), Dunbar (1992; 1998; 2003), Emery et al. (2007).

²⁹⁴For instance, in this respect McNamara (2006, 195) points to the role of the frontal lobes in the development of cooperation: “Frontal lobes are the neural systems most consistently activated in association with decision-making around cooperation dilemmas.”

²⁹⁵Burnham and Johnson (2005).

developed, via cultural creation and accumulation, as complex autonomous entities in which cooperation increasingly became a crucial instrument for the survival of individuals *and* society. This process accelerated strongly from the hunter-gatherer stage, through the agrarian era, to the present modern context of demographic and cultural development.

Hence, it is not surprising that a large part of ethics relates to the regulation of social life. The societal functions of value and norm systems need little justification. The egocentric drives of the individual must be moderated and mastered for successful social life, so that sociality, and also the individual emancipation of all group members, can be optimised. A more difficult issue concerns the desirable value and norm systems regulating the relations between groups of individuals, and in particular between large societies. In-group/out-group relations belong to the most difficult issues in ethics.

It is to be expected that the future development of modern culture will further intensify the tension between competition and cooperation, within as well as between societies. Therefore increasing efforts will have to be made to find a viable balance between both, thus avoiding hyper-individualism and absolutist groupism. All this entails an ever-increasing need for a further shift from competitive toward cooperative efforts. Indeed, as Fereidoun Esfandiary²⁹⁶ noted

...competition is antifuture.

5.3.3.5 The Promotion of Universalism

The specific human genome emerged and evolved in Pleistocene times, in the EEA, when people lived in small tribes and interacted with other small tribes.²⁹⁷ Cooperation within groups had survival and reproductive advantages. Increasing their inclusive fitness via reinforcement of the in-group solidarity and cohesion facilitated defensive or offensive actions against competing out-groups.²⁹⁸ Even in the agrarian and early industrial phases of humanity's cultural history, the more evolved forms of ethnocentric tribalism—patriotism and nationalism—had adaptive advantages and explain much of the exploratory and conquering success of expanding nation-states. Group conflict appears to have been one of the striking universals in human existence.²⁹⁹

Evolutionary science ultimately explains humanity's strong in-group reflexes and their offshoots, such as nepotism, tribalism, ethnocentrism, xenophobia and racism, as a result of the drive to protect and spread one's own genes. Together with the drives toward greed and demographic expansion, the in-group syndrome is responsible for much of the pronounced between-group enmity that characterises human beings.

²⁹⁶FM-2030 (1989, 66).

²⁹⁷Aiello and Dunbar (1993), Dunbar and Spoor (1995).

²⁹⁸Ember (1978), Alexander (1979, 1987), Keeley (1996), Diamond (1992; 2005).

²⁹⁹For instance, Brown (1991, 130).

However, the novel environment that emerged from modern culture is characterised by a number of features and trends that causes the in-group syndrome to become too dangerous. The development of ABC weaponry is so life-threatening that the in-group syndrome has largely lost its adaptive advantage. Furthermore, the exponential increase in scientific knowledge, as well as the improvement of between-group communication by means of ICT (information and communication technologies), international educational and commercial exchange, travel and tourism, all together fundamentally undermines the in-group syndrome by breaking through group isolation and eroding two of its most basic breeding grounds—ignorance and prejudice. Previously separated human populations and nations are now growing toward a single world community, the components of which show an increasing mutual dependency. Modern culture is becoming a globalised phenomenon and has implications at the planetary level. A typical example of the transitional stage, in which humanity finds oneself on a trajectory to higher levels of future stages of culture, is the present unaccomplished extension of within-group amity to the whole of the human species as a single community with a universal morality.³⁰⁰

Although universalism contravenes the strong in-group focused human instincts,³⁰¹ human evolution and history is characterised by a gradual expansion of our circle of moral considerability from the family, to the tribe and the nation, religious confraternity, then to the entire human species.³⁰² The scientific knowledge and technological instruments of modern culture facilitate—and even compel—people and societies to think and act in a more global perspective.

The discoveries of molecular genetics show that people of different racial groups probably have about 99.9% identical DNA.³⁰³ The molecular-genetic reinforcement of this factual datum might facilitate and support, philosophically, the idea of universalism in ethical matters. Another fundamental argument in favour of a universal human ethics relies on the fact that neurological research increasingly points to the idea that our brain functions on the basis of a universal set of biological responses to moral dilemmas.³⁰⁴

With the prospect of safeguarding the survival, as well as furthering the well-being, of the human species, many evolutionary scientists³⁰⁵ are of the view that an evolutionary ethics in modernity should be of a universal or global nature. This implies that our moral norms regarding rights and responsibilities should be extended to all human beings. This moral universalism requires the in-group/out-group relations to be replaced by alternatives to the traditionally hostile and aggressive patterns. In other words, modernisation requires a shift from in-group toward out-group relations. Scientific knowledge, and in particular

³⁰⁰Alexander (1993, 180).

³⁰¹Wells (1905), quoted in Keith (1942, 51).

³⁰²For instance, Singer (1981; 2002), Lahti (2009).

³⁰³Jorde and Wooding (2004).

³⁰⁴Gazzaniga (2005, xix).

³⁰⁵For instance, Darwin (1871), Keith (1947), Katz (1999), Singer (1981; 2002).

evolutionary science, can help to reflect on and work towards a new global, if not cosmic, ethic.³⁰⁶

The plea for a shift towards an increasing globalism does not mean that community development at local, regional and national levels are not important. People live and function in such sizeable groupings on which they depend for their identity and daily living conditions.³⁰⁷ Individual emancipation, as well as societal progress, strongly depends on community coherence. However, in modernity they need to be steered beyond the old-time narrow in-group mindedness. Community development and globalisation no longer need to be incompatible.

5.4 Evolutionary-Based Specific Ethical Challenges Related to Sources of Biological Variability

In earlier work on biosocial interactions in modernisation,³⁰⁸ the domains of cultural intervention were classified according to the source of biosocial variability: individual variability, age variability, sexual variability, various forms of group variability and intergenerational variability. In this book, which is focussed on human variation and relations that need to be subject to ethical consideration, largely the same logic is followed and the following domains are distinguished, hierarchically classified according to their degree of complexity: (1) At the individual level: individual variability regarding biological traits in general, and age and sex in particular; (2) At the group level: variability of and relations with groups of people, according to kin relatedness, social class, race/ethnicity/ideology, and statehood; (3) At the generational level: intergenerational replacement.

From an evolutionary point of view, each of these domains requires attention for specific ethical considerations and reflection that will be discussed in the following chapters.

Contrary to what is sometimes believed, human morality applies to two major domains of life: development of 'self' and relations with 'others', implying obligations toward oneself as well as toward related and non-related others.³⁰⁹

Development of 'self' is concerned with ontogenetics (the development from conception to death) which is necessary for individual survival and fulfilment; this development requires moral guidance because the individual developmental processes in the human are no longer completely genetically programmed and environmental factors can steer the individual development in various directions and levels. These issues are dealt with in Chap. 6.

³⁰⁶Loye (1999), Chaisson (2001), Stewart (2008).

³⁰⁷Salter (2003).

³⁰⁸Cliquet (2010).

³⁰⁹Rottschaefer (1998; 2000, 239), Hinde (2002, 178).

Variation of and relations with ‘others’ is a much vaster domain which includes several important fields for moral action: relations with kin and family, as well as relations with larger groups of individuals—social classes, ideological groups, ethnicities, races, states. These issues are dealt with in Chap. 7.

A specific domain of variation of and relation with others concerns intergenerational change. Issues of intergenerational replacement are addressed in Chap. 8.

The justification for moral action in all of these domains is also concerned with the incomplete genetic programming of the human biogram and the ‘Janus’—double sided—character of human nature regarding moral issues. Indeed, the human species has several genetic and neurological predispositions (partly innate, partly learned) that elicit and support moral behaviour toward ‘self’ and/or ‘others’, but is also equipped with drives that suppress or even oppose morality.³¹⁰ In the first category the authors would list predispositions which lead to capabilities for self-actualisation, caring, empathy, sympathy, altruism (generosity, sharing, solidarity, mutualism, reciprocity), sociability (cooperation, loyalty, tolerance, reconciliation, consolation, conflict intervention, and mediation), and honesty (truthfulness). The second group consists of predispositions toward selfishness, aggressivity, greed, spite, dishonesty, free-riding, cheating, thieving, cruelty, anti-social behaviour, dominance, and violence. An evolutionarily-based universal ethic in the novel environment of modernity can and should contribute to bolstering the former to the detriment of the latter.

³¹⁰For instance, Eibl-Eibesfeldt (1971), Masters (1989), Ehrlich (2000).

Evolution-Based Ethical Challenges Related to Individual Variability

6

Abstract

This chapter deals with age variability, sex variability and individual variability in general. In addition to age and sex relations, interpersonal relations in general are addressed. For each of those issues the salient aspects regarding their evolutionary background, recent trends in modernity, and ethical reflections about the future are discussed. Regarding age variability, the discussion considers the accelerated biological growth process and the prolonged social maturation period in the life course, the increased life expectancy at all life stages, and the prolonging of the terminal phase of life. Regarding sex variability, particular attention is given to the specificity of human sexuality, trends in sexual behavioural in modernity, and ethical reflections about relations between the sexes in the future. Regarding individual variability in general, special attention is paid to the importance of the maintenance of variation, the control of maladaptive traits and attributes, and the containment of individualism. Regarding interpersonal relations in general, the dynamics of individual competition and cooperation, and the causes of individual maladapted behaviour are addressed.

6.1 Introduction

Individual variability appertains to what the previous chapter referred to as ‘ontogeny’—the development from conception to death of individuals. However, ontogenetic variability applies not only to differences within individuals during their life course but also to differences between individuals which emerge and get established during the life course.

Due to their specific ethical implications, three main aspects are discussed: (1) variability of age-specific characteristics; (2) variability of sex-specific characteristics; and (3) variability of individual characteristics in general.

For each of those issues the evolutionary background is recalled, trends in modernity are highlighted, and some crucial ethical implications for the future are reflected upon.

6.2 Age Variability

In the human life course three major stages can be distinguished: childhood, adulthood and old age. All three of these life course stages are associated with age-specific challenges which largely relate to dependency and intergenerational solidarity. As a result of their stronger implications in the evolutionary context, due to changes in intergenerational dependency the discussion will be focused on relations between adults and children and between adults and older persons.

6.2.1 Evolutionary Background of Growth and Senescence

Two major processes characterise the individual life course: growth and senescence, the latter ending in the dying process.

6.2.1.1 Growth

Growth consists of early processes that enhance the functional capacities of the individual. During hominisation the pace of the human growth process evolved, so that postnatal growth acceleration is followed by a period of interruption of growth acceleration in the time before adulthood. This postponement of maturation until puberty, controlled by the hypothalamus, relates to the long period that the human brain needs to become fully functional. During this period of pre-puberty maturation and socialisation the growing individual is still quite docile. From puberty onwards, an individual comes into sexual competition with other adults. Ascending the primate phylogeny, this pre-pubertal period becomes ever longer. In the human it is the longest.¹

6.2.1.2 Senescence

Senescence refers to the age-related changes that lead to the gradual and generalised regression of mental and physical functions that end in death.² The evolutionary explanation of the occurrence of senescence is that ageing is caused by a decrease in the force of natural selection with increasing age.³ Selection against genes that

¹Tanner (1962).

²For instance, Comfort (1956), Finch (1990).

³Medawar (1952).

manifest themselves early in the life course affect a larger number of individuals than selection against genes that reveal themselves at advanced age, when the number of survivors and their reproductive capacity are smaller. Genes with late detrimental consequences can accumulate and result in senescence among individuals who live sufficiently long enough. Senescence is the inevitable result of the fact that selection has a greater impact on genes that only affect survival or fertility early in life than genes whose effects are only manifest late in life.

The human lifespan⁴ has substantially increased over the last few million years of evolution. Evolutionary theory explains this increase as an adaptation related to the increase in brain size. Larger brains allow a better control of the environment and result in a reduction of mortality; larger brains require a longer maturation time; in turn, a longer maturation requires a larger birth interval, as well as a shift from a multiparous towards a monoparous gestation, both of which lead to a lower age-specific fertility. All of these features require a longer lifespan: on the one hand this allows for the more intensive parental care of long-term needy youngsters, and on the other hand it allows for an overall fertility rate that is sufficient for generational replacement. A longer lifespan requires a larger investment in somatic maintenance and repair, in the end this results in a postponement of senescent processes. Over the last few million years the increase in brain size and its co-evolving cultural development in the course of hominid evolution have contributed significantly to the increase in human longevity.⁵

6.2.2 Developments in Modernity Regarding Age Variability

6.2.2.1 Growth

On the subject of human growth, the contemporary industrial cultural phase is characterised by a temporal growth acceleration. This phenomenon occurs in all countries or regions where modern culture develops: this has been true for some 150 years in Western countries, but also recently in modernising developing countries.⁶ This temporal growth acceleration includes a moving forward of the beginning and the end of the maturation and growth processes, and the achievement of a larger end result. The temporal growth acceleration has been observed for body height, body weight, skeletal age, dental eruption, menarche/first ejaculation and other sexual maturation characteristics, several serological characteristics, and measured intelligence (the so-called Flynn-effect).⁷ Whereas growth acceleration is

⁴Lifespan: refers to the typical length of time that an organism can be expected to live.

⁵Carey (2003), Baltes et al. (2006), Gurven and Kaplan (2007).

⁶Meredith (1974), Bodzsar and Susanne (1998), Krawczynski et al. (2003), Zhen-Wang and Cheng-Ye (2005).

⁷Tanner (1962), Flynn (1987).

taking off in many modernising developing countries, it seems to have weakened or even stopped in the upper social strata of the most advanced industrial countries where it has, at this time, apparently reached its limits.⁸

In modern culture, the evolved postponement of biological maturation is considerably prolonged by an additional period of social maturation. Indeed, there is an increasing gap between biological maturation and social maturity. An adequate socialisation and learning period requires much more time than the biologically programmed period, which corresponds *grosso modo* to the end of primary school at 12 years of age. In order to be able to function well in modern culture the average citizen in complex modern society needs a much longer learning period than the duration of primary school. The social maturation time needed transcends the biological (sexual) maturation period by many years. Moreover, the time gap between biological and societal maturity is constantly increasing. On the one hand biological maturity now comes earlier in the life course due to the temporal growth acceleration; on the other hand societal maturity takes more time due to increasing needs for schooling and training. This expanding gap between biological maturation and societal maturity is a typical example of the asynchronic biosocial development in modern culture, as biological-evolutionary adaptation is not fast enough to respond appropriately to cultural change over time. This asynchrony is a major cause of the generational conflicts between parents and their adolescent children in affluent modern societies. Numerous cultural, economic and technological innovations have vastly empowered and raised the awareness of adolescents but at the same time educational needs have prolonged their dependency.⁹

6.2.2.2 Senescence

The Extension of Life Expectancy. Modern societies are characterised by a revolutionary extension of life expectancy, whereby the causes of death have largely shifted from external (mainly infectious diseases) to internal factors (senescent deterioration). Most people spend the largest part of their old age in good health as modern health and welfare care succeed in mitigating or even considerably compensating senescent deterioration.¹⁰ More and more people are protected against or successfully treated for infectious diseases in old age and are thus exposed to senescence as a gradual and generalised regression that results in death. In fact, senescence has become the major cause of illness, disability, dementia, and finally death.¹¹

In modern culture, the average life expectancy at birth¹² has more than doubled over the past two centuries and it has roughly tripled over the course of human

⁸Sinclair and Dangerfield (1998), Tanner (1978), Vercauteren and Susanne (1985), Hauspie et al. (1996), Krawczynski et al. (2003), Zellner et al. (2004).

⁹Noom (1999), Arnett (2001).

¹⁰For instance, Doogle et al. (1988), Avramov and Maskova (2003), Jacobs et al. (2004).

¹¹For instance, Bostrom (2005, 100).

¹²Life expectancy: the average number of years of life remaining at a given age, i.e. the average expected lifespan of an individual.

history.¹³ Life expectancy among hunter-gatherers varied between 21 and 37 years.¹⁴ In the most advanced regions of the world it amounts nowadays to above 80 for men and above 85 for women.¹⁵ Currently it continues to increase by approximately three months every year. Also the maximum reported age at death has systematically been increasing,¹⁶ currently lying at around 120 years.¹⁷

Modernisation has succeeded in enabling more people to reach the biological potential lifespan. However, not much progress has been made so far in life-extending technologies, which could move the current species-specific lifespan to a higher age. However, it is possible that in the near future biomedical inventions will enable the extension of longevity beyond the present species-specific lifespan, in addition to further increasing the number of people who survive up to the maximum lifespan. Since the human species-specific lifespan is not very well known, it is extremely difficult to predict the ultimate reachable limit of old age.¹⁸

Increasing life expectancy clearly influences the age composition of the population. However, population ageing can be the result of population greying as well as of population dejuvenation. The first is caused by an increase in the proportion of the older age groups—a swelling of the age groups at the top of the age pyramid; the second results from a decrease in the proportion of younger age groups in the population, for instance as a consequence of decreasing fertility, which shrinks the age groups at the bottom of the age pyramid. Population greying can be reinforced when larger birth cohorts reach the age categories that are conventionally considered to be elderly or seniors, as is currently the case with the post-World War II baby boom generation reaching seniority.

The likelihood of substantial increases in average lifespan and the potential for extreme longevity raises a host of societal issues: huge increases in the number of old and very old persons; massive growth in health expenditures for the elderly; labour shortages among the prime working age groups; depletion of social security and pension contributors; intensifying intergenerational tensions; and potential for decreasing quality of life for all. Hence, it is not surprising that population ageing is a very important concern for many policy makers today, but it is an even greater ethical challenge for the third millennium as it puts a strain on the traditional intergenerational models of care and transfer of resources. Indeed, ageing costs. It costs in terms of public pension schemes, meeting the new care needs of older people, and expanding health services so that they can meet the growing demand arising from the ageing of the population. It is remarkable that, from the ethics perspective, the achievement of high life expectancy is considered to be a “great triumph of civilisation”,¹⁹ for which people have strived for so long and so hard, yet

¹³Wilmoth (2000).

¹⁴Galor and Moav (2005), Gurven and Kaplan (2007).

¹⁵http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Mortality_and_life_expectancy_statistics.

¹⁶Wilmoth and Lundström (1996).

¹⁷Robine and Vaupel (2002); see also Dong et al. (2016).

¹⁸Finch (1997, 245).

¹⁹Notestein (1954).

we are struggling to develop ethical standards for intergenerational equity to manage this triumph. Beyond the issue of financial costs, opportunity costs for the elderly and their families are also at stake. Societies struggle to find socially useful and individually meaningful activities for its growing elderly population.²⁰

Ageism. It is not surprising that ageism²¹—meaning marginalisation or discrimination based on age, and especially prejudice against the elderly—is so widespread in modern societies.

Surveys amongst the elderly on attitudes or behaviour towards people of higher ages have systematically found that the experience of ageism is widespread, frequent and multiple.²² Seniors often experience disrespect, or are considered to be less able or productive. Older people as a group experience negative treatment in terms of poor access to transport and housing, low incomes, and inadequate nursing home care. There is evidence of extensive *de facto* health care rationing or overtreatment by providers on the basis of age.²³ While few have experienced overt or brutal ageism, interaction in everyday life involves some negative treatment, and only occasional positive sageism,²⁴ i.e. acknowledgement of and respect for the wisdom of older people.

In industrial societies older workers, say 50–60, often experience discrimination in the labour market, have fewer opportunities at job solicitations, and are more often fired or forced into retirement. There is higher than average unemployment among older workers. Employers invest less in elderly workers to keep them competitive in the regular labour market. In the most developed countries elderly workers are often being made redundant, given casual jobs or being pushed into early retirement by their employers.²⁵

In the twentieth century the biology of ageing—resulting in longer and healthier old age—and the societal perception of ageing—as lacking a role in society—clearly evolved in opposite directions.²⁶

The Prolongation of the Dying Process. The use of advanced medical technologies not only contributes to increasing longevity but also, in a growing number of cases, to prolonging the dying process. This issue is receiving increasingly prominent attention in the scientific and ethical literature.²⁷ Death control, either in the form of palliative care or euthanasia, includes practices that deal with the unintended and undesired effects of partial medical successes whereby people are kept alive in conditions of severe terminal suffering or degrading regression. Death control practices—dignified end-of-life decision-making and humane care for dying patients—clearly relate to delicate and difficult issues on which fundamentally

²⁰Avramov and Cliquet (2005).

²¹Butler (1969).

²²Avramov and Maskova (2003), Avramov and Cliquet (2005).

²³Kapp (2001).

²⁴Minichiello (2000), Palmore (2001).

²⁵Andrews (1999).

²⁶Avramov and Cliquet (2006).

²⁷For instance, Logue (1993), Nuland (1994), Gorsuch (2006), Yount (2007), Griffiths et al. (2008).

differing philosophical and religious views exist in all societies.²⁸ In the light of the religious versus secular and conservative versus progressive divide on how to view the prolongation of the dying process, it is necessary to reiterate that this generalised prolongation is not a natural or supernatural creation, but a technical/technological possibility created by science.

6.2.3 Ethical Reflections Regarding Age Variability in Modernity

6.2.3.1 Bridging the Gap Between Biological Maturation and Social Maturity

Emphasising the importance of caring for children would only be kicking open doors. The weak genetic programming of human behaviour and the long maturation process of the human child are the basic roots and form the evolutionary explanation for this ethical principle. The increasing gap between biological maturation and social maturity in modernity only reinforces the survival value of the norm that adults must provide care for children.

The specificity of modernity requires a high level of ontogenetic development aimed at the full actualisation of the human-specific potentialities and abilities, allowing an adequate harmonious phenotypic adaptability to this type of culture. It necessitates, moreover, a rather fundamental change in the contents and methodology of formal, non-formal and informal education; this includes among others a thorough acquaintance with the essential features of modernity and a moral education adapted to diversity and dynamics.

It is reasonable to assume that in the third millennium the value of education—as the systematic instruction provided in schools—and non-formal and informal learning—which enhance knowledge, skills, competences and understanding—should increase in the direction of science-based rather than faith-based rationale.

6.2.3.2 Overcoming Ageism/Promoting Active Ageing

Individual and population ageing are not only the achievements of modernisation but they are also the result of consciously pursued goals. It should be acknowledged that humans have, as all living beings, a strong drive for survival and a desire for long (healthy) life. Hence, it is understandable that modern humans take ample advantage of the extraordinarily increased opportunities offered by science and its applications in medicine and welfare care, which increase life expectancy and fight the unfavourable side effects accompanying senescence. Reaching old age at the individual level—that great triumph of civilisation—should consequently be highly welcomed.²⁹ Ageing at the population level, at least in its component of population

²⁸For instance, Brock and MacLean (1993), Dowbiggin (2005), Paterson (2008), Wilcockson (2008).

²⁹See also Bostrom (2005).

greying, is a consequence of the progress in increasing individual life expectancy and should equally be accepted as a phenomenon to which modern societies have to adapt.

As the prospect of surviving to a very old age affects the overwhelming majority of the population, ageism is a delusion of youth and excessively competitive working conditions. As people reach more advanced stages in their life course, they should have the opportunity and responsibility to continue being active and fully included in societal processes, especially now that their educational and health levels are improving so much, at least of the younger seniors. In this regard, some current policy measures or behavioural patterns are obsolete such as early retirement schemes and relatively low mandatory retirement age. It is obvious that in modernity people cannot continue being gainfully employed until death but opportunities for flexibility and variability in individual ageing and health conditions need to be built into the currently rather rigid age categories that govern intergenerational solidarity. The traditional categorisation of paid work and measurements of productivity need to be reconsidered—taking into consideration society as a whole and not only the enterprise/industry level.³⁰

People are living longer and healthier lives and are spending ever more years in passive leisure. On the one hand reflections are necessary about the place of elderly in society and their responsibilities regarding the take up of health and welfare provisions over a very long period; on the other hand working conditions are maladapted to the ageing of the work force. These issues cannot be addressed at the enterprise level and need to be supported by the new ethics and built into legislative institutions.

Active ageing is promoted in national and international documents but has yet to become the norm in a further modernising humanity.³¹ Ageism is incompatible with the ethical and scientific-technological achievements of modern culture, which has produced a revolutionary increase in life expectancy and vitality at higher ages. In modern culture, ageism associated with the sidelining of elderly persons has become a maladaptive practice as it is a striking example of waste of human creativity and productivity.

Too often Alfred Sauvy's notorious image is seen:

*de vieilles gens qui ruminent de vieilles idées dans de vieilles chaumières*³²

Ageism should get the same negative connotation as racism, sexism, or inequity and needs to be addressed via equal opportunity ethos.

6.2.3.3 Reaching the Species-Specific Lifespan in Good Health

From an evolutionary point of view, the resources that modern culture invests, or should invest, in the extension of life expectancy at older ages seem to be contrary

³⁰For instance, Avramov and Cliquet (2003).

³¹Commission of the European Communities (2002), World Health Organisation (2002), United Nations (2002), Avramov and Maskova (2003).

³²“old people who ruminate old ideas in old dwellings” (authors' translation).

to the principle of maximising inclusive fitness. It may absorb resources necessary to assist the reproduction, education, health care and socio-cultural and socio-economic development of younger generations.

However, a closer look reveals that this apparent contradiction needs to be qualified. Avoiding morbidity and mortality at a younger age and allowing people to reach old age gives people the opportunity to fully develop their own genetic potentialities, and also creates the conditions for their parental and grandparental investment. It also prolongs the potential for the overall contribution to society by each individual.

The further increase of life expectancy is to be evaluated as a positive strategy as long as the results do not decrease quality of life. Not only does it enhance the opportunity to valorise the genetic potentials present in the gene pool of a population; it also promotes the emancipation and happiness of individuals, allowing them to complete every stage of their ontogenetic development. This strategy forms the basis for people to make an optimal contribution to society.

The obvious, and consequently recommended, method of further increasing life expectancy up to the species-specific potential is compressed morbidity,³³ resulting in a retardation of senescent processes and the maintenance of a healthy life course in old age up to or close to the end of life.³⁴ In this way, lifespan in old age would be characterised by a reduction of frailspan in favour of healthspan,³⁵ “adding life to years, not years to life”.³⁶

Investing resources in increasing life expectancy when senescent deterioration has gravely progressed, or when the dying process has irrevocably set in, needs to be carefully evaluated both from individual, family and societal points of view. This issue evokes the delicate and difficult problem of death control.

6.2.3.4 Managing the Dying Process

Sir Francis Bacon, an English philosopher and statesman, devised the concept of euthanasia early in the seventeenth century.³⁷ Derived from the Greek words *eu* (good) and *thanatos* (death), euthanasia means a good or easy death. Today euthanasia has come to mean an act or practice of painlessly putting to death persons suffering from incurable conditions or diseases—euthanasia *sensu largo*. In currently existing legislation, as well as in most attitudinal surveys about euthanasia, the concept is defined in a more restricted sense. Euthanasia defined *sensu stricto* is the prescription or administration of drugs by a physician with the

³³Other anti-ageing strategies such as ‘decelerating ageing’ (=senescence processes are delayed and average life expectancy and maximum life span are increased) and ‘arresting ageing’ (=senescence processes are reversed in adults, restoring vitality and function) (de Grey 2000) which are primarily aimed at extending human lifespan, would also have a substantially favourable effect on health at a greater age.

³⁴Fries (1980).

³⁵Bostrom (2005), Bostrom and Roache (2008).

³⁶Post and Binstock (2004).

³⁷Yount (2000).

intention of ending the suffering of an incurably ill patient at his/her explicit request. It entails the capacity of the patient to give informed consent.

Euthanasia—in its narrow as well in its broader sense—is obviously a subject on which people of different worldviews foster very different opinions.³⁸ Based on the ideologies of the great religious traditions, euthanasia is still illegal in most countries of the world. Muslims believe that only Allah has the right to end life; both Hindus and Buddhists teach respect for life and the belief that euthanasia is an interruption of karma; Jews and Christians base their objections on the Biblical commandment, “Thou shalt not kill”.³⁹ Consequently, in many countries another form of death control is being advocated and developed, namely palliative care.⁴⁰

Euthanasia and palliative care are considered to be fundamentally different practices, mainly due to ideological reasons, but in the view of the authors this opposition is in many respects quite artificial. The two approaches seem to be rooted in different ideological values. Euthanasia is ending the incurable suffering or decay by facilitating death; palliative care is end-of-life care helping patients to bear the suffering leading to death. However, the outcome of procedures for stopping treatment of the underlying disease and/or providing relief from symptoms in palliative care and euthanasia is quite similar in the sense that both relate to the ending of life, only with some difference in timing. Palliative sedation may be considered to be slow euthanasia.⁴¹

The religious opposition to euthanasia is based on the sanctity of life principle, because it is believed that all life comes from God and only God has the right to decide about its termination.⁴² There are also objections against euthanasia which are based on secular arguments, for instance, that human life is a basic good⁴³ and there are concerns about possible abuses.

The proponents of euthanasia rely on the combination of the principles of quality of life and personal autonomy or self-determination. They argue that terminally ill individuals should themselves have the right to make end-of-life decisions, in case they consider that their quality of life is degrading to such an extent that it is not worth being further artificially prolonged.⁴⁴ Oddly enough, both advocates and opponents to euthanasia often invoke the principle of human dignity to justify their positions.⁴⁵

³⁸For instance, Torr (2000), Haley (2003), Allen et al. (2006), Lindsay (2008).

³⁹Allen et al. (2006, 6).

⁴⁰Although often considered a form of compassionate medical care for the terminal ill, palliative care (from the Latin *palliare*, to cloak) is a much broader medical specialisation which is aimed at reducing the severity of disease symptoms, rather than providing a cure, in order to prevent and relieve suffering and to improve quality of life for people facing serious, complex illness. Ventafridda (2006) defines it as a multidisciplinary approach towards patients and their families during the progression of incurable illness, the advanced stages of disease and the last hours of life.

⁴¹Distelmans (2012, 23).

⁴²For instance, Pope John Paul II (1995, 102).

⁴³For instance, Boyle (1989), Gorsuch (2006).

⁴⁴For instance, Kohl (1992), Kurtz (1992), Lindsay (2008, 119).

⁴⁵Behuniak (2011).

The ethical dimension of the management of death is accentuated today and it may be expected to be even more prominent in the future, due to technological advances that allow for artificial prolongation of some vital functions. Artificial prolongation is in fact enhancement of the duration of the dying process, without improvement of the potential for life or the quality of life.

So far, only a few political jurisdictions have started to legalise euthanasia *sensu stricto* and have set up a number of rigorous requirements so that both patients and the medical profession are protected.⁴⁶ These include three European countries—The Netherlands (in 2001), Belgium (in 2002), and Luxemburg (in 2008). Colombia legalised euthanasia in 1997 but the lack of a clear regulatory framework has limited its practice. In Switzerland euthanasia *sensu stricto* is not prosecuted when it is done without self-interest.⁴⁷ Assisted suicide⁴⁸ is legal in Germany, Japan, Albania, and in the US states of Washington, Oregon, Vermont, New Mexico, Montana and California.⁴⁹

In many countries euthanasia is more and more being applied tacitly (usually in the form of strong palliative sedation), because the legislation is lagging behind societal and technological developments.⁵⁰ Legalisation would bring existing practices of (slow) euthanasia out of the grey area, and make them more open for the control of legal liability and protection of legal rights and obligations of both patients and medical care personnel.

Euthanasia *sensu largo*, meaning the terminating the life of patients suffering from incurable conditions or diseases irrespective of their own will, clearly raises another major ethical issue in the euthanasia debate, as it includes patients both with and without informed consent or an explicit request. Euthanasia *sensu largo* can, moreover, apply both to mentally competent as well as to mentally incompetent terminally ill patients.

The euthanasia legislation presently existing in the few countries that have taken this route is still very limited. For instance, in Belgium euthanasia is only allowed in its restricted sense (ending the suffering of an incurably ill patient at his/her explicit request) and is not applicable in the case of acquired incompetence (dementia). Furthermore, elderly people fall outside the law if they are not suffering unbearably from an incurable disease, but want to step out of life because they are suffering from many geriatric ills, lost their partner and have no meaningful future life perspective. There are continuous debates in Belgium about the extension of the right to euthanasia, for example in case of poly-pathologies being considered unbearable.

In 2014 the Belgian euthanasia law was extended to minors. The conditions are that the minor is ‘judgment proficient’ and that the parents or legal guardians agree

⁴⁶Deliens and Van der Wal (2003), Nys (2003), Griffiths et al. (2008).

⁴⁷Giroud et al. (1999), Bosshard et al. (2002).

⁴⁸Physician-assisted ‘suicide’ implies that a physician provides a lethal substance to a patient who can apply it at his/her own convenience. It stands in contrast to voluntary active euthanasia in which a physician performs the intervention requested by a patient.

⁴⁹Wikipedia: legality of euthanasia.

⁵⁰Gastmans et al. (2006).

to the request. The law provides for the possibility of euthanasia for minors only in the case of unbearable and hopeless suffering physically.

Regarding the delicate problem of active ending of life on infants, a remarkable and responsible initiative was developed at the Department of Paediatrics of the University Medical Centre Groningen (UMCG) in the Netherlands in the early 2000s, known as ‘The Groningen Protocol’ which is now applied all over the Netherlands.⁵¹ The Groningen Protocol deals with cases in which a decision is to be made to actively end the life of an infant (1) with no chance of survival, (2) with a very poor prognosis and dependence on intensive care without hope of recovery, and (3) with a hopeless prognosis, who experiences what parents and medical experts deem to be unbearable suffering. The procedure is subject to very strict conditions such as full agreement of the parents on the basis of a thorough explanation of the condition and prognosis and the agreement of a team of physicians, including at least one that is not directly involved in the care of the patient. After the intervention an outside legal body assesses the justification for the decision.

Two of the general ethical goals developed earlier—ontogenetic development of human-specific potentialities and the promotion of quality of life—lead to the logical conclusion that favours managing death. In the present phase of modernisation medicine is not yet able to prevent extreme human suffering, and it even produces unintended prolongation of severe terminal suffering or degrading regression. In the light of the use of life-supporting technology, it seems appropriate that people should have the right to refuse artificial prolongation of the dying process and/or the end to suffering that inevitably leads to death. In pre-modern living conditions, natural selection automatically and rapidly—although often painfully—eliminated serious forms of cognitive and physical deterioration and degeneration. This was nature’s way of avoiding the survival of human life that had lost its specific human nature. Euthanasia is a new form of cultural management of the dying process in which a person concerned has the last word.

6.2.3.5 Increasing the Human Species-Specific Lifespan Potential?

Whereas very few people will reject the goal of reaching the species-specific lifespan in good health, strong differences of opinion exist in the bioethical profession and literature on the question regarding whether to also pursue efforts to increase the human species-specific lifespan potential.

Bioconservatives usually fiercely reject the idea of striving towards extending human longevity beyond the current human species-specific potential. Some of them substantiate their claim on the basis of religious beliefs which accept, value, and submit to the way in which the professed God(s) created human nature, including the limited human lifespan and its embouchement in death. Leon Kass⁵² even makes the case for the virtues of mortality on the basis of a strange gallimaufry of moral benefits such as “interest and engagement”, “seriousness and aspiration”, “beauty

⁵¹Verhagen and Sauer (2005).

⁵²Kass (2002, 264).

and love”, and finally “virtue and moral excellence”. Other opponents of lifespan extending strategies refer to the fact that death is an inherent part of life and is needed for the continuation of the human species.⁵³ Some others invoke dangers of increasing inequalities and injustices in the availability or appropriation of (expensive) lifespan extending techniques, or fear that life-extending strategies would strengthen the age-graded hierarchies or considerably aggravate the currently already serious demographic imbalances regarding diminishing shares of young people.⁵⁴

At present, it is not yet possible to prolong the species-specific human lifespan for adults.⁵⁵ Nevertheless many biogerontologists are convinced that the future progress of the biomedical sciences will ultimately and perhaps even quite soon—possibly in this millennium—succeed in discovering the genetic mechanisms which result in senescent degeneration and death. By knowing the mechanisms, it may become possible to circumvent senescence, either via genetic engineering or by the means of technological interventions in ontogenetic developmental processes.⁵⁶ Contrary to what some bioconservatives moot,⁵⁷ no biogerontologist in their right mind ever suggested prolonging the human lifespan with its present load of degenerative phenomena in very old age. They only advocate prolongevity, namely a significant extension of the human lifespan, free from senescent diseases and disabilities.⁵⁸ Some visionaries even prophesy that future biomedical progress will not only prolong the natural human lifespan potential by a few tens of years but by many hundreds, if not thousands of years.⁵⁹

The perspective of extending the species-specific human lifespan also raises the thorny question of immortality.⁶⁰ Extending lifespan how far? Ten years, one hundred years, one thousand years? Why not infinitely?

How can lifespan extending aspirations and immortality ambitions be evaluated from an evolutionary point of view?

From an individual ontogenetic perspective there can be no doubt that, due to the individual drive for self-realisation and self-preservation, people would want to live a long (and healthy) life; and why not an eternal life? The comforting belief in an eternal hereafter in many religions (and the success of the many books on life after death)⁶¹ is an eloquent expression of this desire to perpetuate oneself in the (far) future. However, it can be expected that life extending aspirations in the modern knowledge-based world are no longer concentrated on the hereafter. Today science is advancing toward this goal through gene manipulation. At the same time advances in scientific knowledge render the probability of an existence of life after

⁵³For instance, Hayflick (1996).

⁵⁴For instance, Lewis (2001), Fukuyama (2002, 57ff), Chapman (2004).

⁵⁵For instance, Olshansky et al. (2002).

⁵⁶Bostrom (2005).

⁵⁷For instance, Fukuyama (2002, 68).

⁵⁸Gruman (2003).

⁵⁹For instance, Bacon (1627), Metchnikoff (1907), Stapledon (1930), de Grey (2007).

⁶⁰For instance, Ettinger (1965), Ettinger et al. (2005), Harrington (1969), Adams (2004), Zey (2006).

⁶¹For instance, Chopra (2006), D’Souza (2009), Kübler-Ross (2012).

death ever smaller. Whenever or wherever anti-ageing procedures are discovered, not only resulting in decreasing or eliminating senescent degeneration but also leading to a longer lifespan, there can be little doubt that many, if not most, people would want to take advantage of those discoveries. We see today the exponential growth of beauty- and health-improving cosmetic and medical industries that help to preserve youthful looks.

The desire to extend human longevity beyond its current natural boundary will have to be carefully matched against the risks of poor quality of life at very old ages and the prolongation of the dying process in pain and discomfort.

Furthermore, its meaningfulness will have to be compared to the length of the other stages of the life course.⁶² Indeed, from an evolutionary point of view, the potential lifespan of the human species is a biological feature that has been selected on the basis of the long maturation time of its offspring and relatively low human fecundity. As long as the duration of human biological maturation does not increase or other reproductive traits do not require a longer reproductive life phase, natural selection will not push toward a longer lifespan. From that viewpoint an additional prolongation of the potential lifespan seems to be a redundant, useless investment.⁶³ However, modernity has fundamentally changed the natural rules of the evolutionary game: the human species no longer wants to be the plaything of natural biological processes. It has embedded in its culture a strong desire to direct its own future evolution. The question is then, should efforts be made to prolong the human natural lifespan, should we strive for immortality?

Further extending the human-specific lifespan makes sense, not only from an ontogenetic point of view (because of our desire to live long and healthily) but also evolutionarily, with the perspective of a progressing hominisation which, by definition, will be characterised by a further extension of brain capacity. Based on the past hominisation trend, which was characterised by a positive correlation between brain expansion and lifespan increase,⁶⁴ it is quite likely that a further increase in brain capacity would also need a further extension of longevity. This is not only because of a possibly longer maturation time but also because of the longer time a more highly performing brain might (have to) be creative and functional.

From an individual transcending evolutionary point of view, lifespan extension will somewhat slow down the evolutionary process over time—as generation length is one of the determinants of the possible rate of intergenerational genetic change. However, this should not be a major evolutionary obstacle, given the very long time perspective during which life can be envisaged to further evolve on our present planet, namely some 500 million to one billion years. More important for the survival, or at least the well-being, of the species is that a longer lifespan will have an effect on the potential future size of the human species, the numerical stabilisation of which at a stationary or even reduced level might have to be compensated by even stronger birth controls than without further increasing longevity. Also, the

⁶²See also Temkin (2008).

⁶³Hayflick (2000), Perls and Fretts (2001).

⁶⁴Sacher (1959), Judge and Carey (2000).

concerns about the risks of increasing social inequalities and injustices in the availability or appropriation of (expensive) lifespan extending techniques have to be seriously taken into consideration. However, these social concerns, as well as the demographic effects related to further extending lifespan longevity, are primarily of an ontogenetic nature and may only indirectly be of phylogenetic importance, namely influencing the genetic future of the human species or its successor(s).

Enhancing individual longevity—within certain limits—does not seem to fundamentally endanger the future evolution of the human species or its successors, at least if ontogenetically it were to be properly managed. By contrast, the pursuance of individual immortality would considerably challenge further evolution of humankind. Immortality combined with the continuation of reproductive capacity could imply the end of generational replacement and continuous population growth. Immortality could fundamentally challenge strivings for further hominisation, which requires intergenerational genetic change. Indeed, we should be well aware of the fact that individuals cannot evolve: only populations (species) evolve. Hence, achieving individual immortality might, in theory, mean the end of hominin evolution. Some argue that preventing individual immortality is a necessary condition for achieving species immortality in the sense of the appearance and evolution of an endless series of successive future hominin stages.⁶⁵

Prevention may not be necessary as the practical realisation of immortality might prove to be less achievable than its theoretical premise. Indeed, John Harris⁶⁶ reminded us of the high probability that immortals, although genetically predisposed to live eternally, might not be completely invulnerable to life course accidents which might, on average, reduce their theoretical immortality to an admittedly high, but nevertheless time-limited longevity.

6.3 Sex Variability

6.3.1 Evolutionary Background of Sex Variability

6.3.1.1 Specificity of Human Sexuality

As already discussed in Chap. 2, Sect. 2.1.2.4, sexual selection shaped the specific human sexual dimorphic features in the course of the hominisation. The specificity of human sexuality is related to the decrease of the difference in parental investment between the two sexes and to the development of cooperative breeding.⁶⁷ This resulted in the establishment of more enduring relations between the sex partners. The ultimate explanation for the human sexual specificity is to be found in the singularity of the human offspring, which requires enduring and intensive care, due

⁶⁵For instance, Gyngell (2015) advances evolutionary arguments against radical increases in life expectancy in general.

⁶⁶Harris (2007, 68).

⁶⁷Isler and van Schaik (2012).

to its long-term neediness. The need for sustained care of children, not just their procreation, lies at the basis of the specificity of human sexuality.⁶⁸

The need for longer lasting sexual relations, increase in paternal involvement, and investment in ever longer maturing offspring in the course of the hominisation, necessitated a feminisation of the hominin male which resulted in a less aggressive, more cooperative, caring, providing and protecting partner, as well as a decrease in male-male competition.⁶⁹ Also, the hominin female developed specific sexual characteristics—such as concealed ovulation, large breasts, multiple erogenous zones, face to face sex interaction, shift from a cyclical toward a non-cyclical sexual readiness, capacity for orgasmic sex—all favouring the enduring interest of the male partner.⁷⁰

An evolved aspect of the specific human sexuality is the strong sexual drive, resulting in coital frequencies that surpass by far the amount needed for generational replacement. The strong sexual drive in the human is often misunderstood. It is not a relatively recent uneconomic maladaptation, as Raymond Cattell⁷¹ wrongly hypothesised, but one of the instruments produced by natural selection in order to facilitate the establishment and maintenance of enduring partner relations.

In the course of the hominisation process, dimorphism in secondary sexual characteristics, such as body size, musculature, assertiveness and energetic activity, competitive and aggressive behaviour, has not yet disappeared completely. The hominin transition from a scavenger-gatherer economy to a hunter-gatherer economy was accompanied not only by increased paternal investment but it also resulted in, and even necessitated, a sex-specific task and role division. Women continued to specialise—very successfully—in caring for and socialising ever slower maturing children and in more sedentary food gathering.⁷² In contrast, men concentrated on strongly mobile (group) hunting, initially on small game, and later also on larger prey, and on the defence and conquest of women and territories.⁷³ This task and role division engrafted itself onto the existing sexual dimorphism in robustness of the early hominins. However, robustness has decreased due to the increasing paternal investment and relaxation of natural selection due to the development of technology.⁷⁴ It is not impossible that still other factors, such as protection against predators,⁷⁵ the effect of larger body size,⁷⁶ or the remnants of ancestral genetic

⁶⁸The care of the big-brained, long maturing hominin infant influenced not only the evolution of the cooperative breeding of the parents but also involved support from other family members such as juveniles (e.g. Kramer and Otárola-Castillo 2015) and grandmothers (e.g. Hill and Hurtado 1991).

⁶⁹Symons (1979), Cliquet (1984), Rancour-Laferriere (1985), Lancaster et al. (1987), Ridley (1993), Geary (1998), Miller (2000), Cieri et al. (2014).

⁷⁰Lancaster (1985), Rancour-Laferriere (1985).

⁷¹Cattell (1972, 245).

⁷²Dahlberg (1981), Slocum (1980).

⁷³Chagnon (1990).

⁷⁴Brace and Ryan (1980), Frayer (1980), Frayer and Wolpoff (1985).

⁷⁵DeVore and Washburn (1963).

⁷⁶Leutenegger and Cheverud (1982).

make-up,⁷⁷ have also played a role in the reduction of sexual dimorphism in *Homo sapiens sapiens*. Very probably our current sexual dimorphism is multifactorial in origin.⁷⁸

The moderate sexual dimorphism of *Homo sapiens sapiens* is a good example of an evolutionary compromise, whereby selective pressures operated in different directions. It resulted in the preservation of (reduced) male robustness and aggressiveness; at the same time it adapted to the needs of group hunting and territorial defence and conquest and to the enhanced requirements of cooperation and sociability with respect to relational and parental investments in large brained and long maturing offspring.⁷⁹

The still existing sexual dimorphism between males and females, not only in body build, genital sexuality and reproduction but also in mind (mental aspects of sexual differentiation),⁸⁰ has an important consequence that males are somewhat more oriented toward impersonal sexuality (sex dissociated from love) whereas females are more focused on personal sex (sex with carefully selected partner).⁸¹ This helps to explain phenomena such as the higher prevalence of polygyny over polyandry, the stronger desire or actual behaviour of many men in having sexual intercourse more quickly, more often and with more partners. Another consequence of the human sexual dimorphism is that, in strongly hierarchical societies, men not only compete with other men but also control and exert power and dominance over women.⁸² This is, for instance, manifested in the association of patriarchy and non-democratic societies, with the higher prevalence of male sexual intimidation, harassment, abuse, and even rape in some circumstances. The sexually generously equipped but reproductively poorly armed human males strived to control women by all means including segregation and imposing submissiveness due to the fear of the cuckoldry syndrome.⁸³

There is strong evidence that the hominisation process was characterised by a shift from promiscuous sexuality, over polygamy and toward monogamy.⁸⁴ As a long-term mating strategy, monogamy had numerous important evolutionary advantages. Children in a monogamous family have a higher coefficient of relationship than in any other social unit;⁸⁵ women can garner far more resources for their children through a single spouse than through several temporary sex partners.⁸⁶ Furthermore, monogamy increases paternal certainty; and children's survival and later reproductive success is more likely as a result of higher paternal investment.⁸⁷ Monogamy may be said to be the expected outcome of K-selection

⁷⁷Cheverud et al. (1985).

⁷⁸Plavcan (2001).

⁷⁹Buss and Malamuth (Eds.) (1996).

⁸⁰Cliquet (2010, 199–210).

⁸¹Malamuth (1996, 275).

⁸²Buss (1996, 306), Wrangham and Peterson (1996).

⁸³Hiatt (1989), Taylor (2002), Geary (2006).

⁸⁴For instance, Marlowe (2003), Chapais (2013).

⁸⁵Melotti (1980).

⁸⁶Buss (1999).

⁸⁷Buss (1999).

processes in which parental investment is equalised between the sexes.⁸⁸ Monogamy decreases sexual competition and increases social cooperation and bonding between males.⁸⁹ In the transition from hunter-gatherer to agrarian economy, with its increasing residential population and higher risk of sexually transmitted infections, socially imposed monogamy groups may have reduced the exposure to such diseases.⁹⁰ The adoption of intensive agriculture favoured the establishment of monogamous unions because ownership of land became critical to productive and reproductive success.⁹¹ Monogamy contributes to the establishment of democracy and the harmonious functioning of larger societies in which sexual competition between males is further reduced and their likelihood of cooperativeness increased.⁹² Normatively imposed monogamy reduces the number of unmarried men, also resulting in a decrease in crime, rape and murder, thereby also heightening success in competition between populations.⁹³

Polygamy, in particular polygyny, is obviously in the interest of dominant powerful males, producing salient male-male inequalities.⁹⁴ It is usually prevalent in societies with strong differences in wealth between males, and with authoritarian governments needing to suppress the sexually have-nots.⁹⁵ It is a form of partnership that is inadequate in modern, large size societies where male-male relations have strongly shifted from competition to cooperation and to more egalitarianism.

However, in socially monogamous societies extra-pair mating is a not uncommon practice. For males, extra-pair mating is evolutionarily explained as a secondary mating strategy aimed at spreading genes over a larger number of partners. For females, the evolutionary advantage is thought to rely on obtaining an increase in quality of genetic offspring.⁹⁶ Recent genetic research findings confirm the genetic underpinnings of variation in extra-pair mating in humans and the ancient biological evolutionary background of this mating strategy.⁹⁷

An important factor for understanding the sexually differential mating strategy in the human is the strongly age-linked sexual differences in the capacity to produce additional viable offspring. In the human species, the male's reproductive capacity is huge and is, from puberty onward, relatively independent of age. In contrast, women's fecundity is low and strongly time dependent.⁹⁸ Women's reproductive capacity is strongly associated with age-varying physical and behavioural features such as general body build, in particular waist-hip ratio,⁹⁹ youthful facial traits,

⁸⁸MacDonald (1995).

⁸⁹Chapais (2013).

⁹⁰Low (1990), Bauch and McElreath (2016).

⁹¹Fortunato and Archetti (2010).

⁹²Alexander (1971; 1979), Betzig (1986), Holcomb (1993), Ridley (1993), Volland (1993), MacDonald (1995), Van Schaik and Michel (2016, 136).

⁹³Henrich et al. (2012).

⁹⁴Kanazawa and Still (1999), Marlowe (2000), de la Croix and Mariani (2015).

⁹⁵Betzig (1995), Arnhart (1998), Geary (1998, 156), Rubin (2002, 118).

⁹⁶Buss and Schmitt (1993).

⁹⁷Garcia et al. (2010), Zietsch et al. (2015).

⁹⁸Eaton and Mayer (1953), Charbonneau (1979), Nieschlag (1986).

⁹⁹Singh (1993), Hughes and Gallup (2003), Streeter and McBurney (2003).

breast form, skin and muscle tone, fat distribution, and energy level.¹⁰⁰ Physically attractive and behaviourally dynamic features peak at younger ages. Therefore, youth and physically attractive features were in the past considered to be strong indicators of high reproductive value¹⁰¹ and are still highly valued by men today.¹⁰² Indeed, women tend to maximise their youthfulness and display their youthful physical appearance.¹⁰³ Women systematically show a stronger preference for resourceful, somewhat older, caring men who are willing to invest time, energy and emotion. Women also have a preference for men with bodily and facial features that express strength, social dominance, but also sociability and confidence. Height is a typical and well-known example of such a feature: it is perceived as a sign of social status, dominance and protection.¹⁰⁴

6.3.1.2 The Origin and Evolution of Love

Love is one of the fundamental behavioural characteristics of the human species. It is largely biologically determined.¹⁰⁵ In the expert literature, two major aspects of love are distinguished: compassionate love (sexual desire) and companionate love (romantic love). Although both are usually related, they are considered to have a different evolutionary origin and function—the first being an expression of the reproduction related mating system, the second an expression of the pair-bonding system that evolved as a function of raising slowly maturing offspring. Both components are controlled by distinct patterns of brain activation.¹⁰⁶

The origin of love between heterosexual adults can be traced back to the earliest hominin ancestors, because it formed the psychological foundation of the social bond that made, via increasing bi-parental care, an essential contribution to the survival of children.¹⁰⁷ The experience of love can be detected in virtually every human population: strong evidence of its existence is found not only in all literate civilisations¹⁰⁸ but also in most preliterate societies.¹⁰⁹

The presence of biological predispositions for love does not mean that they will automatically and universally manifest themselves. These predispositions need to be socially and culturally fostered. Love may get competition from other drives or its expression may be suppressed in particular living conditions. The experience of love may depend upon the degree of enduring compatibility between partners. Last but not least, there may be individual variation in the (genetic and ontogenetic) ability to develop long-lasting affectionate feelings. Consequently, one may expect

¹⁰⁰Barber (1995).

¹⁰¹Fisher (1930), Williams (1975), Howell (1979).

¹⁰²Buss (1989), Thiessen et al. (1993), Bereczkei and Csanaky (1996), Wiederman and Kendall (1999), Lee et al. (2014), Antfolk et al. (2015).

¹⁰³Kachigan (1990), Moir and Jessel (1992).

¹⁰⁴Ridley (1993).

¹⁰⁵For instance, Fisher (1992), Bartels and Zeki (2000), Emanuele et al. (2007), Savulescu and Sandberg (2008).

¹⁰⁶See, for instance, Diamond (2004), Fisher et al. (2005), Gonzaga et al. (2006).

¹⁰⁷Mellen (1981), Gangestad (2011, 125).

¹⁰⁸For instance, Mellen (1981), Buss (1994).

¹⁰⁹For instance, Westermarck (1922), Jankowiak and Fischer (1992), Jankowiak (1995).

a substantial variation, within as well as between populations, in the prevalence and the degree of development of durable affectionate relations. Most men and women continue to opt for durable attachments also in situations where people have a relatively broad opportunity to choose the type of partnership and living arrangement.¹¹⁰ Even most of those who end a cohabitation or marriage often seek a new durable partnership.

The evolutionary origin of love, and particularly of its companionate component, is grounded in the cooperation between the sexes which is aimed at securing parental investment in offspring.¹¹¹ The view that human love is an evolved feature, selected for its function in meeting the needs of slowly maturing offspring, is perhaps less easy to accept than the conclusion that relationships between parental affection and child development have an evolutionary basis. Indeed, in many cultures, the drives for protection, survival and economic security in partnerships seem to be preponderant over affectionate needs, for instance, as can be seen in arranged marriages. Moreover, cross-cultural studies of marital patterns,¹¹² as well as studies of sexual behaviour in modern culture,¹¹³ have documented the mildly polygamic nature of the human—at first sight this feature might seem to be at odds with the need for enduring love. However, the presence of and competition between several drives, such as the need for love, the desire for several sexual partners, and the urge for resource acquisition, does not repudiate their existence and functionality. Clearly, in some socio-ecological conditions one or the other of these drives may become predominant. It is quite understandable that economic drives may have prevailed over affectionate needs in ancestral conditions of material hardship where mere survival was at stake. It is also quite understandable that, according to Louis Roussel,¹¹⁴ from the end of the eighteenth century the idea of happiness became the preponderant foundation of marital and family life in the West. In conditions where vital basic needs (essential for individual or group survival) are satisfied, emotional needs, and also derived and acquired needs, may take precedence.¹¹⁵ Thus, the process of modernisation is very probably characterised by a major shift from survival to love as the basis of family life.¹¹⁶ However, it would be a mistake to think that romantic love is a Western invention. There is sufficient evidence that shows the universal nature of love.¹¹⁷

6.3.1.3 Evolution of Sexual Deviations

The human species is characterised by the presence of several forms of sexuality that deviate from the majority pattern of human heterosexuality and reproduction.

¹¹⁰Laumann et al. (1994), Corijn and Klijzing (2001).

¹¹¹For instance, Buss (2007, 379, 380).

¹¹²Westermarck (1922), Murdock (1961), Mellen (1981).

¹¹³Kinsey et al. (1948; 1953), Spira et al. (1993), Laumann et al. (1994), Wellings et al. (1994).

¹¹⁴Roussel (1989).

¹¹⁵Montagu (1955), Maslow (1972).

¹¹⁶Farrell (1993), Gray and Garcia (2013).

¹¹⁷Jankowiak and Fischer (1992), Buss (1994, 2007), Fisher (2004).

Examples are celibacy, homosexuality, philandering, incest, prostitution, sadomasochism, fetishism, rape, paedophilia, exhibitionism, voyeurism and transvestism.¹¹⁸

From an evolutionary perspective, sexual deviations are quite specific behavioural phenomena, several of which are difficult to explain. With the exception of evolutionary studies about incest,¹¹⁹ homosexuality,¹²⁰ rape¹²¹ and occasionally pornography¹²² and prostitution,¹²³ very few evolutionary analyses have been made of the evolutionary origin of sexual deviations.¹²⁴

John A. Hewitt's¹²⁵ thesis is that some sexual deviations may be by-products of particular sexually related forms of behaviour that had evolutionarily meaningful functions such as male-male bonding (leading to homosexuality), sexual dominance/submissiveness (leading to sadomasochism, rape, and even coercive forms of marriage arrangements), the need for long-term child care or even the preference for youthful reproductive traits (leading to paedophilia), and the need for division of labour (leading to fetishism). If such a by-product is reproductively maladaptive, the evolutionary trend that produces the sexual deviation will be counteracted by a lower reproductive fitness, resulting in a stable evolutionary state with the deviation reduced to a demographic rarity.

Sexual deviations occur in both sexes but most, if not all, are much more prevalent in men than in women.¹²⁶ There are probably several proximate factors causing this striking difference, some of which may also be deviation specific. Hewitt has given a plausible evolutionary explanation: since men can fertilise several women, on average they are reproductively more disposable than women and can acquire traits that fulfil other functions. Women's reproductive investment in each offspring is much higher, costly and makes her more vulnerable and selective in her reproductive strategies.

Another way of viewing some sexual deviations consists of the possibility that sexual deviations are by-products of the evolution of the hominin brain which

¹¹⁸In the sexological literature, the definition of sexual deviation shows some variation. Some authors limit it to activities involving a non-human object, a non-consenting partner such as a child, or pain or humiliation of oneself or one's partner (<http://www.thefreedictionary.com/Sexual+deviations>); others include many more variants such as homosexuality, exhibitionism and voyeurism (e.g. Hewitt 2002). Here, the authors also include forms of behaviour such as celibacy and promiscuity, which deviate from the 'normal' pattern of human heterosexuality and reproduction.

¹¹⁹Westermarck (1906; 1922), Van den Berghe (1980), Shepher (1983), Wolf (1995), Wolf and Durham (2004), Turner and Maryanski (2005).

¹²⁰Muscarella et al. (2001), Wilson and Rahman (2008), Vasey and VanderLaan (2014).

¹²¹Buss and Malamuth (1996), Thornhill and Thornhill (1983), Thornhill and Palmer (2000), Brown Travis (2003).

¹²²For instance, Seto et al. (2001).

¹²³For instance, Burley and Symanski (1981), Buss (1994), Schmitt et al. (2001), McGuire and Gruter (2003).

¹²⁴For instance, Goodman (1998), Hewitt (2002), Shepher and Reisman (1985).

¹²⁵Hewitt (2002).

¹²⁶McAnulty and Burnette (2006).

allows it, in combination with some other biological features or drives, to develop behavioural patterns which are modifications of the basic biological drive.

For instance, the origin of human homosexuality, in the sense of a lasting erotic and emotional preference for members of the same sex as a persistent form of behaviour during the life course, has been considered as a by-product of some facets of the hominisation process. Notwithstanding its lower reproductive success,¹²⁷ i.e. its largely maladapted nature,¹²⁸ homosexuality is maintained in the population at a relatively high frequency¹²⁹ which cannot only to be accounted for by recurrent chance mutations. Hence, evolutionary scientists have been looking for compensating reproductive advantages that this type of behaviour might have had in human evolution and its genetic or ontogenetic mechanisms.

Several explanations have been suggested: homosexuality has some selective advantage due to the presence of genetic variants with pleiotropic effects (sexually antagonistic selection promoting higher fecundity in females and homosexuality in their male offspring)¹³⁰ particularly in socially stratified societies,¹³¹ or genetic variants that interact with other alleles in particular genotypes resulting in heterosis.¹³² Another group of explanations relate to interactions between individuals, including theories based on kin selection,¹³³ reciprocity,¹³⁴ parental manipulation¹³⁵ and homosociality.¹³⁶ A third group of explanations suggest that homosexuality is a by-product of the feminisation process during human evolution.¹³⁷ Sydney Mellen¹³⁸ sees homosexuality as a side effect of a galloping hominisation that advantaged less aggressive, more social, sensitive and communicative males, resulting in an excessive feminisation of some male individuals. An alternative possibility is that it is a consequence of neotenic changes, which caused certain terminal stages of male behavioural differentiation to arrest at a late premature stage in some individuals—a development that went a little bit too far in its trend. This feminisation side effect theory would also explain why homosexuality is much less prevalent among women who had, in the EEA, no reason to become more mas-

¹²⁷For instance, Bell and Weinberg (1978), Schwartz et al. (2010).

¹²⁸Ellis and Symonds (1897).

¹²⁹For instance, Spira et al. (1993), Laumann et al. (1994), Wellings et al. (1994).

¹³⁰Hamer and Copeland (1995), Camperio-Ciani et al. (2004; 2012), Zietsch et al. (2008), Bonduriansky and Chenoweth (2009), Schwartz et al. (2010), Blanchard (2011), Camperio-Ciani et al. (2015); see also Chaladze (2016).

¹³¹Barthes et al. (2013).

¹³²Hutchinson (1959), Kirsch and Rodman (1982), MacIntyre and Estep (1993), Miller (2000).

¹³³Wilson (1975), Weinrich (1978), Blanchard (1997), Apostolou (2013), VanderLaan et al. (2013).

¹³⁴Trivers (1971).

¹³⁵Trivers (1974); see discussion in McKnight (1997, 145–159), and in Kirkpatrick (2000).

¹³⁶Kirkpatrick (2000), Ross and Wells (2000), Fleischman et al. (2014).

¹³⁷Mellen (1981), Miller (2000), Rahman and Wilson (2003).

¹³⁸Mellen (1981).

culine.¹³⁹ Also, Geoffrey Miller¹⁴⁰ has suggested that male homosexuality is a by-product of variable brain feminisation, produced by a polygenetic system in which single alleles for greater sensitivity, empathy, tenderness, and kindness make heterosexual carriers of those genes better fathers and more attractive mates. Rahman and Wilson¹⁴¹ proposed that variations in genotypes produced hominin males who were more feminine in behavioural traits and bisexual in sexual preferences. Females were attracted to such males because they were associated with decreased aggression and infanticide, and superior parenting behaviour. Over time, this choice led to the evolution of alleles associated with exclusive homosexual interest.

6.3.2 Changes of Sex Relations in Modernity

Scientific knowledge, in interaction with modern ideologies—the ideals of the Enlightenment and the French Revolution, liberalism, socialism, humanism, and in particular feminism—is profoundly changing traditional sexual attitudes and behaviour in modernity.

6.3.2.1 Gradual Shift from Women's Subordination to Women's Empowerment

Hunter-gatherer societies are, on average, characterised by relatively equal sex relations. By contrast, due to the emergent availability of energy- and nutrient-rich staple food or livestock, the agrarian-pastoral cultural phase made use of the sexual dimorphic heritage of the hunter-gatherer era to establish or strengthen the patriarchal and socially dominant position of men in a societal context of increasing social inequalities of all kinds. Hence, social and sexual suppression of women increased considerably in agrarian-pastoral societies; this was characterised by an accumulation of material property in which women were, just like staple food or livestock, considered to be property.¹⁴² Sexist¹⁴³ attitudes developed in all its aspects—exclusion of women from economic production and control, resulting in low social status; prohibition from owning property, involvement in politics, and receiving education; seclusion of women and the restriction of many of their

¹³⁹However, the greater sexual fluidity in women might have been an adaptation to the need for cooperative breeding which was a strategy through which ancestral women obtained additional investment for their offspring in order to compensate for common crises such as rape, paternal desertion or death (Kuhle 2013; see also Kanazawa 2016). Another explanation for the divergence of exclusive heterosexual orientation in women is that, in pre-modern living conditions, selection pressures against alleles for such orientations were weak because of the strong parental and partner control of female mating behaviour (see Apostolou 2016).

¹⁴⁰Miller (2000).

¹⁴¹Rahman and Wilson (2003).

¹⁴²Wood and Eagly (2007, 387); see also Konner (2015).

¹⁴³The term 'sexism' has been coined to define ideological and social systems in which sexual variation is used as a primary criterion to assign normatively differentially valued roles and tasks in society (Duberman and Azumi 1975).

activities and rights; confinement to what is called in German language the notorious three Ks: “*Kirche, Küche und Kinder*”¹⁴⁴; close surveillance over female sexuality, premarital virginity and extramarital sex; development of double standards in sexual matters; and last but not least, the religious-ideological foundation, endorsement and enforcement of the biological inferiority and social subordination of women.¹⁴⁵

Sexist attitudes and behaviour continued to prevail in early modernisation, and even today they are not completely eradicated. There may be four main reasons for this phenomenon: (1) the religious values and norms of the agrarian-pastoral era, with their ideological affirmation of women’s biological inferiority and social subordination, are still with us and continue, albeit with decreasing intensity, to exert their influence on sexual relations;¹⁴⁶ (2) the social structural features of the agrarian era largely continue to survive in modern society, which is structurally and functionally still strongly tailored to men; (3) the biological specificity of men allows, or even forces, them in the context of the competitive nature of modern culture, to make use of their larger male body build and greater muscular strength and speed, to satisfy their strong ejaculatory needs, and to exert their drives toward energetic activity, assertiveness and risk-taking behaviour—all features which, in particular circumstances, can easily turn into aggressive and violent behaviour (toward women); and (4) last but not least, the human male remains confronted with a human female whose specific biological characteristics—such as being the preferred object for sexual intercourse and satisfaction, characterised by hidden ovulations, and being the bearer of children—not only make him compete with other males for mating and reproductive behaviour, but make him—in the modern emancipatory, egalitarian, and contraceptive culture vis-à-vis females—a requesting and, to make matters worse, depending party.

The interaction of the traditional ideological indoctrination on sex differences, the social structural and functional features of modern society favouring men’s social status, and the biological specificity of human males, continue to make many men believe in their biological superiority and, hence, their social prerogatives.¹⁴⁷

Although the authors share the view of Ross Honeywill¹⁴⁸ that modernity was—initially—largely a masculine enterprise, it is thanks to the development of modernity and, in particular (biological) science, that knowledge about the sexes and their traditional power relations started to change fundamentally. New knowledge about the differences in the nature and the abilities of both sexes makes it possible to have the necessary changes in conceptions, attitudes, values and

¹⁴⁴“*Kirche, Küche und Kinder*”: church, kitchen and children.

¹⁴⁵Karimi-Boosherhi and Rasouli-Nia (1988), Jogan (1989).

¹⁴⁶Due to immigration from developing countries, in particular with an Islamic religious or cultural background in which women are considered male property, Western societies are increasingly confronted with an upsurge of traditional macho or sexist attitudes and forms of behaviour; they are even experiencing behavioural phenomena such as veiling, honour killings and female genital cutting which had belonged for a long time in the past or they were never part of Western cultural traditions (Manji 2003; Bawer 2006; Van Rooy and Van Rooy 2010).

¹⁴⁷For instance, Goldberg (1973, 1993), Farrell (1993), Connell (1995), Bly (2004).

¹⁴⁸Honeywill (2016, 17).

norms. Biology simply swept away the traditional views on the nature of the sexes and destroyed the ideological foundations of sex inequality and inequity.

However, the application of science in the fields of medicine, economy, and technology is at least equally important. In the first place, biomedical knowledge has induced a revolutionary level of mortality control, the ultimate condition more particularly relevant to women's new opportunities. Modern medicine largely freed women from the high risks of infant and maternal mortality and morbidity, whilst control of infant mortality allowed—and in the end favoured—fertility control. This liberated women from virtually permanent pregnancies and allowed the establishment of a balance between reproductive, productive, and recreational functions in modern society. Of considerable importance in this respect is the development and availability of safe and effective methods of birth control. Modern contraception has had a considerable impact on the subjective perceptions and experiences of both sexes. Women are moving into a completely different power position.¹⁴⁹ Men have lost their position of control over women's sexual and reproductive behaviour and now need to negotiate out of a much more humble and equal status position than in the pre-contraceptive era.

6.3.2.2 Progressive Shift to More Sexual Equality

Overall, modernisation is characterised by a gradually decreasing inequality in a broad range of traditionally different behavioural patterns between the sexes, regarding sexuality, education, occupation, economic activity and political activation.

Several characteristics of modern societies—monogamous mating, humanistic and egalitarian ethos, democratic decision making, aggression prohibiting or controlling polity, complexity of cooperative interactions between citizens—have a suppressing effect on the traditional physical male-male competition. They are producing a shift in this competition away from physical confrontations toward various domains of social competition such as educational, occupational and economic success.¹⁵⁰ At the same time, the modernity features, and their effect on the changing male-male competition and decreasing male dominance over female behaviour, allow a fuller expression of female choice in various domains of social life, not the least in mating behaviour but also in domains such as education, occupation and leisure.

Some authors have advanced the thesis that modernisation is also influencing the physical condition of males, with important consequences for sex relations. The modern cultural environment could accelerate the male feminisation process that was phylogenetically concomitant to the hominisation process. Modern living conditions are indeed characterised by a decrease in the need for the typical old-time masculine attributes such as muscular strength, physical endurance and aggressiveness.¹⁵¹ Modern technological developments in economic production,

¹⁴⁹Van der Dennen (1995), Batten (1994), Cronin (2006).

¹⁵⁰For instance, Geary (1998, 142).

¹⁵¹For instance, McAllister (2009); see also Farrell (1993), Tiger (1999), Sykes (2003).

but also in warfare, as well as the humanisation of interpersonal and intergroup relations, make the old-time masculinity features less necessary or desirable. Moreover, due to the increasing female emancipation, economic independence through work, social protection measures and modern methods of birth control, men have largely lost their double social control system—providing and impregnation—over women.¹⁵²

6.3.2.3 Steady Shift from Sexual Repression to Sexual Emancipation

Modernity is also fundamentally changing the attitudes and behaviours regarding the repression of sexuality, more particularly—albeit not only—for women. The traditional suppression of any sign of a healthy sexual behaviour and pleasure is gradually being replaced by the acceptance of sexuality as an important and humane source of energy and happiness. In modernity, at last we are witnessing the first signs of development of an emerging sexual education, a real sexual emancipation and a true sexual culture.¹⁵³ However, there is still a long way to go.

For instance, sex education was only introduced in most advanced countries in the course of the second half of the twentieth century.¹⁵⁴ However, in some countries where sex education is offered, such as the United States, parents have the right to refuse to let their children take part in the lessons.¹⁵⁵ Often sex education is limited or diluted to physical or health and reproductive aspects and does not sufficiently deal with the specificity of human sexuality, namely affectionate relations. Also, in many countries delicate aspects such as contraception and abortion are not dealt with adequately. In the United States, many schools only deal with the so-called abstinence-only approach of sex education that promotes abstinence from sex but does not teach about contraception or condom use and avoids discussion about abortion.¹⁵⁶ Research reveals no evidence that abstinence-only sex programmes would delay sexual initiation, decrease the frequency of sexual intercourse or number of sexual partners, or reduce sexual transmitted infections (STIs) or pregnancy.¹⁵⁷ By contrast, more comprehensive sex education programmes appear to produce these effects.

6.3.2.4 Moderate Shift from Sexual Abuse to Sexual Safety

The gender emancipation in modernity has had an effect that traditional forms of sexual coercion, such as forced or arranged marriages, or hidden forms of sexual abuse such as incest, rape, forced prostitution or paedophilia, are no longer tolerated or come into the open and can be more effectively fought.

¹⁵²For instance, Tiger (1999).

¹⁵³Abramson and Pinkerton (1995), Kontula and Haavio-Mannila (1995), Comfort (2003).

¹⁵⁴Bruess and Greenberg (2008), Sauerteig and Davidson (2008), Schroeder and Kuriansky (2009).

¹⁵⁵<http://www.ncsl.org/research/health/state-policies-on-sex-education-in-schools.aspx>.

¹⁵⁶For instance, Santelli et al. (2006), Ott and Santelli (2007), Kohler and Lafferty (2008).

¹⁵⁷For instance, Collins et al. (2002).

The humanistic ideals of the modern democratic ideologies reject and condemn all forms of sexual coercion, also those that were accepted as normal or even the norm in traditional ideologies. In particular, this refers to forced or arranged marriages which (often) implied that the resulting sexual relations were not the outcome of personal choices or love of the partners, but were forced upon them because of ideological, social, cultural, economic or political interests of the parental family or broader community.

Although strong forms of incest are rejected in most cultures (incest taboo), the repression of sexuality in traditional ideologies had as a—presumably unintentional—consequence that incestuous behaviour was often hidden, unreported and, consequently, unpunished. The more open sexual climate in modernity facilitates incestuous abuses to become (more) public and to be sanctioned against. The changing climate also raises the moral awareness about incestuous abuses and may have a preventing effect. The increasing number of reported cases of incestuous abuse has raised the question as to whether the less repressive sexual climate is not the cause of this increase. Expert opinion seems to tilt toward the view that the increasing recorded frequency of forced incest is indeed the result of the greater openness to deal with this social pathology which remained hidden in earlier times, rather than a real increase due to a relaxation of the sexual mores in modernity.¹⁵⁸ However, it is not impossible that incest between consenting adult relatives might somewhat increase, now that efficient contraception or selective abortion can prevent the unfavourable genetic effects of inbreeding. Although the human species is, just as many other organisms, endowed with an incest avoiding predisposition, this aptitude is relatively weak and variable, and therefore it needed to be reinforced by a culturally induced incest taboo.

Forced prostitution and rape are practices that are rejected and punished in all cultures—except perhaps in conditions of war.¹⁵⁹ Although in pre-modern times rape may have been an evolved alternative reproductive strategy for males who were unable to successfully attract desirable females,¹⁶⁰ in modern civilisation it is considered as a severe form of sexual abuse. In the past, and often even today, due

¹⁵⁸Feldman et al. (1991).

¹⁵⁹Gottschall (2004), Kivlahan and Ewigman (2010).

¹⁶⁰In contrast to the feminist theory (e.g. Brownmiller 1975; Mardorossian 2004) and the social learning theory (e.g. Malamuth 1980) of rape, the evolutionary theory of rape endeavours to look at the more distant (ultimate) causes of this form of sexual deviance, also taking into account proximate factors of social and biological nature. From an evolutionary perspective, rape is seen as a secondary reproductive strategy of individuals, mainly males, who have no ability or occasion, either due to female rejection or parental objection, to establish a long-lasting sexual relationship or investment in offspring. The predominance of rape among the male sex is explained by the fact that human males are still characterised by a smaller parental investment in offspring, and that they may increase their reproductive fitness by inseminating several females. Although there are strong selective forces against rapist behaviour (from females as well as from ‘other’ competing males) natural selection has apparently succeeded in preserving this violent form of sexual behaviour as a minority phenomenon (Denno 1998–1999; Thornhill and Palmer 2000; Brown Travis 2003; Zeedyk 2007; Apostolou 2013). It can be expected that in modernity, where contraception and induced abortion are broadly available, this form of behaviour will be more strongly selected against (see also Blum 1998, 251).

to overt or covert forms of sexism and misogyny, as well as the sexually repressive climate of traditional, male dominated society, rape resulted in laxity in prosecution, or even generation of guilt feelings among the victims. In many cases, due to the persistent sexist climate—cf. the widespread rape myths¹⁶¹—victims do not even report this crime because of the shame and social stigma associated with this humiliating and damaging sexual assault.¹⁶² The raising standards on quality of life and social justice in modernity gradually result in an increased reporting of rape and sexual assault and conviction of rapists. Nevertheless, research indicates that many sexual assaults are still never reported to police.¹⁶³ Modern(ising) societies still have a long way to go in order to adequately deal with this unacceptable scourge.¹⁶⁴

Paedophilia—sexual activity by an adult with a prepubescent child—is a practice that is not accepted in modern society where the social, spiritual and moral well-being and physical and mental health of children are highly valued. Children should have the right and opportunity to develop, at their own pace, their own sexuality and not be abused by dominant and egocentric adults who may be genetically and/or environmentally predisposed to such behaviour. Art. 19.1 of the United Nations Convention on the Rights of the Child¹⁶⁵ explicitly states that the child should be protected “from all forms of physical or mental violence, injury or abuse, neglect or negligent treatment, maltreatment or exploitation, including sexual abuse, while in the care of parent(s), legal guardian(s) or any other person who has the care of the child.” The recent scandals in the Roman Catholic Church, concerning sexual abuse of minors by clergy, which have become public in many countries, are a typical example of the increasing public awareness and rising moral standards in the domain of sexual relations involving adults and children.¹⁶⁶

6.3.2.5 Demographic Shift from Life-Long to Serial Monogamy

The life-long monogamy ideal in traditional Western societies has never existed in practice, either due to high mortality of women at childbirth, or to various forms of hidden or more or less tolerated extramarital sexual relations. Partnership in modernity is evolving towards a larger variety in partner relations and the number of partners.

The number of sexual partners over the life course has been increasing, due to the increasing occurrence of premarital sex in adolescence, the increase in successive relations as a result of the breaking-up of unions (separation or divorce), reconstitution of new partnerships (remarriage, successive cohabitations), and the increase in multiple partnerships, either simultaneous or subsequently.

¹⁶¹For instance, Suarez and Gadalla (2010).

¹⁶²For instance, Kilpatrick et al. (1992); Kilpatrick (2000), Suarez and Gadalla (2010).

¹⁶³Kilpatrick et al. (1992), Jones (1999), Kilpatrick (2000), Ellis (1989, 3).

¹⁶⁴Westmarland and Gangoli (2012).

¹⁶⁵United Nations (1989).

¹⁶⁶Pilgrim (2011).

However, from recent representative sex surveys¹⁶⁷ it appears that the large majority of people want and live in long-lasting monogamous relations, or reconstitute such type of relations after a break-up. Successive monogamy has again become a statistically important phenomenon, albeit because of separation or divorce instead of the earlier mortality of one of the spouses, in particular of women at childbirth. Extra-pair relations, multiple partnerships or even philandering appear to be all forms of minority behaviour.

6.3.2.6 Modest Shift from Homophobia to Homophilia

The traditional homophobic attitudes derive from Judeo-Christian-Islamic ideology that strongly condemns, punishes and persecutes same-sex relations, which were considered as a socio-pathological behaviour.

Judd Marmor¹⁶⁸ sees fears and anxieties behind homophobia, which is fostered by one or more of three major factors: deep-seated insecurity concerning one's own sexuality and gender-identity, strong religious indoctrination, and simple ignorance about homosexuality. From an evolutionary point of view, a more basic cause for homophobia may be attributed to the fact that in order to maximise their inclusive fitness, people do have an interest in the sexual orientation of their offspring.¹⁶⁹ Just as is the case for parents whose offspring remains childless for other reasons, such as celibacy, sterility or infertility, parents of homosexuals faced the prospect of having no grandchildren and not seeing their genes perpetuated in the future.

In recent decades, homosexual behaviour has become a subject of greater interest in modern society. Various factors may have contributed to this rising interest: the increasing ideological pluralism in advanced democratic societies, the progress of egalitarianism in general, the advance in scientific knowledge about homosexuality, the shift from a belief-based towards a knowledge-based ethics, and the impact of the *holebi* social movement (homosexuals, lesbians and bisexuals) that has succeeded in putting their case on the public agenda. The attention given to homosexuality in recent years is linked with deep-rooted discrimination and not with the demographic prevalence. It appears from probability sample surveys in different countries that the prevalence of same-sex couples is statistically very limited, ranging from three to five percent among men and one to three percent among women.¹⁷⁰

In the immediate future, as homosexual relationships become less stigmatised, their prevalence may be expected to further increase, or at least become more visible. Since homosexuality is largely determined by biological (genetic and/or ontogenetic) factors, and with the shift from a belief-based towards a knowledge-based ethics and egalitarian pluralism, it may be anticipated that there will be increased social acceptance of homosexual households and families as a minority variant. In ethically advanced countries same-sex couples can now register

¹⁶⁷Spira et al. (1993), Laumann et al. (1994), Wellings et al. (1994).

¹⁶⁸Marmor (1980).

¹⁶⁹Gallup and Suarez (1983).

¹⁷⁰Diamond (1993), Spira et al. (1993), Laumann et al. (1994), Wellings et al. (1994).

their partnership and in some countries¹⁷¹ they can marry and have the same rights and obligations as heterosexual couples.

A possible longer-term consequence of the lifting of the taboo on homosexual relationships might be that the genes for same-sex preference may decrease in the gene pool, since the transmission of genes for homosexuality via (forced) heterosexual relations will be reduced. The increasing number of homosexual unions might decrease pairings of unknowing heterosexuals with covert homosexuals. In other words, the selection intensity against alleles inducing homosexual orientation may increase.¹⁷² Social selection against gay genes may also be reinforced through prenatal intervention, when such genes might become detectable prenatally because of parental preferences for heterosexual orientation of their offspring.¹⁷³ Furthermore, in the modern contraceptive society, where high parity is increasingly avoided, the increased risk of adult homosexuality due to the fraternal brotherhood effect¹⁷⁴ may be expected to become less prevalent. Finally, environmentally induced homosexual behaviour, for instance, related to early life experiences such as overprotective motherhood and authoritarian fatherhood,¹⁷⁵ might decrease thanks to progress in psychological and pedagogical insights and their social dissemination.

However, if (male) homosexuality is, indeed, evolutionarily linked to gracilisation, in particular the feminisation of the human male in the hominisation process, and these gracilisation and feminisation trends continue to progress, the reducing trends sketched above might be somewhat counteracted.

6.3.3 Ethical Reflections Regarding Sex Variability in Modernity

Modernity is characterised by a salient pluralism in viewpoints about sexual values and norms.¹⁷⁶ A broad multiplicity of elements underpins this variability in attitudes, in particular the persistent confrontation of the traditional ideological values of the Abrahamic religions in the West and Islamic countries with the scientific knowledge and the secular ideological movements of modernity. None of the modern ideologies have been able to produce, let alone impose, a generally accepted or acceptable norm system guiding and ruling sexual behaviour in

¹⁷¹Belgium, Brazil, Canada, Denmark, France, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, South Africa, Spain, Sweden, the United Kingdom, and in some regions of Mexico and the United States.

¹⁷²See also Apostolou (2016).

¹⁷³Ehrlich (2003).

¹⁷⁴Fraternal brotherhood effect: the probability of displaying a homosexual preference increases with the number of older brothers (Blanchard 1997; Blanchard and Klassen 1997; Barthes et al. 2013).

¹⁷⁵However, solid evidence in support of the social environment as a causal factor in the development of sexual orientation does not yet exist. In general, children raised in homosexual environments have a heterosexual orientation (Swaab 2004).

¹⁷⁶For instance, Cozic (1995), Williams (2000).

modernity. Therefore, an evolutionarily based approach to sex relations in the context of a further progressing modernisation, allowing for a broader time frame and conceptual distance, might relativise some of the current controversies or ambiguities and help to solve them.

Moral norms have always been strongly directed towards regulating sexual relations. The explanation for this concern is not always well understood. At the proximate level, sex is one of the strongest competitive (and often also aggressive) drives in human behaviour and consequently it has to be ordered socially. At the ultimate level, sex is the instrument for reproductive behaviour and consequently for the (differential) transmission of genes—the pre-eminently most important factor at the intergenerational level.

In small communities (of the hunter-gatherer type) and in larger, belligerent societies, sexual relations were strongly under societal control because the reproductive behaviour of its members was of crucial importance for the survival or the expansion of the community. Modern, and in particular peaceful, societies with their millions of citizens are much less vulnerable from a reproductive point of view and, hence, can be much more relaxed in matters of sexual relations. Societal continuity no longer depends on the reproductive performance of virtually every individual or couple. Therefore, a broader variety of sexual relations can be tolerated.

This greater tolerance towards sexual diversity, however, does not imply that the ancient biosocial needs for well-defined values and norms can be replaced by moral relativism. Contrary to what some unworldly advocates of total sexual freedom preach, not everything is possible. Furthermore, modern societies will need to continue to value evolution-based essential biosocial needs, such as long-lasting partner relations, child care and fertility levels, that guarantee individuals' and couples' quality of life as well as society's intergenerational continuity. Tolerance toward some sexual variants, such as homosexuality and childlessness, can be permitted but cannot be expected to become the norm.

A particularly important general rule in matters of sexual relations which are so strongly apt to competition, dominance, aggression and abuse, is the 'Golden Rule or ethic of reciprocity'. In the Confucian version it states that one should not do unto others what you do not want them to do to you.¹⁷⁷ However, despite its importance, this rule is insufficient as the sole foundation for a modern sexual ethics.

6.3.3.1 Furthering Sexual Emancipation

Just as many other human-specific characteristics, human sexuality has to be culturally supported because its biological foundation is only partially genetically programmed. The development of human sexuality can, indeed, be steered in different directions—with an accent on sheer physiological processes and functions, a merely ego-centred genitality, a dominance focused need satisfaction, etc.; or it can

¹⁷⁷Gensler (2012); see also the discussion of the Golden rule in its negative and positive versions in Churchland (2011, 171).

be oriented towards the development of what is specific in human sexual relations, namely the use of the sexual drive as an energy source for the development of enduring, affective relations.

In such a perspective there is no place for the repression of a healthy, normal sexual behaviour in which partners can make use of the broad range of seducing and satisfying sexual practices. Further developing the human-specific sexuality requires a comprehensive sexual education, including all relevant aspects related to sexual and reproductive processes. Obviously, a comprehensive sexual education should not only include information on physical (genitality, reproduction, birth control) and health (avoidance of STI) aspects but also and in particular include education on psychological and relational aspects—the specificity of human sexuality.

6.3.3.2 Establishing Sex Equality and Enhancing Women's Empowerment

A future sexual ethics in a further modernising context may be expected to strongly be equality- and equity-oriented, with equal investment into girls and boys.

Sexism of whatever nature or degree may need to be further combated. We should, indeed, be aware that even the most advanced modern societies are still plagued with unconscious and hidden sex-related biases and so-called glass ceilings and walls.

Contrary to what some strictly equality-oriented ideologues preach, for instance, as can be witnessed in 'equality feminism', sex equality and equity does not imply that women and men should perform, in equal numbers, exactly the same functions in society or should be equally present in all occupations. The biological heritage from our ancient EEA will inevitably continue to produce some sex differences in occupational abilities and preferences. In contrast, it is important that sex-linked differences in occupational activities should be equally valued (and remunerated). However, the authors are of the opinion that there is one domain where sex equal numerical representation should be guaranteed and imposed at all levels, namely ethical and policy decision-making.

Overall, the sex equality- and equity-oriented morality should concentrate on creating equal opportunities. This principle implies the establishment of sex-specific selective measures in many domains of social life, but especially in the domains of educational, occupational and retirement policies, taking into account the inevitably larger maternal investment in offspring. Despite much well-meant lip service being paid to this matter, the real challenges in this domain are still largely underestimated. It might be useful in this respect to call up the forgotten knowledge about the positive experiences of women-friendly measures in former communist countries.¹⁷⁸

A cultural, regional or country specific problem is prenatal sex selection—the practice of diagnosing and aborting female fetuses in countries, such as China and

¹⁷⁸Avramov and Cliquet (2005).

India, where pre-modern preferences for male children still prevail.¹⁷⁹ Although the evolutionary and social background factors of this pre-modern preference for male children are well understood, in modernity it is a maladapted practice. Not only does it offend against the equality principle but the seriously distorted sex ratios, as observed in China and India, could have a number of unfavourable societal side effects, such as a shortage of eligible female marriage partners, and increased risks of several forms of sexual deviant behaviour such as prostitution, socially induced homosexuality, and rape. In contrast, in cultures where prejudice against female offspring has vanished, it is difficult to find rational arguments against pre-conception sex selection aimed at satisfying couples' 'king wish' to have offspring of both sexes.

Overall, notwithstanding the considerable progress that has been made in matters of sexual equality/equity, at least in modern(ising) societies, there is still a long way to go and considerable efforts to be made.¹⁸⁰

6.3.3.3 Securing Sexual Safety

The larger male body build, stronger musculature, masculinised brain physiology, higher levels of androgen production, and regular ejaculation urge can, in conflict or socio-pathological situations, easily lead to aggressiveness and dominance against women.

In modernisation, sexual violence of any nature has become an unacceptable form of behaviour—battering women, threats and harassments, abuse, and rape. Proper normative education and judicial punishment—zero tolerance appropriately introduced here—should guarantee sexual safety, in particular for women and children.

Forced or arranged marriages, female seclusion and mate guarding are considered as reprehensible forms of sexual coercion in modern societies. In many pre-modern societies and ideologies dominant males succeeded in morally and socially imposing such forms of sexual coercion on women (and men) and suppressed their freedom of choice. In modern societies, where personal freedom and self-actualisation are highly valued and belong to the prime human rights,¹⁸¹ forced or arranged marriages and other forms of behaviour intended to limit the sexual autonomy of women are unacceptable—regardless of whether they are considered as normal or even the norm in traditional societies or ideologies.

Modernity is sometimes trapped in its appreciation of diversity and practices such as genital mutilations¹⁸² that are not completely banned. Particularly detrimental is female genital cutting—aimed at controlling the sexual and reproductive life of women and ultimately decreasing their capacity for sexual pleasure. Except for medical reasons, male circumcision is an equally obsolete custom, a remnant of ancient mythical beliefs.¹⁸³

¹⁷⁹Hesketh and Xing (2006), Lai-wan et al. (2006), Prabhat et al. (2006).

¹⁸⁰For instance, Baumgardner and Richards (2000).

¹⁸¹United Nations (1948), Council of Europe (1950; 2010).

¹⁸²Denniston et al. (1999; 2010).

¹⁸³Doyle (2005).

Sexual safety also includes the prevention of sexually transmitted infections, as well as the social safety of sexual minorities such as homosexuals.

A topic which is usually also dealt with under the heading of sexual safety is preventing unwanted or untimed pregnancy, but this issue will be discussed later in Chap. 8, Sects. 8.3.2.1 and 8.3.3.1.

6.3.3.4 Promoting Quality Sexual Relations

As explained above, the specificity of human sexuality as well as the neuro-hormonal equipment that facilitates the development and maintenance of enduring and affective partner relations are, ultimately, a function of long-maturing and dependent offspring. During several millions of years, hominins have been selected for this type of sexuality and neurology.¹⁸⁴

This human-specificity will not only be with us for an additional long time but will also need to be furthered in a progressing modernising culture: evolving standards of quality of life, both for adults and children, will constantly further increase; economic living conditions will no longer be an obstacle to the fulfilment of emotional and affective (more advanced psychological) needs; and the raising and education of offspring may be expected to last ever longer.

Hence, the development of values and norms targeted at the promotion and support of a stable and affectively based partnership may remain a priority goal and preferential role model of modern sexual morality.¹⁸⁵

This does not mean that only the old-time ideal of a lifelong monogamous partnership should be promoted. On the contrary, in cases where a partnership does not succeed in achieving or maintaining a high standard of affective relationship, separation/divorce should be easily achievable so that the establishment of another partnership, if so desired, would be possible.

6.4 Individual Variability in General

Chapter 2, Sect. 2.1 explained how several evolutionary mechanisms and processes result in the production of genetic differences between individuals. It also discussed why our evolutionary heritage makes environmental factors, including moral rules (values and norms), so important for the harmonious development of our human-specific characteristics.

In this section attention will be drawn to the evolutionary significance of individual variation; and it will discuss the adaptive and maladaptive value of self-oriented drives in the original environment in which individual differences emerged.

¹⁸⁴Mellen (1981), Lampert (1997), Fisher (2004), Pedersen (2004).

¹⁸⁵Avramov and Cliquet (2005).

Individual variability can be due to differences between individuals in one or another single trait; but it can also be due to the way in which the variability of several characteristics are combined within individuals, resulting in a much larger variability between individuals.

6.4.1 Evolutionary Background of Individual Variability

6.4.1.1 Evolutionary Importance of Individual Variability

Individual genetic variability is, within certain limits, important from an evolutionary point of view. Variation between individuals in their characteristics, as well as in the combination of their characteristics, is a safety valve with respect to evolving environmental conditions leading to changes in the intensity and direction of selective pressures. Indeed, evolutionists generally reject the idea of creating a uniform humankind because genetic uniformity might seriously hamper adaptability to future changing environmental living conditions.¹⁸⁶

However, the initial variation of single biological characteristics at several life course stages—conception, birth, adolescence, adulthood, seniority—may not be optimally adaptive in some cultural or ecological conditions. Indeed, the initial genetic or congenital variation of most biological characteristics, amplified by environmental causes of variability during the life course, is usually quite broad; but as the life course progresses it narrows due to selective pressures. For instance, at birth some newborns with very low birth weight make them susceptible to high rates of neonatal mortality, resulting in the elimination of all their genes from the gene pool of the population.¹⁸⁷ The result is that the variation in body weight at later stages in life is much smaller than at birth, though still not negligible.

Variation in the combination of various characteristics in the individual—for instance, high potentialities for strenuous physical performance combined with lower cognitive abilities, or vice versa; exceptional artistic creativity combined with weaker health characteristics; high intelligence combined with low fertility—may have various effects on the overall individual phenotypical adaptability on the one hand, and on the intergenerational transmission—namely the genotypic adaptability—of the various variables on the other hand. The combination of high and low phenotypes of various types of characteristics may nevertheless have positive phenotypical adaptability effects on the overall performance of individuals. Excelling in particular features or behaviours may contribute to the maintenance and intergenerational transmission of less favourable genetic variants of co-varying characteristics.

¹⁸⁶For instance, Dobzhansky (1962), Glover (1984; 2003).

¹⁸⁷For instance, Stewart et al. (1981).

6.4.1.2 Adaptive and Maladaptive Value of Self-oriented Drives in the Environment of Evolutionary Adaptedness

The human species emerged and evolved in Pleistocene times and was equipped with features and potentialities that it inherited from earlier evolutionary periods or that emanated in the EEA itself. Most of its features and potentialities, including its strong self-oriented drives, allowed it to survive and reproduce in that harsh ancient environment¹⁸⁸ and thus had huge adaptive value.

However, the success of the hominin lineage in the EEA was largely due to the increasing importance of the extent, intensity, and complexity of its emerging social life for survival, reproduction and intergroup competition. Stronger biological predispositions for behavioural phenomena developed, such as altruism and reciprocity, and also cultural mores evolved that reinforced sociability and restrained ego-centred drives. Unrestrained self-oriented drives became partly maladaptive in the EEA and were thus under biological and cultural pressure.

6.4.2 Developments in Modernity Regarding Individual Variability

6.4.2.1 General Individual Variability in Modernity

In Chap. 1, particularly in Sect. 1.3, the enormously enhanced capability of modern culture was highlighted, mainly through improvements in environmental living conditions, to stimulate the development of characteristics or processes to previously unprecedented heights such as growth, longevity, health, physical and mental performances, and well-being in general.

Here, it is important to emphasise that the concept of well-being associated with improvements in living conditions not only includes the state of the organism itself but also other keys of life satisfaction, and in particular relations with others—family, work environment, overall community, the human species as a whole, and last but not least the planetary environment. Altruistic behaviour, even in its pure forms, produces neurological responses which results in positive emotional feelings, the so-called warm-glow effects.¹⁸⁹

Achievements in phenotypic enhancements resulting from the modernisation process still exhibit significant inequalities. Large parts of the populations living in developing countries are still struggling with the traditional scourges of infectious disease, malnutrition and conflict which depress the development of their potentialities. Also, the much better off developed countries have still not reached a stage in which all of the traditional environmental causes of phenotypic variation are under control, particularly those that are linked to social class hierarchies.¹⁹⁰

It is important to comprehend that modern culture gradually succeeds not only in combating or offsetting the old-time natural causes of environmental deprivation or

¹⁸⁸For instance, Volk and Atkinson (2013).

¹⁸⁹Andreoni (1989), Harbaugh et al. (2007); see also Manner and Gowdy (2010).

¹⁹⁰For instance, Berkman and Kawachi (2000), Bauer et al. (2008).

threat, such as infectious diseases, starvation and war, but also increasingly provides opportunities for artificial enhancement of specific human performances. This implies that the composition of the population changes. The transhumanist goals of enhancing phenotypically human performances by means of technological interventions are already being applied in many domains of life. In this regard, Antonio Sandu¹⁹¹ rightly argues that the current historical moment can already be considered as the beginning of the transhuman civilisation. Many therapeutic and preventive therapeutic interventions, as well as all kinds of enhancement drugs, already succeed in improving physical, intellectual, creative, emotional, athletic, sexual, energetic and even moral performances.¹⁹² As the biomedical sciences further progress, increasingly effective phenotypic interventions will be possible, pushing the population averages upward, narrowing the population variability and transcending the upper bounds of present capabilities.

6.4.2.2 Well-Adapted and Maladapted Features in Modernity

Modern culture has undoubtedly increased the survival chances of individuals. However, it may not have always increased their phenotypical adaptability. In some cases it has increased the physical and/or mental performance and, hence, the adaptability of those individuals; whereas in other cases it may have failed to improve their functionality and, on the contrary, increased their dependency burden. Both paediatrics and gerontology—in fact all medical fields—struggle, from a medical technological as well as from an ethical point of view, with delicate questions about the medical and ethical meaningfulness of sophisticated medical interventions in cases of considerably diminished, or even absent, human-specificity or unbearably increased physical or mental suffering of patients (and their relatives).

Thanks to improving environmental living conditions in general, and biomedical care in particular, the effects of ‘natural’ selection are being changed. In many cases this resulted in a broader variability, but in some cases in the reduction of the initial variation. The improving phenotypic care in modernity results in contraselective effects of medical replacement therapies for deficient or deleterious genes, increasing the viability of genotypes and phenotypes which would have been eliminated at much earlier life stages in pre-modern living conditions. This relaxation of natural selection has an effect that alleles are not only preserved, thanks to replacement therapies or other protecting factors, but are in many cases also multiplied because their carriers are able to reproduce. The frequency of such ‘weak’ alleles is, in other words, increasing via two channels—decreased mortality and increased fertility.¹⁹³ Contraselection is, in fact, an issue that is more directly related to reproductive behaviour. Hence, it will be more extensively discussed in Chap. 8, Sect. 8.3.2.2.

¹⁹¹Sandu (2015, 3); see also Forlini and Hall (2015).

¹⁹²For instance, Rothman and Rothman (2003), Carter (2016).

¹⁹³Dobzhansky (1962), Thibault (1972).

Modern culture, however, faces another challenge related to the extant genetic variability of many characteristics that are remnants from adaptive processes for survival in EEA hunter-gatherer ancestral living conditions and that are still present in our current gene pool. Indeed, some of the genetically determined potentialities and drives which had a high adaptive value in EEA living conditions may have become less optimal, if not outright harmful, in modernity with its new opportunities, requirements and exigencies. Most of those drives concern relations with others, for instance, nepotism—the tendency to favour family members—or xenophobia—the tendency to foster negative feelings against strangers—or out-group enmity—the tendency to foster hostile feelings toward other groups or populations.

Some self-oriented drives are also maladaptive. A salient example of a harmful self-oriented drive in modernity is related to the strong human craving for resource acquisition. In pre-modern living conditions characterised by high risks of resource scarcity or unpredictable fluctuations in resource availability in domains such as food, energy and mates, the craving was the basis for the development of risk management.

By the time of the agrarian era, with its enlarged surpluses in subsistence means, all major religions included norms and rules to control excesses in major self-oriented cravings. In the West, the ‘seven sins’ of Christian theology—gluttony, sloth, avarice, wrath, envy, pride, lust—are a well-known example. Terry Burnham and Jay Phelan¹⁹⁴ relate gluttony to unknown contingencies for the future, lust to excesses in mate acquisition, and pride, envy, sloth, and rage to drives for dominance hierarchy.

In modernity, with its strongly increased affluence of resources, the innate drive for resource acquisition easily turns into overconsumption, with its multiple negative effects on health, social life and the environment. Everyday examples of over-consumption are: excessive intake of food (overweight) and stimulants (addiction), too intense social status competition (excessive stress), philanderous mating behaviour (sexually transmitted diseases, couple dissolution), and excessive pressure on the environment (ecological damage). Affluence easily leads to ‘affluenza’ and ‘luxury fever’¹⁹⁵—all-consuming epidemic.¹⁹⁶

¹⁹⁴Burnham and Phelan (2000, 120); see also Chapman (2004, 103), Krebs (2011, 94).

¹⁹⁵Frank (2010).

¹⁹⁶Dodds (2008, 121); see also Krebs (2011, 87).

6.4.2.3 Individuality Versus Individualism

The individual has a genetically unique identity,¹⁹⁷ during the life course it is enlarged by environmental living conditions and experiences. This became known in German as ‘*individualität*’—individuality, the notion of individual uniqueness, originality, and self-realisation.

In the English-speaking world, the notion of self-determination, self-reliance and the full development of the individual, and pride in personal freedom became popularly known under the concept of individualism. This content differs quite strongly from its historical French meaning that had a pejorative connotation, being largely equated with egoism and selfishness.¹⁹⁸ In many European continental countries, the notion of individualism still has this French meaning.

In literature, the view seems to predominate that modern culture is characterised by a gradual increase in individualistic attitudes and behaviour.¹⁹⁹ Countless survey investigations, such as the World Values Survey and the European Values Study,²⁰⁰ indeed appear to confirm that, in recent decades, attitudinal and behavioural changes in different domains of life show an increasing tendency for individuals to concentrate on themselves, to withdraw from social groups, institutions, and anything outside themselves.²⁰¹ This is revealed in a particularly striking way in the research about changes in family values, family relations and structures.²⁰²

Alexandra Maryanski and Jonathan Turner²⁰³ have argued that our individualistic drive is a typical feature that results from our hominoid heritage, but it was suppressed in the early stages—hunter-gatherer and agricultural-pastoral stages—of our cultural development. This suppressed drive acquired a new impetus in the present scientific-industrial stage. Those authors developed their original thesis in a well documented study. However, there might be another explanation, namely that the reblooming individualism in the scientific-industrial culture is not so much linked to our hominoid heritage, but is due to the increasing cognitive abilities hominins acquired during the hominisation process. These cognitive abilities allow, in the novel environment of modernity, for a stronger development of individuality.

Undoubtedly, there are many factors in the development of modern societies that allow for or even encourage an increase in individualism: technological innovation,

¹⁹⁷Due to the combination of the large number of genes in the genome, and the processes of meiosis and fertilisation, an endless number of genetically different individuals can be formed. Current estimates indicate that all humans are approximately 99.6–99.8% identical at the nucleotide sequence level. Within the remaining 0.2–0.4% genetic material, approximately 10 million DNA variants can potentially occur in different combinations. This represents a very small fraction of the total genome, but it is vastly more than enough variation to ensure individual uniqueness at the DNA level (Tishkoff and Kidd 2004). With the exception of monozygotic (identical) twins, where the segregation-recombination—mechanism is bypassed, no two individuals have the same genome.

¹⁹⁸Lukes (1971).

¹⁹⁹For instance, Schmid (1984).

²⁰⁰Halman et al. (2007).

²⁰¹Glenn (1987).

²⁰²Lesthaeghe (2002), Hofferth (2003), Karraker and Grochowski (2005).

²⁰³Maryanski and Turner (1992).

in particular ICT, geographical and social mobility, affluence, social security, independency of jobs, exposure to media, small family size, rapid social change, open borders, and last but not least, the resurgence of an aggressive fundamentalist capitalism with its increased economic competition and globalisation.²⁰⁴

Thanks to its increased socialisation and technological innovation, modern culture has considerably enhanced the opportunities for individual emancipation and self-actualisation. This has resulted not only in improved physical and mental performance but may have also induced amongst many individuals the subjective feeling of heightened independence and freedom, which hence lay the grounds for an amplified individualism. The growing opportunities for individual emancipation in modern culture are only possible due to higher levels of socialisation and cooperation, and particularly thanks to the actions or influences of ever larger numbers of anonymous and unrelated people. Socialisation and cooperation allowed for transgressing the boundaries of one's own kinship group or even nation. However, some aspects of individual emancipation and basic features of societal progress associated with the interdependence of individuals have evolved in opposite and conflicting directions. The pursuit of more individuality with the growth of human potential, which was made possible by cooperation, contrasts with the quest for individualism, which is associated with lower levels of cooperation. This trend often penetrates national or international ethical or political discussions and their resultant charters in which individual rights are advocated, but individual responsibilities are neglected.

6.4.3 Ethical Reflections Regarding Individual Variability

The authors have already identified three principles which are of high relevance to individual development: the ontogenetic development of human-specific potentialities, the promotion of quality of life, and the promotion of equal opportunities.

Ontogenic development of human-specific potentialities, promotion of quality of life and the promotion of equal opportunities and equity are, in the authors' view, the key ethical objectives. However, some more specific issues should also be stressed.

6.4.3.1 Maintenance of Genetic Variability

Genetic variation ought to be maintained, yet within certain limits—variation between various characteristics, but also variation within characteristics. The evolutionary justification for this principle is that the preservation of a variety of characteristics, as well as the continuing maintenance of a variation within individual characteristics, enables genetic adaptability opportunities in changing environmental living conditions.

By way of example, although a high evaluation of cognitive abilities in the present cultural evolution is comprehensible, maintaining and cultivating attributes

²⁰⁴Elliot and Lemert (2005).

such as physical resilience, strength, endurance and speed should also not be derided. In the event of whatever catastrophe that might disrupt the delicate nature of modern culture, which relies so strongly on the use of technical aids and non-human sources of energy, human physical abilities might be a precious source for survival and save us from regression if not extinction. Hence, a diversified gene pool is a protection against the nasty effects of unforeseeable natural catastrophes.

Also, the preservation of variability per characteristic might be important, for example body height. It is well known that modernisation has been accompanied by a gradual increase in body height and that tallness is a positively valued feature.²⁰⁵ The modern increase in body height is largely due to improved environmental living conditions, not least a higher and richer food intake, but selective processes may also be involved because a richer nutrition and other favourable environmental living conditions relax selective pressures against large body size, in particular at birth.²⁰⁶ However, the fluctuations of body size in history show²⁰⁷ that in poorer living conditions smaller body height has a higher survival value.²⁰⁸

6.4.3.2 Phenotypic Enhancement of Human-Specific Potentialities

Evolutionarily desirable human potentialities in a further progressing modernisation are generally identified as physical and mental health (absence of disease or impairment), immunity (resistance to disease), energism, beauty, longevity, cognitive and emotional intelligence, creativity and above all, sociability.²⁰⁹ This list should also include healthy self-oriented drives that are necessary for individual survival and fulfilment, which are to be distinguished from extreme selfishness, narcissism and solipsism.

Many scholars addressing the issue of developing human-specific potentialities do this in terms of increasing the satisfaction of basic needs,²¹⁰ happiness²¹¹—some speak even about Darwinian happiness²¹²—or quality of life, e.g. Julian Huxley:²¹³

Man's dominant aim must be increase in quality – quality of human personality, of achievement, of works of art and craftsmanship, of inner experience, of quality of life and living in general.

Quality of life is one of the major ethical goals that has been derived from an evolutionarily founded ethics focused on the future development of humanity in a further modernising context.

²⁰⁵For instance, Meredith (1974).

²⁰⁶Thomson (1959), Nettle (2002).

²⁰⁷For instance, Ruff (2002).

²⁰⁸For instance, it is well-known that tall inmates of the Nazi concentration camps were much more vulnerable to the meagre rations they received (Baker et al. 2010; Wachsmann and Caplan 2010).

²⁰⁹For instance, Muller (1958), Huxley (1964), Cattell (1972), Bostrom and Savulescu (2009).

²¹⁰For instance, Ehrlich (2000).

²¹¹For instance, Cattell (1972).

²¹²Grinde (1996).

²¹³Huxley (1964, 246).

Many socially important biological characteristics, in particular those determined by polygenes, can be influenced by environmental factors in their phenotypical expression during ontogenetic development.²¹⁴

In modern culture with its strongly increased exigencies and opportunities for intellectual, artistic and technological innovation, human societies have, more than ever before in history, an interest in the human-specific potentialities of as many citizens as possible being maximised, or at least optimised. This is important not only because all the talents available are needed to further the modernisation process, and to push the scientific, cultural, social, and technological developments up to still higher levels, but also because citizens are needed who can absorb and adequately function in the rich but also demanding novel environment that is being created.²¹⁵

As argued above, the current practice of technological enhancement of ontogenetic processes and desirable characteristics, which are aimed at optimising or maximising human-specific potentialities, should be further pursued as the transhumanist school of thought advocates.²¹⁶

6.4.3.3 Prevention, Suppression, or Transformation of Maladaptive Traits

It must be acknowledged that the human-specific potentialities not only include individually and socially valuable traits but also several drives leading to self-destructive behaviour that decreases or impairs the above-mentioned positive physical, mental and behavioural characteristics.²¹⁷ Furthermore, modern technology has refined and multiplied many drugs, and tools such as guns and fast-running vehicles, which can increase the risks of lowering or even annihilating valuable human characteristics or attributes. Moreover, modern society shows a number of more general features, such as its larger size, its more competitive nature and its larger anonymity, which enhance the risk of maladaptive behaviour by several groups of more vulnerable citizens.²¹⁸

An evolutionarily based set of ethics, aimed at the enhancement of the hominisation and modernisation processes, needs to prevent or suppress phenotypically and, in the end, also genetically maladaptive individual drives such as (self-induced) mutilations, substance abuse (resulting in dependence), gluttony (resulting in obesity), sloth (resulting in apathy), various kinds of excessive risk-taking behaviour including violent sports which degrade or basically harm, physically or psychologically, the practitioners.

²¹⁴Mather and Jinks (1971), Lynch and Walsh (1998), Kearsey and Pooni (1998), Plomin, et al. (2008).

²¹⁵Bajema (1971).

²¹⁶FM-2030 (1970; 1973; 1989), More (1990), Bostrom (2003; 2005), Hughes (2004), Kurzweil (2005), Young (2006), Savulescu and Bostrom (2009).

²¹⁷Masters (1989).

²¹⁸See also Mealey (1995, 166).

6.4.3.4 Fostering Equal Opportunities

Chapter 5, Sect. 5.3.3.3 dealt with the question of the promotion of equal opportunities under conditions of diversity, a matter which is of essential importance for cohesiveness in society.²¹⁹ This principle is also of the highest relevance for the topic of individual development.²²⁰ Whereas the ideal of equality may, given the individual variation be unreachable, the promotion of equal opportunities is a reasonable and fair proxy.

The principle of equal opportunities is well defined in the empirically grounded ideological paradigm that Peter A. Corning refers to as the biosocial contract.²²¹ It consists of three complementary normative precepts, namely (1) equality in the distribution of basic goods and services within a society; (2) equity in the distribution of surpluses beyond the provisioning of our basic needs according to merit; and (3) reciprocity in the contribution to the collective survival enterprise in accordance with our ability and performance.

Notwithstanding the considerable progress that has been achieved in modern culture in implementing the equal opportunity principle, especially with respect to education and work, there is still a long way to go. Deep-seated drives such as nepotism, in-group favouritism, sexist, classist, ethnocentric or racialist prejudice still have to be mastered.

A particularly difficult and delicate problem raised by a continuously progressing modernisation, with its ever increasing complexity and enlarging exigencies and responsibilities, is the social inclusion of individuals who are phenotypically—either due to genetic endowment, environmental accidents or life course events—less well adapted to the novel environment of modern culture. The less healthy, the less physically able, the less cognitively able, the less educated, the weaker emotional personalities, that is to say persons with special needs, are part of the human variability.

Pending future more highly performing biotechnical interventions that would succeed in enhancing the genetic and ontogenetic composition of modernising populations, as the transhumanists anticipate, modern societies are meanwhile striving to develop innovative forms of life-long education and provide social support in a broad range of living and working conditions. This support builds on the ethical principle related to the quest for individual realisation of potentialities but also to the fact that no well-functioning society can allow itself to leave a significant part of its population behind, as lack of support to the socially vulnerable undermines the very basis of social cooperation.

6.4.3.5 Promotion of Individuality, not Individualism

The importance assigned to the person and the increase in opportunities for individual development and emancipation in modernisation is extremely valuable. In modern culture increased opportunities are considered necessary conditions for

²¹⁹Tancredi (2005, 192); see also Brosnan and de Waal (2003).

²²⁰Schaar (1967).

²²¹Corning (2010).

well-being and happiness, and also because historically they have been proven to enhance cultural creativity and social progress.²²²

However, giving an absolutistic priority to individualistic endeavours, without taking into account the various between-individual and individual-societal interdependencies, is increasingly a maladaptive practice. As Frans de Waal²²³ stated:

A morality exclusively concerned with individual rights tends to ignore the ties, needs, and interdependencies that have marked our existence from the very beginning.

The social protection systems based on mutual solidarity, which gradually developed and matured in the course of the twentieth century in modern welfare states, do involve the risk of some individualistic excesses. Friedrich Hayek²²⁴ even speaks of “the re-emergence of suppressed primordial instincts”. Free-riding in any social domain—whether it be social welfare abuse, financial speculation, delinquency, environmental pollution, machismo, aggression, to name only a few—is incompatible with the subtle interrelationships and interdependence between the needs of the individual and community. Modern society requires a vision of humankind that, as Willy Wielemans²²⁵ formulates it, goes ‘*voorbij het individu*’ (‘beyond the individual’); it also needs to promote structures that foster cooperation rather than competition and attempts to channel competitive drives to socially desirable ends.²²⁶

Whereas the understanding of individuality as an expression of uniqueness of a human being is valuable for the preservation of life, individualism as freeloading or abusive behaviour towards the other and/or collectivity is maladaptive.

Our ethical norms should foster ‘individuality’, not individualism since we no longer live in the small communities of the EEA in which human genomes and the current human gene pool emerged. Instead, we live in hugely populous and highly complex societies with considerably enhanced opportunities for individual emancipation and self-actualisation, as well as many maladaptive characteristics with respect to individual-societal inter-dependency. Individuality does not conflict with a global ethic, whilst individualism is narrowly self-centred behaviour.

An evolutionarily founded ethics must, in the context of a further progressing modernisation, be strongly focused on the maximisation of the self-actualisation of valuable human-specific characteristics, in other words, the promotion of individuality. Not only does this need to include self-oriented features but also personality traits that accommodate relations with others—family, community, the human species, even the planetary environment as a whole. In this respect, the innate predispositions to spirituality, which fulfilled an important role in our evolutionary past, could be further enhanced culturally towards a greater sense of belonging to the global world, and could be an evolutionary substitute for the drive towards the runaway individualisation that we are experiencing now.

²²²Beck and Beck-Gernsheim (2002).

²²³De Waal (1996, 167).

²²⁴Hayek (1979, 165).

²²⁵Wielemans (1993).

²²⁶For instance, Singer (1999, 44).

Hence, individualistic attitudes and behaviour, in the sense of its original French meaning, are to be rejected or discouraged. They are a maladaptive, although comprehensible side effect of the modernisation process which has, unfortunately, so far been insufficiently accompanied by educational efforts to make individuals understand and adapt to the novel environment of modernity. The complex modern society and culture depends mainly on the interdependence, cooperation, interaction and mutualism of ever increasing numbers of individuals that hugely transcend the kin- or tribe-related in-group, a topic which will be pursued in more detail in Chap. 7.

6.5 Interpersonal Relations

In addition to the specific age and sex relations, interpersonal relations based on evolutionary predispositions also have to be dealt with. These types of relations became more important as human populations gradually grew in size, but are of particular significance in modernity where nations include millions of people and where interpersonal relations can even go far beyond their own community or national borders, due to progressing internationalisation and globalisation of human activities.

6.5.1 Evolutionary Background of Interpersonal Relations

6.5.1.1 Competition Theory

Human beings, just as other living organisms, are not only equipped with extremely strong drives towards self-actualisation and survival but also with drives to compete with conspecifics for acquiring desirable resources—territory, nutrition, wealth, prestige, and above all sex and reproduction. Darwin's theory of natural selection provides an evolutionary explanation for the competitive drive, but many ideologies, some of a very different nature, e.g. classical or neoliberalism and Marxism, have tried to use (and abuse) his theory to give a scientific foundation and justification to their ideological viewpoints. Even many pre-Darwinian ideologies often based, evidently unknowingly, their beliefs and practices on Darwinian selection principles.²²⁷

The competitive drive can express itself through various forms of behaviour, e.g. selfishness, assertiveness, hard work, social dominance, aggressiveness. Each of them is subject to variation—genetically, ontogenetically and/or environmentally/culturally determined. Extreme variants of those drives can, in particular social or ecological conditions, result in antisocial behaviour.

²²⁷See Keith (1946, 64), Teehan (2006; 2009).

Aggression²²⁸ is one example. Although most traditional and modern ideologies, in general, reject and condemn aggressive behaviour, individual aggressiveness is not only a ubiquitous phenomenon in the human species²²⁹ but in mild forms it appears to have evolutionarily adaptive advantages. Namely it may enhance, via the achievement of increased social dominance, reproductive success.²³⁰

Whereas mild forms of individual aggressiveness are tolerated in most societies, even positively valued and institutionally regulated, extreme forms of individual violent behaviour are usually rejected and combated, except in intergroup conflict or war. The existence of extreme forms of aggressiveness can be due to normal variation of the aggression drive or to the genetic or environmental damage of the aggression inhibition system.²³¹ However, extreme aggressiveness is usually the outcome of interactions between specific genetic predispositions and environmental deprivation or assault.²³² Notwithstanding the social opposition and control of extreme forms of aggressive behaviour, such behaviour may have had some reproductive success, for instance via social dominance, coercion, deception, or rape, and allowed the intergenerational transmission of the genes involved.

Politically or religiously induced values and norms can exacerbate competitive forms of behaviour, usually resulting in a broad range of unfavourable social effects, in particularly enhanced social or sexual inequalities and violence. In the economic sphere such norms result in intensified class struggles and social aggressiveness and violence. In the sexual sphere cultural norms allowing or promoting polygamy, which leaves many young men without a sexual partner or strongly restricted sexual intercourse among youngsters and young adults, result in an increased incidence of social unrest or forms of sexual violence. Some studies show that the proportion of unmarried young men is a good predictor of social or sexual violence in society.²³³

6.5.1.2 Cooperation Theory

Before embarking on the discussion of the evolutionary background of cooperative behaviour, it is necessary to dwell for a moment on the relation between the concepts of altruism and cooperation. *Mutatis mutandis*, this also applies to the relation between selfishness and competition. Indeed, it is often implied that altruistic behaviour and cooperative behaviour are linked, just as it is assumed that selfish behaviour and competitive behaviour are equivalent. However, as Peter Corning argues pertinently in his book *The Synergism Hypothesis*, they are not.²³⁴ Altruism (sacrificing oneself for others) and cooperation (acting/working together with others) are different forms of behaviour, but altruistic behaviour is clearly a strong incentive or condition for cooperative behaviour. This is even truer for the

²²⁸Ferguson and Beaver (2009).

²²⁹McCall and Shields (2008).

²³⁰Hawley and Vaughn (2003), Smith (2007), Ferguson (2008).

²³¹Beaver et al. (2009), Rietveld et al. (2003), Wright et al. (2008), Nettle (2006).

²³²For instance, Caspi et al. (2002).

²³³Hauser (2006, 132).

²³⁴Corning (1983, 84).

relation between reciprocity/mutualism (which may be altruistic or selfish in nature) and cooperation. Hence, the evolutionary mechanisms responsible for the genetic transmission of predispositions to altruistic, reciprocal and mutualistic behaviour are to be considered as strong vehicles for promoting various forms of cooperative behaviour. The sociobiological revolution of the 1960s and 1970s—labelled in Chap. 1 as the Second Darwinian Revolution—pertinently corrected the ideological misinterpretation of Darwin's evolutionary theory by discovering evolutionary mechanisms that explained the genetic transmission of behavioural characteristics, such as altruism and reciprocity or mutuality, that provide a biological-evolutionary basis for cooperative behaviour—the basic ideas that were, in fact, already anticipated in Darwin's²³⁵ *The Descent of Man and Selection in Relation to Sex*.²³⁶

As already explained in Chap. 2, Sect. 2.1, recent sociobiological developments have resulted in the establishment of evolutionary mechanisms through which predispositions facilitating or inducing cooperative behaviour can be transmitted and evolve beyond narrow kinship relations. Theories on various forms of reciprocity selection, coercive selection, group selective processes including cultural group selection, and gene-culture coevolutionary interactions have been elaborated into an overall evolutionary theory of cooperation.²³⁷ Randolph M. Nesse²³⁸ has reminded us that, in addition to kin selection and reciprocity selection, there are several complementary evolutionary mechanisms—sexual selection,²³⁹ social selection,²⁴⁰ social commitment,²⁴¹ manipulation²⁴² and coercion²⁴³—that have the potential to shape altruism and morality because they provide individuals or social groups, or even society as a whole, with a fitness advantage. The fact that evolution has the ability to generate cooperation in an overall context of competition incited Martin Nowak²⁴⁴ to consider natural cooperation as a third fundamental principle, beside natural selection and mutation. Although cooperation cannot be considered as an evolutionary mechanism comparable to mutation and selection, the strong biological predispositions for cooperation are, as an evolutionary result of those mechanisms, to be considered as one of the most specific

²³⁵Darwin (1871).

²³⁶See also Weiss and Buchanan (2009).

²³⁷Recent overviews on evolution of cooperation can be found in: Wilson and Sober (1994), Axelrod (2001), Sanderson (2001), Barash (2003), Hammerstein (2003), Kappeler and van Schaik (2006), Weiss and Buchanan (2009), Bowles and Gintis (2011), Krebs (2011), Nowak and Highfield (2011), Sussman and Cloninger (2011), Volland (2013).

²³⁸Nesse (2000, 229, 230).

²³⁹Miller (1998); see also Chap. 2, Sect. 2.1.2.4.

²⁴⁰Alexander (1987), Frank (1998), Nesse (2009), Boehm (2014); see also Chap. 2, Sect. 2.2.2.3.

²⁴¹Schelling (1960), Hirshleifer (1978), Frank (1988), Nesse (2001).

²⁴²Trivers (1974).

²⁴³Van den Berghe (1979), see also Chap. 2, Sect. 2.2.2.7.

²⁴⁴Nowak (2006, 1563).

features of the human species. Without those predispositions, it would have been impossible for *Homo sapiens sapiens* to develop complex forms of societal life and civilisation.²⁴⁵

In recent years, the biological origin and evolution of human cooperation continues to fascinate the scientific community as can be seen from the lasting flow of publications on cooperation theories,²⁴⁶ the comparative analysis of cooperation in the primate and hominin lineage,²⁴⁷ ontogenetic studies,²⁴⁸ evolutionary game experimental studies,²⁴⁹ and empirical studies on a broad range of specific topics such as the effects of various behavioural predispositions to cooperation,²⁵⁰ the importance of basic emotions—love, gratitude, deference, righteousness, pride, but also anger, envy, shame, guilt, contempt, and moral outrage—for cooperation,²⁵¹ the role of cultural factors or gene-culture coevolution,²⁵² or the effects of demography and ecology.²⁵³

6.5.1.3 Competition/Cooperation Balance

First, it must be reiterated that the evolutionary theories of kin selection, reciprocity selection and group selection have resolved a fundamental paradox in evolutionary theory: natural selection which promotes self-advancement at the expense of others, namely competition, is complemented by various mechanisms which explain the genetic transmission of predispositions and practices leading to altruistic or mutualistic behaviour, namely they promote cooperation.

Hence, contrary to some ideological views in which people are seen as either intrinsically selfish or fundamentally altruistic beings, evolutionary science has well established that social species, and in particular humans, are endowed with drives both for competing and cooperating behaviour.²⁵⁴ Pro- and antisocial forms of behaviour may compete and interact with each other. In virtually all viable or successful societies, social rules or legislations have been struggling to devise a just

²⁴⁵For instance, Gorelik et al. (2012).

²⁴⁶For instance, Nowak et al. (2010), West et al. (2011), Tomasello et al. (2012), Krasnow et al. (2013), Rand and Nowak (2013), Smaldino et al. (2013), Zaki and Mitchell (2013), Keltner et al. (2014).

²⁴⁷For instance, Brosnan (2010), Melis and Semmann (2010), Langergraber et al. (2011), Silk and House (2011), Barrett et al. (2012), Grueter et al. (2012), Burkart et al. (2014).

²⁴⁸For instance, Tomasello (2009), Hamlin et al. (2011), House et al. (2012), Sebastian et al. (2013), Kuhlmeier et al. (2014), Jensen et al. (2014).

²⁴⁹For instance, Rosas (2010), Fehr et al. (2011), Marlowe et al. (2011), Xia et al. (2011), Eriksson and Strimling (2012), Garcia and Traulsen (2012), Hwang and Bowles (2012), Zhuang et al. (2012), Capraro et al. (2014), Stewart and Plotkin (2014), Hoffman et al. (2015).

²⁵⁰For instance, Smith (2010), Marlowe et al. (2011), Xia et al. (2011), Garcia and Traulsen (2012), Hwang and Bowles (2012), Nowak and Highfield (2012), Tomasello et al. (2012), Rand and Nowak (2013), Wang (2013), Capraro et al. (2014), Smaldino (2014).

²⁵¹Fessler and Haley (2003).

²⁵²For instance, Atkinson and Bourrat (2011), Chudek and Henrich (2011), Dijkster (2011), Ihara (2011), Bogin et al. (2014), Phillips et al. (2014).

²⁵³For instance, Lamba and Mace (2011), Powers and Lehmann (2013), Krasnow et al. (2013), Tan et al. (2013).

²⁵⁴Masters (1989, 1), May et al. (1989), Hinde (2002, 178), Kümmerli et al. (2010).

balance between competitive and cooperative behaviour. However, from an evolutionary point of view—a long-term perspective—increasing complexity and progression results from a process in which cooperation overtakes competition in importance.²⁵⁵ Samuel Bowles and Herbert Gintis²⁵⁶ list three reasons why altruistic behaviour, supporting cooperation, outcompeted selfish, competitive behaviour: (1) it protects altruistic members from exploitation by the self-interested (shunning, ostracism and execution of free-riders); (2) it favoured systems of socialisation that led individuals to internalise the norms that induce cooperation; and (3) it was an advantage in between-group competition for resources and survival that was, and remains, a decisive force in human evolutionary dynamics.

The sociobiological discoveries about the biological-evolutionary mechanisms underlying altruistic and reciprocal or mutualistic behaviour were received with initial enthusiasm in some quarters. It was believed that they scientifically confirmed the value and truthfulness of ancient ideological viewpoints or appealed well to some of our cherished universal moral tenets such as the Golden Rule or the love message of Jesus Christ.²⁵⁷ However, initial enthusiasm has been fundamentally shattered by the discovery that altruistic and reciprocal or mutualistic behaviour is in fact, at least in its ultimate effects (namely the differential transmission of alleles), to be equated with genetically selfish behaviour. In other words, social cooperation, without excluding moderate forms of individual competition, fulfils the same functions as competition. We are not only genetically predisposed to altruistic behaviour but also culturally conditioned to such behaviour, both by ancient (e.g. “...thou shalt love thy neighbour as thyself”²⁵⁸) and modern (e.g. ‘*fraternité, liberté, égalité*’²⁵⁹) ideologies, so that we have difficulties in digesting this “bitter pill of our fundamental selfishness” as Randolph M. Nesse²⁶⁰ put it. In biological-evolutionary terms, true or genuine altruism—or ascetic altruism, as Joseph Lopreato²⁶¹ calls it—can only be defined as helping behaviour that decreases the inclusive fitness of the altruist and increases that of the beneficiary:

Ascetic altruism is behaviour, conscious or unconscious which, guided by innate predispositions, potentially reduces the inclusive fitness of the dispensers and potentially increases the fitness of the recipients.

How is group cooperation to be reconciled with the competitive self-interest of individuals? Paradoxically, in particular conditions of in-group or out-group threats and competition, the development of altruistic behaviour favours cooperation which, in turn, is advantageous for individual survival and hence the transmission of genes. As already mentioned in Chap. 2, Sect. 2.1.2.8, human evolutionary history is, contrary to intuition or moral conviction, in all probability characterised

²⁵⁵For instance, Nowak and Highfield (2011, 267ff).

²⁵⁶Bowles and Gintis (2011, 4).

²⁵⁷For instance, Pope (1994; 2007).

²⁵⁸Leviticus 19:18.

²⁵⁹National motto of France, originating in the French revolution (Latham 1906).

²⁶⁰Nesse (2000, 228).

²⁶¹Lopreato (1981, 117).

by a co-evolution of group-beneficial altruistic/cooperative behaviour and violent intergroup competition and warfare.²⁶²

The altruistic/mutualistic drives of the human must have been a very early hominid adaptation. Human grouping tendencies developed as early as the Pleistocene, in the EEA. It was an adaptation for living in small groups in which people were genetically closely related and where people also had the opportunity to get acquainted with all of the group members.²⁶³

6.5.1.4 Evolutionary Causes of Antisocial Behaviour

The biological-evolutionary theories about the predisposition and transmission of altruistic and cooperative behaviour do nevertheless raise the question as to why some people continue to behave in a largely or even exclusive selfish or antisocial²⁶⁴ way? Why are there free-riders and cheaters in our species? How can evolutionary theory explain the widespread occurrence of genetically determined or influenced antisocial behaviour that, in principle, must be seen as a maladaptation in such a highly socially developed species as *Homo sapiens sapiens*?

Just as the evolutionary background of the prevalence of forms of maladapted moral behaviour has been explained (see Chap. 2, Sect. 2.2.6), different elements also have to be considered regarding the evolutionary background of antisocial behaviour. In general, both genetic and environmental factors may, in complex interactive processes, contribute to the development of antisocial behaviour.²⁶⁵

Predispositions to selfish and/or altruistic behaviour may be subject, just as any other biological trait, to genetic variation resulting from mutations or particular gene recombinations at conception. As is the case with all complex forms of behaviour, those predispositions are only partially determined by genetic factors. Consequently they can also vary in their ontogenetic development due to environmental influences, and not the least result from socio-cultural determinants. Some extreme genetic variants of selfish behaviour, leading to strong expressions of dominant or aggressive drives, are usually subject to negative selection due to their higher risks. However, in particular circumstances they may have had some reproductive advantage and success and consequently have been intergenerationally transmitted. Most importantly, since most people have the ability to develop or display selfish as well as altruistic forms of behaviour, the combination of these predispositions—as well as the social or environmental challenges people have to cope with—may tilt the adaptive strategy they choose in one direction or the other. Consequently, on an evolutionary scale, these elements may result in the simultaneous co-existence of different behavioural strategies that compete with each

²⁶²Keeley (1996), Gat (2006), Choi and Bowles (2007), Lehmann and Feldman (2008), Bowles (2009; 2012), Ginges and Atran (2011), Halevy et al. (2012), Gneezy and Fessler (2012), Gorelik et al. (2012), Konrad and Morath (2012), Rusch (2014), Puurtinen et al. (2015).

²⁶³Wilson and Sober (1994).

²⁶⁴Antisocial behaviour is any behaviour that causes damage to other persons or even to society as a whole. It is to be distinguished from asocial behaviour which refers to the absence of interaction with other people.

²⁶⁵Moffitt (2005), Rutter et al. (2006).

other.²⁶⁶ Evolutionary game theory also helps to understand how alternative competitive strategies may result in evolutionarily stable or slightly fluctuating population equilibria, with the frequencies of different traits or behavioural patterns dependent on their reproductive payoffs in varying living conditions.²⁶⁷

Obviously, in most cases, or on a long-term scale, antisocial behaviour remains a minority phenomenon, simply because reproductively it is a less advantageous form of behaviour than cooperative behaviour in a social species and it is subject to negative selection. Moreover, in a species as highly socialised as the human, antisocial forms of behaviour are fiercely combated by enforced community rules.²⁶⁸

Nevertheless, sociobiology and evolutionary psychology have developed several specific evolutionary theories of antisocial behaviour with the goal of explaining its relatively high frequency,²⁶⁹ particularly among males.²⁷⁰ Four major theories can be distinguished, which partially overlap in several respects.²⁷¹ Indeed, all of these theories have the common assumption that antisocial forms of behaviour produce, especially in particular living conditions, reproductive advantages for individuals who victimise others, allowing their own genetic predisposition to be transmitted to future generations, or prevent the reproduction of others. These four theories are the cheater (or 'cad vs. dad') theory of antisocial behaviour, the r/K theory of antisocial behaviour, the coincidental status-striving theory, and the cuckoldry-fear theory.

The cheater (or cad vs. dad) theory of antisocial behaviour²⁷² is the expression of genetic programmes for an evolved male strategy that is aimed at adopting a cad reproductive strategy rather than a dad strategy. In other words, this theory describes males who focus on obtaining numerous mating opportunities by means of highly deceptive and/or forceful strategies, rather than assisting their partner in caring for the offspring they sire. Several forms of sexual harassment and assault, forced copulation, and of course especially rape²⁷³ are explained by this theory.

The r/K theory of antisocial behaviour²⁷⁴ assumes that people who have the tendency to harm others may be manifesting a more r-oriented reproductive strategy by producing more offspring than law-abiding citizens.

The coincidental status-striving theory²⁷⁵ states that competition for status and resources favours males who attract mates and sire a disproportionate share of offspring. Males who are the most extreme in their overtly competitive and status-striving activities are more likely to violate the within-group order. Many

²⁶⁶Thomas (1984), Barr and Quinsey (2004).

²⁶⁷For instance, Colman and Wilson (1997).

²⁶⁸For instance, Masters (1989).

²⁶⁹Rowe (2002), Mealey (1995), Walsh and Ellis (2003), Gottschalk and Ellis (2009).

²⁷⁰Wrangham and Peterson (1996), Ghiglieri (1999).

²⁷¹Ellis (1998).

²⁷²Macmillan and Kofoed (1984), Harpending and Draper (1988), Gottschalk and Ellis (2009).

²⁷³Thornhill and Thornhill (1983), Thornhill and Palmer (2000).

²⁷⁴Ellis (1987).

²⁷⁵Alexander (1979), Ellis (1990).

cases of homicide, as forms of elimination of male competitors, can be explained in this respect.²⁷⁶

The cuckoldry-fear theory²⁷⁷ explains some forms of antisocial behaviour based on the idea that males, due to the uncertainty of their paternity, are more susceptible to the risk of being cuckolded in cases of their partner's infidelity. Thus, males would be under additional natural selection pressure to use violent tactics in order to curtail sexual infidelity. Various forms of male partnership tactics—mate guarding, partner sequestration, female genital mutilation, spouse abuse, assault and murder²⁷⁸—as well as some forms of child neglect and abuse and infanticide, particularly in cases of non-relatedness, come under this heading.²⁷⁹

The two major components of antisocial behaviour—violence and cheating—have a clear evolutionary basis: they formed as an adaptation to the EEA, albeit as occasional or secondary strategies. However, it is important to keep in mind that behaviours and emotions which evolved as reactions against antisocial violence and cheating are also part of our evolutionary heritage.²⁸⁰

Obviously, not all antisocial behaviour is ultimately related, consciously or unconsciously, to reproductive drives as proposed by the above-mentioned evolutionary theories. A substantial part of antisocial behaviour appears to be life-course persistent, influenced by variations in cognitive and emotional personality, as well as neurological and hormonal functioning. These are caused by unfavourable genetic or developmental factors, or the combination of the presence of a specific biological endowment and the perceived or actual social inequalities in the accessibility or availability of desired goods and services in society.

6.5.2 Interpersonal Relations in Modernity

As explained extensively, human populations evolved from very small numbers in the hunter-gatherer phase of cultural development to many millions in modern societies, a novelty to which *Homo sapiens* has not yet adapted genetically.²⁸¹ Therefore, modern million-member societies face many biosocial constraints and conflicts resulting from the fact that the human mind, with its specific evolved psychological mechanisms and design as an adaptation to ancient living circumstances, is not yet adapted to the novel environment we have created.²⁸² Modern societies consequently struggle with many problems related to the necessity to induce cooperative behaviour amongst huge numbers of people with whom individuals have no close genetic relatedness, and whom they mostly do not know very

²⁷⁶Daly and Wilson (1988), Duntley and Buss (2005).

²⁷⁷Hiatt (1989), Geary (2006).

²⁷⁸Buss (1994; 2002).

²⁷⁹Lightcap et al. (1982), Burgess and Garbarino (1983), Ellis (1998), Daly and Wilson (1988).

²⁸⁰Raine (1993).

²⁸¹Campbell (1975), Masters (1989, 158).

²⁸²Bowlby (1969), Irons (1998).

well²⁸³ or with whose values they do not identify well. Finding the right balance between cooperation and competition is one of the main endeavours of modern societies.²⁸⁴ Human nature has partly stalled, and therefore partly maladapted, in its evolutionary transition from individual to group,²⁸⁵ and from small tribal societies to large million-member societies: this is well illustrated by the historically transient nature of very large societies in which competitive and cooperative forces so often could not be kept in balance.²⁸⁶

6.5.2.1 Competition and Cooperation in Modernity

The development of nation-states, with their well-organised and well-trained police forces and other bodies of law enforcement, has undoubtedly succeeded in humanising society and diminishing or controlling excessive competition such as aggression and violence on the one hand. The modal citizen no longer needs a personal escort or bodyguard team to travel from one city to another as in medieval times. Although this does perhaps not apply fully to children, young women, elderly people, or even a solitary walker in some quarters of many large modern cities, even in advanced countries assaults, thefts, and rape attempts still appear to be regular events.²⁸⁷ On the other hand the development of modern culture, with its drives towards scientific, technological and cultural innovation, and ever-increasing (economic) growth and wealth, has raised the stakes of meritocracy in education and work, but it has also considerably increased the interpersonal competition in order to achieve excellence and access abundance. No domain of societal life escapes this trend of competition: education, science, economics, sport, literature and other forms of art.

Democratic and respectable policy decision makers have made increasing competition their primary political goal. In 2000 the EU Lisbon European Council set as a new strategic goal for the following decade:

to become the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion.

In 2009, US President Barack Obama, speaking about education at the Hispanic Chamber of Commerce, said that the U.S. must improve education to stay competitive in the world economy and concluded his speech with the advice:

... start to prepare every child, anywhere in America, to outcompete any worker anywhere in the world.

²⁸³Bowlby (1969), Tooby and Cosmides (1990), Wilson (1975; 1978), Burnham and Johnson (2005).

²⁸⁴Ridley (1993).

²⁸⁵Stearns (2007).

²⁸⁶Masters (1989, 21).

²⁸⁷For instance, Shichor et al. (1979), Kneebone and Raphael (2011).

Modern societies apparently tend to confuse competition with performance and choose to forget or ignore their own scientific findings about the negative effects of unbridled competition, which increases stress up to unbearable heights and disrupts family life, kills empathy, friendship and cooperation, increases anxiety and aggression, and in the end lowers performance, productivity and creativity.²⁸⁸ The psychophysical potential for dealing with continuous and intensive competitive challenges has its limits. Overexerting human potential in competition may impair well-being and creative performance.²⁸⁹

On the one hand the intensity and amount of cooperation between large(r) numbers of people has been achieved via macro-social management in practically all domains of social life—education, labour, mobility, health and welfare care, social security, and police and military protection. Reciprocal altruism has been considerably enhanced via imposed taxation, redistribution of community resources and the development of social protection.²⁹⁰ On the other hand at the interpersonal behavioural level far less progress has been made, such as when observing the indifference towards others or the lack of personal involvement and aid in many daily life situations that require a personal commitment towards unrelated citizens. Particularly in big cities, there is the often amazing indifference and non-assistance from bystanders at accidents or incidents,²⁹¹ and a lack of courtesy, even towards elderly people, pregnant women or people carrying babies. In many countries, at first sight trivial, the traditional custom of ceding his seat in a bus, tram or train has dwindled away.²⁹² One may even wonder whether several inherent features of modernisation—such as the increasing wealth of individuals and families, the market type of economy,²⁹³ and the development of social protection measures at macro-levels as rights that carry little individual responsibility—are a partial cause of the lack or even decrease of altruism, reciprocity and mutualism at personal level.

Stronger interpersonal forms of cooperation appear to only exist in smaller size communities where everyone knows everyone, in societies where altruistic values are particularly strongly emphasised, or in ideological, ethnic or racial in-groups that are in competition with or threatened/discriminated by out-groups.

6.5.2.2 Antisocial Behaviour in Modernity

The situation regarding antisocial behaviour in modernity has profoundly changed in several respects compared to the context of earlier stages in human evolution and history. There have been important changes in the causes of antisocial behaviour and in what is considered to be antisocial behaviour. Also, the types and degrees of

²⁸⁸Kohn (1987).

²⁸⁹For instance, Cordes (2008).

²⁹⁰In this respect Richard Dawkins (1976, 105) characterised the welfare state as: “perhaps the greatest altruistic system the animal kingdom has ever known. But any altruistic system is inherently unstable, because it is open to abuse by selfish individuals, ready to exploit it.”

²⁹¹Latané and Darley (1970).

²⁹²For instance, Burton (2008).

²⁹³See, for instance, Kasper and Borgerhoff Mulder (2015).

control of social behaviour have changed and, above all, the number, aggregation and mobility of people within and between nations has increased tremendously.

Improving living conditions, educational efforts and efficient policing practices are considerably reducing earlier widespread forms of antisocial behaviour such as assault, theft and homicide. Living standards have improved in many respects, thereby eliminating extreme causes of shortages in livelihood and decreasing the need for antisocial actions in order to obtain elementary resources for survival and well-being—for instance, the well-known increases in many forms of social strife and criminality in situations when famine strikes.²⁹⁴

Concerning the content of what is considered to be antisociality, several domains of social interactions are characterised by increasing rigour (e.g. all forms of sexual harassment, child abuse, ecological mismanagement), but other domains continue to be approached with great laxity or incompetence (e.g. financial fraud, Internet abuse, international crime).

Furthermore, regarding moral control mechanisms of antisocial behaviour, moves in opposite directions can be discerned: on the one hand there is a decrease of socialisation and conditioning by traditional ideologies due to the weakening of their ideological foundation, but insufficient take-over by modern secular ideologies; there is also a decrease in family and nearby community control; on the other hand there is the increase of the broader, albeit insufficiently compensating, societal control mechanisms (police, ICT).

The increase of population size and of mobility of persons within and between states caused a considerable increase in the number and superficiality of interactions between genetically non-closely related citizens,²⁹⁵ allowing free-riders, cheaters and downright antisocial individuals to take ample advantage of the resulting increased anomy. Modernity is probably also changing the population composition with respect to predispositions to antisocial behaviour through the conservation, or even promotion, of less favourable genetic mutations or behavioural patterns which were under heavy selective pressures in pre-modern living conditions, but now have sufficient survival value in the modern culturally, economically, or biomedically protected environment or are even fostered by such environments.

Criminality. Antisocial behaviour manifests often itself as criminal behaviour, although it is a broader concept than criminal behaviour, the latter being limited to acts that are defined by the criminal code of a country. Nevertheless, a person may exhibit antisocial behaviour without being a criminal, and a person can exhibit criminal behaviour without being antisocial. Notwithstanding their differences, they often coincide.

²⁹⁴Keys and Brozek (1950).

²⁹⁵Newson and Richerson (2009).

In recent decades, biocriminology has made enormous progress in identifying genetic and neuro-hormonal factors and their interaction with environmental and socio-cultural living conditions in the development of antisocial, and in particular criminal, behaviour.²⁹⁶

Present-day biosocial criminology is primarily based on recent developments in three large biological fields of study: genetics, neurosciences and evolutionary biology. The first includes molecular genetics,²⁹⁷ but behavioural genetics is even more important.²⁹⁸ The neurosciences include neurophysiology, psychophysiology and neuro-chemistry.²⁹⁹ The third domain includes several fields of biological anthropology, in particular sociobiology and evolutionary psychology.³⁰⁰

It is, in particular, the progress in the evolutionary sciences that considerably contributed to the understanding of why modernity is still plagued by a substantial amount of antisocial behaviour and, in particular, criminal behaviour. The human species is still genetically and neuro-hormonally equipped with drives—and a variation in those drives resulting in the development of different coping and reproductive strategies—which were functional and adaptive in the ancient environment in which our specific gene pool took shape.³⁰¹

In modernity, biological predispositions or life course events resulting in antisocial behaviour, and *a fortiori* criminal behaviour, have become socially maladaptive. However, the protecting environment of modernity might be increasing the reproductive adaptedness of such predispositions. For instance, Shuyang Yao and colleagues³⁰² found, on the basis of a nationwide study, that criminal offenders in Sweden had more reproductive partners and more children (from different partners) than non-offenders. Those authors consider criminality to be adaptive in contemporary industrial society, the result of an alternative adaptive reproductive strategy.

Modern societies are, notwithstanding the much improved living conditions including elimination of starvation and other extreme forms of shortages in livelihood, excellent breeding grounds for antisocial and criminal behaviour, due to (1) their huge population sizes with their numerous social interactions between genetically non-related or socially anonymous citizens; (2) the opening of national

²⁹⁶Mednick and Christiansen (1977), Buikhuisen (1979), Taylor (1984), Wilson and Herrnstein (1985), Mednick et al. (1987), Eysenck and Gudjonsson (1989), Denno (1990), Ellis and Hoffman (1991), Raine (1993), Moir and Jessel (1995), CIBA Foundation Symposium (1996), Rowe (2002), Walsh (2002), Walsh and Ellis (2003), Thienpont (2005), Wright et al. (2008), Walby and Carrier (2010), Rocque et al. (2012), Raine (2013).

²⁹⁷Rowe (2002).

²⁹⁸Mednick and Christiansen (1964), Rhee and Waldman (2002).

²⁹⁹Raine (1993).

³⁰⁰For instance, Mealey (1995), Pitchford (2001), Quinsey (2002), Walsh and Ellis (2003), Thienpont (2005).

³⁰¹For instance, Mealey (1995), Thienpont (2005), Ferguson (2008; 2010), Duntley and Shackelford (2008).

³⁰²Yao et al. (2014).

borders to international traffic via migration, travel, commerce and ICT; (3) the strongly competitively oriented social fabric;³⁰³ and (4) the still considerable social inequalities in opportunities which provoke feelings of relative deprivation. Moreover, modern culture has a protective environment in which the basic needs for security, nutrition, housing, education, labour opportunities, health care, and leisure are largely ensured; it also frees the individual from the need to respond to the challenges, exigencies and dangers of living in natural circumstances—such as the stresses of hunting and gathering, natural disaster, and war. Consequently, modern culture attracts some people, in particular young males, to sensational, adventurous, and occasionally antisocial, actions.³⁰⁴

Thanks to the considerable progress in the ethical, social, psychological, and biomedical sciences, the manifest and deeper lying causes of antisocial and criminal behaviour are now much better understood. Furthermore, increasingly better methods have become (or will soon become) available to prevent or cure undesirable deviant forms of behaviour. Indeed, one of the most important findings of recent decades is that increasingly the risk of antisocial or criminal behaviour can be predicted at a young age, on the basis of the combination of familial, social,

³⁰³See Callahan (2004).

³⁰⁴Recently, many commentators in Western countries have expressed surprise about Western-raised and educated young men of Muslim creed joining the ranks of the Jihad warriors in the so-called Caliphate ISIS that Islamic fundamentalists are trying to erect in parts of Syria and Iraq or undertaking terrorist attacks in Western countries. This is not surprising at all. First of all, the numbers of European jihadi in proportion to the total Muslim population in Europe is extremely small (<0.02%). Even when only younger age groups (20–40) are taken into account, the figures remain very low (<0.2%). Indeed, it is rather surprising that the pull is not much higher, given the Western policies towards the Middle East on the one hand, and the poor integration of many second- and third-generation migrant descendants on the other hand. It is a textbook example of a convergence of all necessary biosocial elements to produce such a phenomenon: (1) young men, (2) sexually highly aroused but frustrated, (3) many with relatively low cognitive abilities making them easily susceptible to simplistic and fulfilling instigations about aggressing and destroying out-groups, (4) and/or emotional personality characteristics, predisposing them to adventurous heroic, asocial or criminal behaviour (Victoroff 2005; Weenink 2015), in contrast with their often dull or banal preoccupations or even non-occupations, (5) experiencing feelings of injustice toward their own in-group and/or feelings of personal deprivation of societal benefits, (6) strongly in need of finding or affirming a socially high status identity, (7) preyed on by fundamentalist religious zealots who find ample incentives in their holy scriptures to arouse self-deception among their adherents (Fink and Trivers 2014) and to incite them to punish or kill the out-group of despicable infidels, amply taking advantage of the inborn drive to defend and promote the in-group and assault out-group(s), and (8) last but not least, originating from a religious group in which fundamentalist beliefs about the construction of an idealised world, especially in the hereafter, are largely prevailing (Koopmans 2013). In particular the last factor may be an important cause for the astonishing fact that some well educated youngsters, originating from privileged wealthy families, also appear to be attracted to the jihad calling.

An even more puzzling question is why Western-educated Muslim women migrate to ISIS, although here the numbers are even lower than for the male jihadists. From a preliminary analysis of the motives of such women (Hoyle et al. 2015), it appears that partly similar factors as for male ISIS adepts play a role in their decision, namely disappointment with Western society and policy, but also, based on their indoctrinated belief system, desire to be part of and contribute to an ideal Muslim society in the traditional, dutiful, submissive, domestic female role.

physiological and behavioural indicators. Neural defects, low arousal levels, low verbal intelligence, hormonal abnormalities, low serotonin levels, lack of ability to concentrate, irritability, impulsivity and aggressivity, experience of deprivation or abuse, insufficient moral training at a young age, and especially the combination of several of these indicators, form risk predictors for antisocial behaviour and criminality in adolescence and adulthood. Progress in the aetiology of antisocial and criminal behaviour, together with expanding possibilities for ethical, social, psychological and biomedical interventions, offer new opportunities for early, preventive treatments for children with multiple risks of criminal behaviour and may allow a shift from a juridical punitive approach toward a controlled psychotherapeutic and biomedical approach.³⁰⁵

Psychopathy/Sociopathy. The multidisciplinary study of antisocial and criminal behaviour has contributed to the identification of antisocial personality disorder (APD or ASP),³⁰⁶ either in the form of psychopathy or sociopathy. The distinction between psychopathy and sociopathy is not always very clear, but the authors would opt for David T. Lykken's³⁰⁷ distinction whereby psychopathy is considered to be the result of being born with abnormal emotional personality traits of congenital origin, whereas sociopaths are primarily or mainly the result of a failure to receive adequate socialisation due to weak or irresponsible parenthood or social deprivation in general. This distinction corresponds to the one Linda Mealey³⁰⁸ makes between primary and secondary sociopaths.

The prevalence of psychopathy is estimated at about one per cent.³⁰⁹ Its prevalence is much higher in prison populations, particularly among chronic criminal offenders.³¹⁰ Psychopathy is mostly a male phenomenon; it is almost four times as high in men than in women.³¹¹

Psychopathy is considered to be the lower extreme of the normal distribution of the capacity for empathy.³¹² Psychopaths have a lack of empathy, remorse, guilt and shame. In the professional literature they are described as people without conscience, as being callous, selfish, dishonest, arrogant, aggressive, impulsive, irresponsible, hedonistic, promiscuous, as well as egocentric, glib and grandiose but superficial. They manifest a lack of concern for the suffering of others, are at ease with their exploitation of others and show extreme reluctance to be responsible for others.³¹³

³⁰⁵Moir and Jessel (1995), Rocque et al. (2012).

³⁰⁶For instance, Black and Landon (2013).

³⁰⁷Lykken (1995).

³⁰⁸Mealey (1995; 1997, 162).

³⁰⁹Hare (1999).

³¹⁰Mealey (1995).

³¹¹Sigvardsson et al. (1982), Mulder et al. (1994), Cottler et al. (1995).

³¹²See, for instance, Baron-Cohen (1997; 2011). Some authors consider psychopaths to be a subspecies of humans (Harris 1995; Kopenhaver 2010), or a special taxon (Harris et al. 1994), erroneously applying taxonomic concepts to phenomena which are expressions of normal variation within the human species.

³¹³Cleckley (1984), Hare (1999), Churchland (2002), Millon et al. (2002), Blair et al. (2005), Blair, (2006), Farrow (2007).

They start sexual activity at an early age and often in an aggressive way. They tend not to form strong attachments or long-term relationships, and are characterised by marital histories of desertion, non-support and abandonment.³¹⁴

They often display antisocial behaviour, which frequently results in a criminal record.³¹⁵ They lack the violence inhibition mechanism (VIM) in the presence of submission.³¹⁶ A specific characteristic of psychopathy is that extremely violent and antisocial behaviour appears at a very early age, characterised by a broad variety of antisocial forms of behaviour such as lying, theft, killing animals, truancy and disruptive actions at school, and delinquent behaviour.³¹⁷

However, not all psychopaths are violent people or even criminals.³¹⁸ They are often perceived as attractive and charming; they are often sexually hyperactive and can be highly skilled at deception and manipulation. There is only a weak association between psychopathy and high IQ.³¹⁹

Psychopathy has a genetic predisposition.³²⁰ Its heritability has been estimated at 50 per cent.³²¹ Several differences in brain structures have been identified showing signs of abnormal neurophysiology,³²² including reduced activity in areas involved in emotional processing. There is no convincing evidence that psychopathy is the direct result of early social or environmental factors.³²³

Several characteristics of psychopathy—among others its relative high prevalence, its aggressive and sexual predatory nature—have provoked evolutionary scientists to wonder whether psychopathy is not just a pathology resulting from accumulated unfavourable mutations,³²⁴ but might be a minority alternative life-history strategy that is evolutionarily adaptive.³²⁵ According to this view, psychopathy is a strategy of individuals who are unsuccessful in the normal competition for resources or mates, therefore they use deception and cheating to get them without reciprocating. Psychopathy is a frequency-dependent strategy,

³¹⁴Hare (1999), Fulton et al. (2010; 2014).

³¹⁵Eysenck (1977), Raine (1993), Ellis and Walsh (2000), Noziglia and Siegel (2006).

³¹⁶Blair (1997, 87), Blair et al. (2005).

³¹⁷For instance, Harpending and Sobus (1987), Hare (1999).

³¹⁸Dutton (2012).

³¹⁹Cleckley (1984), Hare and Neumann (2008).

³²⁰Hare (1995), Plomin and McGuffin (2003), Jang (2005), Viding et al. (2005), Larsson et al. (2006).

³²¹For instance, Mason and Frick (1994), Viding et al. (2005), Larsson et al. (2006), Ferguson (2010).

³²²Kandel and Freed (1989), Damasio et al. (1990), Smith et al. (1992), LaPierre et al. (1995), Raine et al. (2000), Tiihonen et al. (2000), Blair, et al. (2001), Laakso et al. (2001), Lacasse et al. (2003), Hauser (2006, 237), Kiehl et al. (2001; 2006), Rilling et al. (2007), de Oliveira-Souza et al. (2008), Weber et al. (2008), Wahlund and Kristiansson (2009), Yang et al. (2009), Rijdsdijk et al. (2010), Rummel and Glenn (2015).

³²³Pitchford (2001).

³²⁴Barr and Quinsey (2004), Glenn et al. (2011).

³²⁵For instance, MacMillian and Kofoed (1984), Harpending and Sobus (1987), Harris et al. (1994), Harris (1995), Mealey (1995), Baron-Cohen (1997), Colman and Wilson (1997), Pitchford (2001), Crawford and Salmon (2002), Wiebe (2004), Ferguson (2008), Verplaetse et al. (2009), Cartwright (2010, 427), Kopenhaver (2010), Glenn et al. (2011), Glover (2011).

meaning that the force of natural selection against it varies according its relative frequency in the population.³²⁶ Although they are under risk of being socially combated or ostracised in one or another way, their promiscuous sexual and mating pattern in combination with their cheating and deceiving behaviour, make them succeed to a certain degree in transferring their genes intergenerationally.³²⁷

An alternative to the sexual/mating hypothesis is the warrior strategy:³²⁸ between-group competition might have favoured the presence of warriors with personality traits that facilitated them to ruthlessly and recklessly fight and eliminate others, in the end contributing to group survival.

Some scholars have argued that modernity is not only an excellent breeding ground for criminal behaviour, due to its lack of small-scale social control,³²⁹ but that the extremely competitive and cheating nature of the modern economy and corporate culture is an ideal soil in which psychopaths can thrive, more particularly in the higher ranks of corporate, military and governmental hierarchies.³³⁰ Clive R. Boddy, Rick Ladyschewsky and Peter Galvin³³¹ identified greater amounts of psychopathy at more senior levels of corporations than at more junior levels; they argue that the ruthless, selfish and conscience-free approach to life of corporate psychopaths raises not only problems for corporations themselves but also for society as a whole, due to the global spread of a too strongly individualistically and supercompetitively oriented corporate economy. In a recent paper Clive R. Boddy³³² even argues that psychopaths working in financial corporations may have had a major part in causing the recent global financial crisis.

It leaves no doubt that the present competitive corporate culture, in which psychopaths thrive so well, is unsustainable in the long-term. However, it might take quite some time before modern societies are able to take adequate measures to change and contain this development, since it will need to be politically mastered at the international, if not the global, level. Hence, the economic success of psychopathic personalities cannot be expected to have a long fate. However, there is another reason why psychopathy will regress in modernity: just as is the case for machos in general, the strongly promiscuous psychopaths will no longer have the reproductive success they had in the past, because in modern societies women now possess efficient means of birth control through which they can avoid undesirable conceptions or pregnancies with partners who are not prepared to share long lasting parental responsibilities with them.

³²⁶Baily (1995), Mealey (1995), Colman and Wilson (1997).

³²⁷See also Hare (1995), Wiebe (2004).

³²⁸Baily (1995), Book and Quinsey (2004), Kopenhaver (2010).

³²⁹Boehm (2012, 338).

³³⁰Callahan (2004), Lobaczewski and Knight-Jadczyk (2007), Kopenhaver (2010).

³³¹Boddy et al. (2010).

³³²Boddy (2011).

6.5.3 Ethical Reflections Regarding Interpersonal Relations

6.5.3.1 Containing Competition

From the preceding sections, it appears that modernity struggles with two fundamental problems regarding competitive behaviour. The first one concerns the individual drive for outcompeting others in order to obtain or secure resources for self-actualisation and reproduction. The second relates to the specific economic and technological features of modernity that incite individuals, or groups of individuals, to express their urge for resource acquisition far beyond their individual or family needs: they develop a culture of greed and grabbing that must inevitably lead to societal stress and strife, as well as ecological overcharge. Both the individual drive for resource acquisition and the culture of greed, which developed in agrarian and especially in industrial society, ultimately result from a genetics that emerged in ancient times of within- and between-group competition for scarce resources.

As argued above, modernity needs a substantial further shift from competitive toward cooperative efforts. Realists will argue that it will be impossible to completely eliminate the drive towards competition from the human genome or gene pool. Perhaps not, but in the modern culture of the future the ethical goal should be focused on the drive for individual self-actualisation and interpersonal cooperation instead of interpersonal competition. If this principle could be introduced throughout our educational system and political culture, and become better rewarded socially, it might have unexpected multiplicative dispersal effects in many other domains of social life.

The culture of greed, transcending the need for satisfaction at the individual or family level, which developed in agrarian but especially in industrial society, and not the least in its present global neo-liberal variant, has to be contained considerably in order to avoid its unfavourable social (i.e. growing social inequalities) and ecological (i.e. increasing environmental deterioration) consequences.³³³

6.5.3.2 Promoting Cooperation

The human species is a social species, but its genetic predispositions for sociality have been largely selected as a function of social relations with few (and mostly closely related) people, and ultimately with the view to individual self-interest. Moreover, intragroup cooperativeness was evolutionarily largely designed as a function of intergroup competitiveness.

As human societies grew in size and complexity, cultural systems (moral, religious, educational, legal) had to be developed to deal with interpersonal relations between ever larger numbers of people. However, so far humanity has failed to develop a moral system that would allow the human species to function as one single unit.³³⁴ Indeed, we are genetically not so well prepared to deal with altruism at a distance. Our gene pool developed largely in the ancient EEA, when group sizes were small and our physical and mental horizon for mutual help was strongly

³³³For instance, Motesharrei et al. (2014).

³³⁴Alexander (1993, 180).

restricted.³³⁵ The position that we have reached today is to develop ethics of altruism that generally ends at the border of sovereign states.

Modernity is characterised by two counter movements which impede the further development of a well-adapted social morality: (1) as argued above in Sect. 6.4.2.3, the development of welfare state institutions induced the subjective feeling of heightened independence and boundlessness amongst many individuals, and hence lay the grounds for an amplified individualism; and (2) the weakening of the traditional religiously based moral code systems, and their insufficient replacement by secular moral indoctrinating systems, also hinder progress in cooperative morality.

Hence, modern society should make considerable innovative efforts to develop a strengthened social morality via its ideological pillars, its educational system, its mass media and its policymaking. As Sam Harris³³⁶ wrote recently in *The Moral Landscape*:

There may be nothing more important than human co-operation... few subjects have greater bearing upon the question of human well-being.

Prosocial behaviour requires a subtle biocultural interaction: internally a sufficient neuro-physiological and endocrinological basis for social arousal needs to be present, but externally the culture must be sufficiently stimulating in order to satisfy the exploratory and danger defying neuro-hormonal constitution of the human, particularly the potentially aggressive drives of the male adolescent and young adult. We will have to foster our social intelligence—the capacity to understand the intentions, motivations and desires of other people³³⁷—and to organise mutual cooperation among strangers on a massive scale.³³⁸

6.5.3.3 Mastering Antisocial Behaviour

In modern society violent and cheating behaviour has become evolutionarily maladaptive: socially because the harsh living conditions (including intergroup conflict) of the original EEA no longer exist, at least in peacetime; and reproductively because women can now protect themselves efficiently against involuntary conception by means of modern birth control practices through which the reproduction of genes of sexual offenders and abusers can be avoided.

All forms of antisocial behaviour, in their violent or cheating variants, disturb normal social life and community welfare and well-being in way one or another.

³³⁵Hauser (2006, 10).

³³⁶Harris (2010, 55).

³³⁷Gardner (1983).

³³⁸Bowles and Gintis (2011, 199).

There is no place for antisocial behaviour, let alone criminality, in the modern welfare state that aims to offer care for all of its citizens, create equal opportunities for everybody, and keep inequalities within reasonable limits.

Whereas the social causes of antisocial behaviour can easily be eradicated through fair social policies, it is much more difficult to deal with any kind of biological causes that predispose individuals to antisocial or criminal behaviour. Predispositions or urges toward such behaviour should be canalised into socially positive activities. Where this proves to be impossible, such as may be the case for psychopathy, paedophilia or sexual assault, it can be hoped that further progress in biomedical sciences will soon allow complementary measures, or even the replacement of traditional juridical punitive measures, by psychotherapeutic and medical interventions in order to prevent such undesired forms of behaviour. Personal freedom in these matters absolutely needs to be subordinate to community welfare and well-being. As Sam Harris³³⁹ pointed out pertinently:

Evolution may have selected for territorial violence, rape, and other patently unethical behaviours as strategies to propagate one's genes—but our collective well-being clearly depends on our opposing such natural tendencies.

³³⁹Harris (2010, 101).

Abstract

In this chapter four major categories of group relations are addressed, which are based on: (1) kin and family; (2) social status; (3) race, ethnicity, worldview, or political conviction; and (4) statehood. The evolutionary background, developments in modernity and ethical reflections for the future are discussed for each of them. Family relations are discussed in the broadest possible meaning, in order to include all variants appearing in modernity. The evolutionary origin of the family is explained, the changes that families experience in modernity are sketched, and ethical reflections for the future are suggested. The evolutionary heritage and modern changes of our drives for status achievement, egalitarianism, and distaste for relative deprivation are described. Major ethical forward looking aspects in the evolutionary perspective are presented. Competition with respect to social disparities based on race, ethnicity, worldview or political conviction are highlighted in their common evolutionary background grounded in the in-group/out-group syndrome. Regarding relations between states, the evolutionary heritage of intergroup conflict leading to present day governance systems is recalled. Ethical aspects of international relations that represent challenges for the future are identified.

7.1 Introduction

Four types of group relations are distinguished because each one of them is characterised by a specific type of feature that is at the root of antagonistic behavioural patterns towards other groups. The first concerns kinship and family relations that are usually associated with nepotism. The second concerns distinctions which are characterised by differences in social status, resulting in a social class hierarchy,

which is often subject to classism.¹ The third are distinctions characterised by racial, ethnic, or ideological features and are often subject to various forms or degrees of racism, ethnocentrism, or ideological intolerance. The fourth one concerns between state relations based on governance organisation, often associated with several forms or degrees of xenophobia.

7.2 Kinship and Family

Kinship and family relations are a primary form of interpersonal relations. There are several definitions of the term kinship. Here it is used in its biological meaning, namely people related by descent (genetic relatedness). The term family is a broader concept than kin, as it refers to a group of people affiliated by descent (= kinship, mostly a genetic relationship, but it can also include adopted or foster children), sexual affinity (marriage, consensual union, living-apart-together (LAT) relation and commuting relation), or coresidence (other household types).

The development of kinship and family relations in modernity requires the consideration of those relations in a broad context, including relations resulting from lineage (parent-children relations) and ascendance (adults-parents relations), relations based on affinity which may be of a sexual nature (marriage, consensual union, LAT-relation, commuting relation) or a social nature (non-sexual coresident adults). This approach allows the inclusion of biological as well as social family relations, and all types of family and household forms, not only traditional nuclear and extended families but also monoparental families, adoptive families, reconstituted families, gay and lesbian unions, etc.

Nuclear family relations include two major components: partnership relations and parent-children relations—the latter descending as well as ascending. Both fundamentally relate to care and well-being, be it of a sexual, psychological, social, educational, financial or health care nature.

7.2.1 Evolutionary Background of Family Variability

Some social scientists² believe that the family is not a natural phenomenon, but instead it is a social construct based on social and psychological factors. In contrast, evolutionarily inspired scholars maintain that the origin of the human family is of a biological nature and that, even today, especially in modern culture, the only functions that keep families together remain biosocial in nature.³ The family is a typical sociobiological group phenomenon. The social-constructionist view of the family is an example of short-term, proximate and non-evolutionary thinking.

¹Classism: prejudice or discrimination based on social class.

²For instance, Ditch et al. (1995), Zonabend (1996).

³Gough (1971), Van den Berghe (1979), Mellen (1981), Emlen (1995), Chapais (2008), Gorelik et al. (2010).

A long-term, evolutionary and cross-cultural approach, in contrast, shows that the ultimate and fundamental *raison d'être* of the human family is of a biological nature:

The human family is, very simply, the solution our hominid ancestor evolved over three to five million years to raise brainy, slow maturing, neotenic, highly dependent, and therefore, very costly (in terms of parental investment) babies.⁴

7.2.1.1 Long-Term Childcare and Enduring Partnership

The origin, universal existence and future continuity of the (nuclear) family are the result of the hominisation process that produced the human-specific brain that requires, in turn, a long postnatal maturation and socialisation process.⁵ Families are the social extension of uterine life, based upon the needs of slowly maturing human children—several of which must be produced in order to guarantee inter-generational continuity.⁶ The predisposition to intense and long childcare is the result of selective processes in response (during hominisation) to the increasing ontogenetic dependence of the human infant and adolescent.

As argued in Chap. 6, Sect. 6.3.1, the sexual specificity of the human species, facilitating the establishment of enduring love relations between the partners, has been selected as a function of the increasing dependent long maturing offspring.

Evolutionary science provides us with four theories from which specific hypotheses about mate preference and choice in an enduring partnership can be derived: 'good genes' theory, parental investment theory, reproductive value theory, and paternity confidence theory.

The 'good genes' model refers to the preference for and choice of mates who possess features displaying viability, parasite resistance, immunocompetence and developmental stability.⁷ Features expressing physical fitness, the population average, and bilateral symmetry are clearly preferred in mate choice, by both men as well as women.⁸

The concept of parental investment⁹ implies, for a species such as the human where males contribute significantly to the upbringing of their offspring, which females seek to mate with males who have the ability and willingness to provide resources that will benefit their children.¹⁰ This implies that females will value and seek out male personality characteristics such as intelligence, ambition, and industriousness; social features such as high educational level and high social status (which are associated with or result in increased earning capacity); and physical

⁴Van den Berghe (1988, 43).

⁵Gough (1971), Van den Berghe (1979), Mellen (1981), Emlen (1995), Bellah (2011, 104).

⁶Van den Berghe (1979), Filsinger (1988), Booth et al. (2000), Salmon and Shackelford (2007).

⁷Westermarck (1921), Barber (1995).

⁸Gangestad and Buss (1993), Singh (1993), Buss (1994), Perrett et al. (1999), Shackelford and Larsen (1999), Thornhill and Grammer (1999), Honekopp et al. (2004), Roberts and Little (2008), Craig and Little (2008).

⁹Trivers (1972).

¹⁰Alexander and Noonan (1979).

features such as height and strength.¹¹ Other desirable attributes might include: dominance, maturity, emotional stability, reliability, fidelity, willingness to provide for resources, sociability, and love.¹²

Reproductive value¹³ is the degree to which individuals of a given age and sex have the capacity to produce additional viable offspring and, hence, to transmit their genes to future generations. In the human species, the male's reproductive capacity is huge and from puberty onward it is relatively independent of age.¹⁴ In contrast, women's fecundity is low and strongly time dependent. Women's age-specific natural fertility varies quite substantially: it increases in the first years after puberty, peaks in the mid twenties, and thereafter it gradually and increasingly declines with age, especially after 35 years of age.¹⁵ At the same time, women's future reproductive capacity is strongly associated with age varying physical and behavioural features such as general body build, in particular waist-hip ratio,¹⁶ youthful facial traits, breast form, skin and muscle tone, fat distribution, and energy level. Physically attractive and behaviourally dynamic features peak at younger ages. Therefore, youth and physically attractive features are considered strong indicators of high reproductive value and are consequently highly valued by men since women's fecundity is a limited and, hence, precious resource.¹⁷

Paternity certainty¹⁸ is a sensitive issue in a species where the male contributes quite substantially to parental investment. Whereas maternity can never be doubted, paternity can. Consequently, parentally investing males have a genetic interest in securing paternity confidence in order to avoid cuckoldry (the investment in offspring that is not genetically theirs).¹⁹ Accordingly, paternal investment will lead to a relatively stronger experience of male sexual jealousy and to a stronger male preference for female chastity and fidelity. This evolutionary prediction finds confirmation in many traditional sexually asymmetrical sociocultural practices and double standards: female sequestration, veiling, genital mutilation, virginity protection, foot binding, mate guarding, chastity belts, spousal homicide, legal restrictions on female sexual behaviour, wife beating, penalties for adultery, conjugal dissolution, daughter guarding, etc.²⁰

7.2.1.2 Elderly Care

Whereas there is a strong basis in evolutionary theory for explaining partnership behaviour and parental care for offspring, the question has been raised as to whether

¹¹Barber (1995).

¹²Buss (1994, 2007).

¹³Fisher (1930), Williams (1975).

¹⁴Nieschlag (1986).

¹⁵Eaton and Mayer (1953), Charbonneau (1979).

¹⁶Singh (1993), Hughes and Gallup (2003), Streeter and McBurney (2003).

¹⁷Howell (1979), Buss (1989), Wiederman and Allgeier (1992), Ridley (1993), Thiessen et al. (1993), Bereczkei and Csanaky (1996), Wiederman and Kendall (1999).

¹⁸Daly and Wilson (1978).

¹⁹Platek and Shackelford (2006).

²⁰Dickemann (1979), Daly et al. (1982), Betzig (1989), Batten (1992), Buss (2002), Perilloux (2008).

there are also evolutionary explanations for the care of people in their post-reproductive stage of life. Views differ on this matter. On the one hand some scholars state that “evolution does not care about elderly” because, as has been seen in Chap. 6, Sect. 6.2.1.2, genes protecting survival at post-reproductive age are less selected for²¹: the force of natural selection weakens with increasing age.²² On the other hand some scholars argue that, since the elderly can increase the reproductive fitness of their adult children—cf. the grandmother hypothesis²³—the latter have a reproductive interest in transferring resources to their parents.²⁴ Although the net flow of transfers within families goes universally from parents to children and grandchildren, there is often also a partial flow from adult children to elderly parents.²⁵ Moreover, the altruistic care given to an ageing parent could also be explained on the basis of kin selection theory²⁶ and reciprocity theory.²⁷ Finally, there are several theories—attachment theory, equity theory, and family obligation theory—which explain elderly care more on the basis of ontogenetic processes to which adult children have been acculturated.²⁸

7.2.1.3 Nepotism

There is another important evolutionarily based family characteristic that is responsible for a particular form of family related attitudes and behaviours, also persisting in modern living conditions. It concerns the predisposition to favour people according to their degree of genetic relatedness, conventionally called nepotism.²⁹ Nepotism is defined as favouritism shown to relatives.³⁰ Behaving nepotistically, namely by favouring one’s own kin, increases the probability of enhancing one’s inclusive fitness by favouring the reproduction of the genes one shares with the recipients of one’s altruism. Hence, nepotistic behaviour is a consequence of kin selection and is explained by inclusive fitness theory.³¹

7.2.2 Family Variability in Modernity

In their kin influence hypothesis, Lesley Newson and Peter J. Richerson³² suggest that modernity is characterised by a considerable shift in people’s social networks going from relatives to non-related persons.

²¹For instance, Bonneux et al. (1998).

²²Medawar (1952).

²³Williams (1957), Hill and Hurtado (1991).

²⁴Coall and Hertwig (2010).

²⁵For instance, Caldwell (1982), Lee (1997).

²⁶Hamilton, 1964.

²⁷Trivers, 1971.

²⁸For instance, Cicirelli (1991).

²⁹The word nepotism derives from the Italian ‘*nipoti*’ which refers to any family descendent; in Latin ‘*nepos*’ stood for grandson or nephew.

³⁰Van den Berghe (1978), Alexander (1979), Bellow (2003).

³¹Hamilton (1963; 1964), Maynard Smith (1964).

³²Newson and Richerson (2009).

Indeed, the twentieth century has witnessed remarkable changes in family structures and dynamics in Western Europe, North America and other overseas mainly English speaking countries, as well as in non-Western countries where modernisation is taking off³³: smaller household sizes; continuing shift from extended to nuclear families; advance of the initiation of sexual partnership³⁴; decrease in nuptiality, although eventually a large majority of couples marry³⁵; increase in separation or divorce³⁶; appearance of new forms of unions such as unmarried cohabitation³⁷ and living-apart-together³⁸; increase in single-person households³⁹; rise in the number of one parent families (mostly headed by women) either from separation, by accident or choice⁴⁰; increasing number of remarriages⁴¹; changing sex relations among others due to increasing outside employment of women⁴²; shift from incidental to planned parenthood⁴³; changing relations between adults and their parents⁴⁴; and, last but not least, a substantial decrease in fertility, often to below replacement levels.⁴⁵

In the 1960s, several of these family changing phenomena started to accelerate because they spread over larger sections of Western or westernised populations, due to the combined effects of a number of interrelated and mutually reinforcing economic, technological and cultural factors which speeded up in that period.⁴⁶ This caused Ron Lesthaeghe and Dirk van de Kaa to define these changes as the Second Demographic Transition.⁴⁷

The important changes in family structures observed in recent decades are partly the result, but also partly the cause, of changes in relational contents, dynamics and processes.⁴⁸ Both partner relations and parent-child relations have been affected by several changes in values, power and decision-making and in the emotional content of relationships. Partnership is shifting from complementarity toward egalitarianism, from normative behaviour toward individual choice and from a commanding toward a negotiating housekeeping. Similarly, parent-child relations have undergone changes including a shift from paternal power to parental authority, from

³³Cliquet (2003), Avramov and Cliquet (2005).

³⁴Bozon and Kontula (1997, 1998).

³⁵Kiernan (1993), Sardon (2002).

³⁶Deven and Cliquet (1986), Sardon (2002).

³⁷Trost (1979), Corijn and Klijzing (2001).

³⁸Rindfuss and Stephen (1990), Trost (1998), Fisher (1992).

³⁹Cherlin et al. (1997), Corijn and Klijzing (2001).

⁴⁰Deven and Cliquet (1986), Miller (1992), Barber (2005), Van Delft et al. (1988), Burghes (1993).

⁴¹For instance, Norton and Miller (1992).

⁴²Gornick and Meyers (2003), Van Dongen (2009).

⁴³Cliquet and Schoenmaeckers (1976).

⁴⁴For instance, Rossi and Rossi (1990), Grundy (2008).

⁴⁵For instance, Cliquet (1987), Chesnais (1998), Teitelbaum (1999), Frejka (2008).

⁴⁶Hoffman-Nowotny (1987), Van de Kaa (1987), Cliquet (1991; 2003).

⁴⁷Lesthaeghe and van de Kaa (1986), Lesthaeghe (1995; 2010).

⁴⁸Deven (1996).

submission to self-development, from obedience toward exploration and from a unilateral toward a bilateral transmission of values and knowledge.

The many changes in family structures and functions observed in modernity undoubtedly have many effects. Overall, most changes correspond to basic needs and desires which can, in the more liberal moral climate and richer economic context of modernity, be achieved to a greater extent, and consequently they must be positively valued. This is particularly the case for women whose social and psychological position in family relations has considerably improved. Innovative features of modernity such as the scientific knowledge about sex differences, the emancipatory secular ideologies, the rise in educational levels of both women and men, the independent occupational opportunities for women, and last but not least, the effects of lower infant and maternal mortality and greater fertility control have contributed to the emancipation of women.⁴⁹

However, some of the modern family changes also have unfavourable side effects to which societies have not yet adapted well. A few examples may illustrate this:

- The (partial) shift from the earlier social control of family structures and functions to personal choices and decision-making make both partnership and parent-child relations subject to much higher cognitive and emotional requirements. Consequently, although family relations have become more satisfying, they are also more vulnerable and less stable⁵⁰;
- The increase of outside employment for women has several advantages, for instance for the economic/financial situation of the family as whole, and especially for the empowerment and independence of women themselves. However, working conditions remain tailored to men and, due to insufficient societal adaptations to the new family situation, the dual career of parents is not easy to manage. In many cases there is simply not enough parental time left for adequate parenting. The increasingly competitive nature of the market economy, pushing people to ever higher levels of production, goes in the opposite direction to what is needed in terms of quality parenting⁵¹;
- There is evidence that the modernisation process is characterised by a major shift from the authoritarian toward authoritative, permissive, uninvolved or nurturing styles of family relations.⁵² Whereas research seems to suggest that the authoritative and nurturing styles are the most recommendable, there is evidence that these ideal styles are still far from being generally realised;

⁴⁹Cliquet (1984), Aarssen (2007).

⁵⁰Cliquet (2003).

⁵¹For instance, Gauthier and Smeeding (2004).

⁵²Behavioural scientists distinguish several parenting styles and practices in early child development. Parenting (or child rearing) is the process of promoting and supporting the physical, emotional, social and intellectual development of a child from infancy to adulthood. For instance, Diana Baumrind (1971) distinguished four major parental types: authoritarian, authoritative, permissive, and uninvolved; Dacey and Packer (1992) also distinguished the nurturing parent model.

- Couple dissolution and divorce have undoubtedly contributed to resolving union or marital conflicts. However, they also result in a substantial number of cases of increasing poverty, more particularly of female headed single parent households⁵³;
- The effects of couple dissolution or divorce on children is a complex issue, which depends on a broad variety of separation/divorce contexts such as the age of the children, the nature of the separation process (peaceful or warlike), the future parental roles of both parents, and in the case of remarriage by one or both parents, the quality of the reconstituted family climate. No doubt, separation/divorce is for most children (and parents) a painful and stressful process, the development and consequences of which are not always properly dealt with⁵⁴;
- Growing numbers of elderly people, and especially women, are living alone in old age. The majority of elderly people living alone or in couples seem to be satisfied with their independence.⁵⁵ Nevertheless, due to the increasing life expectancy and the shift in the causes of morbidity and mortality from exterior to internal factors, an increasing proportion of elderly need permanent assistance or care in old age. This care, due to a variety of reasons—geographical mobility, desire of adult children as well as the elderly persons or couples to remain independent, outside employment of the traditional female carers of older people—can in many cases no longer be provided by adult children⁵⁶;
- There is also the phenomenon of below replacement fertility that will be discussed in Chap. 8, Sect. 8.2.2.2.

7.2.3 Ethical Reflections About Family Variability in Modernity

7.2.3.1 Promoting Quality Family Relations

Different views have been expressed about the (desirable) future of the family.⁵⁷ Observing the many changes that the family is undergoing in modernity, some have advanced doom-mongering views about the disappearance of the family⁵⁸ while others long for a return to the traditional family: these are views that are obviously widespread in ideologically (religiously and/or politically) conservative quarters, if not in extreme right wing circles.⁵⁹ Among futurists, some more eccentric visions blossom such as the idea that “social institutions like the family become obsolete in

⁵³For instance, Avramov (2002).

⁵⁴For instance, Deven and Cliquet (1986), Fomby and Cherlin (2007), Van Peer (2007).

⁵⁵Lee (1997), Dooghe et al. (1988), Jacobs (2004).

⁵⁶Vanden Boer (1999).

⁵⁷For instance, Cornish (1979), Roussel (1989), Duvold (1995), Moynihan et al. (2005).

⁵⁸See discussion in Berger and Berger (1983), Wright and Jagger (1999).

⁵⁹Abbott and Wallace (1992), Gilbert (1999).

scientifically and technologically advanced societies”,⁶⁰ or that there is “no necessary reason why partnership has to be limited to a dual unit, but could consist of three, four, or even more consenting adults who wish to get married and have children”.⁶¹

On the one hand such visions greatly undervalue existing biosocial knowledge about the evolutionary origin of family bonding, regarding partnership as well as parent-children relations; and on the other hand they undervalue modern experiments regarding alternative family models. Taking those insights into account, there can be little doubt that we will, for a very long time, be genetically predisposed to drives towards emotionally high quality partnership and to continue self-rearing of one’s own children. Evolved partnering love, as well as parent-child love, has been thoroughly built into our genetic heritage and it is not likely to change for a long time.

Representative surveys about sexual behaviour or family relations, including the opportunity to express preferences for a wide variety of sexual and partner relations, result in massive preferences for enduring love relationships.⁶² However, less conventional forms of sexual relations, some of which may represent alternative forms of reproductive strategies, seem to attract more attention or succeed better in getting into the public spotlight, thereby seriously distorting the representation of reality.

Research on children who have grown up in institutional environments—even with perfect material living conditions—show that the absence of individual emotional bonding leads to behavioural disturbances (aggressivity, delinquency, antisociality), intellectual retardedness (lower IQ), and even physical retardation (stunted growth, illness, and increased mortality).⁶³ Whenever attempts have been tried to collectivise child rearing outside the nuclear family—see the experiments in the Oneida community,⁶⁴ the early Soviet Union,⁶⁵ and the Israeli Kibbutzim⁶⁶—they soon had to be abandoned, due to the considerable economic costs, the mediocrity of the results, or the dissatisfaction of the parents about their reduced parental role towards their own children. The suppression of the bond between parent, especially mother, and children is felt to be emotionally intolerable in the large majority of cases.⁶⁷

The principal challenge regarding family life in modernity and a further progressing modernisation consists of providing overall support to families to deal with the negative side effects of modernisation such as the higher emotional and intellectual demands on family relations, the work life/family life incompatibility and the more complex relations between descendants and ascendants. In other words,

⁶⁰For instance, FM-2030 (1973), Bainbridge (2010).

⁶¹For instance, Sorgner (2010).

⁶²Spira et al. (1993), Laumann et al. (1994), Wellings et al. (1994), Corijn and Klijzing (2001).

⁶³Bowlby (1951), Montagu (1957), Rutter (1972).

⁶⁴For instance, Foster (1984), Coşgel (2000).

⁶⁵For instance, Prigent (1955).

⁶⁶For instance, Sharabany et al. (2001).

⁶⁷Arnhart (1998).

the modernisation process requires ethics that enhance the overall quality of partner relations and parent-children relationships.⁶⁸

7.2.3.2 Accepting Diversity in Family Structures

As already argued in Chap. 6, Sect. 6.3.3, modern societies with their millions of citizens are reproductively much less vulnerable and, hence, can be much more receptive to behavioural variation in the domain of sexual, family and reproductive patterns. Moreover, a diversity in family structures will better harmonise with the broad diversity of social and psychological needs and philosophical convictions present in modern populations. A further modernisation can embrace a variety of family forms, in terms of legal status (married, unmarried, divorced), living arrangements (cohabiting, living-apart-together, commuting), sexual orientation (heterosexual, homosexual), parenting (biparenting, monoparenting, coshared parenting), and primary or successive relationships.

Regarding successive relationships, it must be recalled that in the past enduring marriages or unions which lasted 50 or 60 years were exceptional because of high mortality. Nowadays, separation or divorce has largely replaced mortality as the precedent for the establishment of another union. From the perspective of a further evolving hominisation and progressing modernisation, a succession of relations during the life course might become a still more common phenomenon, due to the expectation that longevity will be further prolonged.

7.2.3.3 Revisiting Mutualism Between Descendants and Ascendants in Families

Due to the nuclearisation of the family, increasing female outside employment, geographical mobility and individualisation in general, in many cases grandparenting is losing its important supporting parenting role in modernity.⁶⁹ There is perhaps no immediate solution for situations in which grandparenting is impossible, but the enduring importance of grandparenthood can only be underlined, not just for grandparenting itself, but in many cases as support for family expansion.⁷⁰

The same family and societal developments—nuclearisation of the family, female outside employment, geographical mobility and individualisation in general—make it increasingly difficult to obtain family support for older adults in need of assistance or care. Various alternative, but undoubtedly more costly, solutions are being or will have to be set up on mass scale such as community welfare care, domiciliary care, residential care, sheltered housing and institutional care.⁷¹

In view of the increased longevity and the future expected further increase in life expectancy, the ethical basis of the family solidarity that goes predominantly from descendants to ascendants needs to be revisited.⁷²

⁶⁸Cliquet and Avramov (1998), Avramov and Cliquet (2005).

⁶⁹For instance, Silverstein and Long (1998).

⁷⁰For instance, Hočevar and Črnič Istenič (2010).

⁷¹For instance, Vanden Boer (1999).

⁷²Avramov and Cliquet (2003).

7.2.3.4 Addressing Nepotism in Modernity

Favouring one's own kin is a deeply rooted human drive that, in all probability, cannot be disposed of easily. At first sight there is nothing wrong with helping kin, particularly offspring. However, modern social processes and interactions between individuals have become so complex and diverse that traditional kin nepotism has to become subordinate to broader moral rules, such as guaranteeing equal opportunities, without which broader social interactions cannot function properly. This matter will be addressed in greater detail in Sect. 7.3.3.1.

7.3 Social Status Hierarchies

All known human societies show relatively strong differences in the distribution of wealth, power, and prestige. Sociologists have amply documented the phenomenon of social stratification in which people are ranked into a number of hierarchically differentiated layers.⁷³ Societies are, however, not only structurally stratified: the different positions and functions of its members are also differentially evaluated and rewarded.⁷⁴

Depending on the stage of a society's cultural development—gathering-hunting, agrarian-pastoral, industrial, post-industrial—the allocation of differentially rewarded social status positions are made on the basis of different criteria, such as descent, personal wealth, military, political or religious status, economic and financial status, education, and personal qualities,⁷⁵ or these criteria are differently weighted or valued.

7.3.1 Evolutionary Background of Social Status Hierarchies

The existence of social status inequalities in human societies is consistent with dominance/competence hierarchies that are generally found in social animal species,⁷⁶ and especially in the closely related African great apes.⁷⁷

During the hominisation process, social status differences evolved in a fluctuating manner: these have ranged from strong despotism, as present in the great apes, relatively egalitarian relationships among nomadic hunter-gatherers, strong social hierarchies in the agricultural-pastoral and early modern eras, to gradually decreasing social inequalities and inequities in the more advanced modern societies.⁷⁸ Overall, humans are characterised by a universal drive to social

⁷³For instance, Sorokin (1927).

⁷⁴For instance, Barber (1957), Ellis (1993).

⁷⁵Barber (1957), Grusky (1994).

⁷⁶Hinde (1974), Wilson (1975), Omark et al. (1980), Trivers (1985), Wilkinson (2005).

⁷⁷De Waal (1982), Boehm (1999, 64), Mazur (2004), Chapais (2015, 163).

⁷⁸Knauff (1991, 391), Boehm (2012), Gavrillets (2012), Harvey (2014).

dominance.⁷⁹ What appears to change over time is the social validation of the source and the acceptable degree of power and influence underpinning hierarchies.

At the individual (or family) level, social hierarchies are the result of within-group competition for scarce resources such as territory, food and sexual mates. The drives toward high status and priority access to resources are related to the principle of the maximisation of inclusive fitness.⁸⁰ Status and prestige are the markers of social success. Social success is the route to power which, in turn, is the key to the universal human desire of resource acquisition.⁸¹ High status is associated with greater access to resources, wealth and mates, which can be converted into the production of a larger number of offspring: eventually this means a higher likelihood of intergenerational transmission of genes.

At the group level, social dominance relations (leadership-followership relations) may have had several other advantages during hominisation such as maintenance of group stability,⁸² facilitation of the transmission of communication,⁸³ and coordination and collective action in intergroup conflict or competition for resources.⁸⁴ Essentially, groups organised in hierarchies appear to be more efficient at intergroup combat than groups that are organised in other ways. D. Cassill and A. Watkins⁸⁵ even argue that cooperative hierarchies provided a greater probability of survival to a greater number of members than egalitarian cooperatives. Leadership, either despotic or democratic, clearly becomes more important as group size and social complexity of societies increase.⁸⁶

Hence, individual survival drive as well social efficacy may be reasons why predispositions for deference and submissiveness toward authority were embedded in the human gene pool that so strongly influenced social status hierarchies and the moral rules that regulate them.⁸⁷

The evolutionary background of social status differences is ultimately explained with differential reproductive fitness, in other words, with Darwinian selection. Much has been written to explain why people spend so much time and energy on status related behaviours such as flaunting outward appearances. Present-day people are obsessed with a youthful appearance: both women and men use various forms of enhancement, for instance, to appear taller or acquire excessively big breasts in the case of women, and drive huge or powerful cars in the case of men. Several explanations have been given for this remarkable phenomenon. Amotz and Ashivag Zahavi⁸⁸ explain this by what they call the handicap principle, a phenomenon that acts as a signal of high status and availability of abundant resources which is

⁷⁹Boehm (1999, 147).

⁸⁰Hamilton (1964), Williams (1966), Alexander (1979).

⁸¹Betzig (1986).

⁸²de Waal (1996, 128).

⁸³Omark et al. (1980).

⁸⁴Alexander (1979, 1993), Van der Dennen (1995), Sidanius and Pratto (1999), Flinn et al. (2005), King et al. (2009), Gavrillets and Fortunato (2014).

⁸⁵Cassill and Watkins (2010).

⁸⁶King et al. (2009).

⁸⁷Boone (1998), Krebs (2011, 75ff).

⁸⁸Zahavi and Zahavi (1997).

ultimately important for survival and reproduction. Appearance is a tool used to acquire greater admiration and greater social status. In order to acquire a gracious gait and appear taller, many women wear stiletto shoes. Advantages obtained from wearing this uncomfortable footwear may be compared to peacock tails or deer antlers.

Since the space for high social status in society is by default scarce, achieving such a status is the source of intense competition and conflict. Differences in social status often involve social inequalities associated with dominance styles varying from tolerant to despotic.⁸⁹ Strong unequal social status relations usually elicit movements to restrain the power and privileges of more dominant strata and to achieve a relatively egalitarian distribution of resources.⁹⁰ Indeed, notwithstanding his strong predisposition to seek high social status, *Homo sapiens sapiens* has, in the course of his evolution, also been endowed with a longing for egalitarianism⁹¹ and distaste for relative deprivation.⁹² Several factors and processes have been suggested for the evolution of the egalitarian drive: counter-dominant coalitionary behaviour, envy, social selection for altruism and self-restraint, moralistic punishment, and intergroup conflict.⁹³ The ethnological and sociological literature as well as results from economic game experiments motivated Herbert Gintis⁹⁴ to introduce the epithet *Homo equalis*,⁹⁵ the human who tries to keep inequalities within narrow margins, albeit with some variation in degree—“a weak urge to reduce inequality when on top, and a strong urge to reduce inequality when on the bottom”.⁹⁶ Gerald Gaus⁹⁷ even speaks about the egalitarian species. From an evolutionary perspective, it may be argued that people will further develop a dislike of excessive social disparities that give groups of people power over others.

7.3.2 Developments in Modernity Regarding Social Status Allocation

Modernisation is characterised by a clear shift from authoritarian toward democratic organisation in demographically large and socially complex societies, which have a generalised statutory basic education and large proportions of highly educated populations. Nevertheless, modern societies still struggle to find the right balance between human predispositions to hierarchically structured social status differences and human urges for egalitarianism.⁹⁸ Democratisation is, in other words, not only

⁸⁹de Waal (1996, 125).

⁹⁰Marx (1867).

⁹¹Erdal and Whiten (1994), Boehm (1999).

⁹²Fehr and Schmidt (1999).

⁹³Boehm (1993; 1997; 1999; 2012), Erdal and Whiten (1994), Dawes et al. (2007), Gavrilovs (2012).

⁹⁴Gintis (2000, 252).

⁹⁵*Homo equalis*, from Italian ‘eguale’, Latin ‘aequalis’.

⁹⁶Gintis (2000, 258); see also Guinote et al. (2015).

⁹⁷Gaus (2015).

⁹⁸Somit and Peterson (1997, 3).

impeded by specific social characteristics of complex modern societies but also by human evolutionary heritage.

In modern culture, the hierarchy of functionally necessary social activities increasingly needs to be determined by the degree of people's personal capacities and competences to acquire knowledge and take up responsibility.⁹⁹ These factors require a particular biological (physical as well as mental) endowment and equipment of the individual as well as the necessary educational (and moral) training to valorise those biological potentialities.

Due to Mendelian segregation and recombination of genes, as well as other life course events, biologically partially assorted social classes become more heterogeneous intergenerationally. To a certain extent social stratification needs to be reassorted in each generation. Modern societies need to enhance social mobility in order to remain functional and assign jobs and social status on the basis of personal abilities and performances instead of family bonds.¹⁰⁰

Modernity has made huge progress in creating democratically more equal opportunities for all its citizens by enlarging the opportunities for education and assigning jobs according to abilities and performances, and by achieving movement towards meritocracy. However, due to various deeply embedded ancient drives, such as nepotism, in-group bias, tribalism, ethnocentrism, racism and xenophobia, modern societies have not completely succeeded in building up their social stratification through a shift from descent to capacity, performance and production.¹⁰¹

The experience of planned economies has shown that complex societies must maintain a reasonable gradation in labour remuneration in order to motivate citizens for their study and labour efforts.¹⁰² Communism kept the income variance for workers low and failed to stimulate the more creative and productive people. On the other hand, in recent decades in many Western market economies the income differential has increased substantially between the average worker and the average top manager. The accumulation of wealth in the hands of very few has further peaked, exacerbating social differences and inequity.¹⁰³ Mainly in the US and other English speaking countries, income inequality has exploded since the 1980s; this is not only on the basis of an unprecedented increase in wage inequality but also due to a growing inequality of capital income.¹⁰⁴ In this context, it is appropriate to refer to the recent research on the increase in social inequalities and use of resources by Safa Motesharrei and colleagues¹⁰⁵ in which they show that not only overexploitation of natural resources but also exuberant social inequalities can independently result in a general societal collapse.

⁹⁹Barber (1957), Chapais (2015).

¹⁰⁰Sorokin (1927), Burt (1961), Cliquet (1968), Salter (2008).

¹⁰¹Savage and Egerton (1997), Rubin (2002).

¹⁰²For instance, Rawls (1971, 100).

¹⁰³For instance, Hacker and Pierson (2010), McQuaig and Brooks (2013), Piketty (2013).

¹⁰⁴Piketty (2014, 300).

¹⁰⁵Motesharrei et al. (2014).

Contrary to what one would expect from our egalitarian heritage that took shape in the hunter-gatherer era¹⁰⁶ and the social emancipatory and egalitarian oriented ideologies of the agrarian-pastoral era¹⁰⁷ and class struggles in the industrial¹⁰⁸ era, the longer-term hominisation may require greater ethical weight to be given to equity.

7.3.3 Ethical Reflections Regarding Social Status Acquisition

7.3.3.1 Meritocracy and Equal Opportunities

The very nature of modern society with its large population that requires complex organisation, and the still present human predisposition to social dominance, make the establishment of a well functioning democratic organisation a difficult endeavour. Nevertheless, the long-term ethical goals of development of human-specific potentialities, promotion of quality of life, promotion of equal opportunities and moving from competitive toward cooperative efforts can only be achieved in a well functioning system in which all citizens benefit from the abundance and are part of the decision-making processes.

From an evolutionary perspective, social hierarchy was necessary and it was embedded in deep-seated human drives for self-actualisation and advancement, interindividual competition, resource acquisition, and ultimately reproductive success. It is necessary today because of the size and complexity of modern culture, whose functioning is based on the diversification of tasks and responsibilities.¹⁰⁹ Some authors argue that control is in the existential interest of both higher and lower status groups.¹¹⁰ However, sources and degrees of hierarchisation require social control by means of values, norms and institutions without which they easily degrade to social inefficiency and injustice.

From a reproductive fitness point of view, social hierarchies are, in the modern contraceptive culture, perhaps less important than they were originally in the EEA where they ultimately fulfilled an important role in the maximisation of inclusive fitness. Nevertheless, to the extent that modern social hierarchies are, even more than in the past, associated with and caused by differentials in biopsychic potentialities, their positive association with reproductive performances remains essential for the future evolution of humankind.

The complexity of modern societies requires the diverse talents present in the population to be well developed and adequately allocated to specific tasks and

¹⁰⁶Boehm (2012), Gavrillets (2012).

¹⁰⁷See, for instance, the ‘Sermon on the Mount’ in the Bible, Matthew, 5: 1–12.

¹⁰⁸Marx (1867), Green (1884), Leo PP XIII (1891).

¹⁰⁹Masters (1989), Sober and Wilson (1998), Wilson (2002, 36).

¹¹⁰Social control is in the interest of higher social status groups because the enduring welfare and success of the privileged also depends on the harmonious functioning of society as a whole (Diamond 2005, 513). Social control is also in the interest of the lower social status groups because leadership is an important condition for the proper functioning of complex societies (De Waal 1996, 128).

responsibilities. Modernity can only exist, be sustained and further evolve when it is based on the principle of meritocracy and equal opportunities for people to develop their abilities.

Our sexually reproducing system implies that with each generational change our genotypes are segregated and our genes are recombined. As a result children do not always completely resemble their parents. This genetic recombination and segregation system requires that, in a complex, diverse society, people in every generation are to be biosocially reassorted over the various social strata. Modern societies must be hierarchically open societies in which social mobility is easily possible. Meritocracy is a precondition for achieving greater intergenerational equality of opportunities. Survey research also finds a massive preference for meritocratic distributions.¹¹¹

In addition to the Mendelian segregation and recombination of genes, ontogenetic developmental processes occurring during the pre- and/or postnatal life course may also affect the physical or mental performance potentialities of individuals and require changes in occupational activities.

Hence, from an intergenerational point of view, rigid class or caste structures are incompatible with the requirements of modern societies, as they need the right people on the right jobs in order to maintain their dynamic functionality and creativity. Modern societies need strong democratisation policies to reassort, across the different social strata in each generation, the talents and performance capabilities of individuals in the population.

The Mendelian transmission system, as well as the environmentally sensitive and impressionable long maturation process, requires a broad recruiting and assorting system based on the principle of providing equal opportunities for all, especially via education.

A clear distinction must be made between difference and inequality. Most of the time differences are products of nature (or culture). For example, women and men are different but given equal opportunities for education and status acquisition they do not have to be socially unequal.

7.3.3.2 Elites

Social hierarchies have been and are associated with the privileged status of elites. Elites—understood as groups of people who fulfil an eminent intellectual, social, cultural, economic or political role in society—are of considerable importance in modernity as drivers of innovation from which all people benefit.¹¹² This includes, *inter alia*, scientists, engineers and biomedical researchers who made modern scientific-industrial culture, but also the philosophical, ethical, legal, and political thinkers and activists who contributed to shaping the democratic and humane social order of modern civilisation.

The notion of elite has acquired a pejorative connotation in some quarters because some high status actors in modern economics and politics have not been

¹¹¹Marshall et al. (1999), Baumard et al. (2013).

¹¹²Cattell (1972, 339), Cela Conde (1987, 148).

able or willing to master some of the ancient drives, such as selfishness, greed and cheating, and have enriched themselves disproportionately and immorally at the expense of their own and other populations. Some researchers argue that people of high social status behave more unethically¹¹³ and show less communal and prosocial behaviour¹¹⁴ than lower class individuals. Raymond Cattell¹¹⁵ rightly advocated that our educational system should increase the correlation between intelligence and character values because:

A society which allows its most highly intelligent individuals to manifest ill-balanced, emotionally perverted and essentially dishonest character traits is in grave danger indeed.

Roger D. Masters¹¹⁶ also emphasised the crucial importance of the moral responsibility of modern elites:

From the perspective of evolutionary biology, the survival of a mature civilization depends in good part on the virtue of its members. ... This risk of overexploiting the benefits of civilization can arise either from the behaviour of elites, who seek to gain benefits beyond those available from social surpluses, or from the population at large, unable to justify restraints in private consumption.

A further progression of human evolution and culture requires considerable enhancement of the social morality of humanity's elites. It also needs considerable knowledge and skills in the general population so as to control the most advantaged. From the evolutionary perspective, particularly endowed people should be fully aware of the fact that they are the privileged outcomes of genetic recombinations in the human gene pool, often reinforced with favourable social or environmental events in human culture or society. Due to this privilege they need to assume higher social responsibilities and obligations. High moral virtues are required in order to take up a biosocially rooted endowment that allows for successful leadership. One should not lose sight of the evolutionary understanding of the genetic recombination in the human gene pool via sexual reproduction. This basic mechanism implies that there is the need for intergenerational replacement of elites based on the merits of each succeeding generation.

7.3.3.3 Equity and Social Inclusion

As the modernisation process proceeds, a substantial proportion of the populations will, due to their limited capabilities of genetic or ontogenetic endowment, or as a result of life course accidents, have difficulties in adapting to or being fully functional in this novel environment. As society becomes more complex, the increasing societal exigencies put people with limited biological abilities or lower social capital in a socially less favourable position.¹¹⁷

¹¹³For instance, Piff et al. (2012).

¹¹⁴For instance, Guinote et al. (2015).

¹¹⁵Cattell (1972, 377).

¹¹⁶Masters (1989, 185).

¹¹⁷Gottfredson (1997, 2004), Bostrom and Sandberg (2007).

It is well known that people differ in their cognitive or other abilities and that in advanced modern societies, in which such a high value is placed on intellectual abilities and qualifications, an increasing proportion of the population may not be able to meet the requirements of a competitive, creative, and fast evolving economy. There are historical examples of societies failing to resolve the conflicts between within-generation and intergenerational sources of biological variation and social stratification inequalities. The communist regimes in Eastern Europe had full employment policies but were unsuccessful in motivating their more endowed workers. Today, many Western European countries with generous welfare policies suffer from high and non-random rates of unemployment.

The challenge of integrating less adaptable and vulnerable members of society, and employing less capable members of society may be expected to accompany societies in the decades to come. It is clear that considerable efforts will have to be made to improve educational qualifications, but educational efforts alone will not resolve the problem of different abilities—educational systems are by default meritocratic. Modern societies will have to continue providing jobs or create meaningful activities which allow less capable and qualified people to remain functional and socially included in the novel environment of modernity.¹¹⁸

7.4 Race, Ethnicity, Worldview, and Political Conviction

Populations within current nation states have a miscellaneous composition with respect to various characteristics stemming from group differences such as: (1) population genetic differences, often commonly referred to as racial differences¹¹⁹; (2) ethnic differences, characterised by differences in cultural traits such as language or customs; (3) differences in worldview (*‘Weltanschauung’*, philosophy of life), including religious and various forms of non-religious beliefs such as atheism, agnosticism and freethinking; and (4) differences in political conviction or adherence.

Several of those group differences often coincide, not because of genetic causes but due to historical processes or migration histories, or socio-political movements. These group differences may be partly correlated with social status differences.

¹¹⁸Avramov (2003).

¹¹⁹In the biological sciences the concept of ‘race’ has a very specific meaning. In population genetic terms it is defined as a population that is statistically significantly distinguished in its allele frequencies from other populations, is distributed within a more or less localised territory, and may interbreed with neighbouring populations in areas of geographical overlap. However, the number of allele pairs to consider in identifying a race is an arbitrary matter. The genetic categorisation of races is a probabilistic matter. Hence, many racial classifications are possible. Usually, populations that differ in only a few of their allele frequencies are not characterised as races. As a rule, the concept is reserved for important biological subdivisions of a species which are distinguishable by a substantial combination of genetic characteristics resulting from their evolutionary past.

The reason for dealing with these four groups of differences under the same heading is that they evoke remarkably identical, although differently labelled, between-group patterns of behaviour. They are embedded in the in-group/out-group syndrome.¹²⁰ Indeed, racism,¹²¹ ethnocentrism,¹²² xenophobia,¹²³ and various forms of philosophical, religious or political intolerance show identical sociological and psychological traits. They can all be traced back to the same evolutionary background.

7.4.1 Evolutionary Background of In-Group/Out-Group Relations

In-group/out-group distinctions, whether rooted in genetic, cultural, linguistic, or ideological (religious or political) identification, but also occupational, or even recreational (mainly competitive sports) identification, are often associated with attitudes and various forms of behaviour that express stronger degrees of amity, attachment, empathy, trust, altruism, or favouritism towards the own group. They are associated with indifference, avoidance, rejection, disapproval, discrimination, or even straightforward enmity toward out-groups. A wealth of empirical investigations,¹²⁴ together with many laboratory experiments in recent years¹²⁵ as well as

¹²⁰The concept of 'in-group/out-group syndrome' bundles together all possible forms of social behaviour for situations in which social entities are opposed to each other; it is characterised by a variety of attitudes or feelings of alienation but can also be associated with attitudes and forms of behaviour that involve feelings of superiority versus inferiority and can even be a source of latent or open animosity. The in-group can be defined as a couple, a nuclear or extended family, a circle of friends, a sports club, a clan, a tribe, a social class, a religious or philosophical group, a linguistic group, a cultural community, a nation, a race, or a species. The opposite of the in-group is the antagonistic out-group, the strangers, the 'others' (Thienpont and Cliquet 1999).

¹²¹The term 'racism' describes the belief that genetic differences between human populations, which determine particular socially or culturally relevant biological and psychological qualities, justify and legitimate making a discriminating distinction between people belonging to or descending from those populations, and thus treating them differently. However, this term is often used in an inappropriate way, namely referring to ethnic or religious traits that have nothing to do with genetic differences.

¹²²Ethnocentrism refers to feelings of loyalty toward one's own cultural community, usually coupled with negative attitudes toward other, different communities. Ethnocentrism is a broader concept than racism because different types of qualities can characterise culturally identifiable groups: language, values, norms and customs, religion, etc.

¹²³Xenophobia (<Greek: *xenos* = strange, foreign; *phobos* = fear) concerns feelings of fear or aversion of, if not hatred for, foreigners. Xenophobia is simply the flip side of the same coin as ethnocentrism, although it does not inevitably derive from ethnocentrism. One can be ethnocentric without detesting others. Ethnocentric feelings can turn into hostile feelings as a consequence of negative experiences with neighbours (Van den Berghe 1999).

¹²⁴See for instance, Worchel and Austin (1986), Reynolds et al. (1987), Brewer (1999), Thienpont and Cliquet (1999), Salter (2004), Giles, et al. (2010), Hruschka and Henrich (2013).

¹²⁵See, for instance, Bernhard et al. (2006), Efferson (2008), Yamagishi and Mifune (2008), Mifune et al. (2010), Halevy et al. (2012), Masuda (2012), Mussweiler and Ockenfels (2013).

mathematically modelling studies,¹²⁶ have extensively documented in-group bias and negative attitudes and behaviour toward out-groups.

Many explanations have been given for phenomena such as racism, ethnocentrism, xenophobia, and religious or political intolerance.¹²⁷ However, why are in-group/out-group relations, and particularly in-group amity and out-group enmity, so strongly linked to similarities between the members of the in-groups and dissimilarities with members of the out-groups? Furthermore, why do the similarities and dissimilarities apply to phenotypic as well as to social and cultural characteristics?

The formation of effective group alliances had many obvious proximate advantages, especially in situations of between-group competition,¹²⁸ and in-group alliances can easily lead to in-group egoism.¹²⁹ However, ultimately, the fundamental explanation for the in-group/out-group forms of behaviour relies in the genetic selfishness grounded in kin selection theory,¹³⁰ reciprocity theory,¹³¹ and similarity theory.¹³² These three theories—kin selection, reciprocity, and similarity theory—converge in inducing behavioural patterns that favour the intergenerational transmission of an individual's own genes, either via kin or via more remotely related consorts. The selfish gene theory¹³³ is the ultimate common denominator of these theories.

However, empirical evidence shows that the in-group/out-group syndrome is not only applicable to genetically different groups. It is also suitable for other forms of groupism ranging from homogamous partner choice, sex- and age-related bonds, friendships, occupational units, to ideological (religious and political) groups, and obviously ethnicity.¹³⁴ Apparently, kin-related phenotypic markers of genetic similarity are extended to ethnic or other sociocultural group characteristics in larger communities; these are defined by the degree of perceived relationship, which can go far beyond any genetic affinity.¹³⁵ The nepotistic drive is simply extended from kin to other forms of group identity that involves similarity in social, cultural, linguistic, religious, or political characteristics. Peter Richerson and Robert Boyd define them as symbolically marked subgroups¹³⁶—groups to which people belong and identify themselves on the basis of beliefs. It is interesting that the phenotypically weakest markers of similarity (ideological groups) make the strongest use of kin-related nomenclature categories—fatherhood, motherhood,

¹²⁶For instance, Fu et al. (2012), Nakamura and Masuda (2012).

¹²⁷For instance, Banton (1987).

¹²⁸Silverman and Case (1998).

¹²⁹Tullberg and Tullberg (1997).

¹³⁰Hamilton (1964).

¹³¹Trivers (1972).

¹³²Rushton et al. (1984), Salter and Harpending (2013).

¹³³Williams (1966), Dawkins (1976).

¹³⁴Cliquet (1965).

¹³⁵Van den Berghe (1978; 1999), Eibl-Eibesfeldt (1998).

¹³⁶Richerson and Boyd (2005, 234).

brotherhood, sisterhood. In this context Ara Norenzayan and colleagues¹³⁷ even use the concept of ‘fictive kinship’ relations.

Several scholars, beginning with Charles Darwin¹³⁸ himself, consider the in-group/out-group syndrome to be a major determinant in the development of morality, either because moral principles appear to be mainly focused on one’s own group,¹³⁹ or because the function of moral systems is to enable the own group to compete successfully with other human groups.¹⁴⁰ Indeed, as Richard Alexander and several other scholars have argued that¹⁴¹ rather than predators other human groups, as well as disease or scarcity of resources, may have been an important selective factor in the hominisation process, resulting in the promotion of biological traits and moral rules that reinforced in-group solidarity and cooperation. Roger D. Masters¹⁴² considers that both intragroup cooperation and intergroup competition were particularly instrumental in offsetting the selective disadvantages of the enlargement of human groups beyond the narrow borders of kin-related group members.

Peter Richerson and Robert Boyd¹⁴³ argue even that the tribal level of social organisation in the EAA resulted, through cultural group selection and mainly as a consequence of intergroup conflicts, in the establishment of dispositions which they label as tribal instincts.

Herbert Gintis¹⁴⁴ devised the epithet *Homo parochius* for this human tendency to divide human groups into insiders and outsiders at a net material cost to oneself. In recent publications, some authors now use the term parochialism for this phenomenon.¹⁴⁵ However, this is a less fortunate concept for designating in-group/out-group antagonisms because it incorrectly suggests that this syndrome would be mainly related to religious divisions.¹⁴⁶

The in-group/out-group syndrome is probably one of the strongest and multi-dimensional innate drives that characterises the human biogram. In recent years, more investigations have begun to reveal some genetic determinants¹⁴⁷ and neuroendocrinological bases¹⁴⁸ of in-group bias and out-group derogation and intergroup conflict. In-group favouritism is already present in young children.¹⁴⁹ Nevertheless, it has also been documented that the intergroup variation in

¹³⁷Norenzayan et al. (2016, 13).

¹³⁸Darwin (1871).

¹³⁹de Waal (1996, 30).

¹⁴⁰Alexander (1987, 142).

¹⁴¹Alexander (1975; 1990), Wrangham (1999), Flinn and Coe (2007, 341).

¹⁴²Masters (1989, 173).

¹⁴³Richerson and Boyd (2005, 214ff).

¹⁴⁴Gintis (2000, 252).

¹⁴⁵For instance, Bernhard et al. (2006), Van Dijk and Feith (2010), Bowles and Gintis (2011, 133ff), Hruschka and Henrich (2013).

¹⁴⁶The concept ‘parochialism’ is a derivation of the concept parish (from Latin ‘parochia’ and Greek ‘paroikia’) which is a small unit of believers in Christian denominations.

¹⁴⁷For instance, Guo (2006), Lewis and Bates (2010), Hatemi et al. (2010), Lewis et al. (2014), Kandler et al. (2015).

¹⁴⁸For instance, De Dreu et al. (2011).

¹⁴⁹Jordan et al. (2014).

in-group/out-group attitudes and behaviour is related to a broad variety of environmental cues—for instance, moral learning, infectious disease risk, thermic stress, economic insecurity, experience of war, exposure to globalisation—and, in some cases, even to short- or long-time scale processes of gene-environmental interactions.¹⁵⁰

7.4.2 Developments in Modernity of In-Group/Out-Group Relations

The evolutionary analysis of the in-group/out-group syndrome clearly shows that this was a necessary and successful strategy in the EEA. Small population units had survival and reproductive advantages, thus increasing their inclusive fitness via reinforcement of the in-group solidarity and cohesion, thereby facilitating defensive or offensive actions against competing out-groups. Even in the agrarian phase of humanity's cultural history, the more evolved forms of ethnocentric tribalism—patriotism and nationalism—had adaptive advantages.

However, the historic in-group/out-group syndrome has largely lost its adaptive advantage in the novel environment that emerged from modern culture. This results from its increased needs for cooperation and interaction between ever increasing numbers of people, and its growing mobility and communication opportunities, leading to a globalisation of science and technology, commerce, tourism, culture and politics.¹⁵¹ On the contrary, in several respects it may have become a maladaptive strategy. Nevertheless, we are still equipped with this deep-rooted urge to form groups on the basis of biological, cultural or political similarities and by distancing ourselves against the 'others'. Although positive contacts between in-groups and out-groups reduce prejudice,¹⁵² many norms and institutions in modernity are still based on tribal social instincts.¹⁵³

7.4.3 Ethical Reflections About In-Group/Out-Group Relations

7.4.3.1 Ethnocentrism and Racism

It is self-evident that efforts at education and socialisation will have to be substantially increased in order to counteract the ancient innate drives toward nepotism, tribalism, ethnocentrism, racism, and xenophobia, as well as the traditional religious belief systems and modern political ideologies that support or reinforce those drives. This action is necessary because the speed of modern cultural development, with study, research, industry, trade, tourism, policymaking, high rates and degrees

¹⁵⁰See for instance, Hruschka and Henrich (2013), Krosch and Amodio (2014).

¹⁵¹Avramov and Cliquet (1999), Avramov and Cliquet (2007), Avramov (2008).

¹⁵²For instance, Christ et al. (2014).

¹⁵³Richerson and Boyd (2005, 229).

of mobility, migration, and international relations, has considerably outpaced the rate of genetic change.¹⁵⁴

Combating the various forms of prejudice and discrimination of individuals or groups who are perceived as different does not contradict the desirability of promoting community identity and cohesion, whatever the community characteristics may be—ancestry, ethnicity, worldview, etc.¹⁵⁵ Promoting community identity is a necessity for a harmonious individual and societal emancipation, but should not be a reason or cause of demeaning or discriminating ‘otherness’, because tribalism has become a maladaptive practice.

7.4.3.2 Ideological Pluralism

The populations of modernised countries are characterised by ideological pluralism, namely with respect to worldviews and political conviction. The first manifests itself in a plurality of religious adherence and practice and in various forms of non-religious convictions such as freethinking, agnosticism and atheism; the second in the plurality of political movements and parties and the possibility of having democratic free elections.

Whereas political pluralism is the rule in all modern democracies, only a limited number of countries constitutionally recognise and/or institutionalise pluralism in worldviews. Religious institutions are still very powerful members of the governance systems, even in modern states. Let us take the example of Belgium where, in addition to the ethnic diversity (Dutch, French and German speaking communities), two major ideological dividing lines run through the country: the first concerns the plurality in worldviews, mainly characterised by a dividing line between religious believers (mainly Roman Catholics) and freethinking people; the second concerns the political pluralism, mainly characterised by the opposition between left ($\approx$ socialist) and right ($\approx$ liberal) political convictions.¹⁵⁶ Regarding the pluralism in worldviews, Belgium is one of the very few countries in which its public primary and secondary educational systems include, in addition to religious education (mainly Catholicism, but also Protestantism, Orthodoxy, Anglicanism, Judaism, and Islam), a course in non-confessional ethics.¹⁵⁷ Children and their parents can choose which pillar to follow. Public and non-Catholic free universities have departments for training teachers in non-confessional ethics. However, in recent years, the meaningfulness of the pillarised, expensive and complicated structure of the ideological education in Belgian public schools (in Catholic schools obviously only Catholic religious education is provided) is being questioned. Different sides are proposing that the specific ideological education (choice of denominational or

¹⁵⁴For instance, Reynolds et al. (1987), Thienpont and Cliquet (1999).

¹⁵⁵Salter (2004).

¹⁵⁶Huyse (1970; 1987).

¹⁵⁷In addition, Belgium has a cultural pact that obliges public authorities to involve the various ideological and philosophical orientations in the preparation and implementation of cultural policy (Belgisch Staatsblad 1973). The pact also includes guidelines for a balanced ideological composition of governing bodies of institutions, infrastructures and services that were established by the government, or are governed under a public authority.

freethinking ethics) should be replaced by a general philosophical-ethical education on citizenship. In this way young people would be educated about all major philosophical-ethical and religious orientations and approaches. This would not only make them philosophically-ethically more literate but would also allow them to understand how to handle philosophical-ethical and religious differences in a globalising world.¹⁵⁸ However, these proposals have collided with fierce opposition, not only from the Catholic side and other denominational groups but also from mainstream freethinking quarters. It will probably take quite some time before the ideological and professional vested interests of different groups are overcome.¹⁵⁹

In his *A Theory of Justice*, John Rawls¹⁶⁰ raises the difficult question of the tolerance of the intolerant. Departing from his justice principles, he pertinently argues that righteous citizens should strive to scrupulously preserve the fragile right to free expression for themselves and also the intolerant, as long as freedom itself is not jeopardised. In modernity, the intolerant might have to be educated and obliged to respect the freedom of others. Indeed, it must be above any doubt that historic achievements in the area of universal rights cannot be waived, for example freedom of expression, freedom of belief (religious or atheistic), self-actualisation of the individual in the field of education, sexuality, family formation, reproductive and sex/gender equality. Modern democracies should closely monitor their science and Enlightenment based moral achievements in the field of freedom of expression and freedom of thought (religious or otherwise). However, at the same time they must confront authoritarian/fundamentalist ideologies which exploit these freedoms and abuse them with the aim of abolishing diversity and the cultural and moral progress humanity has reached, and to bend them in a cultural regression in which intolerance, ignorance and irrationality again prevail.

7.5 Competition and Cooperation Between States

7.5.1 Evolutionary Background of Relations Between States

The discourse on in-group/out-group relations also applies to between population relations where the biological and/or cultural differences may be even more outspoken and between which competition for territorial, energy and other resources may be more strenuous. Hence, it can be expected that the drives (discussed earlier)

¹⁵⁸See, for instance, the Flemish association '*LEF (Levensbeschouwingen, Ethiek, Filosofie)*' (= Worldviews, Ethics, Philosophy) (<http://www.levensbeschouwingen.be/>).

¹⁵⁹The opponents of a general, pluralistic philosophical/religious/ethical course do have a strong didactic argument in their conviction that it is practically impossible for teachers to objectively treat such sensitive, delicate and engaged matters as the different and often opposite world views in a non-prejudiced way. In their mind education in worldviews—whether of a religious or non-religious nature—requires a personal engagement in the specific ideology being dealt with.

¹⁶⁰Rawls (1971, 242).

for nepotistic favouritism and in-group or tribal preferential treatment and out-group enmity play a greater role.

The archaeological and historical record of between population relations, strongly demonstrates in all three major cultural stages—gathering-hunting, agrarian-pastoral and industrial—that violent conflict played an important role in the evolution and history of humankind,¹⁶¹ even to the extent that some scholars argue, in line with Heraclitus’s notorious saying “war is the father of all things”, that the progress of human civilisation and culture is a direct function of warfare.¹⁶² As soon as the hominisation process, with its increasing cognitive abilities, allowed hominins to become ecologically dominant, it strengthened between group conflict in order to gain control over ecological resources.¹⁶³

The present scientific consensus (particularly in scientific disciplines with an evolutionary background) about the cause of human violence, both at the individual and group level, considers that it usually results from the combination of biological predispositions towards competitive and expansionist drives, and scarce or unequally distributed resources needed for survival, social power magnification, biological reproduction and demographic multiplication.¹⁶⁴ The biological predispositions to individual and collective violence and out-group enmity have been under strong selective pressures in the course of the hominisation process. Some scholars consider them to be evolutionary adaptations, others as evolutionary by-products.¹⁶⁵ This complex history is often sidelined in some policy circles as may be seen in the well intentioned but lopsided *Seville Statement on Violence 1986*, subsequently adopted by UNESCO in 1989,¹⁶⁶ which largely denies the role of biological (genetic) factors in violence.

The evolutionary background of warfare is thought to go back to the common ancestor of chimpanzees and hominins, *P. prior*, who consisted of patrilocal, multi-male, polygamist groups that competed for females.¹⁶⁷ In the course of the hominisation process, this intergroup competition for females resulted, by means of sexually selective¹⁶⁸ and group selective processes,¹⁶⁹ in the establishment of genetic predispositions to male bonding, in-group cooperation and favouritism, and

¹⁶¹Harris (1974), Eibl-Eibesfeldt (1979), Ferguson (1984), Shaw and Wong (1989), Crook (1994), Van Der Dennen (1995), Keeley (1996), Wrangham and Peterson (1996), Guilaïne and Zammit (2005), Kelly (2005), McCall and Shields (2008), Bowles (2009), Gat (2009), Baofu (2010), Pitman (2011), Gorelik et al. (2012).

¹⁶²For instance, Mataré (1999, 31), Turchin (2011), Turchin et al. (2013).

¹⁶³Geary (2007, 306); see also Bowles and Gintis (2011, 133).

¹⁶⁴For violence at the individual level, see Ghiglieri (1999), Kanazawa and Still (2000), Moir and Jessel (1995), Pitchford (2001), Raine (1993), Rowe (2002), Walsh and Ellis (2003). For violence at the group level, see Shaw and Wong (1989), Low (1993), Crook (1994), Van Der Dennen (1995), Keeley (1996), Eibl-Eibesfeldt and Salter (1998), McCall and Shields (2008), Gat (2009), Teehan (2010).

¹⁶⁵Durrant (2011).

¹⁶⁶http://portal.unesco.org/education/en/ev.php-URL_ID=3247&URL_DO=DO_TOPIC&URL_SECTION=201.html.

¹⁶⁷Wrangham and Peterson (1996).

¹⁶⁸Rusch et al. (2015).

¹⁶⁹Egas et al. (2013).

out-group enmity: all of these were instrumental to intergroup conflict and warfare. In the further course of the hominin evolution, with its gradually increasing cultural complexity and numerical size of human populations, intergroup competition for females expanded to the increasing need for a greater variety and amount of other natural resources.¹⁷⁰ With the emergence of the agricultural revolution, and later the early industrial revolution, not only did the need for territorial acquisition and protection surge but also the drive to socially dominate and exploit others thrived, as shown in the emergence or intensification of social phenomena such as social or ideological hierarchism, slavery and colonialism.

An intriguing point, already referred to in Chap. 2, Sect. 2.1.2.8, is that during the hominin evolution the spreading and intensification of within-group altruism and cooperation may have been strongly driven by between-group conflict and warfare,¹⁷¹ or at least by group defence.¹⁷²

In the gathering-hunting stage of human evolution there was a positive association between warfare and reproductive success, because mating and fitness benefits were worth individual lethal risks.¹⁷³ This was probably no longer the case in the agrarian-pastoral and industrial eras where warfare, fought by ever larger armies equipped with increasingly technological killing weapons, mainly had proximate benefits such as territorial expansion, economic power and resources acquisition. This gives less reproductive benefits, except perhaps for the successful warlords and other upper class members who take advantage of the warfare but are not directly involved in the war operations.¹⁷⁴

The genetic effects of warfare has divided the scientific community for a long time¹⁷⁵; but for modern societies, where armies are recruited on the basis of physical and mental health features, knowledge-based opinion seems to tilt towards contraselective effects. War is dysgenic in modernity.¹⁷⁶

The current wars, especially proxy wars, are a confirmation of the deep-seated drive towards plundering the out-groups. However, evolutionary science shows that the human species is—in addition to selfish nepotistic and tribal drives—endowed with strong potentials and capacities for altruistic, reciprocal and cooperative behaviour that may, in different future living conditions, be extended across tribal or national borders, and even be applicable to the whole of the human species.¹⁷⁷

¹⁷⁰Pitman (2011).

¹⁷¹For instance, Boehm (1999), Smirnov et al. (2007), Choi and Bowles (2007), Lehmann and Feldman (2008), Bowles (2009), Ginges and Atran (2011), Halevy et al. (2012), Konrad and Morath (2012), Gavrillets and Fortunato (2014).

¹⁷²Rusch (2014, 359).

¹⁷³Rusch et al. (2015).

¹⁷⁴Low (1993).

¹⁷⁵Crook (1994).

¹⁷⁶Cattell (1972, 202).

¹⁷⁷See, for instance, Fehr and Fischbacher (2003), Manner and Gowdy (2010).

7.5.2 Developments of Relations Between States in Modernity

Modernity continues to be plagued by the presence of traditional warfare, increasingly through the use of modern technologies, on the one side¹⁷⁸; on the other side, the relations between states are characterised by slowly increasing international cooperation, both at the regional¹⁷⁹ and global levels,¹⁸⁰ and by very modest degrees of international developmental assistance.¹⁸¹

Most, if not all, of the intergovernmental bodies are still in a very early stage of development, severely hampered in their functioning by traditional national interests, including some of their most powerful member states.¹⁸² Another limiting factor in the development of efficient intergovernmental bodies is the presence in world gatherings of a large number of non-democratically elected governments who defend the interests of authoritarian oligarchies, and governments that are politically inspired by ideologies that emerged and flourished in pre-modern cultural eras.¹⁸³

Despite omnipresent evidence of permanent warfare worldwide, modernisation is, overall, characterised by a decrease in violence.¹⁸⁴ As Steven Pinker¹⁸⁵ wrote:

...it is perhaps the most important and most underappreciated trend in the human saga: Violence has been in decline over long stretches of history, and today we are probably living in the most peaceful moment of our species' time on earth.

The increasing cooperation between states is embedded in four major features of modernity: (1) development of the ethics of democracy; (2) potential for generalised advantages of technological progress; (3) expansion of tools such as IT for dissemination of knowledge and ideologies; and (4) balance of terror due to the development of weapons of mass destruction.

According to Rudolph J. Rummel,¹⁸⁶ democracies are less warlike than their preceding political regimes. The more democratic nations are, the less likely they will be disrupted by domestic violence and the less likely they will provoke international conflict or be involved in war. Rummel's conclusion is straightforward: "democracy is a method of non-violence". This is particularly the case where

¹⁷⁸For instance, World War I and World War II.

¹⁷⁹For instance, European Union, EU; Shanghai Cooperation Organization, SCO; Association of Southeast Asian Nations, ASEAN; Arab League; African Union, AU; Organization of American States, OAS; Union of South American Nations, UNASUR; Pacific Islands Forum.

¹⁸⁰United Nations.

¹⁸¹For instance, United Nations Development Programme (UNDP); International Monetary Fund (IMF); World Bank Group; United Nations Population Fund (UNFPA).

¹⁸²Cf. the vetoing behaviour of the US, Russian Federation, and China in the Security Council of the UN.

¹⁸³Cf. the opposition by fundamentalist Islamic regimes (and from the Holy See) to many of the draft articles on women's empowerment, sexual and reproductive rights and health of adolescents, abortion, and the family of what became in the end the Cairo Programme of Action of the third UN World Population Conference in 1994.

¹⁸⁴Keeley (1996), Pinker (2011).

¹⁸⁵Pinker (2007); see also Gómez et al. (2016).

¹⁸⁶Rummel (1994, 1995, 2002).

democracy goes hand in hand with limitation of excessive inequalities. This is probably largely due to the fact that, with the exception of some psychopaths, sociopaths and religious or political zealots, the large majority of people in modern democracy—with the right to speak in political decision-making, and experiencing relative wealth and freedom from mass scale hunger and disease—have too much to lose from the waste and horror of war.¹⁸⁷ However, proxy wars are flourishing today, whereby technologically more advanced states can avoid own casualties by utilising out-groups.

For both individuals and societies, the spread of modern technology in all areas of life (education, research, industry, trade, transport, housing, health, nutrition, leisure and comfort in general) has benefits for both producers and consumers: the first have a financial interest in selling their products, while the latter also want to acquire access to skills for social mobility and to enjoy the pleasures of modern comfort.

Dissemination via ICT has become an extremely powerful means to spread modern knowledge and ideologies to deprived population groups and countries which are governed as oligarchies. The inverse is true also.

The development of weapons of mass destruction, namely nuclear, biological, or chemical weapons, includes the risk of annihilating all human life on the planet or at least reducing it to more primitive levels of development and civilisation. It may be considered as a miracle that the huge, but now slightly decreasing although still considerable, stockpiles of nuclear weapons in the world have not yet, by chance or on purpose, led to a nuclear Armageddon.¹⁸⁸ The balance of terror whereby no state could be spared has so far been reasonably effective in preventing cataclysmic warfare.

7.5.3 Ethical Reflections about Relations between States

All specific features of modernity—the present world population size, the eradication of mass hunger and disease in prosperous economies, the development of democratic decision-making, the risks of using weapons of mass destruction, the dysgenic and other miserable effects of modern warfare—point to the necessity to stop using warfare as a means of resolving international conflicts. A much better approach, supported by an effective world police force, should be able to prevent or to contain emerging international conflicts¹⁸⁹ than the currently ill designed,¹⁹⁰ manipulated¹⁹¹ and prejudiced¹⁹² planetary machinery for controlling and avoiding international warfare.¹⁹³

¹⁸⁷Cattell (1972, 198).

¹⁸⁸For instance, Croddy et al. (2004).

¹⁸⁹See also Cattell (1972).

¹⁹⁰Cf. the veto rights of large powers, some of which are dictatorial regimes, whereas some others still pursue an imperialist policy.

¹⁹¹Cf. the US pressures on judges of the International Criminal Court.

¹⁹²Cr. the highly selective character of recent warlords being brought or not brought to court, for example some of the small fry from former Yugoslavia, but not the Western war criminals responsible for the 2003 Iraq invasion.

¹⁹³The UN Security Council, the International Court of Justice and the International Criminal Court.

As Samuel Bowles and Herbert Gintis concluded:

Altruism and parochialism may have a common evolutionary origin, but the two are not inseparable... parochialism need not be our destiny.¹⁹⁴

The solution for improving the relations between states is very simple, although probably very difficult to realise. It is simple because there is only one solution, namely to increase international and intergovernmental cooperation; it is most difficult due to the tenacity of the in-group/out-group syndrome and the vested interests linked to it.

All evolutionists who have dwelled on this question advocate the same precept: universalism; a world brotherhood of mankind¹⁹⁵; expanding the kind of morality that we now express within groups¹⁹⁶; broadening of the target of our altruism¹⁹⁷; expanding the circle of our concern and involvement.¹⁹⁸ Or, as the great visionary scientist Julian Huxley¹⁹⁹ stated:

To have any success in fulfilling his destiny as the controller or agent of future evolution on earth, he must become one single inter-thinking group, with one general framework of ideas: otherwise his mental energies will be dissipated in ideological conflict.

Some scholars think that the forthcoming global society will be characterised by a unity in diversity.²⁰⁰ Earlier reference has been made to Raymond Cattell's²⁰¹ remarkable *Beyondism* in which he proposed, as a goal of evolutionary progress, the development of an ethos or atmosphere that he defined as 'cooperative competition' among groups, in contrast to a culturally homogeneous universalism. This is one of the very few issues in which the present authors fundamentally disagree with Cattell because his cooperative competition is in essence contradictory to the spirit and trend of globalising and universalising modernity. Although it must be acknowledged that Cattell's model is the one that is currently emerging²⁰² as an intermediate stage between the former nationalist stage and the future universalist stage, it is nonetheless opposite to the spirit of and trend towards a universal modernity. Since the human species is culturally in a major transitional stage of its development, we see and we will, for quite some time, continue to see differences in degree and tempo of the shift towards the future universalist and sustainable

¹⁹⁴Bowles and Gintis (2011, 147).

¹⁹⁵Keith (1948, 58).

¹⁹⁶Alexander (1987, 190), Boehm (2012, 343).

¹⁹⁷Dawkins (1976, 10).

¹⁹⁸Singer (1981, 2002, 111).

¹⁹⁹Huxley (1964, 84).

²⁰⁰See, for instance, John Stewart's (2008) 'Evolutionary Manifesto'.

²⁰¹Cattell (1972, 105).

²⁰²Consider some of the major present-day competitive cooperators on the world scene: the US, the European Union and China. They clearly represent three different societal models, but all are unsustainable in a long-term perspective: the US, dominated by its private capitalist enterprise culture resulting in an unbearable social climate of excessively large variance in income range and lack of social protection for huge segments of its population; the European Union, with its admirable social protection model, but insufficient political integration and policy decision-making; China with its stunning economic growth and development, but its lack of democratic decision-making policy.

modernity; however, seen from a long-term perspective this is probably only a temporary stage and not the ultimate goal.²⁰³

Although selective processes will inevitably further promote the degree and intensity of international cooperation in the cultural stage of modernity in which the human species finds itself, the processes of learning by trial and error might still take a lot of time whereas some features of modernity, such as the availability and diffusion of weaponry of mass destruction, or the exhaustion, destruction or pollution of indispensable precious resources, leave no time to let things take their course. Hence, in 1984 Robert Axelrod,²⁰⁴ in his prescient book *The Evolution of Co-operation*, implored us to use our foresight by speeding up international cooperation.

In essence, globalisation is the outcome of the modernisation process whereby science and technology, commerce, culture and ideology are gradually, but at an increasing speed, disseminated all over the planet. Globalization has also opened up opportunities for more global social justice by lifting out of extreme poverty people in least developed countries who otherwise would have no access whatsoever to paid work. Obviously, humanisation of working conditions in industry in developing countries, and prevention of massive unemployment or impoverishment of (expensive) workers in developed countries is a major challenge ahead. Globalisation is characterised by an increasing connectivity and interdependence of the world's scientific, economic, and political processes, the apogee of which would consist of a world political federation.

In recent decades, the concept of globalisation has acquired a bad, or at least a mixed, reputation mainly due to the greedy excesses of the current runaway economic globalisation, which is characterised by an insufficient world community control and the harsh neo-liberal deregulation of commodity, capital and labour. World political authorities are either running behind the economic developments or are the playthings of the corporate interests of the very few.²⁰⁵ However, it must also be admitted that part of the reluctance about globalisation is due to the persisting influence of our tribal instincts and our lack of insight into our fast changing existential condition.²⁰⁶ As Paul L. Ehrlich²⁰⁷ noted:

... we are still primarily small-group animals, evolved genetically and culturally to operate in limited, homogeneous, largely closed societies.

Notwithstanding the current critical and inhumane economic and financial world developments, so pitifully illustrated by the recent banking crisis, the ultimate goal remains the achievement of a mature globalisation: present-day inequalities between states will have been erased and the human species will have reached a planetary moral, economic, cultural and political community, a unified, inclusive

²⁰³See Elgin (1993).

²⁰⁴Axelrod (1984, 191).

²⁰⁵Stiglitz (2003), Baylis et al. (2011).

²⁰⁶Rubin (2002).

²⁰⁷Ehrlich (2000, 301).

and highly evolvable global society.²⁰⁸ Through globalisation, humanity can transcend its evolutionary past.²⁰⁹ Hence, the need for developing a new, universal morality for all humanity.²¹⁰

Notwithstanding its innate narrow-minded in-group drive, the human brain possesses neural capacities, such as emotional sharing, empathic concern and affective feeling,²¹¹ which may achieve such a goal in the presence of, or under pressure from scientific enlightenment, proper educational/agogic action and creative political governance.

²⁰⁸For instance, Wells (1905), Keith (1946), Huxley (1964), Axelrod (1984), Elgin (1993), Stewart (2008).

²⁰⁹See also Modelski et al. (2008).

²¹⁰Penn and Mysterud (2007, 290).

²¹¹Decety and Cowell (2015, 293).

Evolution-Based Ethical Challenges Related to Intergenerational Replacement

8

Abstract

In this chapter the evolutionary background, developments in modernity and ethical reflections for quantitative and qualitative aspects of reproductive behaviour are addressed. First, the evolutionary and historical background and the causes of the human species' numerical growth are described. Next, major specific developments in modernity are discussed: the demographic transition, the paradox between the maximisation of inclusive fitness theory and below replacement fertility, and the relations between world population size and ecological sustainability. Finally, ethical reflections on the future demographics of the human species are outlined. Regarding the qualitative aspects of human reproduction, phenomic and genomic aspects are distinguished. The main features of reproductive behaviour in modernity are elucidated and their effects on demography, sexual relations and genetics are examined. Ethical reflections regarding qualitative aspects of human reproduction include euthenic as well as eugenic aspects. Advantages and disadvantages of different eugenic methods and decision-making processes are assessed.

8.1 Introduction

From an evolutionary point of view, reproduction is undoubtedly the most important biosocial phenomenon. Reproduction secures the intergenerational perpetuation of life. Genetically linked differential reproduction allows for changes in the population-genetic composition from one generation to another, potentially resulting in adaptation to new environmental challenges. Differential genetic reproduction is the ultimate instrument for biological evolution.

8.2 Quantitative Issues Regarding Reproductive Behaviour

Population growth is an extremely important characteristic of the twentieth century because of the historically unique, strong increase in the world population, which is expected to expand further during this century. According to the medium variant of the UN Population Division population prospects¹ the world population would, in the course of the twenty-first century, increase from six billion in 2000 to *circa* eleven billion by 2100 and then slowly decrease or fluctuate at a somewhat lower level (Fig. 8.1).

8.2.1 Evolutionary Background of Population Growth

8.2.1.1 Fecundity, Fertility, Mortality, and Population Growth in Pre-modern Times

Humans are characterised by a relatively high fecundity²: this feature has been selected as a function of the high mortality levels that prevailed in the ancient EEA. High mortality required a high realised fertility³ in order to compensate for death of infants and children.⁴

Studies on the reproductive behaviour of hunter-gatherer and agrarian-pastoral populations show high fertility levels: the observed completed fertility often averaged five to six live births.⁵ However, there was also a high between-population

¹United Nations Population Division (2015).

²Fecundity or potential fertility refers to the number of live-born children that could be realised without the limiting effects of sexual taboos, late marriage, lactational amenorrhea, pathological sterility, contraception and induced abortion. On the basis of a number of empirical observations of populations in different stages of cultural development and by the means of different methodologies, the average total potential fertility in human populations has been estimated to be 15.3 live-born children, with a between-population range of 13–17. The within-population (interindividual) variability in fecundity in populations with an average of 15.3 and a standard deviation of 5.09 has been calculated to lie between 0 and 26 live births (Bongaarts 1978; Bongaarts and Potter 1983), see also Léridon (1973, 1987), Léridon and Menken (1979), Langhoff (2007).

³Fertility refers to the number of live born children actually born to a woman. Completed fertility or completed family size is the fertility a woman has realised by the end of her fecund life phase. Proximately, fertility is the result of the combined effects of sexual intercourse, contraception, abortion and lactation on fecundity. Ultimately, fertility is influenced by the level of desired family size—which is itself subject to influences from biological drives, cultural values and socio-economic living conditions.

⁴For instance, Volk and Atkinson (2013).

⁵For instance, Henry (1961), Léridon (1973, 1987), Xie (1990), Hewlett (1991), Wood (1994).

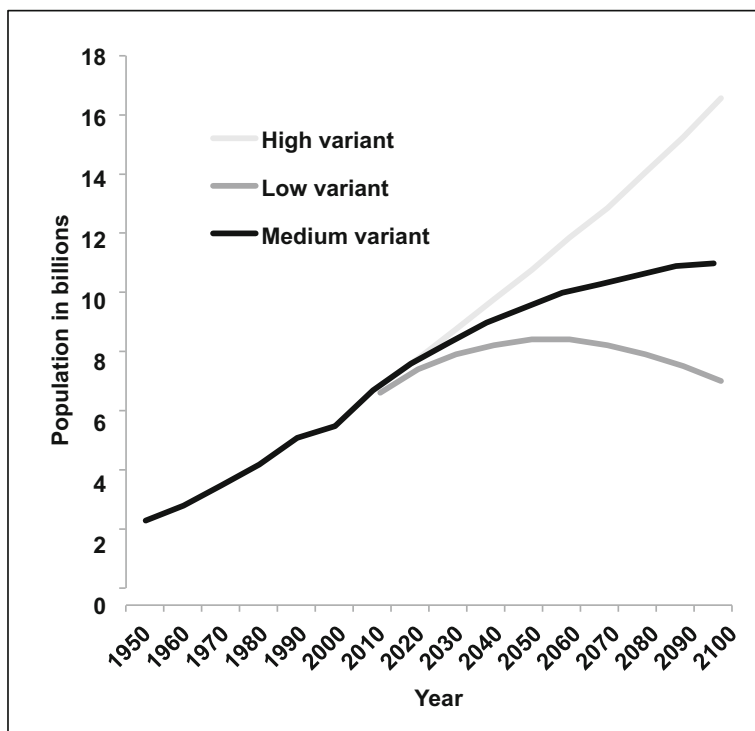


Fig. 8.1 World population prospects: the 2015 revision (United Nations 2015)

variance in pre-modern fertility.⁶ Furthermore, the individual variation within those populations was considerable.⁷

Due to high mortality, intergroup conflict and periodical catastrophes, population growth in the hunter-gatherer era was very low and population size was almost stationary.⁸ While fertility was five to six children on average, infant and child mortality reduced it to less than half; other calamities often reduced it further, resulting in zero growth.⁹ The average intrinsic growth rate¹⁰ was below 0.04 per

⁶For instance, Hewlett (1991) found among 23 hunter-gatherer societies TFRs (total fertility ratios) ranging between 2.6 and 7.8 live births, with a mean of 5.4; among 19 farming-herding societies the range is between 2.4 and 8.4 live births, with a mean of 6.1. Wood (1994) found among 70 natural fertility populations an average TFR = 6.1 with a between-population variance of 1.38.

⁷For instance, in the seventeenth-eighteenth centuries in rural Tourouvre-au-Perche, France, the completed fertility was 6.0 with a variance of 13.1 (live births ranging from 0 to 19); among the present-day Amish in Ohio the average number of live births is 6.3 with a variance of 11.1 (live births ranging from 0 to 15) (Charbonneau 1979).

⁸Hassan (1975), Polgar (1975).

⁹Birdsell (1968).

¹⁰The intrinsic rate of population increase is the instantaneous per capita birth rate, minus the instantaneous per capita death rate (Pianka 2000).

cent per year.¹¹ The size of the world population has been estimated as 50 million people in the period before the start of the agrarian-pastoral revolution.

Fertility increased in the agrarian-pastoral era¹² and, although mortality also increased,¹³ it resulted in a higher intrinsic growth rate which allowed for a slow and gradual population increase.¹⁴ This led to a world population of one billion before the start of the Industrial Revolution in the nineteenth century.

8.2.1.2 Maximisation of Inclusive Fitness

An important concept in the evolutionary study of reproduction is the theory of the maximisation of inclusive fitness.¹⁵ This theory asserts that humans, like other organisms, developed through natural selection evolved behavioural tendencies in order to maximise their genetic representation in future generations in the context of constraints set by the environment and their phylogenetic past. Such optimal reproductive success, achieved through the production and survival of descendants and other blood relatives, results in evolutionary adaptiveness.

Both at the individual/family level and at the group level, and particularly in intergroup competition, demographic expansion was often an instrument of competition and conflict.¹⁶

8.2.2 Demographic Developments in Modernity

8.2.2.1 Demographic Transition

One of the important characteristics of modernisation is the demographic transition—the shift from high to low mortality and fertility levels.¹⁷ This transition began in the eighteenth century in North Western Europe and the United States with a gradual decrease in mortality which in most cases was followed, approximately one century later, by an incremental but rapid decrease in fertility by using parity-specific birth control interventions.

Whereas the pre-transition phase was characterised by high mortality, high fertility and moderate population growth, the beginning of the demographic transition was characterised by mortality control and continued high fertility, resulting in explosive population growth (Fig. 8.2).

The theory of the demographic transition built on the premise that, following the mortality decrease, fertility levels would decrease and population growth would fluctuate around the population replacement level. The expected result of the

¹¹Polgar (1975), Hassan (1975), Winterhalder et al. (1988), Gignoux et al. (2011), Zahid et al. (2016).

¹²In the agrarian era, fertility amounted, on average, to 6–7 live born children per women (for instance, Bentley et al. 1993, 274).

¹³For instance, Armelagos et al. (1991).

¹⁴Polgar (1975), Bocquet-Appel (2011), Gignoux et al. (2011).

¹⁵Hamilton (1964).

¹⁶MacDonald (1999), Parsons (1999).

¹⁷Landry (1934), Notestein (1945), Chesnais (1986), Lee (2003).

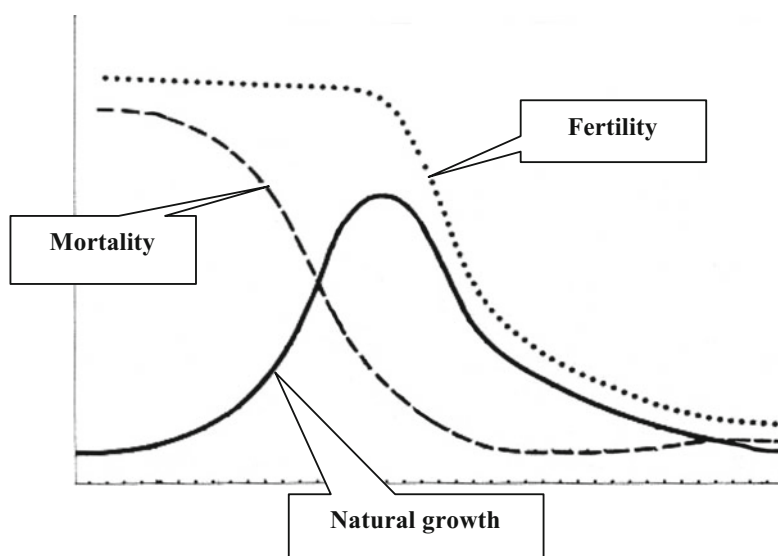


Fig. 8.2 Mortality and fertility decrease and population growth during the demographic transition (Based on Chesnais 1986)

demographic transition theory was a stationary population. However, in contrast to the theory, modern countries have not yet reached the expected stage of the demographic transition where balance would occur. Most developed countries appear to have leaped into a new phase, that of persistent below-replacement fertility.¹⁸

In the old industrial countries, the demographic transition gradually and slowly evolved in parallel with the Industrial Revolution in the eighteenth and nineteenth centuries. In the developing countries, mortality control and gradual fertility decline generally gained momentum in the course of the twentieth century. Some scholars distinguish two demographic transitions in the demographic changes that have accompanied the modernisation process, each characterised by a different pace of change: the first demographic transition, characteristic of the old industrial countries, and the present demographic transition,¹⁹ typical of the developing world.²⁰ Indeed, the present demographic transition in the developing world is not only characterised by a later and faster decrease of mortality and fertility rates but also started at much higher levels than the first demographic transition in the old industrial countries.

¹⁸Teitelbaum (1999), Frejka and Ross (2001), Goldstein et al. (2003), Wilson (2004), Hoorens et al. (2011).

¹⁹Not to be confused with the above mentioned 'Second Demographic Transition' of Lesthaeghe and van de Kaa (1986, 1987, 1995, 2010) who refer to the recent accelerations in relational and reproductive behaviour in developed countries.

²⁰For instance, Reher (2004), University of Michigan (2006).

Meanwhile, the move to below-replacement fertility is also spreading in fast emerging economies outside the old Western world.²¹ Today, about 42% of the world population lives in countries with below-replacement fertility²² and it is expected that it will spread further in the coming decades.²³ It is estimated that 75% of all countries will be reproducing at below-replacement levels by 2050.²⁴

Below-replacement fertility has raised the question of how this phenomenon is to be reconciled with the biological imperative of fitness maximisation. How can this paradox be explained? In recent decades many hypotheses have been suggested to explain, from an evolutionary perspective, the reduced fertility in modern industrialised populations.²⁵ Many of these explanations are not mutually incompatible: this only goes to show how many factors are involved in the reproductive decision-making process and how modern culture has a multifactorial impact on it. Indeed, the new fertility regime is a deviation of the traditional adaptive strategy: it is a new regime on which selection has had little impact so far; the family context has changed profoundly; attitudes towards investment into and expectations from children have changed tremendously; the innate drive regarding resource acquisition has taken advantage of the increased modern economic benefits, etc.²⁶

Some authors have argued that, from an evolutionary perspective, low fertility, or even (a temporary) below-replacement fertility, would be a maladaptive strategy.²⁷ This might be true from a short-term point of view, but when one considers low fertility simultaneously (1) in a long-term perspective, (2) from a population or global point of view, and (3) in a novel context of modernity with its high consumption patterns and high standards of quality of life (including low mortality), low fertility appears as a good adaptive strategy which, in the long run, will not only benefit the human species as a whole but also its individual members.²⁸ Maximising inclusive fitness in a context of population growth and resource

²¹For instance, Kinfu (2000), Caldwell and Caldwell (2003, June 2005), Jones (2007), Atoh (2008), Sutton (2009), Westley et al. (2010).

²²Espenshade et al. (2003), UN Population Division (2015).

²³Morgan (2003), Sobotka (2009).

²⁴Lutz et al. (2001).

²⁵Maladaptive strategy hypothesis (Hill 1984; Davis 1986; Vining 1986; Pérusse 1993; Borgerhoff Mulder 1998; Boyd and Richerson 2005); shortage of time hypothesis (Irons 1979); fertility control hypothesis (Turke 1989); breakdown of kinship network hypothesis (Turke 1989; 1990; Newson et al. 2007; Newson 2009; Newson and Richerson 2009); relaxed fertility selection hypothesis (Aarssen 2005); evolved two-child family hypothesis (Lopreato and Yu 1988); cultural evolutionary hypothesis (Boyd and Richerson 1985); transmission competition hypothesis (Aarssen and Altman 2006); quality of children hypothesis (Harpending and Rogers 1990; Rogers 1990; Kaplan 1996; Volland 1998); social status/competition hypothesis (Boone and Kessler 1999; Mace 2000; Johansson 1987; Mueller and Short 1983; Pérusse 1993, 1994; Borgerhoff Mulder 1998; Low et al. 2002); economic benefit hypothesis (Volland 1998; Kaplan and Lancaster 2000; Shenk et al. 2013); changed relations between ontogenetic fitness and reproductive fitness hypothesis (Caldwell 1982; Cain 1982; Handwerker 1986; Cliquet 2010); extrasomatic wealth hypothesis (Kaplan et al. 2002).

²⁶Low (1994), Borgerhoff-Mulder (1998), see also Cliquet (2010, 319–324).

²⁷Hill (1984), Vining (1986), Pérusse (1993), Borgerhoff Mulder (1998), Boyd and Richerson (2005).

²⁸See also Krebs (2011, 186).

exploitation that already has an ecological overshoot of 1.5 Earths, is maladaptive (see below in Sect. 8.2.2.2). This overshoot can be expected to further increase when developing nations reach consumption levels of Europe or North America. H. Kern Reeve and Paul W. Sherman²⁹ suggest that the demographic transition is not a human maladaptation but rather a well-adapted life history decision-making, taking into account not only the number of offspring but also offspring quality and intergenerational resource generation and transmission.

8.2.2.2 Population Growth and Size During Modernisation

The onset and the intensity of the difference between the decrease in mortality and fertility during the demographic transition caused an exponential growth of the human species, which evolved from about one billion people around 1800 to two billion around 1930 and four billion around 1975. As already mentioned, the world's population now amounts to seven billion people and it is expected that, by the end of this century, it might peak at around eleven billion³⁰ and then start to decline (Fig. 8.1).

While the annual population growth rate in the period before the industrial cultural phase was very low and very slowly increased from 0.04 to 0.1%, during the short span of modernising it very rapidly and strongly rose to just above two per cent in the period 1965–1970. Since then, this figure has decreased again; by the end of this century it is expected to be back at the very low values it had during most of human prehistory. The present and past ages thus represent a unique and nonrecurrent moment in the demographic history of humankind.

The major part of the population growth since the middle of the last century took place and still does occur in developing countries: in many of these countries it forms a strong constraint on socio-economic development and preservation of ecological equilibria.³¹

Regarding the developed world, in the period before World War II fertility evolved to below-replacement levels in more than half of the European countries.³² After a temporary post-World War II baby boom in the middle of the twentieth century, fertility resumed its decline—in some countries in the 1960s and 1970s, and in others as late as the 1980s. By the end of the century, fertility reached unprecedentedly low levels, notably in southern and particularly in eastern European countries where fertility took a steep plunge after the collapse of communism,³³ as well as in Japan³⁴ and some overseas English speaking countries.³⁵ By the turn of the century, the total fertility rate seems to have stabilised at more or less

²⁹Reeve and Sherman (2007, 93).

³⁰United Nations Population Division (2010).

³¹Ehrlich and Ehrlich (2008).

³²For instance, Frejka and Ross (2001), Wilson (2004), Van Bavel (2008).

³³Kohler et al. (2002), Goldstein et al. (2003).

³⁴Japan: TFR 2000: 1.3 (Atoh 2008; UN Population Division 2010).

³⁵Canada: TFR 2000: 1.52; Australia: TFR 2000: 1.75 (UN Population Division 2010).

below-replacement levels³⁶ and since then recovered even a little bit.³⁷ As explained above, the move to below-replacement fertility has also spread to fast emerging economies outside the old Western world.³⁸

For a long time demographers have shown that a long-lasting subreplacement fertility would eventually lead to a virtual disappearance of the population.³⁹ This will not happen either because policies will try to reverse the low fertility trends or populations themselves will change their behaviour, as a result of experiencing the negative effects of a too long-lasting below replacement fertility, or even because some minority populations, who continue to realise high fertility levels, instigate resumed population growth and become the demographic majority.

Indeed, within more developed countries some ethnic or religious groups, as well as some immigrant groups from developing countries, maintain a (much) higher fertility than the rest of the population. Well-known examples are the Anabaptists (Amish, Hutterites, and Mennonites) in North America who continue to reproduce at natural fertility levels (on average about 7 children per woman),⁴⁰ and the Islamic immigrants in many European countries who have fertility rates which are double or triple that of the host population. However, the fertility rates of second and third generation descendants of immigrants tend to be much lower than those of the original immigrants.⁴¹ In many developed countries religious people, in particular Catholics, have a higher fertility than secular people. However, in recent decades the fertility differentials of various ideological groups in developed countries has tended to become smaller. In many cases the higher fertility of particular religious groups results from religious positions that are remnants from pre-modern value- and norm systems. In some cases the higher fertility is deliberately maintained or stimulated in order to enlarge the quantitative representation of the in-group in the population. Eventually, this must inevitably contribute to aggravating the ethnic, racial or ideological in-group/out-group relations in the country.⁴² From a demographical point of view, even relatively small fertility differentials within populations can, when persistent in the long run, reverse population growth trends.

8.2.2.3 Carrying Capacity of the Earth

The developmental or environmental effects of population size (and growth) cannot be estimated and evaluated as such, i.e. independently of the degree of quality of life and the kind and degree of consumption that we want to achieve or the amount of resources (energy and space) we (want to) use. Hence, we face an almost

³⁶Bongaarts (2002).

³⁷For instance, Lutz (2006), Sánchez-Barricarte and Fernández-Carro (2007), Hoorens et al. (2011), Goldstein et al. (2009).

³⁸For instance, Caldwell and Caldwell (2003, June, 2005), Jones (2007), Atoh (2008), Westley et al. (2010).

³⁹For instance, Bourgeois-Pichat (1988), Frejka et al. (2008), Reher (2007), Billari and Kohler (2004).

⁴⁰Nonaka et al. (1994), Greksa (2002), Hurd (2006).

⁴¹Coleman (2006), Westoff and Frejka (2007), Caldwell (2009).

⁴²Bialasiewicz (2006), Richerson et al. (2010), Kaufmann (2011).

insurmountable difficulty in assessing the relationship between the numerical development of the human species and the carrying capacity of our planet. This difficulty appears so clearly from the persistent diversity in attitudes, beliefs and policies on this matter. For instance:

Population growth should be halted and a slow decline begun to a population size that, in a couple of centuries, might be environmentally sustainable⁴³

Overpopulation does not threaten the environment or humanity.⁴⁴

There is considerable variation in the estimates of the number of people that the Earth can carry because of the different hypotheses that have been proposed. Many authors have tried to define the carrying capacity of the Earth, starting with Antonie Van Leeuwenhoek (1679) who estimated that the maximum number of people the Earth could support is 13.4 billion. Many more estimates followed of how many people Earth could support, ranging from less than 1 billion to more than 1000 billion. For 65 studies giving a range, the lower and upper bounds amount to 7.7 and 12 billion.⁴⁵

A recent interesting approach has been the calculation of the Ecological Footprint by the Global Footprint Network.⁴⁶ Global Footprint Network's core research calculates both the Biocapacity (BC)⁴⁷ and the Ecological Footprint (EF)⁴⁸ for more than 200 countries, using over 5000 data points for each country per year, derived from internationally recognised sources; these have been used to determine the area required to produce the biological resources a country uses and to absorb its wastes and to compare this with the area available.⁴⁹ The ratio EF/BC is the estimated ecological overshoot. For 2007, the ecological overshoot (EF/BC) is 50% above unity; meaning, humanity used the equivalent of 1.5 Earths to support its

⁴³Ehrlich (2000, 322); see also Grant (1992; 1996), Hern (1990, 1993), Hardin (1993), Pimentel and Pimentel (1997; 2005), Smail (1997), Margulis (1998), Grant (2000), Short and Potts (2009).

⁴⁴Bailey (2006); see also Simon (1981; 1998), Connelly (2008), Angus and Butler (2011), Ellis (2013).

⁴⁵Cohen (1995, 402–418).

⁴⁶Wackernagel and Rees (1998), Ewing et al. (2010); <http://www.footprintnetwork.org/>.

⁴⁷Biocapacity (BC) = area × bioproductivity (Ewing et al. 2010). The biocapacity is measured by calculating the amount of biologically productive land and sea area available to provide for the resources a population consumes and to absorb its wastes, given current technology and management practices.

⁴⁸Ecological footprint (EF) = population × consumption × resource and waste intensity (Ewing et al. 2010). When the BC > EF, there is an ecological reserve; when the BC < EF, there is an ecological deficit. The ratio EF/BC is the estimated ecological overshoot. In their Ecological Footprint Atlas 2010 edition, the Global Footprint Network estimated for 2007 the world's biocapacity at 11.9 billion global hectares (gha) and the ecological footprint at 18.0 billion global hectares (gha) for a world population of 6.7 billion people. This gives an average biocapacity per person of 1.8 global hectares (gha) and an average footprint per person of 2.7 global hectares (gha), giving an ecological overshoot (EF/BC) of 1.5.

⁴⁹The 'ecological footprint' is perhaps not a completely satisfactory instrument to measure the total ecological impact of humanity—for instance, it does not include the impact of the use of chemicals or the effects on biodiversity (see Wijkman and Rockström 2011, 150)—but it is an impressive and most elaborated proxy for measuring the human impact on the environment.

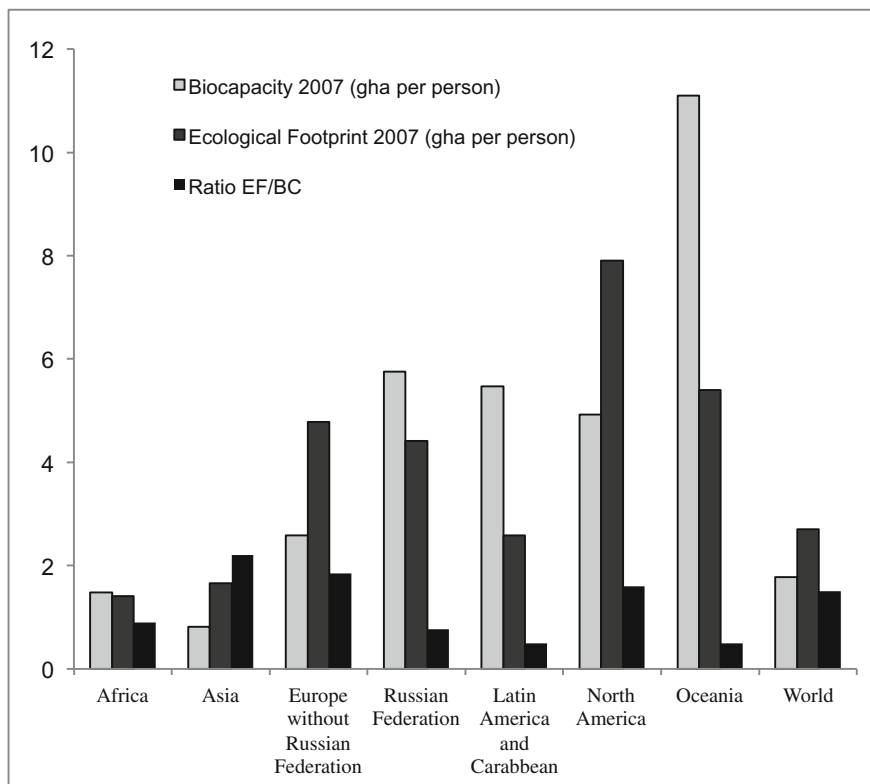


Fig. 8.3 Biocapacity, Ecological Footprint and EF/BC ratio in 2007, per continent and world (authors' calculations based on Ewing et al. 2010)

consumption. From Fig. 8.3 it can be seen that there are substantial differences in the ecological overshoot between continents.

In addition, it has to be observed that the current ecological overshoot of 1.5 Earths relates to a world population in which only about 20% is estimated to enjoy a standard of living typical of the developed world.⁵⁰

In the hypothesis that the whole world acquires by 2050 the level of prosperity of Europe with its current consumption patterns, it can be estimated that humanity would need almost four Earths (Fig. 8.4).⁵¹ If the European consumption further increased linearly between 2007 and 2050, as it did between 1991 and 2007, and this level of consumption is applied to the whole world population in 2050, humanity would need nine Earths. It is self-evident that this is impossible. Even with the hypothesis of the development of new technologies, it seems inevitable that a further increase in the quality of life on a planetary scale can only take place

⁵⁰Smail (2002, 27).

⁵¹See also Wackernagel and Rees (1996), Smail (2002, 28).

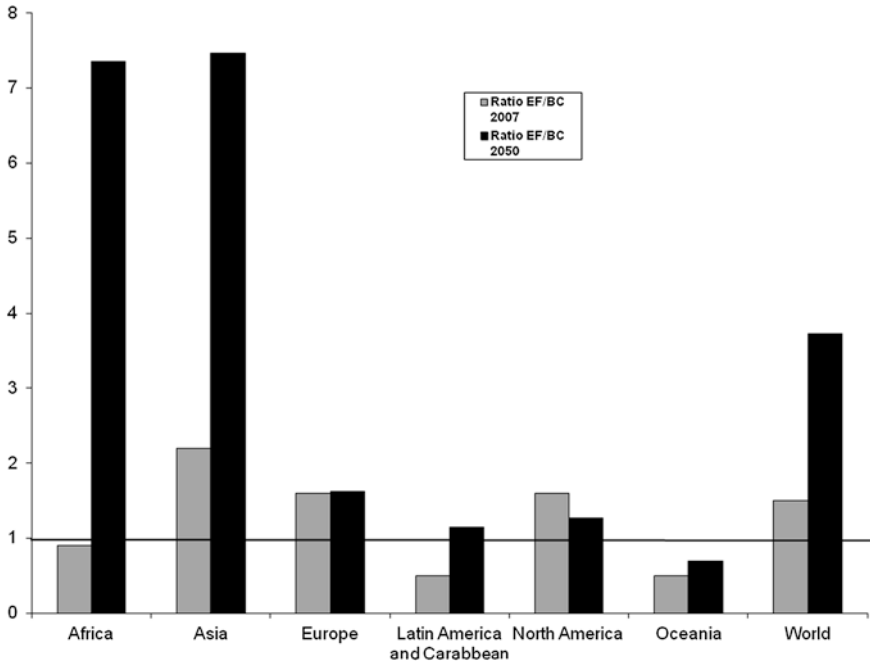


Fig. 8.4 Ecological deficit/reserve in 2007 and 2050, based on the hypothesis that the whole world acquires the level of prosperity and welfare of Europe with its current consumption patterns (authors' calculations on the basis of data from Ewing et al. 2010)

at the expense of a reduction in population size and change in consumption patterns.⁵²

Identical reasoning can be made for many specific types of resources. Let us take the example of the needs, uses and distribution of fresh water, which is clearly an indispensable but finite resource. The increasing use of this natural resource is not only related to the world population growth but also, and in particular, to the advance of the modernisation process (Fig. 8.5).

Walter K. Dodds⁵³ estimated that the availability of freshwater on the Earth amounts to 9000 km³, approximately half of which is currently being used by the human species, namely 678 m³ per person. In the United States 2700 m³ is used per person. If the US usage was extended to the total world population, more than twice the naturally available water resources would already be needed. Knowing that the world population will, in all probability, further increase by three to four billion people, it is without doubt that the American water consumption levels cannot be generalised at the global level. Even if the current excessively high US use and abuse of fresh water was substantially reduced, the expected further world

⁵²See also Catton (1980), Pimentel and Pimentel (1991; 1997), Diamond (1992; 2005), Myers (1997), Ferguson (1999), Pimentel et al. (1999), Costanza (2000), Smail (2002), Rees (2003).

⁵³Dodds (2008, 21); see also United Nations (2011, 99ff).

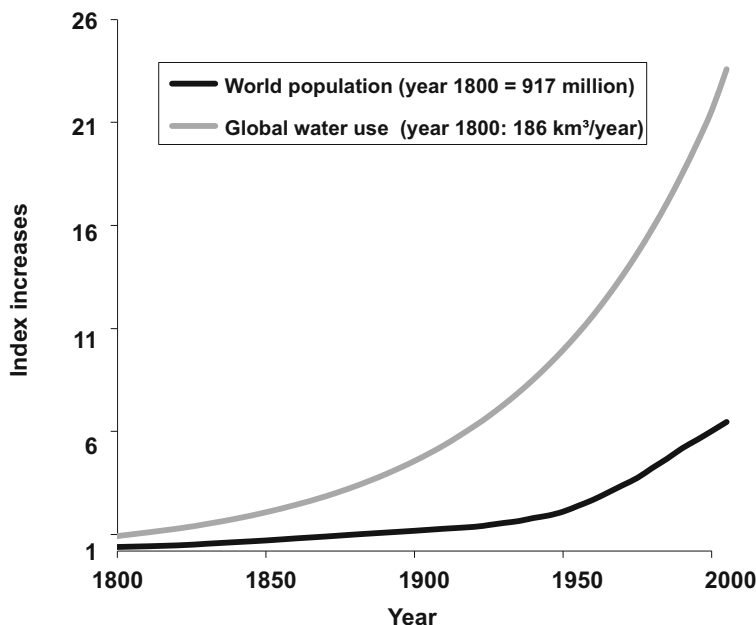


Fig. 8.5 World population growth and global water use between 1800 and 2000 (Dodds 2008, 215–216)

population increase up to eleven billion is incompatible with the goal of applying modern water consumption patterns.

If the current US use of fresh water (2700 m^3 /per person) was generalised at the global level, the Earth, with its 9000 km^3 availability of fresh water, could support 3.3 billion people. If the data provided in Meadows, Randers, and Meadows⁵⁴ are used, roughly identical results are arrived at, namely 3.7 billion people.

Figure 8.6 represents the relationship between the Human Development Index (HDI) (2012) and the Ecological Footprint (2007) for 153 out of 192 countries in the world. It also illustrates well the double effort that would have to be made to reach a future sustainable human development—namely, moving the countries with a low or medium HDI, as well as the countries with a high or very high HDI, into the ‘sustainable human development’ quadrant of the graph.

8.2.3 Ethical Reflections Regarding Population Growth

Given the evolutionarily crucial importance of reproductive behaviour, it will not come as a surprise that individuals are equipped with a series of behavioural

⁵⁴Meadows et al. (2004, 67): total availability of freshwater = 5.620 km^3 , US use per person = 1500 m^3 .

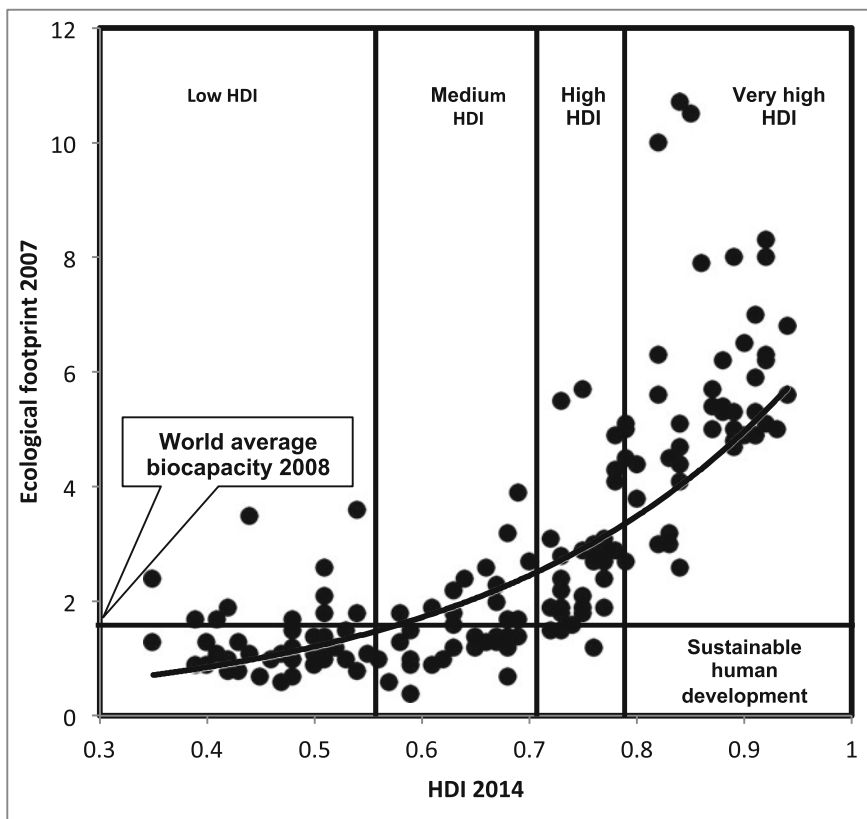


Fig. 8.6 Relationship between Human Development Index (2014) and ecological footprint (2007) for 155 out of 188 countries in the world (after UNDP 2013, 35), http://www.footprintnetwork.org/en/index.php/GFN/blog/human_development_and_the_ecological_footprint

predispositions, such as the drive for mate acquisition, greed for resource acquisition, territorial expansion, status seeking behaviour and love of children, that are—consciously or unconsciously—targeted at transmitting one’s genes intergenerationally. Nor is it surprising that traditional ideologies, which played such an important role in the adaptability of societies in pre-modern times, attach paramount importance to reproductive values and norms. Consequently, ethical issues related to reproductive behaviour are a very sensitive matter.

Human reproduction needs to be seen in the context of ethical goals for a further evolution of the hominisation process: (1) the preservation of ecological sustainability; and (2) the cultural furthering of the modernisation process.

Given the knowledge we have about the past and present damage that the human species has caused to the planet’s natural environment, together with the threat that current trends in ecological mismanagement may continue, unrecoverable damage to the available natural resources will occur with detrimental consequences for the

human species itself. Hence, for pragmatic and moral reasons, we should protect the existing biodiversity, the natural ecological systems and the available natural resources that our planet possesses.⁵⁵

The authors argue for a matured and further progressing modernity—i.e. a cultural stage based on the application of modern science and technology which allows the optimal development of human-specific potentialities, but without the current-day disastrous effects on biodiversity, depletion of natural resources, overpopulation, underdevelopment, use of environmentally harmful technologies, overconsumption, environmental pollution, ABC-weaponry threats for preserving consumption patterns and dominance of powerful nations and neo-colonial exploitation.

There is plenty of evidence concerning the desire of people in advanced countries to further progress on the path of modernisation, as well as the desire of people in second and third world countries to develop, in order to acquire levels of quality of life and well-being similar to those of the ‘first’ world countries.

It can be expected that further scientific and technological development through future inventions and interventions might resolve some of the shortages of vital resources that have been identified today. We are only at the very beginning of the modernisation process and great scientific innovations, for instance in the fields of genetic engineering, robotics and nanotechnology, which will further uplift the quality of life to unprecedented heights: this may radically change our present perceptions about overpopulation and the exhaustion of limited material resources to sustain human life.⁵⁶ Forecasters have generally failed dismally to foresee the drastic changes brought about by completely unpredictable discoveries.⁵⁷

Apropos reproductive behaviour, we should always think about its possible impact on future generations. Indeed, in reproductive matters we need, in addition to a short-term perspective, a long-term, and even a very long-term approach.

Regarding the short-term—generational change in the narrow sense of the word—it is not difficult to demonstrate the indispensable role of value and norm systems. Just as in the case of ontogenetic development, the reproduction of a new generation is not completely genetically programmed. Value and norm systems also influence the number of children that women bear and people raise.

Regarding the long-term, ethical goals concerning generational replacement are more difficult to justify on the basis of objective scientific arguments. The acceptance of this type of goal depends on the way in which life is conceived. From the point of view of the individual’s perception, ethical values do not extend beyond five or six generations—grandparents, parents, self, children, grandchildren, great-grandchildren. However, when the levels of personal perception and experience are transcended and the advances of modern science are taken into consideration—particularly with respect to knowledge about the evolution of life—ethical systems may take on a different dimension. From an evolutionary perspective,

⁵⁵Ehrlich et al. (1977), Wilson (1992), Hardin (1993), Chew (2001).

⁵⁶Kurzweil (2005, 13).

⁵⁷Rees (2003, 14).

human life has a temporal dimension that extends over a period of several million years and is characterised by a process of hominisation, the essential feature of which consists of increasing encephalisation, resulting in a growing capacity for controlling life and the environment.

8.2.3.1 Achieving Stationary Population

Assuming the desirability of preserving the Earth's natural ecological systems and resources, as well as a further progressing modernisation, it is clear that lower mortality and fertility rates need to be achieved. As a pragmatic endeavour, a decrease in mortality is in general supported by strong ethical norms. Nobody wants to regress to living conditions where the life course of people was constantly threatened by infectious diseases, malnutrition, homicide and natural disasters. However, since mortality no longer needs to be compensated by high fertility in order to maintain population stationarity, we are at a crossroads.

Consider the following facts (1) the present world population already has an ecological overshoot of 1.5 Earths, (2) the developing regions in the world rightly want to acquire well-being levels comparable to those of the most advanced countries or regions, and (3) the highest population growth rates exist in the least developed countries or regions. Thus, a global aim should be set to achieve, as soon as possible, a zero world population growth.

Due to demographic inertia,⁵⁸ it will be necessary to temporarily reduce fertility in many regions of the world to below-replacement levels, in order to reach zero growth as soon as possible.

It will not be easy to set the achievement of a stationary population goal as an ethical objective. First of all, there are the explicit proponents of population growth, usually targeted to in-group expansion, so well expressed in the allocution of the late Algerian President Houari Boumédiène at the General Assembly of the United Nations in 1974: "*Nous vous vaincrons par le ventre de nos femmes*" or the recent statement of the present Turkish president Recep Tayyip Erdoğan who in 2016, urged Turkish women to have at least three children,⁵⁹ and called recently on Turkey's citizens in Europe to step up their rates of procreation and have five children each in order to increase their power and influence in Europe.⁶⁰ Moreover, there are still many, often silent, growth advocates even in the scientific community. There are even the advocates of explicit population growth such as the late Julian Simons, Ben Wattenberg, Nicolas Eberstadt, Ronald Bailey and Matthew Connelly.⁶¹ The views of the silent advocates of further population growth are more

⁵⁸Demographic inertia refers to population growth effects resulting from changes in the structure of the population age pyramid (Koons et al. 2007).

⁵⁹Many reports in current or recent European mass media, for instance, <http://www.dailymail.co.uk/news/article-3627087/>.

⁶⁰Many reports in current or recent European mass media, for instance, <http://www.telegraph.co.uk/news/2017/03/17/>.

⁶¹Simon (1981, 1998), Simon and Kahn (1984), Wattenberg (1987), Watson and Wattenberg (1989), Eberstadt (1997), Bailey (2006), Connelly (2008), Angus and Butler (2011).

often expressed as views against birth control or prohibiting abortion rather than explicitly favouring the present levels of population growth.

Silent population growth advocates are often found among economists and politicians in general, because of the idea that population increase (via more numerous younger age groups) will contribute to the increase in economic production or enhance political power, within or between populations. In the short-term, and as an isolated phenomenon, at first sight this idea seems to be correct. However, although this was true in earlier cultural stages of human evolution and history, the premise cannot pass the critical test of a sound scientific analysis in a modern context.⁶² In particular, in a long-term perspective and from a more global approach, also taking into account broad ecological and resource concerns, avoidance of further population growth in an already overcrowded planet should be a concern.

Most individuals or couples, wherever in the world, are not motivated by world population growth issues in deciding how many children they wish to have and what family size they actually realise. However, enlightened ethical, economic and political decision makers, in discussions about the big world problems of today—being of an ecological, financial, economic or physical nature—seldom address the population dimension in an appropriate way.

It is a striking fact that the preponderant role of the population factor is so often concealed or at least unaddressed in all kinds of societal strife situations—starvation, water shortage, unemployment, in-group/out-group conflicts—or natural disasters—climatic changes, earthquakes, floods, tornados, droughts.⁶³ For instance, in the United Nations' *Millennium Development Goals Report 2011* the world population crisis is not addressed and the need to reduce fertility in demographically expanding regions does not figure among the eight—otherwise very laudable—goals proposed.⁶⁴ Even in the new set of 17 measurable *Sustainable Development Goals (SDGs)*, formally accepted by the UN General Assembly in 2015, the issue of the world population growth was totally out of sight.⁶⁵ Also, at the recent United Nations Conference on Climate Change in Paris,⁶⁶ population size or growth were not considered. It seems that human development and climate are dissociated from populations.

In addition to those who do not want, for expansionistic, nationalistic or economic reasons, to consider the negative effects of a further population growth, there

⁶²See, for instance, Coleman and Rowthorn (2011).

⁶³Smail (1997).

⁶⁴United Nations (2011). The eight 'Millennium Development Goals' are: eradicate extreme poverty and hunger; achieve universal primary education; promote gender equality and empower women; reduce child mortality; improve maternal health; combat HIV/AIDS, malaria and other diseases; ensure environmental sustainability; global partnership for development.

⁶⁵Among the 17 identified Sustainable Development Goals, only Goal 3.7 includes an indirect hint regarding fertility control: "By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes." (<https://sustainabledevelopment.un.org/sdgs>).

⁶⁶United Nations (2015).

are also the proponents of other ethical principles, such as individual freedom, individual reproductive rights, or the sanctity of life, who completely ignore the demographic, societal, genetic, or ecological dimensions of unrestrained population growth.⁶⁷ Individual rights activists and patriarchally oriented religious institutions often form surreal coalitions in these matters, as population and ecological experts were able to observe during the Prepcom negotiations for the 1994 United Nations International Conference on Population and Development.⁶⁸

8.2.3.2 Decreasing the World Population Size

Considering the facts that the human species already transcends the carrying capacity of the planet, reduces the natural biodiversity, unbalances many natural ecosystems, depletes natural resources through deforestation and overfishing, depletes non-renewable energy sources, pollutes the environment (air, soil, rivers, lakes, seas and oceans), and is, in all probability, responsible for accelerating climatic changes through high carbon dioxide, methane and other chemical emissions,⁶⁹ and considering further that the quality of life of populations in developing regions should not only become identical to that of developed countries, but that the quality of life of all should be further enhanced albeit by replacing quantity by quality consumption, it is necessary to decrease the world population growth to reach size which would be ecologically and globally sustainable in the long-term perspective.⁷⁰ As Julian Huxley⁷¹ stated several decades ago:

The world has to achieve the difficult task of reversing the direction of its thought about population. It has to begin thinking that our aim should be not increase but decrease – immediate decrease in the rate of population-growth, and in the long run, decrease in the absolute number of people in the world, including our own countries.

Therefore, a temporary, slightly below-replacement fertility, as it manifests itself in many developed countries and newly emerging economies, should be considered highly welcome and should extend as soon as possible to developing countries, especially those experiencing high population growth or density.

Regarding the situation in Europe, Dirk Van de Kaa⁷² noted rightly:

Thus, developments go at least in the right direction and Europe may well benefit from them. Conceivably it might increase material wealth, help protect the environment, and increase the educational and other investments in the children who are born. Europe should again set an example for other continents to consider.

A generalised (obviously temporary) below-replacement fertility would lead to a decrease of the world population in the coming centuries as anticipated, for

⁶⁷For instance, Connelly (2008, xii, 382).

⁶⁸See, for instance, Cliquet and Thienpont (1995).

⁶⁹For instance, Wijkman and Rockström (2011), Meadows et al. (2004), Dodds (2008), Cafaro and Crist (2012), IPCC (2013).

⁷⁰For instance, Van de Kaa (1978), Cohen (1996), Hardin (1992), Pimentel and Giampietro (1994), Ehrlich (2000), Grant (2000), Smail (2002).

⁷¹Huxley (1964, 86).

⁷²Van de Kaa (2010).

instance, by the low variant population prospects of the UN Population Division⁷³ (Fig. 8.1).

Taking the Earth's finite physical and ecological limitations into account,⁷⁴ what population size would the Earth be able to support with the hypothesis that the whole world population would reach the developmental and consumption levels of Europe? In the hypothesis that Europe's consumption pattern would further increase between 2007 and 2050, as it did between 1991 and 2006, a sustainable world population would amount to 1.03 billion people.⁷⁵ In the hypothesis that the whole world would reach the developmental and consumption levels Europe had in 2007, the planet could support 2.5 billion people.⁷⁶ These figures (1.3–2.5 billion) correspond quite well with other estimations, based on more sophisticated calculations available in the literature, which all range between one and three billion.⁷⁷ Assertions that the Earth might be able to support a population of 10, 15 or even 20 billion with a standard of living at the level of the most advanced nations of today are, as J. Kenneth Smail⁷⁸ writes, “not only cruelly misleading but almost certainly false”.

Estimations of a sustainable population size with respect to the renewable fresh water requirements per person for irrigated agriculture and other requirements (industrial, hygienic, leisure) that are common in present-day advanced countries⁷⁹ also lie in the range of the low population figures quoted above. However, in the domain of water requirements much stronger regional differentiations in carrying capacity can already be observed and may be expected to increase considerably—although in many cases this problem could, admittedly, be resolved through the construction of water pipeline networks, just as we now have oil pipeline networks. However, the Earth's capacity for providing fresh water is limited, as explained above, unless a very cheap energy source became available that would allow massive desalination of seawater.

A generalised below-replacement fertility in the coming centuries would lead to a decrease in the world population such as appears from long-term, low-variant population scenarios.⁸⁰ Indeed, such long-term scenarios show that very small differences in average fertility can make a huge difference to the final size of the

⁷³UN Population Division (2004).

⁷⁴Wijkman and Rockström (2011, 4).

⁷⁵This figure is obtained as follows: 9.306 (world population prospects in 2050, in billions)/3.8 (number of planets to support the world population at the developmental level of Europe in 2007)/2.38 (the extrapolation of Europe's consumption pattern between 2007 and 2050, as it did between 1991 and 2006) = 1.03 billion inhabitants.

⁷⁶This figure is obtained as follows: 9.306 (world population prospects in 2050, in billions)/3.8 (number of planets to support the world population at the developmental level of Europe in 2007) = 2.5 billion inhabitants.

⁷⁷Ehrlich and Ehrlich (1990, 1996), Grant (1992; 1996, 75; 2000), Hardin (1993), Pimentel and Pimentel (1991, 1997), Giampetro and Pimentel (1993), Wackernagel and Rees (1996), Pimentel et al. (1999, 33–34), Costanza (2000), Wackernagel and Yount (2000), Smail (2002), Pimentel and Pimentel (2005).

⁷⁸Smail (2002, 27).

⁷⁹For instance, Cohen (1995, 297–328); Dodds (2008, 21–26).

⁸⁰UN Population Division (2004), Basten et al. (2013).

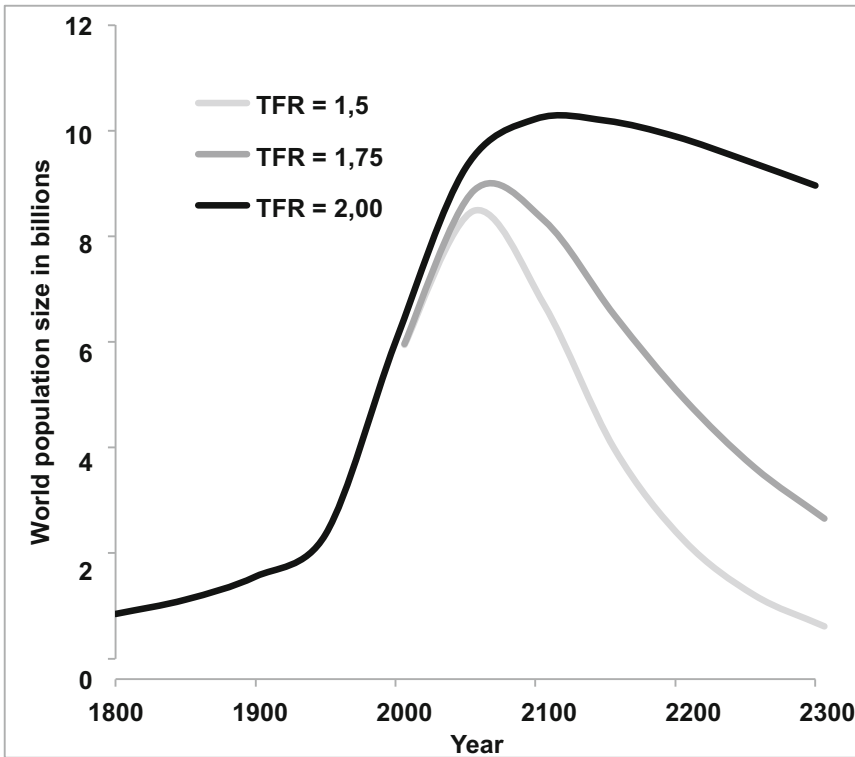


Fig. 8.7 World population increase of *Homo sapiens sapiens* since the beginning of the nineteenth century, and hypothesising that the future growth would evolve according to low and medium variants of the total fertility rate (TFR:1.50; 1.75; 2.00) and an average life expectancy of 90 years (based on Basten et al. 2013)

total world population. For example, with a sustained Total Fertility Rate (TFR) of 1.75 instead of 2.00 children per woman, the population on Earth by 2300 would only be three instead of eleven billion, i.e. eight billion less. If worldwide fertility decreased to the current average for Europe, the world population in 2300 would amount to approximately one billion (Fig. 8.7).

Given the quasi-certainty that the world population will further increase, in all probability up to eleven billion, temporary solutions will have to be found for those eleven billion people.⁸¹ However, it is difficult to see how it would be possible to increase substantially, in the few coming decades that separate us from 2050 or 2100, the living standards of the present underdeveloped regions in the world up to the existing levels of the most advanced countries; it is also hard to envisage a substantial decrease in the production and consumption patterns and material living standards of the developed countries.

⁸¹Wijkman and Rockström (2011, 179).

A well-known and often heard alternative solution to the current ecological challenges is the reduction or change in the excessive production and consumption patterns in the developed world.⁸² Consumption volumes and production patterns of the developed countries should take into account their unfavourable effects on the planetary environment, and they need to stop abusing resources from other regions or indebting their future generations. One must acknowledge that the present 'World Order' is all about preserving access to abundance to in-groups and silently or overtly blocking access to valuable resources to out-groups. Ideologies that sustain and encourage high fertility are playing an important role in keeping out-groups poor and powerless.

Indeed, the necessity to change the production and consumption volumes and patterns should not divert our attention from the equally important—and ultimately most important—issue of demographic numbers as, for instance, Ian Angus and Simon Butler⁸³ do from the ideological perspective of ecosocialism. Those authors rightly stress the disastrous ecological effects of the current consumption and particularly the production patterns, especially in the developed world, and rightly identify their root causes in the present form of capitalist societal organisation with its rampant profit-growth ideology, its considerable energy and resource wastage, and its huge within- and between-country social inequalities. However, they not only grossly underestimate the effects of population numbers but also misinterpret, because of their lopsided ideological framework, population concerns as expressions of socially conservative and reactionary attitudes aimed at maintaining a socially inequitable status quo. Even the consensus that was reached at the UN International Conference on Population and Development in Cairo 1994⁸⁴ is alleged to have given "new credibility to an agenda that has long been used to block social change".

Undoubtedly a lot has to be profoundly changed in matters of production and consumption, but it is illusory to think that populations in advanced countries or emerging economies will be prepared to substantially reduce their standard of living and quality of life—their achieved sense of well-being. It is also unimaginable that the populations in developing regions would stop aspiring to achieve the quality of life levels of the more advanced nations. Moreover, the further progression of the modernisation process will increasingly require energy and other resources. Hence, although considerable ecology friendly improvements in consumption and production patterns can and should be made, the most important ultimate trade-off will be between enhancing quality of life and decreasing population size worldwide.

The efforts to decrease population size should not necessarily be envisioned by country or be proportional to the present population size of each country. It would probably be wiser to consider larger geographical unities, such as continents or subcontinents, or regions with specific geographic capabilities or constraints, such as regions susceptible to natural catastrophes, mountain regions, (semi-)desert regions.

⁸²For instance, United Nations (1992), de Geus (2003), Angus and Butler (2011).

⁸³Angus and Butler (2011).

⁸⁴United Nations (1994).

For example, looking at the current and expected ecological overshoot per continent, as represented in Figs. 8.3 and 8.4, it is quite clear that all continents, with the exception of Oceania, will have to reduce their population in order to maintain or increase their quality of life. Africa and Asia may have to make the biggest efforts. In this respect, the Chinese one-child policy has succeeded in avoiding an additional increase of 400 million people.⁸⁵ One might have reservations about the method of implementing that policy. However, the outcome at the population level is significant.

It is quite clear that the goal of decreasing the world population, to one third or even one tenth of what it is currently projected, will require a profound reassessment and change of humanity's moral, demographic, and economic goals and policies. It will also necessitate a major change in the traditional way of thinking by the religious institutions and secular political movements in the world: their support will be needed to reverse the current attitudes, behaviours and policies regarding demographic growth.⁸⁶

It will be equally necessary to overcome our inborn drives and culturally reinforced desires oriented toward unlimited resource acquisition as can, unfortunately, be observed on a daily basis in national, continental or world politics. These biological drives and cultural norms will have to be changed when pursuing long-term sustainability. Neither the traditional religions nor the most modern secular ideologies, except the ecological movement and perhaps also the humanist movement, are intrinsically focussed on ecological sustainability.⁸⁷ On the contrary, traditional authoritarian regimes, as well as modern democratic regimes, are (for different reasons) all oriented towards economic (and often also demographic) growth.

8.3 Qualitative Issues Regarding Reproductive Behaviour

The numerical development of the human species is relatively easy to define and measure. The notion of the quality of parental investment is a much more difficult issue to define: it includes not only objective, material elements of the development of human potentialities but also subjective elements of what people consider and value as quality of life.

Quality of life fundamentally includes two partially interrelated aspects—the nature of genes and gene combinations we inherit from our parents, and the way in which our life course develops under the influence of our genome, i.e. the environmental/social influences to which we are subjected—and a third aspect, the environment with its material and immaterial components that we create for ourselves and our environment. All three groups of determinants of our quality of life

⁸⁵Greenhalgh (2003).

⁸⁶See also Smail (2002, 41).

⁸⁷Dodds (2008, 153–163).

—the genetic, the external environmental/social, and the self-induced/created environmental determinants—can be achieved at very different levels.

In Chap. 5 it was argued that rationally grounded choices could be made in the following ways: (1) ontogenetically, the maximal development of the human-specific potentialities; and (2) phylogenetically, the progression of the hominisation process. What are the implications for ethical choices in the domain of reproductive behaviour?

8.3.1 Evolutionary Background of Qualitative Intergenerational Changes

This discourse can be very brief since the evolutionary processes resulting in the establishment or intergenerational change of qualitative traits in the population—whether genetic or cultural in nature—have already been extensively discussed in Chap. 2. The evolutionary background of quality of life issues essentially relates to the evolutionary mechanisms through which genes and memes are created and are all, or are not differentially, transmitted to subsequent generations. Genetic and cultural mutations provide qualitative variation; drift, migration and above all the various forms of selection to which genetic or cultural traits are subjected, result in their elimination, maintenance or increase.

Intergenerationally, the evolutionary toolkit results in the reproductive fitness of individuals or groups—the degree to which their genes and memes are intergenerationally transmitted and eventually result in the genetic and/or cultural adaptation of the organism/species to its environment.

8.3.2 Qualitative Reproductive Developments in Modernity

The modernisation process has a huge impact on reproductive behaviour. The following will be discussed: modern influences on reproductive behaviour which have a phenotypic effect, in other words influence aspects of quality of life which do not necessarily have transgenerational hereditary effects; and influences on reproductive behaviour that have a genetic effect.

8.3.2.1 Phenotypic Reproductive Developments in Modernity

Birth Control. In modernity two types of cultural-technological interventions in reproductive behaviour have to be distinguished, namely interventions to limit births and procedures to enhance fertility. Among the first group, contraception and induced abortion have to be considered⁸⁸; regarding efforts to enhance

⁸⁸Infanticide was a rather common practice in pre-modern eras, but it has become a rare phenomenon in modernity thanks to the general humanisation of modern culture and in particular due to the spread of contraceptive and abortive methods (Williamson 1978; Harris 1977; Hoffer and Hull 1981; Birdsell 1986; Herman-Giddens et al. 1999; Milner 2000; Putkonen et al. 2009).

fecundity/fertility, two types of methods are available for people who have difficulties in getting pregnant or completing a pregnancy with a life birth: biomedical interventions to enhance fecundity/fertility and adoption.

Contraception. Although birth control practices are not exclusively limited to modern culture (hunter-gatherers and agrarian-pastoral populations usually kept their fertility substantially below the biological potential through a variety of procedures),⁸⁹ modern societies underwent a revolutionary transition in fertility control, namely the general dissemination of parity-specific birth control practices through contraception and induced abortion.

The demographic transition was not caused by a major technological innovation in fertility limitation; although appliance methods, such as the condom, gradually became available they were not widely used initially. The major methods applied were *coitus interruptus* as well as several other traditionally known methods such as abstinence, extended nursing and late marriage. In the later stages of the demographic transition (the first decades of the twentieth century) induced abortion and—at least in some countries—mechanical barrier methods (such as the condom, pessaries, douche and spermicides) increased in importance.⁹⁰

In the second half of the twentieth century, modernised countries experienced—with significant differences in pattern and pace—a second contraceptive transition, which was characterised by the development and dissemination of technological innovations: hormonal contraceptives, intrauterine devices and (somewhat later) more advanced medical techniques for female and male sterilisation (Fig. 8.8).⁹¹ The new contraceptive technology was, moreover, paralleled by new surgical and pharmacochemical abortion procedures.⁹²

The contraceptive profile in advanced countries continues to modernise.⁹³ In many overseas predominantly English speaking countries and several Western European countries, the most recent changes concern a notable increase in rates of female and male sterilisation. In most of those countries sterilisation has already become the most common method after people have reached their desired family size.⁹⁴

A remarkable feature of the first contraceptive transition is that it occurred not only without much support from public or religious authorities but also against the opposition of various powerful groups of the establishment such as governments, legal authorities, churches, political parties and the medical profession. Despite its revolutionary character, the dissemination of birth control at the turn of the twentieth century took place in silence, if not in secrecy. Neo-Malthusian groups were

⁸⁹Himes (1936), McLaren (1990), Riddle (1992).

⁹⁰Dawson et al. (1980).

⁹¹Westoff and Ryder (1977), Cliquet and Lodewijckx (1986), Léridon et al. (1987), Benagiano et al. (2007).

⁹²Cliquet and Thiery (1972), Baird et al. (1995).

⁹³Frejka (2008).

⁹⁴Ross (1992), Lodewijckx (2000).

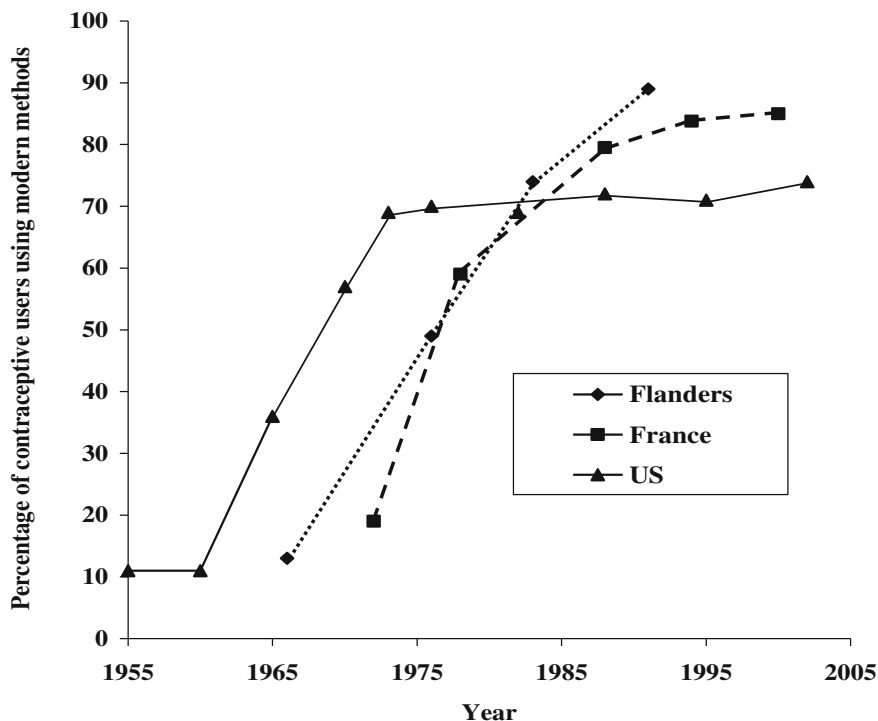


Fig. 8.8 The second contraceptive transition in Flanders, France, and the United States (Freedman et al. 1959; Whelpton et al. 1966; Westoff and Ryder 1977; Ford 1979; Mosher and Westoff 1982; Cliquet and Lodewijckx 1986; Mosher and Bachrach 1988; Cliquet and Callens 1993; De Guibert-Lantoine and Léridon 1998; Bensyl et al. 2005; Trussell and Wynn 2008; Fertility and Family Survey in the ECE Region; www.ined.fr/2009)

fought or boycotted from all sides.⁹⁵ The second contraceptive transition initially encountered identical, though less generalised resistances.

It is no surprise then that both the first and the second contraceptive transitions were characterised by substantial social and ideological differences in the use and effectiveness of contraception—less educated, poor people, as well as people with low cognitive skills, applied less contraception.⁹⁶ Practicing churchgoers used less effective contraception compared to freethinking and non-religious people.⁹⁷

Although contraceptive differentials have decreased considerably, vulnerable groups remain in populations where sexual and reproductive education is still insufficiently embedded in the educational systems and mass media, or where medical and welfare care services do not yet fulfil their tasks properly. Present-day population subgroups with unmet family planning needs are those that have

⁹⁵Stengers (1971), Van Praag (1979).

⁹⁶For instance, Cliquet and Balcaen (1983).

⁹⁷For instance, Cliquet and Schoenmaeckers (1976), Cliquet and Maelstaf (1977).

inadequate knowledge or are too poor to purchase modern contraceptive tools in order to control their fertility such as adolescents and people with weak cognitive abilities, and people who are still under strong in-group cultural pressures such as ultraconservative religious denominations,⁹⁸ socially insufficiently integrated immigrants from developing countries⁹⁹ and people living in poverty.

Abortion. In modernity, induced abortion is still quite frequent, albeit with strongly differentiating statistics according to the stage of the demographic transition, the contraceptive profile of the population, and prevailing attitudes, values, norms and legislation.¹⁰⁰ In general, it can be said that modernisation is characterised by an increasing acceptance and legalisation of induced abortion, a shift from non-medical (criminalised abortion) to medical forms of induced abortion (*abortus arte provocatus*), and a decrease in both non-medical and medical pregnancy interruptions—the latter being subject to an efficient contraceptive policy.¹⁰¹

From a statistical perspective, the indications for induced abortion are mainly of a social nature: age (too young, too old), marital status (unmarried, divorced), family size (excess fertility), financial constraints, and failed contraception. Medical indications are less common: maternal indications have become an exceptional phenomenon whilst relatively rare foetal indications can result in selective abortion.¹⁰²

Biomedical interventions to enhance fecundity/fertility. Medically assisted fertility is a phenomenon that has developed gradually with modernisation; it involves a broad range of medical techniques ranging from general medical and genetic counselling to specific technical interventions that facilitate or replace natural conception. Such techniques may include donor insemination, ovum donation, in vitro fertilisation, gamete and zygote intrafallopian transfer, and embryo transplantation, as well as methods aimed at maintaining the pregnancy and inducing or facilitating delivery. In recent decades, the concept of medically assisted fertility has been increasingly understood in the narrow sense of methods that facilitate or replace natural conception.¹⁰³

Whereas medical interventions related to the whole process of childbearing are quite widespread, conception related interventions are, at the population level, still quite rare. Nevertheless, it can be observed that increasing numbers of couples who experience difficulties in getting pregnant are turning to these techniques in order to fulfil their family-building desires.¹⁰⁴ In recent years, concern has grown about the possible long-term effects of proceptive interventions on foetal birth weight and

⁹⁸For example, Eaton and Mayer (1953), Nonaka et al. (1994), Greksa (2002), Hurd (2006, 2011), Kaufmann (2011), Paltiel (2013).

⁹⁹Jones et al. (1986), Bajos et al. (2002), Guldi (2008).

¹⁰⁰Tietze (1981), Ketting and Van Praag (1983), Henshaw et al. (1999), Alan Guttmacher Institute (2000).

¹⁰¹Cliquet and Thiery (1972, 1985), Ketting and Van Praag (1983), Faúndes and Barzelatto (2006).

¹⁰²Alan Guttmacher Institute (2000), Bajos et al. (2002).

¹⁰³Bentley and Mascie-Taylor (2001), de Jonge and Barratt (2002).

¹⁰⁴Delmotte and Cliquet (1983), Lodewijckx and Schoenmaeckers (1994), Schieve et al. (2002), Sobotka et al. (2008).

malformations.¹⁰⁵ Prudence is also called for in the application of proceptive medical techniques at ever higher ages for proceptive mothers due to increased foetal morbidity risks at those ages.¹⁰⁶

Adoption. From an evolutionary point of view, adoption has been interpreted as a ‘paradox’, a ‘misfire’, even a ‘double whammy’, because adoptive parents not only fail to increase their own reproductive fitness but they also improve someone else’s.¹⁰⁷ Adoption is one of those topics that anti-evolutionists like to use to refute evolutionary theory,¹⁰⁸ but this is an example of profound misunderstanding of the complexity of the evolutionary process and mechanism. First of all, in the past adoptive parents were often related to the natural parents. However, most importantly humans are also equipped with a natural desire to care for children. This caring predisposition can easily lead to adoption when people cannot have children of their own.¹⁰⁹ Adoption is a minority phenomenon: it is a secondary strategy in case natural parenthood is impossible.

Phenotypic Effects of Birth Control. In the first place birth control has quantitative effects. Below, demographic effects in general and effects on the differential growth of various ideological groups are briefly elucidated as examples. However, birth control can also have qualitative effects. It can influence many aspects of people’s life experiences such as out of the house employment of women, partner relations, investment in children, and sexual satisfaction. Two examples are briefly discussed: effects on sexual behaviour in general and effects on male machismo behaviour.

Demographic Effects in General. The general spread of parity-specific birth control practices, starting at the end of the nineteenth and the beginning of the twentieth centuries, obviously had a strong effect on fertility: it formed the proximate cause of the fertility decline in the demographic transition. Some have raised the question as to whether modern contraceptives (and medical abortion methods) in the second half of the twentieth century also caused the resumption of the fertility decline that has been observed since the mid 1960s, after the baby boom of the post-war decades. There is considerable misinterpretation of the supposed causative relationship between the spread of efficient contraceptives—the pill, intrauterine device (IUD) and sterilisation—and the onset of the recent fertility decline that, indeed, remarkably occurred at the same time. It is often overlooked that in earlier periods—in the 1930s and even earlier—some populations succeeded in reducing their fertility to below replacement levels by using less effective methods (mainly withdrawal, sexual abstention and induced abortion). Successive fertility surveys—before and after the second contraceptive transition of the 1960s—have shown that the desired family size has decreased only slightly in recent decades. Moreover, desired family size appeared—and still appears to be—largely independent of the number of children actually produced: before the second contraceptive transition,

¹⁰⁵Cetin et al. (2003), Dulitzki et al. (1998), Kozinszky et al. (2003), Belva et al. (2016).

¹⁰⁶For instance, Salihu et al. (2003).

¹⁰⁷Dawkins (1976, 100), Eisenberg (2001).

¹⁰⁸For instance, Clayton (2002).

¹⁰⁹Silk (1990), Arnhart (1998).

families did not differ substantially in their (original) desired number of children irrespective of completed family size (large and small). However, when the pill and other modern methods became available the unplanned or undesired large families (largely) disappeared. Subsequent fertility surveys that paid sufficient attention to the phenomenon of excess fertility¹¹⁰ have shown that untimed and undesired births are increasingly averted by means of effective contraceptive methods. Hence, there can be no doubt that efficient birth control methods help women or couples achieve a better and more conscious control of the family building process. The avoidance of unplanned and especially unwanted pregnancies does have an influence on completed fertility.¹¹¹ Less apparent, though perhaps more important, is the indirect attitudinal effect of the availability of modern birth control methods on planned parenthood. The existence of such methods, and the knowledge that fertility can be mastered rationally and efficiently, may influence individual attitudes and motivations with respect to conscious decision-making about parenthood.

Effects on the Differential Growth of Various Ideological Groups. It is a well-known and well-established fact that the demographic transition progressed at a different tempo according to worldviews of people. Quite universally, religious people evolved more slowly in the reduction of their fertility than secularised people.¹¹² There have been several explanations for this quite general phenomenon, the most evident being the stronger individualistic values for self-fulfilment among secularised people and the stronger reproduction oriented teaching and indoctrination among religious people. Although, in general, there has been a gradual levelling down of the religious/non-religious differentials in fertility, even today religious people have more children than secular people.¹¹³

In addition to the generally positive fertility gradient related to the degree of religiosity, there are two specific forms of religious demography which amplify the fertility differentials according to worldview, namely (1) endogenous fundamentalist religiosity; and (2) immigration from less developed countries.

Whereas fertility differences between religions such as Protestantism, Catholicism, Judaism and Islam are decreasing, the differences between 'modernists' and 'fundamentalists' within each of those religions are persisting or even growing, which is changing the numerical proportions between religious moderates and fundamentalists. Hence, the classical secular-religious differential in fertility is exacerbated by fundamentalist religiosity, resulting in a fertility gradient going from the lowest values among secular people, to higher values among modernist religious believers, then the highest values among fundamentalist believers.¹¹⁴ Extreme examples of endogenous fundamentalist growth are Haredi (ultraorthodox) Jews, Finnish Laestadian Lutherans, American Old Order Anabaptists such as the Amish and Hutterites, and Dutch Orthodox Calvinists. Some of these groups show

¹¹⁰For instance, Cliquet and Balcaen (1983), Lodewijckx et al. (1988).

¹¹¹Calot (1990).

¹¹²For instance, Immerman and Mackey (2003), Kertzer (2006), Derosas and van Poppel (2006).

¹¹³For instance, Cliquet and Maelstaf (1977), Lutz (1987), Schoenmaeckers and Lodewijckx (1999), Philipov and Berghammer (2007), Frejka and Westoff (2008).

¹¹⁴Hout et al. (2001), Kaufmann (2011, 100).

fertility rates several times higher than the modernist believers, resulting in considerable demographic expansion.¹¹⁵ In many cases fundamentalist movements or institutions are actively using their knowledge about the numerical (and ideological/political) effects of higher reproductive rates, inciting their followers to produce large numbers of children in order to demographically strengthen their position and outnumber the 'others'.¹¹⁶

Also, immigrants from developing to developed countries often have considerably higher, though gradually decreasing, fertility than the host populations¹¹⁷ and are substantially increasing their representation in the population, at least in the agglomerations where they concentrate. For instance, in a few decades Brussels—the capital of the European Union—will have a majority population of Muslims, unless the secularisation process is accelerated.¹¹⁸

The fertility differentials between different ideological groups can change the numerical representation in countries; however, in some cases secularisation can be a powerful counterforce, offsetting the religious fertility advantage.¹¹⁹ If the fertility differentials along the fundamentalist-secular gradient persist intergenerationally and are insufficiently compensated by secularisation, one may expect political and cultural implications. The greatest effect consists of a regressive cultural evolution regarding the achievements of modernity in domains such as scientific research, freedom of expression, individual self-actualisation, family planning, recreation, and rights of whoever fundamentalists consider to be undesirable or inferior such as atheists, women, homosexuals and apostates.¹²⁰

Inspired by recent studies showing that variation in spirituality/religiosity is partly determined by genetic factors, Robert Rowthorn¹²¹ raised the question as to whether the religious/non-religious fertility differentials might also have effects on the genetic composition of the population and the values it cherishes. Taking into account the findings of Laura B. Koenig and Thomas J. Bouchard,¹²² who suggest that a genetic predisposition towards religion is associated with obedience to authority and conservatism, Rowthorn concludes that the higher fertility of religious people will not only diffuse religiosity genes in the population but also the values to which they are predisposed.

However, the future might not look so gloomy for free-thinking people and so rosy for religious fundamentalists. Modernity possesses increasingly powerful educational and technological means—obligatory schooling followed by ever prolonging education, TV, Internet, ICT in general—that disseminate the equally strongly increasing scientific knowledge base about the origin of the universe, of

¹¹⁵For instance, Eaton and Mayer (1953), Nonaka et al. (1994), Greksa (2002), Hurd (2006), Kaufmann (2011).

¹¹⁶For instance, Pride (1985).

¹¹⁷Lesthaeghe et al. (1988), Schoenmaeckers and Callens (1992), Coleman (1994, 2006), Lesthaeghe and Surkyn (1997), Westoff and Frejka (2007).

¹¹⁸Schoenmaeckers and Callens (1992, 144).

¹¹⁹See also Kaufmann (2011, 259).

¹²⁰See also Kaufmann (2011, xxi), Longman (2004, 33).

¹²¹Rowthorn (2011).

¹²²Koenig and Bouchard (2006).

life and of humanity, as well as the causes and mechanisms of biological evolution, social progress and cultural innovation. All these things influence people in their thinking and behaviour in a progressing modernising world. Increasing secularisation, or at least liberation from the traditional ideological straitjacket, seems to be inevitable; this will also result in more and more people with a strong predisposition towards spirituality looking for other social, cultural and political solutions than the ones offered or imposed by fundamentalist branches of traditional religious institutions. Nevertheless, increasing efforts will have to be made to fight obsolete ideologies that may possess considerable financial means for propagating their outmoded ideas. Examples are the financial power of some oil-rich Islamic theocracies that support the spreading of fundamentalist Islam outside the Near East,¹²³ or conservative American Maecenas who support the spreading of creationist or intelligent design ideologies as so-called 'scientific theories', even resulting in the erection of museums that illustrate 'scientifically' the truthfulness of the biblical genesis story.¹²⁴

Effects on Sexual Behaviour. A major effect of modern, efficient contraceptive methods concerns their favourable influences on people's sexual life and satisfaction. The success of these modern methods is not only due to their efficacy in preventing conception but also their smaller or non-interference in coital behaviour. Those who have experienced the transition from the use of the traditional methods, such as withdrawal, periodical abstinence (and even mechanical methods), to the use of the modern, highly effective methods, such as oral contraception, IUD and sterilisation, testify how liberating those methods are. This is due to the reduction of the fear of unexpected pregnancy and in non-interference with lovemaking. This has been difficult to measure precisely because the users of modern effective methods have so much higher sexual expectations and standards than the users of traditional methods.¹²⁵

Familiarity with efficient control over fertility permitted or favoured other sexuality related processes: premarital sex became less risky; marriage could be postponed or temporarily replaced by other types of union formation.

It is difficult to evaluate with precision whether modern contraception has substantially contributed to the emergence or advancement of the so-called sexual revolution, but its effect is probably largely overestimated.¹²⁶ Effective contraceptives may have furthered premarital sex, they may have contributed to the spreading of consensual unions, they may have facilitated extramarital relations and the formation of new partnering, but sexuological research shows that the arrival of modern contraception was not associated with a considerable increase of sexual promiscuity.¹²⁷

¹²³See for instance Ludlow (1998), Menelik (2010).

¹²⁴See for instance, <http://www.answersingenesis.org/>; Numbers (2006).

¹²⁵Van den Bogaert (1976).

¹²⁶Antibiotic drugs may have had a more important influence in this respect (Sipe 1990).

¹²⁷For example, Spira et al. (1993), Laumann et al. (1994), Wellings et al. (1994).

Effects on Male Machismo Behaviour. One of the longer-term evolutionary effects of modern contraceptives might be that their use will gradually change the sexual behaviour and perhaps even the genetic composition of the male population.

Women can now efficiently control their fertility through the use of efficient contraceptives: this has freed them from the psychological pressures and physical burden of unwanted or untimed pregnancy, resulting in decreasing numbers of unwanted adolescent births, premature marriages, forced marriages, and excess fertility. Perhaps efficient contraception has also facilitated for women the choice of multiple partnership and extramarital relations. However, for promiscuous males, modern contraceptive methods are an 'evolutionary dead end': the gene-spreading effect of their behavioural pattern is strongly reduced, if not completely eliminated. In the long run, modern contraception will erase the genetic effect of the machismo of philandering males since extramarital affairs will no longer have reproductive effects. Indeed, modern birth control practices are completely changing the rules of the game. Whereas in earlier times sexual promiscuity and extramarital sex might have increased the reproductive fitness of philanderers, in the modern contraceptive society women can effectively protect themselves against the unexpected or undesired side effects of adultery, namely against births which would not be fathered by their chosen partner(s). The same holds true for aggressive males who in earlier times, particularly in wartime, succeeded in increasing their inclusive fitness by means of rape or slavery, but in modern society they can achieve no such advantages. When parenthood tends to concentrate amongst couples that establish enduring relations, this personality type will have the advantage, both genetically as well as culturally. The long-term Darwinian effect of differential reproduction should not be underestimated.¹²⁸ If men want their genes to be reproduced, they will have to adapt their sexual behaviour much more than in the past to the desires and needs of women.

8.3.2.2 Genetic Developments Related to Reproductive Behaviour in Modernity

So far, reproductive behaviour in modernity has had two types of effects on the genetic composition of modern populations: unintended dysgenic changes as a consequence of contraselective effects and intended genetic changes as a consequence of eugenic interventions.

Dysgenic Effects of Modernisation. Up until now modern culture has had two types of dysgenic effects on the human gene pool: (1) contraselective effects due to a reversal of social status linked differential reproduction, particularly with respect to cognitive skills; and (2) selection relaxation effects of medical replacement therapies for deficient or deleterious genes.

Reversal of Social Status Linked Differential Fertility. It is generally believed that the pre-modern era in human evolution and history was characterised by a slightly positive relationship between social status and reproductive success, either because higher status males succeeded in acquiring more mates, and/or because

¹²⁸Cliquet and Avramov (1998).

wealthier families possessed more material resources which slightly reduced mortality, in particular infant and child mortality.¹²⁹ According to Larry S. Milner,¹³⁰ the social class related differential fertility in medieval times was strongly related to the differential practice of infanticide. Hence, natural selection operated in pre-modern living conditions not so much via direct differences in fertility, but indirectly via mate selection or differential mortality.¹³¹

As mentioned in Chap. 5, Sect. 5.3.2.2, the slightly positive relation between social status and reproduction, which existed in pre-modern times, reversed during modernisation through the socially differential spread of birth control. The most developed and prosperous strata of the population generally came to control their fertility earlier and more effectively than the others.¹³² The fairly significant correlation between cognitive abilities, education and socioeconomic status, as well as direct observations on the negative relation between cognitive abilities and fertility¹³³ (Fig. 8.9), gave rise to the theory of contraselection. In this theory the view has been put forward that modernisation would be attended by a decline in cognitive ability.¹³⁴

Meanwhile, the negative association between fertility and socio-economic status (SES) indicators in industrial societies decreased quite substantially because birth control also became a common practice among lower educational and social status strata.¹³⁵ Some countries¹³⁶ even show the first signs of a possible return to a slightly positive relationship¹³⁷; this supports Frederick Osborn's¹³⁸ 'eugenics hypothesis' which states that when individuals have freedom to make fertility related choices, more children will be born in the most favourable home environments. This implies that the end of the demographic transition might be characterised by a positive association between reproductive fitness and socially valuable biological traits.

Nevertheless, many industrial societies still show a moderate negative relationship between fertility and a variety of SES indicators (Fig. 8.10). However, some studies show that men and women have a different relationship between SES

¹²⁹Retherford (1993), Chagnon (1997), Richerson and Boyd (2005), Gurven and von Rueden (2006), Nettle and Pollet (2008).

¹³⁰Milner (2000).

¹³¹Cattell (1972, 287).

¹³²Cochrane (1979), Vining (1986), Skirbekk (2007).

¹³³Cattell (1937, 1950), Vining (1986), Glad (2003), Shatz (2008), Retherford and Sewell (1988).

¹³⁴For instance, Graham (1970), Lynn (2001).

¹³⁵Kirk (1969), Weeden et al. (2006).

¹³⁶Kravdal (1992), Hoem (1993), Fieder and Huber (2007), Goodman and Koupil (2009; 2010).

¹³⁷In several countries there appears to be a sex difference in this reversing trend: whereas fertility is slightly positively related to men's educational level, it is still negatively related to women's educational level (cf. Hopcroft 2006; Weeden et al. 2006; Fieder and Huber 2007; Keizer et al. 2007; Nettle and Pollet 2008), or intelligence level (Retherford and Sewell 1988). This sex difference in reproductive outcome is probably due to the difficulties which career women experience when trying to combine motherhood with occupational aspirations (as Muller had predicted in the 1960s), and perhaps also because of the postponement of childbirth (Hewlett 2002; Kemkes-Grottenthaler 2003).

¹³⁸Osborn (1952, 1968), Osborn and Bajema (1972).

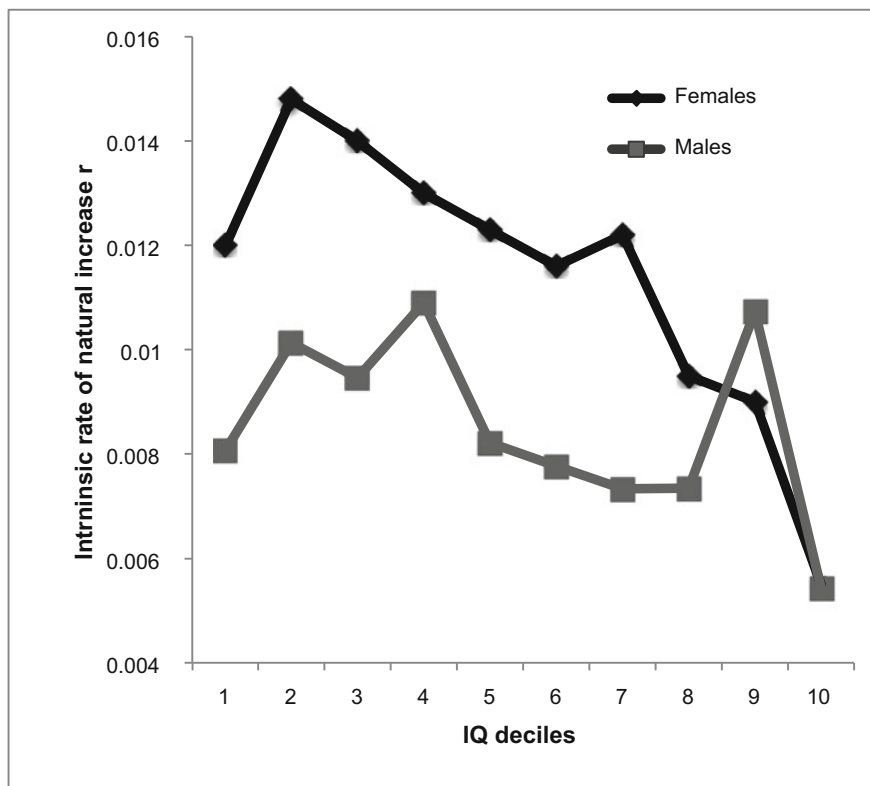


Fig. 8.9 The intrinsic rate of natural increase r by IQ deciles and sex, derived from the Wisconsin Longitudinal Study (based on Retherford and Sewell 1988)

indicators, such as educational level and income, and completed fertility or lifetime reproductive success. Whereas a flat or slightly positive relation is found for men, a more explicit negative association continues to exist for women.¹³⁹ In many countries considerable proportions of highly educated or professional women remain childless.¹⁴⁰ For instance, in Germany, a country characterised by a high rate of childlessness in general (about 25%),¹⁴¹ 40% of women with an academic degree remain childless.¹⁴² In the United States, between one third and one half of all high-achieving women have no children.¹⁴³ Apart from the long-term dysgenic effects that may be expected if this trend continues, there must also be unfavourable short-term social effects resulting from such huge proportions of voluntary

¹³⁹For instance, Hopcroft (2006, 2015), Fieder and Huber (2007), Nettle and Pollet (2008), Huber and Bookstein (2010), Barthold et al. (2012).

¹⁴⁰Kiernan (1989), Kirk (2001), Rowland (2007), Konietzka and Kreyenfeld (2007).

¹⁴¹Dorbritz and Schwarz (1996), Dorbritz (2008).

¹⁴²Weiss (2002), Duschek and Wirth (2005).

¹⁴³Hewlett (2002), Hopcroft (2006), Fieder and Huber (2007).

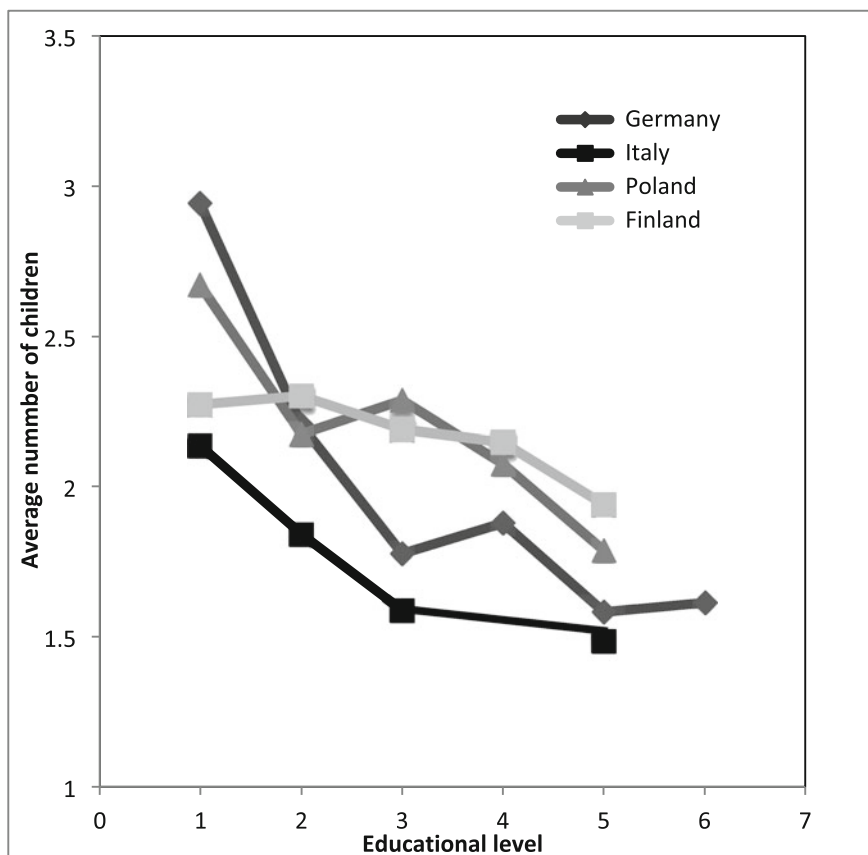


Fig. 8.10 Differential fertility by education of 40–65 year old women in selected European countries (Avramov and Cliquet 2008)

childlessness amongst the best educated and creative people who, one might suppose, are the able to provide a favourable social environment for raising children.

Overall, research indicates that the link between IQ and fertility in modern society seems to have had a slight dysgenic effect upon intelligence in the course of the twentieth century, even though birth control became a fairly generalised practice.¹⁴⁴ However, this is probably only a temporary consequence of a major shift in cultural development and its associated demographic regime. In the near future—namely in the course of this millennium—this dysgenic effect might be neutralised, if not reversed, by future improvements in genetic knowledge and genetic engineering, and the adaptation of norms to the new genetics and demographics. In particular, the low (or deficit) fertility of highly educated working women might be avoided if appropriate measures are taken in order to better reconcile work and

¹⁴⁴Retherford and Sewell (1988), Lynn and Van Court (2004), Lynn and Harvey (2008).

family life for women, and to better balance childcare and household chores between men and women.

Selection Relaxation. In modern culture humans have succeeded in efficiently intervening against disease and death, with the result that a considerable part of modern populations reaches a much higher age than in pre-scientific living conditions. As mentioned in Chap. 5, Sect. 5.3.2.2, the successful phenotypic care provided in modern culture leads to a relaxation of natural selection.¹⁴⁵ Alleles, which in pre-scientific living conditions were rapidly barred from the gene pool, are currently preserved thanks to replacement therapies or other protecting factors and in many cases their carriers are also able to reproduce. This results in the increasing frequency of such ‘weak’ alleles.¹⁴⁶ Furthermore, the selection relaxation caused by mortality control, just as with morbidity control, may be reinforced by an increase in reproductive fitness. Surviving individuals may find a partner or partners and produce children. Although many congenital defects are known to result in lower marriage rates, in infertility or are associated with low fertility,¹⁴⁷ the effect of modern culture is that, through replacement therapies, mating and reproductive opportunities for those with genetic disorders are improving.¹⁴⁸

The quantitative effect of selection relaxation depends on several factors: the relationship between mutation pressure and the degree of relaxation, the effect of replacement therapy on reproductive fitness, and the mode of inheritance (dominant, recessive or polygenic).¹⁴⁹ Computer simulations show that for all types of inheritance the increase in allele frequency is very slow, especially for recessive alleles or polygenic conditions, for which the most deleterious alleles are hidden in heterozygous combinations.

Eugenic Effects of Modernisation. There are two major types of eugenic effects of modernisation. The first one pertains to the general dissemination of modern birth control practices; the second is related to the development of genetic counselling.

Eugenic Effects of the General Dissemination of Birth Control Practices. As explained above, the demographic transition was initially characterised by strong differentials in birth control practices according to various indicators of social status (educational level, income, prestige, etc.). The increasingly positive association between social status and cognitive abilities in modern democratising societies, and the positive relation between social status indicators and birth control, leading to negative relations between those indicators and fertility, resulted in the theory of the contraselective (= dysgenic) effects of modernity. However, as modern birth control practices spread throughout the population, particularly with the development of effective contraceptives in the second half of the twentieth century (= the second contraceptive transition), the initially strong fertility differentials considerably

¹⁴⁵Crow (1966), Cavalli-Sforza and Bodmer (2013).

¹⁴⁶Dobzhansky (1962), Monod (1970, 179), Thibault (1972).

¹⁴⁷Reed (1971), Slater et al. (1971).

¹⁴⁸Teitelbaum (1972).

¹⁴⁹Cavalli-Sforza and Bodmer (2013).

decreased and can even be expected to level out or even slightly reverse, as can be observed in the most advanced modern countries.¹⁵⁰ Hence, to the extent that a sound modern contraceptive (and educational) policy succeeds in reaching all people in the population, fertility differentials will no longer depend on the lack of knowledge or availability of means to control one's fertility, particularly among the less able, less educated, or underprivileged strata of the population.

Eugenic Effects of Genetic Counselling. Thanks to the explosive development of human genetics and biotechnology, present-day genetic counselling dispenses an increasing diagnostic and therapeutic toolkit, going from traditional genetic pedigree analysis, through biotechnological identification methods, to contraception, genetic-selective abortion and medically assisted fertility¹⁵¹: this increasingly allows the conception or birth of offspring with genetic impairments to be prevented through parental choice, and in more and more cases it allows couples to choose to have disability-free offspring. The rapid progress in molecular genetics will soon broaden medical genetics with the revolutionary tool of germinal therapy; this will make it possible to treat sex cells with recombinant DNA in order to genetically alter germline cells, so as to replace unfavourable genes with desired genes.¹⁵² Medical genetics has a eugenic effect at the individual and family level and, if sufficiently available in society, also at the population level.¹⁵³ For instance, it is estimated that the new national screening policy for Down's syndrome in Denmark will make the country Down's free by 2030 as a result of parental choice.¹⁵⁴

8.3.3 Ethical Reflections Regarding Qualitative Reproductive Issues

As could be expected from the preceding discussion, ethical dimensions of qualitative aspects of reproductive behaviour need to include two complementary domains of action: phenotypic (= eugenics) and genetic (= eugenics).¹⁵⁵

The authors use the classical concepts of eugenics and eugenics to label those domains of action. Eugenics¹⁵⁶ refers to actions that improve people's functioning and well-being by altering their environment and living conditions. A subdomain of eugenics is eugenics, which aims to directly influence the phenotype rather than the genotype.¹⁵⁷ Although the concept of eugenics was originally defined by Francis Galton¹⁵⁸ as "the science which deals with all the influences that improve

¹⁵⁰Kravdal (1992), Hoem (1993), Fieder and Huber (2007).

¹⁵¹Mashiach et al. (1990), Robertson (1994), Gardner et al. (2004).

¹⁵²Wheale and McNally (1988), Friedmann (1998), Stock and Campbell (2000), Stock (2002).

¹⁵³For instance, Holloway and Smith (1975), Devore (1992), Bernhardt et al. (2000), Castellani et al. (2009).

¹⁵⁴Ekelund et al. (2008); <http://www.ncregister.com/daily-news/the-fight-to-eliminate-down-syndrome-eugenics-at-work/#ixzz3cB9OyiXB>.

¹⁵⁵Huxley (1964), Cattell (1972), Calman (2004).

¹⁵⁶Eugenics = from Greek: *euthenein*: thrive, flourish. See for instance, Richards (2011).

¹⁵⁷Lederberg (1960).

¹⁵⁸Galton (1883, 1905).

and develop the inborn qualities of a race to the utmost advantage”—implying that it includes both genetic and environmental actions to improve human-specific traits—it is usually interpreted as actions that aim to transmit favourable genetic characteristics—at the individual, family or population level—to future generations. Most people in scientific and lay circles choose to forget that eugenics implies also environmental actions.

Many people hesitate or even refuse to use the concept of eugenics due to excesses of the early, so-called ‘Mainline Eugenic Movement’,¹⁵⁹ and particularly because of the political and criminal abuse of the concept and practice by the Nazi regime in Germany during the 1930s–1940s.¹⁶⁰ Often eugenics is (wrongly) interpreted as attempts by the state to improve, whether or not via coercive measures, the genetic composition of the population.¹⁶¹ In order to distinguish individual from social efforts to influence or change the genetic transmission of particular genetic characteristics, Julian Savulescu¹⁶² devised the concept of procreative beneficence which aims to produce the best child, of the possible children, a couple could have. Although the authors understand the concern of Savulescu to create a distance from a concept that has been utterly abused, changing words does not alter the contents of a premise. Likewise, the authors do not reject all the ethical concepts of Christianity and socialism because they have also been utterly abused in some phases of human history.

¹⁵⁹See Kevles (1985).

¹⁶⁰See for instance Saller (1961), Klee (1983), Müller-Hill (1984, 1988), Kaiser et al. (1992), Glad (2006, 65–74). Contrary to what many scholars and commentators argue (for instance, MacKellar and Bechtel 2014, 19–21), Nazism had nothing to do with a genuine eugenic policy. The Nazi rhetoric on eugenics was absolute hypocrisy, a cover for other politically motivated actions that had no eugenic effect at all, and in some cases had precisely the opposite, namely a dysgenic effect. The indiscriminate sterilisation of people with genetic impairments was scientifically unfounded (cf. Dahlberg 1948). The euthanasia of handicapped people had no eugenic repercussions. Most of the victims were seriously ill, were institutionalised and had no opportunity to transmit their genes intergenerationally. The aims of this policy were apparently more of an economic than a biological nature. With respect to the promotion of the so-called Aryan race, the Nazi policies were likewise deceitful because this so-called Aryan race does not exist as a biological entity. In so far as the German population was associated with the Nordic variant of the Caucasian race, there was not a single scientific argument or proof for the alleged biological superiority of this population-genetic variant. Also, the extermination policy toward the Jews had nothing to do with eugenics. On the contrary, by driving the more intelligent Jews and other valuable intelligentsia away as emigrants to other lands, or by eliminating them in concentration and death camps, Nazism in fact had a dysgenic effect, comparable to the persecutions of prominent thinkers by the Catholic Inquisition in the late medieval and early Renaissance eras. The intellectual superiority of the Jewish population was well known to the Nazi geneticists and anthropologists (cf. Lenz, in: Bauer et al. 1936). The Jewish achievements and intellectual capability were apparently a thorn in the flesh of the Nazis. The Shoah (or ‘holocaust’) was in fact a ‘final solution’ to the problem of competition with a socially creative and successful population group that was a traditional scapegoat in Christian Europe in times of crisis. Unfortunately, many people associating or confounding eugenics with Nazism do not read German, do not know the relevant literature, choose to ignore it, or do not critically think about the facts.

¹⁶¹For instance, Young (2006).

¹⁶²Savulescu (2001, 2009).

In an excellent reassessment of eugenics, Richard Lynn¹⁶³ rightly states that it is quite unusual to reject a theory that is essentially correct. He sees the increasing precedence accorded to individual rights over social rights as the fundamental cause of the decline of eugenics in the later decades of the twentieth century—a phenomenon which he perceives as causing the rejection of eugenics and increasing the acceptance of individual rights in many other domains of life. Lynn's explanation about the shift from social to individual rights is absolutely correct, but this shift is probably also linked to two other twentieth century phenomena, namely the social abuses of authoritarian regimes (fascism, Nazism, communism) and the lopsided environmentalism that dominated the social sciences.

The recent strong development of molecular genetics and biotechnology in general has evoked an explosion of scientific and ethical-philosophical-religious publications, pro and contra, on what is now called the 'new eugenics',¹⁶⁴ or even 'neugenics'.¹⁶⁵

8.3.3.1 Euthenic Reproductive Goals

In a modern(ising) context, with its strong mortality control, the promotion of birth control is a necessity. The degree to which births should be controlled—limited or enhanced—depends on the well-being of the children to be born, of the families that raise them, and of the population that supports them. The degree to which births are controlled also depends on the quality and sustainability of their environment in which they will grow up.

Promoting Contraception. From a modern perspective emphasising the need to promote the practice of birth control in the sense of reducing fecundability to zero in some life stages looks like kicking down an open door. However, despite the considerable progress that has been made in recent decades, there is still a substantial unmet need, particularly in developing countries. In the modernised countries there are still unmet needs among vulnerable population groups, such as adolescents, less able or less educated people, immigrants coming from developing countries and poor people, concerning both knowledge and the availability of modern, effective contraceptives. In many developing countries the unmet need still reaches levels that were typical of the advanced countries in their early demographic transitional phases at the beginning of the twentieth century.¹⁶⁶ We still face the fact that important ideological institutions, in particular the Roman Catholic Church, oppose the use of modern, effective contraceptives. The recommendations of the United Nations World Population Conferences of Bucharest (1974), Mexico City (1984) and Cairo (1994)¹⁶⁷ have not yet been put into practice all over the world or for all population categories.

¹⁶³Lynn (2001); see also Paul (2014).

¹⁶⁴Paul (1998), Habermas (2001), Lynn (2001), Duster (2003), Agar (2004), Glad (2006), Sorgner et al. (2006), Pope Benedict XVI (2009), Turda (2013), MacKellar and Bechtel (2014).

¹⁶⁵Selgelid (2014, 6).

¹⁶⁶Westoff (2006), The World Bank (2010), United Nations (2011), Darroch (2013), Darroch and Singh (2013).

¹⁶⁷"All couples and individuals have the basic right to decide freely and responsibly the number and spacing of their children and to have the information, education and means to do so." (United Nations 1975; 1984; 1994).

Legalising Induced Abortion within the Framework of an Effective Contraceptive Policy. Several types of intervention—sexual abstinence, contraception, induced abortion and infanticide—have traditionally been used to achieve birth control. There is a very simple biological reason why fertility limitation should primarily be achieved by using contraception: whenever there is a choice, intervention in biological processes should always be given preference to the minimalistic intervention.¹⁶⁸ Hence, contraception is preferable to induced abortion. Infanticide, as a practice of pre-modernity, has virtually disappeared as a means for limiting the family size.

As a means for controlling fertility, induced abortion is clearly a sign of failed contraception. Nevertheless, induced abortion has been legalised in modernised societies within the framework of a birth control policy that aims to reduce that type of intervention to a residual minimum. To be effective it needs to be set up in an educational framework of pre- and post-pregnancy counselling about abortion and contraception in which, however, the woman is free to decide by herself.¹⁶⁹ Empirical analyses about induced abortion practice and prevalence show that legalisation of abortion in the framework of an effective contraceptive policy succeeds in reducing abortion practice to a minimum.¹⁷⁰ In fact, legalising abortion reduces this practice much more than prohibitive measures and criminal prosecution. However, principled opponents of abortion care more about their principles/prejudices than about the actual positive outcome of legislative regulations.

Selective abortion, in cases of foetal or maternal health indications, is discussed below as an aspect of eugenics.

Enhancing Fertility? A minority of people—individuals or couples—cannot have children naturally, for instance, subfecund couples, single people and homosexual unions. Modern methods of medically assisted reproduction, as well as adoption, can increasingly help such people to satisfy their desire to have and raise children. There can be no doubt that such individuals or couples may be excellent parents.

However, in each of those cases there are arguments for applying due diligence measures in which the well-being of the children should be of primary concern. For instance, in the case of subfecundity, care is necessary in order to avoid medically assisted fertility interventions causing unfavourable genetic or ontogenetic effects on the offspring.

In a modern, technologically strongly, developed and million sized population context, society can deal with diversity in parenthood models including single parents and homosexual couples. However, since we are still a bisexual species in which children have an interest in having a father and a mother, the lone

¹⁶⁸Opponents of contraception will argue that the minimalistic rule in fertility control would imply that preference should be given to sexual abstinence over contraception. However, in the authors' view, sexual abstinence is a much more profoundly intervening and disturbing intervention in an important biological process—sexuality—than modern methods of contraception.

¹⁶⁹Cliquet and Thierry (1972), Staatscommissie voor de Ethische Problemen (1977).

¹⁷⁰Ketting en Van Praag (1983), Faúndes and Barzelatto (2006).

mother/father or homosexual parental couple may be expected to remain a minority phenomenon.

Avoiding Excess Fertility and Excessively High Fertility. Due to inadequate contraceptive policies, many societies are still confronted with more or less high levels of excess fertility—pregnancies or births that are not wanted.¹⁷¹ Obviously, a child may not be wanted at conception but it does not mean that it is not loved later on. However, excess fertility increases chances that all children may not receive sufficient care and support. Given the high developmental and educational standards that modern societies pursue, it goes without saying that excess fertility, resulting in parents having more children than they want, because they have no access to effective contraception, should be avoided.

Modern(ising) societies are, despite the progressing demographic transition towards low fertility, also confronted with an important residue of very large families—say five or more children. The (very) large family system is largely a remnant of the transition from a pre-modern to a modern demographic regime. In pre-modern living conditions people begot many children, but many of them did not survive the infant or juvenile stage. In modern living conditions, due to infant mortality control and social protection, large families can flourish thanks to the greatest altruistic system—the welfare state—that human societies have ever devised. As Richard Dawkins¹⁷² argued:

What has happened in modern civilized man is that family sizes are no longer limited by the finite resources which the individual parents can provide. If a husband and wife have more children than they can feed, the state, which means the rest of the population, simply steps in and keeps the surplus children alive and healthy....we have abolished the family as a unit of economic self-sufficiency, and substituted the state.

Nevertheless, the phenotypic features of children from (very) large families often contrast less favourably with children from small or moderate family sizes.¹⁷³ One cause is the less favourable living conditions in large families, particularly in families with low income, where there are simply not enough material means as well as parenting time available to meet the increased educational standards of modernity. Another cause is that people with weak personality characteristics, low cognitive skills, or low education do not succeed in adequately mastering their fertility. Both phenomena—unfavourable living conditions and biosocial assortment—often coincide.

A specific problem is population groups that continue to achieve high fertility because of their (usually religious fundamentalist) ideology that rejects so-called unnatural contraceptive interventions in their reproductive potentials—conveniently forgetting that the welfare state, which finances their high fertility, is equally unnatural. Some groups also want to expand their influence and power through demographic expansion to the detriment of the well-being of women and often

¹⁷¹For instance, Lodewijckx (1988), Tsui et al. (2010), Finer and Zolna (2011).

¹⁷²Dawkins (1976, 125).

¹⁷³Terhune (1974), Bossard and Boll (1975), Cliquet and Balcaen (1983), Desai (1995), Redmond (2000), Rodgers et al. (2000), Bradshaw et al. (2006).

children as well. This is a particularly thorny problem, because the proposition that such groups should lower their fertility to the average level of the general population might be interpreted as interfering with the principle of personal freedom. There is, however, the much more important issue that they compete in a domain that is no longer adaptive. The real competition in meritocracies is in cultural, social or economic domains typical of the novel environment of modernity. The seemingly moral principle professed by some ideological groups for achieving the biological maximisation of inclusive fitness principle in a modern(ising) environment is actually a form of maladaptive behaviour—it decreases chances of children to succeed. Some even call it immoral, as it may be regarded as denial of the opportunity to control fertility and non-assistance of socially vulnerable persons through the denial of knowledge and opportunity.

The demographic expansionism of religious fundamentalists in modern societies is largely possible due to the ideological and materialistic acquisitions of modernity (ideological pluralism and tolerance, infant and maternal mortality control, control of contagious diseases, generous social transfers), the very essence of which is in fact challenged by unsustainable fertility levels maintained through moral in-group pressure or denial of access to knowledge and means.¹⁷⁴

8.3.3.2 Eugenic/Transhumanist Goals

In the science based eugenic literature,¹⁷⁵ as well in the more recent transhumanism literature,¹⁷⁶ three major human qualities can be identified that are subject to eugenic action: cognitive abilities, emotional personality characteristics that facilitate altruism and sociability, and mental and physical health. Ultimately, this comes down to what has been defined here as the enhancement of the hominisation process.¹⁷⁷ (See also Chap. 5, Sect. 5.3.2.4.) Indeed, both the eugenics and transhumanist proponents express considerable concern about the genetics of future generations: firstly, to avoid harm to our descendants; secondly, to improve their capabilities to adapt to future potential cultural developments and to push those developments to higher levels of performance. Eugenics/Transhumanism favours a long-term evolutionary perspective¹⁷⁸ in which, as Jonathan Glover states “equal weight is given to people’s interests, whichever generation they belong to”.¹⁷⁹

Indeed, eugenics/transhumanism aims to transfer to the genetic and intergenerational domain what we already do in advanced societies in the domains of biomedical care and educational training: promoting the development of human-specific features, such as intelligence, morality (sociability, altruism,

¹⁷⁴See also Kaufmann (2011, 259).

¹⁷⁵Galton (1883), Muller (1935), Crew et al. (1939), Osborn (1940; 1968), Sutter (1950), Blacker (1952), Bajema (1976), Lynn (2001), Sorgner et al. (2006).

¹⁷⁶For instance, Mehlman (2003), Agar (2004), Bostrom (2004), Miller and Wilson (2006), Savulescu (2009), Savulescu and Bostrom (2009), Knoepffler and Savulescu (2009), Buchanan (2011).

¹⁷⁷Cliquet (1961; 1997–1998, 2010).

¹⁷⁸See also Cattell (1972), Elgin (1993), Rees (2003), Glover (2006); <http://longnow.org>.

¹⁷⁹Glover (1984, 140).

honesty, etc.), physical attractiveness, physical performance, sexual satisfaction, longevity, and health in general, thereby extending our concerns from the intra-generational to the intergenerational domain, from phenomic care to genomic care. So far, conscious human intervention has mainly been limited to phenotypic care and improvement, for instance through intragenerational intervention. Intergenerational intervention, particularly by using genetic manipulation, requires a generation transcending ethics and policy. Such an ethical orientation and policy programme would allow the human species to control not only its demographic growth and phenotypic development but also its genetic composition—in other words, its future evolution. This proposition may, at the beginning of this century, sound quite daring, if not scary, just as at the beginning of the twentieth century quantitative birth control was feared and vigorously opposed. However, from a longer-term perspective it is difficult to imagine that the human, once the technical know-how has been mastered, will not try to avoid genetically determined diseases and promote genetic features that are considered socially desirable or advantageous such as cognitive ability, sociability, physical attractiveness, and mental and physical health in general.

In the domain of human reproduction, the twentieth century was characterised by the massive shift from chance to choice in matters of quantitative birth control, whereas the twenty-first century might see the rapid shift from chance to choice in matters of qualitative birth control. Eugenics/Transhumanism is essentially aiming to replace the rather crude natural selection by a more humane cultural selection.¹⁸⁰

Limiting Dysgenic Features or Trends. The human gene pool is continuously undergoing mutations. Most of these mutants have detrimental effects on the organism.¹⁸¹

In modern culture therapeutic practices produce, through selection relaxation, contraselective effects which maintain, or even reproductively increase, alleles in the gene pool that are less favourable for the physical or mental health or for the

¹⁸⁰ It is perhaps useful to remind the reader the sense in which the concept of selection is used: it is Darwinian or reproductive selection, i.e. the differential choice of particular characteristics (or their alleles, genotypes, or genomes) over other variants for transmission to future generations.

¹⁸¹ According to recent studies (e.g. Giannelli et al. 1999; Nachman and Crowell 2000) the mutation rate in a human zygote is estimated to range between 128 and 175 mutations per diploid genome per generation; one out of three is estimated to be deleterious. Each individual carries five to seven lethal recessive genes (Muller 1950; Cavalli-sforza and Bodmer 2013; Larson 2002). Humans are estimated to have approximately 21,000 genes which can lead to abnormal phenotypes when mutating (OMIM 2017). Some of the genetic mutations are relatively minor or are amenable to treatment; others result in death or serious disability. This genetic load manifests itself partly in each generation by genetic impairments, most of which are eliminated in the very early stages of embryonic development as miscarriages or stillbirths. Some five per cent of newborns are born with a visible congenital impairment. Some other genetic diseases, such as Huntington's chorea, develop at a later stage in the life course. Most congenital impairments are genetic in origin, namely they are caused by some defect in the DNA of the carrier. In pre-modern living conditions, the mutational load was kept constant over succeeding generations by natural selection through the immediate or delayed elimination of deleterious alleles. Rare favourable mutations, in contrast, were preserved and spread through the increased reproductive fitness of their carriers and resulted in increased adaptiveness, which contributed to further hominisation.

social integration of their carriers. These ‘saved’ genes are added, in each generation, to newly arising mutations: slowly but systematically the population’s mutational load therefore increases.¹⁸² Whilst modern culture increases (through therapeutic interventions) the phenotypic adaptability of previously deleterious or harmful alleles,¹⁸³ a primary aim of eugenics is still to avoid genetic deterioration through an increase in less favourable genetic variants and to preserve the more favourable genetic variants in the gene pool.¹⁸⁴

The arguments that eugenic action is inevitable¹⁸⁵ are as follows. In the long run, the accumulation of culturally (medically) preserved and reproduced deleterious genes together with the newly arising natural mutations in each generation would lead to a situation in which most, if not all, individuals in the population are endowed with innumerable hidden and conspicuous genetic defects; these would require such a scale and variety of medical treatment and social care that it would consume a lot of society’s resources, leaving no surplus for other social or cultural needs.¹⁸⁶ Eventually, euphenic correction of the (increasing) genetic load would not be sufficient to guarantee the maintenance of mental, social and physical health at the population level, therefore eugenic intervention would have to be undertaken.

Modern culture also manufactures products that contain or emit ionising radiation and some molecules that have mutagenic effects which increase the mutational load in the human gene pool.¹⁸⁷ It is clear that eugenics aims to prevent the increase of the mutational load due to the use of such harmful products.

Finally, eugenics endeavours to change the trend toward dysgenic differential reproductive practices through which less desirable genetic variants of socially important continuous characteristics, such as low cognitive ability and some negative emotional personality characteristics, succeed in increasing their representation in subsequent generations.¹⁸⁸

All procedures to limit dysgenic features aim to alleviate unnecessary human suffering and in James Neel’s¹⁸⁹ words:

Protect the gene pool against damage.

An argument that is sometimes invoked for preventing or limiting dysgenic developments is the fact that, in addition to the multiple psychological and physical suffering genetic impairments provoke for affected individuals, such impairments involve considerable costs to families and society as a whole.¹⁹⁰ In the authors’ view, cost of are in terms of money is a relatively weak argument, considering the

¹⁸²Muller (1960).

¹⁸³Dobzhansky (1962; 1967).

¹⁸⁴Huxley (1964).

¹⁸⁵For instance, Carlson (1973).

¹⁸⁶Muller (1960).

¹⁸⁷Obodovskiy (2015).

¹⁸⁸For instance, Buchanan et al. (2000), Lynn (2001), Savulescu (2001).

¹⁸⁹Neel (1970, 820).

¹⁹⁰See also the discussion in MacKellar and Bechtel (2014, 126–128).

huge financial resources modern societies have (and choose to spend and gamble away on very objectionable purposes such as military expenses).

Promoting Favourable Genetic Features. Modern societies must adapt to a rapidly changing environment, in which a high premium is being placed on high intelligence, creativity and energy. On the one hand such societies require individuals with high cognitive abilities and creativity in order to adapt to the rapidly changing social and technological environment; on the other hand individuals need high intelligence and creativity to be able to cope with the challenges of modern culture and to take advantage of the new opportunities for self-fulfilment.¹⁹¹

The continued development of culture toward levels and depths so far unseen, but conceivable, could be advanced by increasing key human faculties—cognitive abilities, sociability, and mental and physical health and longevity—to still higher levels which are beyond the present variation. This would allow the human species to have a deeper insight and understanding of itself and of nature in general; to further improve its mastery of the biological, physical and social environment; and to reach higher levels of well-being, both at the individual and the societal level, and increase the survival chances of the species. Thus, eugenics might contribute to this drive for mastery in the development of future stages of culture as, for instance, envisaged by Duane Elgin¹⁹² or by the transhumanist movement with their visions of the future transhuman and posthuman.¹⁹³

Once the direction of human evolution is set culturally and the social and medical techniques for acting upon that evolution have been developed, a number of individuals or even entire societies might attempt to genetically programme their offspring as favourably as possible. As we succeed more and more in treating and eliminating diseases and disabilities, it may also be expected that we will increasingly be inclined to take a preventive approach to ill health. Moreover, it is entirely possible that genetic engineering will not remain restricted to avoiding pathological situations, but will be broadened to improve ‘normal’ characteristics such as cognitive performance, memory, emotional life, sociability, physical attractiveness, sexual arousal and performance, and other desired human characteristics.

However, it is not impossible that some people will try to promote other, socially less valuable features such as, for instance, aggressivity. This raises the question of the relationship between the individual and the population. New biotechnologies will enable individuals and families to apply a kind of ‘home-made eugenics’¹⁹⁴ in which they can decide on the type of children that they want to have. The dangers with this ought to be recognised, as already argued above in Chap. 5, Sect. 5.2.3.4. Society must ensure that parental choices do not harm the future well-being of their descendants or of society as a whole. In this respect Thomas Douglas and Katrien

¹⁹¹Bajema (1971).

¹⁹²Elgin (1993).

¹⁹³Bostrom (2004), Miller and Wilson (2006), Harris (2007), Savulescu (2009), Savulescu and Bostrom (2009), Knoepfler and Savulescu (2009), Buchanan (2011) (see also Chap. 6, Sect. 6.2.3.4).

¹⁹⁴Kevles and Hood (1992).

Devolder¹⁹⁵ pertinently argued that procreative selection should not only focus on the well-being of the own offspring but should also take into account the effects on the well-being of others. Hence, the principle of ‘procreative beneficence’¹⁹⁶ should be complemented or accompanied by what they call the principle of ‘procreative altruism’—a principle that was already implicitly embedded in the ‘old eugenics’ through its emphasis on promoting genetic predispositions to sociability.

A specific problem related to human variation in a further progressing modernisation concerns the perspective of the ability to produce, in a not too remote future, probably already in this century, identical genetic copies of individuals by cloning. This technique, already applied in an experimental stage on animals, consists of producing offspring from a somatic cell. This asexual reproduction results in an individual which is genetically identical to the provider of the somatic cell. There already exists an extensive literature on the advantages and disadvantages, and more particularly on the ethical implications of cloning.¹⁹⁷ It is no surprise that bioconservatives are fiercely opposed to cloning.¹⁹⁸ In the context of the present discourse, there is only one aspect that is relevant to the discussion: to what degree would cloning affect human variability and the future hominisation process? The answer clearly depends on the degree to which cloning would be practiced and replace sexual reproduction. Whereas the cloning of exceptionally talented individuals might have positive effects on the short-term biological and cultural future of humanity, this practice must be discommended at the population level because, when massively practiced, it would reduce biological variability and counteract the advantages of genetic recombination linked to sexual reproduction.¹⁹⁹

Objections to Eugenic Goals. The authors perceive four major objections to the pursuit of eugenic goals²⁰⁰: (1) objections related to recent historical events and developments; (2) objections of a religious or philosophical nature; (3) fears about increases in inequality within populations; and (4) fears about the position of people with disabilities. They are partly similar to the objections to the transhumanist goals described in Chap. 5, Sect. 5.3.2.4.2.

Objections Related to Recent Historical Events and Developments. These objections pertain to phenomena such as the coercive nature of earlier eugenically intended interventions, the class and race biases of some of the earlier eugenic movements, and especially the political and criminal abuse of the eugenic ideology in Nazism which, in reality, pursued practices that had nothing to do with eugenics or were even dysgenic in nature.²⁰¹ However, none of the science-based eugenic or

¹⁹⁵Douglas and Devolder (2013).

¹⁹⁶Savulescu and Kahane (2009).

¹⁹⁷Silver (1998), MacKinnon (2001), Mackintosh (2012), Craig (2012), Philip and Cherian (2013).

¹⁹⁸For instance, Cole-Turner (1998), Kimbrell (1998), Annas et al. (2002), President’s Council on Bioethics (2003); see also article 11 of the UNESCO Universal Declaration on Bioethics and Human Rights (2005).

¹⁹⁹See also Glover (1984, 2003, 2006), Glannon (2001, 132).

²⁰⁰For a more detailed overview of arguments supporting and opposing eugenics see, for instance, MacKellar and Bechtel (2014, 120–183).

²⁰¹See footnote 162, p. 379.

enhancement treatises consider between-population genetic differences as one of the goals to be pursued. Eugenics and enhancement proponents are only interested in specific individual characteristics and their prevalence and intergenerational transmission within populations, which are independent of between-population-genetic differences. Nevertheless, some authors continue to suspect or warn against a possible hidden racialism in eugenic endeavours.²⁰² Although it is, indeed, quite likely that people will express population-genetic and even cultural ‘in-group’ concerns or preferences for normal traits in their choices of partners or germ donors for disease replacing or health promoting eugenic interventions,²⁰³ in-group drives need to be taken into account—but they are not drivers of eugenics and, hence, should not be used as an argument against eugenic endeavours or practices.

Objections of a Religious or Philosophical Nature. The religious objection relates to the belief that the human species is the result of a divine creation of which humans are not entitled to usurp this supernatural power (see also Chap. 5, Sect. 5.3.2.4). However, considerations that are not purely religious, for instance, secular philosophical conceptions about human nature or human dignity, may also evoke concern or even opposition to any intergenerational genetic enhancement or betterment of the human species. Such religious and/or philosophical convictions probably lie at the basis of statements as can be found in the Council of Europe *Convention for the Protection of Human Rights and Dignity of the Human Being with Regard to the Application of Biology and Medicine*,²⁰⁴ in which article 13 stipulates that “an intervention seeking to modify the human genome may only be undertaken for preventive, diagnostic or therapeutic purposes and only if its aim is not to introduce any modification in the genome of any descendants”. This position is a typical example, not only of an extremely conservative point of view but also a complete lack of a broad, intergenerational vision of life as a dynamic, evolving phenomenon.

The Equality Question Revisited. As argued earlier, the equality question (see also Chap. 5, Sect. 5.3.2.4) is often raised by many opponents of human enhancement or eugenic policies because of the fear that they will widen the gap between haves and have-nots.²⁰⁵

However, it cannot be stressed enough that eugenic endeavours will first of all favour people with higher risks of genetic impairments, less abilities or capabilities to master their fertility and raise children in the best possible conditions—at least if eugenic policies were developed at the population level—thereby achieving improved health and well-being for all. Thus, the first major effect of a eugenic policy is its levelling effect on inequalities by the elimination of heavy genetic impairments that are an important cause of inequality and inequity.²⁰⁶

²⁰²For instance, Roberts (1997), Russell (2010), Phelan et al. (2013).

²⁰³For instance, Hanson (2001, 294).

²⁰⁴Council of Europe (1999).

²⁰⁵Sandel (2009, 74), Mehlmán (2003), Wolbring (2006).

²⁰⁶Bostrom (2003).

Moreover, the importance of between-individual differences should be reiterated, and in particular the existence of higher abilities in some individuals which have occurred throughout history, and will more than ever be of importance for the further progression of human culture and well-being. The well-being of the biologically less endowed or less able depend largely on the presence and opportunities of the genetically privileged. Consequently, as Raymond Cattell wrote in his *Beyondism* several decades ago:

We should accept individual difference with appreciation and admiration rather than envy.²⁰⁷

Last but not least, it should be recalled that eugenics is not only concerned with the genetic constitution of individuals but also the population, and even the human species as a whole. The purpose of eugenics is to push human-specific characteristics towards the higher tail end of their frequency distribution.

The Disability Question Revisited. The disability question is another one of the major social objections by bioconservatives against human enhancement. It is necessary to reiterate the fallacy of the arguments of the disability rights campaigners²⁰⁸ who reject what Julian Savulescu and Guy Kahane²⁰⁹ call the Selection Against Disability (SAD) View (see also Chap. 5, Sect. 5.3.2.4). Because of the ramifications of the positions taken by disability activists and bioconservatives for the ethics of intergenerational reproduction, the authors dwell somewhat more in detail on the pending controversies.

When addressing the disability question, we should first of all try to understand the origin of this phenomenon. In each generation the genes in a reproductive community are recombined in genotype combinations some of which appear to produce phenotypes that show more or less serious disabilities, due to new unfavourable mutations or hidden deleterious alleles from former generations. In addition to genetically caused malformations, accidents during the early ontogenetic development (or even during later phases in life) can further increase the prevalence of disabilities. Most serious forms of disabilities are eliminated by natural selection in early (pre- or postnatal) stages of ontogenetic development²¹⁰—and also in many pre-modern cultures by direct or indirect infanticide.²¹¹ However, some impairments succeed, particularly in the medically and socially highly protective environment of modernity, in surviving the conception or pregnancy stage. As a branch of preventive medicine, eugenics simply wants to correct the imperfect and inhumane action of natural selection by using a more efficient and more humane cultural selection, by choosing that part of the initial biological variation that has optimal chances to live a healthy life; this is selected from the biological

²⁰⁷Cattell (1972, 379).

²⁰⁸For instance, Kass (2002), Wolbring (2003), Sandel (2007), Garland-Thomson (2012).

²⁰⁹Savulescu and Kahane (2009).

²¹⁰Taking into account all prenatal losses (early losses, clinically recognisable spontaneous abortions and stillbirths), it is estimated that more than two thirds of conceptions end in intrauterine mortality (Hertig 1967; Léridon 1973; Macklon et al. 2002).

²¹¹For instance, Williamson (1978), Birdsell (1986).

(genetic and ontogenetic) variability that becomes visible at reproduction in each new generation. Since we have to severely limit the number of births anyway, at least in a modern context of successful mortality control, we might want to choose the better genetic genomes to constitute the next generation.

In other words, in the knowledge-based and humane oriented era of modernity it would be immoral to take an indifferent attitude towards the genetic and phenotypic diversity that results from our phylogenetic heritage. In its present early stage of development, modernity is clearly still in a transitional phase. Whereas in pre-modern living conditions disability problems were largely resolved in a 'natural' way, namely through spontaneous early mortality and/or non-intervention, now, thanks to the increasing resources for medical and social assistance and knowledge about phenotypic care, modern culture succeeds in substantially prolonging the life expectancy of heavily disabled people; however, this is not always done by redressing their impairment to levels of higher quality of life. In the future, as biomedical sciences progress further, the perspective exists that it will be possible to prevent the development of genetic impairments, and even to largely correct impairments arising during the life course. The development of a disability ethics²¹² needs take biological evolutionary and cultural historical developments into account.

Advocates for the rights of the disabled oppose eugenic prenatal testing and the choice of selective abortion because they think that disability is part of the identity of the disabled person and that life with severe disability is worthwhile, or they believe that all diseases are part of the diversity of the human experience.²¹³ Feminist disability theorist Rosemarie Garland-Thompson²¹⁴ even considers a disability as a potentially generative resource rather than an unequivocally restrictive liability. Many scholars perceive here a fundamental difference in valuing life: whereas disability activists give priority to equal and inherent dignity and worth of all human life, eugenists give priority to quality of life for all human beings.²¹⁵ However, disability activists confuse moral equality with functional equality.

Disability activists not only completely lack insight into the evolutionary origin of congenital causes of disability, they also make no distinction between caring for people who were born with or acquired serious physical or mental impairments and correcting prenatally such impairments. Efforts to care for people with significant limitations, giving them equal opportunities and integrating them into society, should not be a reason for opposing endeavours to prevent the development of genetically or ontogenetically caused severe impairments: unfortunately, this distinction is not always made in disability rights discussions.²¹⁶ In fact, it can be

²¹²Glannon (2007).

²¹³Rock (1996), Wolbring (2000; 2003).

²¹⁴Garland-Thompson (2002; 2012).

²¹⁵For instance, Adorno (2010, 140).

²¹⁶For instance, Amundson and Tresky (2008).

observed that people, when able to choose, a large majority prefer the avoidance of disability.²¹⁷ Most people, indeed, are very eugenic minded and behave accordingly, whenever they have the opportunity to do so and as far as they have not been indoctrinated otherwise.

As argued earlier, wherever modern science develops, disabled people are the first to take advantage of the scientific progress in reducing the suffering linked to disabilities. Fortunately modern science also increasingly succeeds in reducing—by prevention—the prevalence of disabilities.²¹⁸

Disabled people and disability rights advocates should acknowledge that modern science is progressing in its endeavours. Not only are suffering and disability being relieved somewhat but also there is success in preventing more disabilities: disabled people know so very well, on the basis of their unfortunate experience and suffering, how much such a condition can poison one's life and prevent one from experiencing the normal joys of a disability-free existence. The old-time 'Golden Rule' should also be applied here and ethically guide people and especially the disability rights campaigners.

The conclusion of Calum MacKellar and Christopher Bechtel in their book *The Ethics of the New Eugenics* state that "...a compassionate civilised society should learn to accept all possible future children in an environment that reflects its unconditional and equal acceptance of the suffering as well as the happy child". While accepting the inevitable and ensuring care for the misfortunate is laudable, the conclusion of these authors follows from a number of salient *lakunae* in their overall scientific evaluation of the problem, as well as from a number of propositions resulting from traditional philosophical or theological tenets which are no longer well adapted to the novel environment of a further progressing modernity. The authors' main objections to those authors rejecting prevention of disability are as follows:

- The total lack of consideration of present scientific knowledge about causes and consequences of evolutionary mechanisms and processes;
- The lack of any reflection about the confrontation of those evolutionary mechanisms and processes with the novel environment of modernity, which increasingly allows people to control life processes and to avoid the miseries of the genetic and other life event lotteries to which they can be exposed;
- The lopsided and limited consideration of concerns of an individualistic nature, with total neglect of population (societal) or intergenerational dimensions;
- The oversimplified conceptualisation of life characteristics and potentialities by opposing, as mutually exclusive alternatives, equal and inherent dignity and worth of all human life versus quality of life and reduction of suffering, both of which should be thoughtfully taken into consideration. (Opposing 'equality/dignity versus quality of life' as mutually exclusive alternatives is a

²¹⁷For instance, Evers Kiebooms (1987), Haddow and Palomaki (1996), Baruch et al. (2008).

²¹⁸Hughes (2004, 12).

typical example of dualistic thinking, probably a remnant of traditional religious ways of conceiving matters of life and death);

- The conviction about the superiority or the one and only nature of the own worldview (in casu, favouring compassionate equality/dignity principles at the cost of enhancing health and quality of life of each human being), as if an alternative or divergent worldview (in casu, prioritising quality of life) could not equally be a sign of a civilised compassionate society. (Identifying equality/dignity values and norms as signs of ‘civilised’ societies is not only a very lopsided ideological position but also shows a salient lack of humility. It is a typical expression of cultural in-group thinking);
- The disregard of the fact that earlier abuses of eugenics had nothing to do with a scientifically based eugenics. (These abusers’ views were largely inspired by ‘in-group’—nation, race, religion—considerations, whereas a scientifically based eugenics is concerned with the future of the human species as a whole);
- The lack of a broad time perspective in which the dynamics of changing viewpoints and experiences in the fast changing environment of modernity are duly taken into consideration (For instance, in the early decades of the twentieth century, quantitative birth control was initially rejected by virtually all of the renowned and respected political, military, and religious establishment; but in the course of that century, opinions and behaviours evolved towards a general acceptance and application of quantitative birth control. In the present century, the same change might occur regarding qualitative birth control);
- The denial of the reality that people are different, are being valued differently, are being paid differently, are being hierarchically classified according to their societal functions and performances, and that modern societies are organised and functioning on the basis of sorting and selecting procedures all the time and in every societal domain—in the educational system, in the labour system, for sport performances, and scientific and cultural output. (Evoking opposition between the equality/dignity principle and the quality principle in the domain of reproductive behaviour is a typical example of equivocal thinking, whereas this is not done in all other domains of social life);
- The view that the current ‘civilised’ opinion about the equality/dignity principle would have been largely inspired by traditional (i.e. Christian) values and norms associated with altruism and compassion for others, thereby benevolently ignoring the possibility that this principle might mainly be the result of individualistic selfishness resulting from concerns about the application of sorting and selective procedures to ourselves.

8.3.3.3 Eugenic Methods

There are three dimensions to be addressed in the choice of eugenic methods to be used: (1) level of intervention: individual and/or population; (2) type of eugenic approach: negative or positive eugenic interventions; and (3) type of technique to be used: reproductive behavioural strategies and/or eugenic engineering.

Individual and/or Population Eugenic Strategies. Eugenic action can be limited to targeting individuals or families, identified on the basis of pedigree analysis, who have a larger than a population risk of transmitting undesirable genetic traits. This is what is currently practiced in genetic counselling centres at universities or hospitals where parents with suspected hereditary defects are advised and possibly medically assisted on parenthood. Eugenic action can, however, be broadened by applying population level screening methods in order to identify at the population level the presence of undesirable genetic variants and apply reproductive or biotechnological procedures to prevent the intergenerational transmission of those variants (e.g. screening for sickle cell anemia).

Whereas in the domain of genetic counselling individual (or family) eugenic counselling is quite generally accepted and applied, population approaches are often met with more reluctance.²¹⁹ Part of this opposition might be due to the inherent practical difficulties (cost, organisation) of this approach, but some opposition might also be of an ideological nature—resistance against risk of abuse of social engineering policy approaches.

From an evolutionary point of view that is, by definition, focused on the human species, eugenic strategies should be targeted both at the individual and the population level of organisation. Furthermore, several of the major evolution derived ethical principles—the ontogenetic developmental principle, the equality principle, and the quality principle (see Chap. 5, Sect. 5.3.3.1–5.3.3.3)—point in the same direction.

Negative and/or Positive Eugenic Interventions. Negative eugenic methods consist of interventions that are aimed at preventing the transmission of unfavourable genetic traits; positive eugenics wants to enhance the frequency of favourable genetic variants.

Negative eugenics can make use of choice/change of partner, sexual abstention, contraception, genetic-selective abortion, and prevention of industrial practices (use of ionising radiation or of particular mutagenic molecules) that increase the mutational load in the population. Positive eugenics seeks to favour the transmission of desirable characteristics, either through the stronger reproduction of carriers of alleles for such characteristics, or through the use of biotechnological procedures such as medically assisted fertility interventions or, in the future, germinal engineering.

It should be stressed that negative and positive eugenic interventions are not to be seen as alternatives, but as complementary strategies. Hence, it should be negative *and* positive measures, instead of negative *or* positive ones. Although radical opponents to eugenics usually reject both strategies, many geneticists and ethicists who take a more moderate position towards eugenics more often favour negative eugenic measures than positive ones.

Reproductive Behavioural Strategies and/or Eugenic Engineering. The distribution of the genetic variants in a population can be changed through differential reproduction of the carriers of those variants—but only within the existing

²¹⁹For instance, de Jong and de Wert (2015, 49).

range of variation—and/or by methods of eugenic engineering that might in the future also transcend the upper border of the presently existing variation. The first strategy is sometimes called ‘the old eugenics’, whereas the second one is referred to as the ‘new eugenics’.

Reproductive Behavioural Strategies. In modern, democratic society with its increasing social assortment and intergenerational social mobility of available talents in the population, via educational selection systems and job recruiting procedures based on the principle of excellence, the genetic background of those talents—in particular intelligence, sociability and health characteristics—are differentially assorted over the different functional social strata (see Chap. 7, Sect. 7.3.2). In most modern societies the social and educational stratification is still negatively related to reproductive behaviour, although in the course of the progressing demographic transition (and the second contraceptive transition) the reproductive differentials have tended to decrease and level out.

From a eugenic as well as a cultural point of view, the ideal would be to have the existing negative relation between social/educational stratification and reproduction changed into a positive one.²²⁰ Culturally, of course, it is necessary to enhance equal opportunity policies to buffer the negative effects of the genetic lottery.

People with genetic variants contributing to higher cognitive abilities, sociability and health characteristics should not have to encounter barriers in the work place which prevent them from having children. In the short run, facilitating the combination of parenthood with high creativity and social achievements in science and society would have positive cultural effects; in the long run it could also have favourable effects on the genetic composition of the population, despite the inhibitory effects of deleterious mutations, intergenerational recombination of genetic variants, and non-homogamous partner choice. A positive association between social/educational stratification and reproduction would also have a euthenic effect: more children in homes with better environmental opportunities.²²¹

There are multiple means to achieve such a reversal in reproductive behaviour, but the most important are probably the dominant value and norm systems that should be changed through educational efforts and modernisation of ethics in the work place. Fertility research shows that highly educated women often want more children than they actually have, but are confronted with deficit fertility due to their long studies, their high professional responsibilities, and their geographical mobility leading to the absence of grandparental, other family and social support.²²²

Eugenic Engineering. A completely different, but in no way opposite, strategy consists of biotechnological interventions. This includes the current compensation for or correction of individual genetic or ontogenetic impairments and also

²²⁰Whereas Cattell (1972, 392) is in favour of fitting the birth rate to earnings in order to ensure a generally positive eugenic trend, the present authors would rather favour a positive relationship between educational level and reproduction. Earning differences may be partially an outcome of educational differences, but individual wealth is often determined by factors other than personal qualifications or performances.

²²¹Cattell (1972, 348).

²²²Abramov and Cliquet (2003, 2005, 2008), Hočevar and Čerňič Istenič (2010).

improving, at the population level, the (genetic or ontogenetic) capabilities of ‘normal’ characteristics such as intelligence, sociability, physical attractiveness, sexual performance, physical abilities, longevity, and health characteristics in general—the essential aim of the transhumanist movement.

Eugenic engineering, now sometimes called reprognetics,²²³ includes micro-engineering medical techniques that influence the transmission of genes to the next generation or future generations via procedures such as medically assisted fertility or germinal gene therapy.

Medically assisted fertility is already comprised of a number of techniques which positively intervene in the generation of an embryo: artificial insemination by donor (AID), ovum donation, in vitro fertilisation (IVF), embryo transplant, embryo selection, and sex choice.²²⁴ Whilst some of these methods may be intended for countering infertility—a disorder that is, however, not always genetic—all of them can be used to replace unfavourable characteristics and have genetic effects.

The discovery of the structure of the organic molecules responsible for genetic transmission (DNA) by Watson and Crick in 1953, together with the emergence of molecular genetics with its applications in biotechnology, undoubtedly provides the means for the future development of germinal gene therapy. This is the technique in which sex cells are treated with recombinant DNA in order to genetically alter germline cells to replace unfavourable genes with wanted genes.²²⁵ Whilst changes to somatic cells affect only specific cells within a given organ system and are not passed on to future generations, germline changes affect every cell in the body and are passed on to future generations.

The genomic era of medicine began in 2003, fifty years after the first description of the structure of DNA, when the Human Genome Project completed the sequencing of the human genome.²²⁶ Knowledge about the normal and pathologic variation for all human genes will allow the diagnosis of genetic diseases and in the future it will lead to effective treatments for them, particularly at the level of the genes themselves. It is generally acknowledged that, at the present stage of development of applied human genetics, human germline therapy is still too risky.²²⁷ However, the recently developed powerful genome editing technique—known by the acronym CRISPR-Cas9—opens up promising perspectives for fast advances in the field of human gene therapy.²²⁸ Nevertheless, researchers have also expressed the necessity to progress this with prudence so that genomic engineering and germline gene modification can be performed safely and ethically.²²⁹

²²³Silver (2000, 375).

²²⁴Mashiach et al. (1990), Robertson (1994), Gardner et al. (2004).

²²⁵Wheale and McNally (1988), Friedmann (1998), Stock and Campbell (2000), Stock (2002).

²²⁶Guttmacher and Collins (2003).

²²⁷Reiss and Straughan (1996), Stock and Campbell (2000), Stock (2002).

²²⁸Doudna and Charpentier (2014).

²²⁹Baltimore et al. (2015), International Summit on Human Gene Editing (2015), Doudna and Sternberg (2017).

As already explained in Chap. 5, Sect. 5.2.3.4.2, in their anti-enhancement crusade, bioconservatives are particularly opposed to germinal gene therapy²³⁰ but their arguments have been amply refuted by enhancement proponents.²³¹ Contrary to what is sometimes envisioned, eugenic engineering will not harm future diversity and evolvability of the human species, but will “ensure rather than undermine its health and longevity”.²³²

8.3.3.4 Eugenics: Who Decides?

A preliminary remark concerns the general social climate in which a eugenic policy can be developed. Sometimes, eugenics is labelled as a right wing, reactionary, conservative ideology that seeks to preserve the prerogatives of the ruling upper classes. It is true that a large part of the early twentieth century pseudo-eugenicist movement was class and race biased. However, the later science-based eugenics, as developed in what some historians now call ‘reform eugenics’ was promoted by socially minded scientists such as Havelock Ellis, J.B.S. Haldane, Julian Huxley, Hermann Muller and Frederick Osborn—all of whom advocated the improvement of the stock of the human species through selective breeding.²³³ Even Francis Galton’s principal successor in eugenics, Karl Pearson, was a ‘Darwinian’ socialist.²³⁴

Prominent eugenic thinkers, such as Hermann Muller, Julian Huxley, Frederick Osborn, Jean Sutter, Raymond Cattell and Carl J. Bajema,²³⁵ were even of the view that it would be impossible to achieve eugenic goals in societies that were based on *laissez-faire* economics or authoritarian regimes. Democracy, guaranteeing personal freedom and a humanistic individual development by having a generous social protection system, was considered a necessary condition for sound and humble eugenics.²³⁶ Socially motivated eugenicists also strongly favour female emancipation²³⁷ and the widespread availability of birth control.²³⁸ As has been seen in Chap. 5, Sect. 5.2.3.4, the transhumanists also attach great importance to democratic and generous social policies as a basic condition for achieving their eugenic goals.

Coercion versus free choice in the application of eugenic measures is one of the oldest debated ethical issues in the history of eugenics. This problem is not specific to eugenics because it applies to many other areas of social life, especially medical practice, but in the case of eugenics it always entails intergenerational implications.

²³⁰For instance, Kass (2002), McKibben (2003), Mehlman (2003), President’s Council on Bioethics (2003), Sandel (2007), Sutton (2012).

²³¹For instance, Fletcher (1974), Lyon and Corner (1995), Walters and Palmer (1997), Stock (2002), Baylis and Robert (2004), Glover (2006), Allhoff (2008), Lindsay (2008), Potter (2010).

²³²See, for instance, the discussion in Powell (2012).

²³³Paul (1998).

²³⁴Kevles (1985).

²³⁵Muller (1934), Huxley (1936, 1962), Osborn (1940), Sutter (1950), Cattell (1972), Bajema (1972).

²³⁶Osborn (1940).

²³⁷For instance, Muller (1960).

²³⁸For instance, Osborn (1940).

Individual decision-making—sometimes called liberal eugenics²³⁹—is often both opposed to and favoured over state regulated eugenics,²⁴⁰ although both are identical in intentions in that they decide about the enhancement of other people.²⁴¹ Both individuals and states may make mistakes, although it must be admitted that the mistakes of governments can have much more serious consequences than those of individual citizens.²⁴²

An ethical dichotomy—individual free choice versus social (state-regulated) compulsory application of eugenic practices—is too simplistic a view of the ethical approach towards eugenics. In fact, it is possible to see a broad spectrum of gradually differentiated positions between these two extreme positions. At the one extreme—free choice—individuals may receive non-directive genetic counselling and make autonomously informed decisions about their future reproductive behaviour. The role of the genetic counsellor is defined as that of a neutral, non-judgemental information provider rather than a decision maker—a definition that would, according to Alison Pilnick,²⁴³ enjoy widespread agreement amongst genetic counsellors in the United States.²⁴⁴ At the other extreme—compulsory eugenics—individuals (identified as having a genetic risk) are required to participate in genetic counselling or screening and are, in cases of a diagnosed individual or family risk, obliged to follow legal provisions such as sterilisation or abortion.

A variety of other, more nuanced positions are possible in between these two extremes. For instance, whilst leaving the ultimate choice, in principle, to the patient, genetic counsellors could exert ‘soft coercion’²⁴⁵ or ‘persuasion’²⁴⁶ in convincing the patient to follow the counsellors’ advice or decision. This viewpoint means that counsellors could positively interfere in the decision-making process in the interest of the patients, their families, and society overall.²⁴⁷

Compulsory rather than individual free choice might, but should not necessarily, be more common where the approach to eugenics is more socially oriented than individually or family oriented. In principle, however, all possible ethical positions regarding eugenic practices could be applied both in individually and socially oriented eugenics. It appears that when people can choose, a large majority select the avoidance of disability in their offspring.²⁴⁸

The best solution would probably be to (1) favour an educational/agogic approach—informing and motivating future parents to consider possible eugenic effects in their reproductive decisions; (2) promote or impose obligatory genetic

²³⁹For instance, Habermas (2001), Agar (2004), Sparrow (2011).

²⁴⁰For instance, Agar (1998), Savulescu (2001), Bostrom (2003; 2005), Glover (2006).

²⁴¹Sorgner (2009).

²⁴²Bostrom (2005, 206), Glover (1984, 48).

²⁴³Pilnick (2002).

²⁴⁴See also the position of the Board of Directors of the American Society of Human Genetics which affirms its commitment to the fundamental principle of reproductive freedom and unequivocally declares its opposition to coercion based on genetic information (Reilly 1999).

²⁴⁵Bajema (1971).

²⁴⁶Savulescu (2001).

²⁴⁷Staatscommissie voor de Ethische Problemen (1976).

²⁴⁸For instance, Evers-Kiebooms (1987), Haddow and Palomaki (1996).

counselling/genetic screening; (3) keep in principle the ultimate decision as a right but also as a responsibility of individuals; and (4) set societal limits to genetic choices which could harm the children's well-being.

A particularly difficult issue arises in cases where patient(s) are (develop)mentally or socially incompetent to make a free and responsible decision about having children when there are high genetic risks. However, this question applies not only to cases where there are genetic risks but also to many other domains of social life (e.g. inheritance, parenthood in general, medical interventions, euthanasia). In the current stage of modern cultural development, the effects of the ideology of individualism on education policies and medical practice, as well as attitudes toward eugenics, cause disputes amongst professionals and the public at large.

Another disputed issue is the question as to whether parents have the right to choose the sex of their offspring—a question that is, strictly speaking, not a eugenic issue (see also Chap. 6, Sect. 6.3.3.2). Sex, indeed, is not a disease, but why should parents who already have one or more children of the same sex not be allowed to satisfy their 'king's/queen's wish' and have a child of the opposite sex? At the social level, this issue is clearly more a question related to sex relations and demographics: in some societies, where discriminatory attitudes toward girls are still prevalent, this may result in serious distortions of the sex ratio, as is, for instance, currently experienced in China and India.²⁴⁹ It is understandable that many feminists fulminate against the practice of sex selection instead of focusing on social discrimination of girls and women.

Another series of ethical problems in eugenics concerns the issue of informing the patient about his/her risks of developing a genetic disorder²⁵⁰ or his/her risks of transmitting the disorder to offspring. An even more tricky issue concerns the question as to whether relatives should be warned, possibly against the patient's wishes.

Related to the issue of the right to genetic privacy is the question of informing third parties, for instance with regard to job recruitment. Employers, both in the public and private sectors, have an interest in recruiting healthy employees who have a low risk of suffering from a long-term disease. Medical examinations are now a common part of the normal selection procedure for some long-term jobs. With the increasing possibilities of identifying the presence of genes that, in time, could cause unfavourable phenotypic effects, the question arises as to whether genetic screening procedures should be included in recruitment medical examinations.²⁵¹ This problem also emerges in the case possibly using genetic test results in insurance, with the risk of insurance clients being treated unfavourably on the basis of their genetics.²⁵² This question already exists for health conditions in general, since many insurance contracts are contingent on the absence of known phenotypic health risks.

²⁴⁹Johansson and Nygren (1991), Arnold et al. (2002).

²⁵⁰For example, with regard to Huntington's chorea, see Elger and Harding (2003).

²⁵¹For instance, Draper (1991), Rothstein (1995).

²⁵²For instance, Joly et al. (2003), Zick et al. (2005), Wilkinson (2010).

It is understandable that germinal engineering often meets with more opposition and requires a more cautious approach than somatic engineering. Eugenics not only plainly contradicts the traditional conception of the creation of human life but it also has implications for the genetic composition of future generations.²⁵³

Implementing demographic selection poses several delicate problems, mainly related to the type of demographic method used to achieve the aims—such as partner choice, fertility, generation length and mortality. Whilst expanding personal freedom and opportunities in partner choice could have positive genetic effects,²⁵⁴ the increasing claims for sexual and reproductive rights for all—including people with severe handicaps²⁵⁵—might have adverse effects if these rights are not combined with responsibilities and obligations for kin and society to assist these parents and their offspring.

Genetic selection by the means of mortality involves the delicate problem of induced abortion. Although a majority of countries in the world have already adopted laws liberalising pregnancy interruption for therapeutic reasons, including foetal indications, abortion will remain a controversial issue for some time, at least in those countries that have not yet modernised their legislation²⁵⁶ or in countries where pro-life lobbyists actively try to reverse the existing pro-abortion legislation.

Achieving a differential fertility raises the problem of the methods to be used: free choice, education or coercion. In a value and norm system that prizes the enhancement of individual emancipation and autonomy, only free choice and education can be advocated. However, what happens if free choice and education cannot help? What are the social and intergenerational implications when the most educated and best trained citizens prefer to practise art or science, or to pursue other lifestyles, rather than raise children? What if persons with low cognitive skills cannot learn to realise that fertility limitation contributes to their own well-being, the well-being of offspring and the well-being of society? Some have expressed the opinion that in a number of cases soft coercion cannot be excluded²⁵⁷ or that active intervention by educational authorities, welfare workers and public health workers is necessary.²⁵⁸ In the authors' view much discussion, reflection and ethical consideration is still pending on these issues.

Now that opportunities for the qualitative control of births and deaths are increasing with the development of biotechnology, a societal debate on the limits to the use of these powers is inevitable and absolutely necessary. It is to be expected that the initial discussion of this will include a profound ideological debate, confrontation and political struggle. Although biotechnology is still in its early stages, it has already given an enormous impetus to the development of bioethics. Whereas there can be differences in views about the methods to achieve the eugenic goals, there should be no dispute as to the goals themselves.

²⁵³Stock (2002).

²⁵⁴Epstein and Guttman (1984).

²⁵⁵United Nations (2006).

²⁵⁶United Nations (1995).

²⁵⁷Bajema (1971).

²⁵⁸Staatscommissie voor de Ethische Problemen (1975).

From an evolutionary-based ethical point of view, it is essential that in matters of genetics, not only the interests and well-being of the individual making choices but also the health and welfare at the population level are considered; but above all, attention should be given to the well-being of future generations.

8.4 Complementarity of Quantitative and Qualitative Reproductive Goals

At first sight, the reader might be confused by the apparently opposite recommendations concerning quantitative and qualitative reproductive behaviour in a further progressing modernisation.

Indeed, on the one hand the authors argue in favour of quantitative birth control, bringing fertility levels (temporarily) below replacement level in countries or regions that are still confronted with high population growth or density, which prevents them from reaching the developmental levels of the most advanced nations in the world. On the other hand the authors advocate creating conditions and opportunities for creative and productive people to have children. This may seem to be a salient paradox.

However, on the one side fertility research has extensively documented that a high proportion of births are unwanted among people who do not know how or have no access to modern contraception; on the other side research has documented that high proportions of highly educated childless women had never decided not to have children. They have encountered obstacles in combining their careers with having children. Both outcomes, excess fertility and childlessness, raise the question of equality of opportunity.

Furthermore, it is not contradictory to simultaneously argue in favour of limiting fertility to replacement levels, or even decreasing temporarily fertility to below-replacement levels, as well as arguing for the maintenance of a variance in fertility within a certain range. From an ethical point of view, well adapted to the living conditions of a further progressing modernisation, there is no contradiction in promoting a quantitative birth limitation policy and a qualitatively oriented fertility policy—just as there is no contradiction between a policy favouring enduring partnership (via marriage or consensual union) and the legislation facilitating divorce, or between an educational policy avoiding abortion and the legalisation of abortion.

Changing the genetic composition of a population (the gene pool of a population) is a matter of differential reproduction, which is independent from the observed or desired demographic growth model. A qualitatively focused differential reproduction can be achieved in a demographically shrinking, stationary, or expanding population.

What are the chances that the quantitative birth control of the twentieth century will be perpetuated and generalised at a world scale, leading to a decrease in the world population (in view of developmental and ecological goals), and be complemented by a qualitative control (in view of enhancing the human-specific potentialities)?

There can be no doubt that those two population goals will be strongly opposed in some circles.

With respect to quantitative birth control, many politicians and economists still cherish (explicitly or implicitly) the old-time population growth ideology: they are not able to adapt to the novelty of modernity, or to see political, economic and ecological phenomena interacting at a planetary level. Fierce opposition to a (temporary) population decrease can also be expected to come from ideological groups, and particularly from religious groups, who still want their in-group to multiply and “fill the earth”, conveniently forgetting or denying that the Earth is already overcrowded and plagued by excessive inequalities.

Opposition to the qualitative control of reproduction may be expected to come from some of the major traditional religious ideologies who continue, very selectively, to oppose cultural interventions on ‘God’s creation’. However, opposition can also be expected from some modern political ideologies such as liberalism that is predominantly focused on the individual; or socialism that cannot free itself from its nineteenth century (then justified) focus only on the deprivations of the least privileged classes; or some feminist fractions that perceive a menace from male dominance in every innovative intervention in the domain of reproduction.

Nevertheless, the shift to a qualitative control of births is already underway, pursued by individuals and couples who want to avoid the transmission of genetic impairments. In the future, when germinal engineering becomes available, many prescient people will certainly also endeavour to enhance ‘normal’ features of their offspring—just as individuals and couples started in the twentieth century controlling the number of their conceptions or births before the established ethical-religious and political rulers approved it.

It could well be that some cultures or regions in the modernising world will progress faster on this path than others. For instance, it would not come as a surprise that the modernising nations that are under the influence of the Eastern philosophies would progress much faster in adopting qualitative population policies than the countries which developed under the aegis of the Mediterranean religions. This might occur despite the fact that, as a consequence of the Enlightenment and the development of science, these countries initiated the eugenic, transhumanist and other qualitatively oriented ideologies. In the end, and as an intermediate stage, Raymond Cattell²⁵⁹ might be partially or temporarily right with his idea of ‘co-operative competition’ as a grand experiment of deliberately setting up bioculturally diversified groups.

Hence, ‘evolutionaries’²⁶⁰ will have to make considerable efforts to disseminate their ideas and convince ethicists, religious institutions and especially policy makers about the utility of the two population goals to be pursued in the domain of reproduction: decreasing numbers and increasing capabilities of people.

²⁵⁹Cattell (1972, 106).

²⁶⁰Stewart (2008).

Abstract

In this last chapter the major conclusions from the individual chapters in this book are summarised and integrated. The chapter closes with a section about the need to reconcile traditional and modern ideologies. It is argued that the evolutionary approach is a good way to bring together religious and secular ideologies in order to reflect upon and develop a new global ethics focussed on a long-term evolutionary perspective. It systematises the questions that need to be addressed regarding the values and norms to be adapted and shaped for the future successful enhancement of human potentialities conducive to further hominisation.

9.1 Ideological Conflicts in the Modern World and the Need for a Universal Ethic

In this book it is argued that, at the start of the third millennium, the populations living in the modernising environment are confronted with ideological clashes between traditional religious supernaturally revealed moral codes, modern secular ideologies that assign to humans the responsibility for developing ethical standards, and findings from science that are posing new challenges both for religious and secular worldviews. Furthermore, ideological conflicts are observed within as well as between states.

Both the traditional religions and the current secular ideologies are considered by the authors to be partly inadequate to deal with the ethical problems of humankind in modernity and to safely guide the human species through new subsequent stages of biological evolution and cultural development. The traditional religious

ideologies of the pre-scientific era, which fulfilled an important survival function, are in many respects no longer well adapted to the novel environment of modernity and its exigencies for further human biological evolution and cultural development. The modern secular ideologies approach moral dilemmas and challenges in modernity in a strongly fragmented and often conflicting ways promoting only vested interests of specific groups. They usually lack a vision about the long-term future and focus on single issues or specific population groups. They underachieve in applying or even strengthening moral principles and practices at the interpersonal levels.

It is argued that dealing with the ethical challenges of humankind in modernity, and considering future opportunities opened up by science and technology, necessitates a universal morality that transcends the in-group foundations of religions and blends the fragmented secular ideologies. Religions claim universality but in fact they are in-group institutions concerned with winning over and enlarging the pool of the faithful. The universal morality of the third millennium needs to transcend in-group institutions, be it religious or secular. Evolution science can, in the context of a further progressing modernisation, provide the framework for reflecting upon and developing such a comprehensive ethic. The emergence and development of evolution science, with its consecutive Darwinian Revolution, Modern Evolutionary Synthesis, Second Darwinian Revolution and molecular revolution, provides a solid, naturalistic basis for embedding values and norms in order to secure a safe and progressive future ontogenetic development and phylogenetic evolution of humankind. Knowledge about the hominisation process provides an evolutionary indicator that makes it possible to distinguish future alternative directions in which humanity could evolve and make rational choices about the future trajectory to opt for. Likewise, the characteristics of the modernisation process make it possible to differentiate between various possible future orientations and make knowledge-based choices about the desirable directions to pursue.

Reflections about the value and norm changes needed, from a progressing evolutionary perspective, to adapt to the opportunities and challenges of a further evolving modernisation process, will need to be elaborated on the basis of the confrontation of the hominisation process with features of the modernisation process.

9.2 Evolution-Based General Ethical Goals for the Future

For any future of humankind the general evolution derived prerequisites are the preservation of ecological sustainability and the cultural furtherance of the modernisation process.

The central goal that the authors argue should be set is the phylogenetic enhancement of the hominisation process.

General derived goals are: the ontogenetic development of human-specific potentialities; the promotion of quality of life; the promotion of equal opportunities; the shift from strongly competitive toward more cooperative relations; and the promotion of universalism.

9.2.1 Preservation of Ecological Sustainability

Humanity is in a critical stage due to the disruptive human impact on life and the environment of this planet. It is facing serious, anthropogenically caused, ecological challenges such as overpopulation, overconsumption, abuse or depletion of natural resources, environmental pollution and climate change, and decimation of biodiversity.

The commitment to a long-term ecological sustainability is considered a *sine qua non* for the survival, the long-term development and the further evolution of the human species on this planet. Crucial components of the physical environment need to be preserved such as inhabitable and arable land, water, and climate. On the one hand we are in competition with many other life forms; on the other hand the human species vitally depends on the existence of other life forms for breathing, nutrition, digestion, and even for more subtle psychological needs. The priority ranking of the ecological goal as one of the two ethical prerequisites for the future development and evolution of humankind is, from an evolutionary perspective, fully justified.

9.2.2 The Cultural Furtherance of the Modernisation Process

An essential component of a future evolution-based morality concerns the fact that the modernisation process is a positive achievement of humankind, despite some of its temporarily unfavourable but corrigible side effects. The idea of a further progressing cultural furtherance, which would spread all over the world, has been challenged by the hypothesis of some scholars who argue in favour of the development of multiple modernities. However, the authors are of the opinion that the latter can only be a temporary or intermediate stage in the future cultural development of the human species, because the modernisation process is mainly driven by the progress of sciences which are the most powerful unifying element and universal mediator in modern culture.

The justification for the choice of a progressing modernisation is based on the fact that modernity is not only the current apogee of the cultural trajectory the hominins have achieved over time but also that it succeeded, better than any of the previous cultural stages, in mastering extrasomatic threats, satisfying human needs and achieving unprecedented high levels of welfare and well-being. Hence, the furthering of the modernisation process, in its enlightened or matured form, is considered as a priority goal of an evolutionarily founded ethical approach.

9.2.3 Phylogenetic Enhancement of the Hominisation Process

The central goal of the evolution-based ethics proposed here consists of the phylogenetic furtherance of the hominisation process for the long-term future of humanity, ultimately resulting in the evolution of posthuman stages. It is an old idea that, in recent years, has been actively revived by the transhumanist movement.

The rationale for choosing a further progressing hominisation goal is that the past direction in human evolution is characterised by a process of increasing evolutionary complexity that has resulted in an enlarged potential to understand the world, to adapt better to environmental diversity and challenges, to master our own biology and our environment, to increase our survivability and longevity, to satisfy our needs and desires, and to reach higher levels of quality of life, welfare and well-being. The extrapolation of this process will enable a further increase in the human-specific potentials and, through them, further enhance the well-being of humans. It is assumed that an evolved hominin stage beyond the present *Homo sapiens sapiens* stage might put future humankind into a better position to cope with the cosmic, biological and sociocultural challenges which will confront it in the future.

9.2.4 The Ontogenetic Development of Human-Specific Potentialities

Human ontogeny not only depends on its phylogenetic heritage but also on the physical, biological, social and cultural environment in which it develops. It can be subject to considerable variation, going from a minimal to a maximal development.

The evolutionarily founded central goal—the enhancement of the hominisation process—implies that not only can the ontogenetic development of human-specific potentialities be achieved at its highest possible level, but also that the further ontogenetic enhancement of human-specific features can be pursued at that highest level for more if not all people.

9.2.5 The Promotion of Quality of Life

Just as the nature of the phylogenetic goal in an evolutionarily embedded ethic—the enhancement of the hominisation process—defines the nature of the ontogenetic goal—the development of human-specific potentialities at the highest possible level—this ontogenetic goal, in turn, results in the pursuit of the maximisation of quality of life.

In the pre-modern stages of human evolution and history, the pursuit of high quality was often supported by achieving high quantity and the survival of the fittest. However, modernisation has already boosted world population size and consumption patterns to high levels, the combination of which now surpasses the

ecological carrying capacity of the planet. In a further progressing modernisation, the traditional positive relationship between quality and quantity may have to be reversed to a negative one. Namely the further pursuit of ever higher levels of quality of life for the whole of humanity will have to be achieved at the expense of quantitative goals, in particular regarding population size.

9.2.6 The Promotion of Equity

Genetic variation is, from an evolutionary point of view, an extremely important phenomenon because it creates opportunities for adaptation in changing environmental living conditions. At the same time, genetic and other causes of biological variation do produce inequalities in potentialities that may be a source of social inequality, social friction, societal malfunctioning and social injustice.

Modernisation is characterised by strong efforts to reconcile biological diversity with the ideals of equity by creating equal opportunities. An evolutionary-based ethics will, in the context of a further progressing modernisation, simultaneously have to positively value some aspects of genetic diversity and value social institutions that support diversity but which also enhance equal opportunities.

9.2.7 The Necessary Shift from Competitive Towards Cooperative Behaviour

The hominisation process is characterised by a shift from competitive towards cooperative behaviour, although humans remain endowed with drives for both competition and cooperation.

The modernisation process has accelerated the trend towards increased cooperation. However, the genetic predispositions selected and adapted to deal with social interactions in and between small populations are not in equilibrium with human cooperative requirements in the novel modern environment. A further progressing modernisation will require an ever increasing need for cooperation at the world level.

9.2.8 The Promotion of Universalism

The specific human genome emerged and evolved in Pleistocene times, when people lived in small tribes and interacted with other small tribes, resulting in the development of strong predispositions towards in-group oriented behaviour. However, human evolution and history is marked by a gradual expansion of our circle of moral considerability that substantially transcends the narrow 'in-group' oriented human inner drives: this goes from the tribal level, to the nation level, and then to the level of the human species in its entirety.

An evolutionary-based ethics, which must operate in a further progressing modernisation, should be of a universal nature: this means that moral rights and responsibilities should relate to the whole human species.

9.3 Evolution-Based Specific Ethical Challenges

In this book, evolution-based specific ethical challenges have been discussed according to the source of biosocial variation to which they pertain, hierarchically classified according to their degree of complexity: (1) individual variability; (2) group relations; and (3) intergenerational replacement. For each of those aspects, the evolutionary background, developments in modernity and ethical reflections for the future have been discussed.

The evolutionary approach—within the framework of a further progressing modernisation—is an adequate method to identify crucial ethical challenges and designate the direction in which solutions could be pursued or identify which gaps in the moral codes need to be filled in order to address the challenges of the third millennium. This applies to the major features of individual variability—sex, age and individual differences in general—as well as the various forms of group relations—kinship and family relations; social status hierarchies; racial, ethnic and ideological differences; and international relations. The long-term evolutionary approach is particularly relevant for intergenerational replacement and intergenerational solidarity.

9.4 Reconciling Religious and Secular Ideologies and Evolutionary Goals

The ethical foundations, and some of the goals, of the religious ideologies are largely maladapted to modernity. The secular ideologies are fragmentary and currently incapable of providing a coherent response to the future evolution and development of humanity. A huge number of current and expected challenges are not addressed by the current moral norms, which are lagging behind and fail to cope with new situations stemming from scientific knowledge and technology. Moreover, both the traditional religious and the modern secular ideologies seem either to have lost or not yet acquired substantive moral authority. All this implies, at first sight, that the future of the human species (and our planet) looks pretty bleak. For some demographic and ecological challenges there is not much time left to address urgent problems in order to avoid further damage.

Nevertheless, it can be expected that both the traditional religious belief systems and many modern secular ideologies will still be with us for quite some time. The persistence of religious traditions will continue to direct or influence the behaviour of believers and play an important role in the lives of many people; this is either

because of their neurological predisposition to think and feel in such a way and/or because of the power or action of powerful religiously controlled societal institutions. The diversity of modern fragmented secular ideologies, resulting from individual or (in-)group interests or the incapacity to devise a grand vision for the future, will also continue to keep busy and divide the minds and actions of many agnostics and atheists and will perpetuate their mutual ideological conflicts.

However, when looking at the relatively short historical time span that the modernisation process has been embedded in science, there is room for moderate optimism. Modernisation has, in its short history, enabled many fundamental changes with profound ethical implications. They include abolition of slavery, regulation of labour conditions, removal of many barriers to upward social mobility, and achievement of a higher standard of living and quality of life for large segments of the population. Changes have taken place hand in hand with the growth in opportunities for self-actualisation, guaranteed freedom of individual expression, greater autonomy in the choice of personal relations, promotion of female emancipation, family planning, and equal gender rights. Societies have achieved the advancement of ideological pluralism and tolerance, establishment of democratic governance, enlargement of environmental awareness and development of inter-governmental cooperation.

In the course of modernisation, many traditional ideologies have in several respects adapted to the findings and opportunities of the sciences, achievements of technology, and social movements that strived towards more social justice and equity.

Adaptation is often labelled in such a way that it reconciles traditional and scientific approaches. By way of example, most Christian denominations use medical science to lower the suffering of their believers in the terminal stages of life. They have developed palliative care practices in cases of incurable disease, which is, in fact, a ‘soft’ and prolonged form of euthanasia. Furthermore, many religious people and organisations are very progressive with respect to promoting equal opportunities for all, and cooperation between individuals and societies, also at the global level.

Regarding the views of the Catholic Church towards evolutionary science, some change can be discerned. In the papal encyclical *Humani generis* of 1950 “concerning some false opinions threatening to undermine the foundations of Catholic Doctrine”, Pope Pius XII speaks about the “doctrine of evolution... as if the origin of the human body from pre-existing and living matter were already completely certain and proved by the facts” and rejects polygenism (understood as “Adam represents a certain number of first parents”). In 1996 Pope John Paul II, addressing the Pontifical Academy of Sciences, stated: “Today, more than a half-century after the appearance of that encyclical, some new findings lead us toward the recognition of evolution as more than a hypothesis.” Furthermore, Pope Benedict XVI stated at a meeting with clergy in 2007: “... there are so many scientific proofs in favour of evolution which appears to be a reality we can see and which enriches our knowledge of life and being as such.” Nevertheless, all three popes continued to make a dualistic distinction between the evolution of the human body and the

creation of the human soul, not willing or unable to accept that the human mind/spirit/soul is irrevocably linked to and dependent upon the material basis and evolution of the human brain and body.

A fact of considerable importance is the diversity in the adaptation process of religious tenets to the findings and insights of modern science. Some denominations (for instance mainline Protestants) seem to have no major problem in assimilating and adapting to scientific progress; others (for instance the Catholic Church) are clearly struggling more with the novelty of modernity; still others (for instance Christian Evangelicalism in America and fundamentalists in Islamic countries) still adhere to the literal interpretation of their Holy Scriptures. Even within many religious groups, diversity exists in theological interpretation of the Holy Scriptures.

It may be expected that some countries, particularly in the Islamic sphere of influence, will have more difficulty in adapting to modernisation and to adopt fully modern science together with its societal and moral implications. Many of these countries—where the Holy Scriptures are literally interpreted—accept technology but reject science. Indeed, Islamic countries struggle with three obstacles on their way to modernisation—philosophical, social and political. The philosophical obstacle relates to the very nature of Islam with its specific content which is in so many conceptual respects fundamentally challenged by the achievements of science; the social obstacle concerns the fact that science and modern secular ideologies were not developed indigenously¹; finally, the political obstacle is that modernisation/Westernisation was/is introduced, if not imposed, by ideologically different and technologically superior foreign invaders, colonisers, and exploiters, which stimulated a strong in-group reflex.²

However, an important phenomenon is the historically well-documented change in attitudes and behaviours of many religious believers during the modernisation process, which was contrary to the doctrinarian positions of their churches or belief systems. Let us take for example, the contraceptive transition (the shift in use of inefficient to efficient contraceptive methods) among Catholics, as revealed through several fertility surveys in the second half of the twentieth century. Although the Catholic Church only allows the use of so-called ‘natural’ methods of family planning, the large majority of Catholic practitioners, albeit somewhat later than non-believers, switched their contraceptive behaviour from traditional to modern contraceptive methods.

In fact, there is no reason why religions, which believe that a supernatural power has created humankind and equipped it with mental powers to organise and develop its life and future, would not be able to find rational arguments in theology to adhere to the central goal of an evolutionary ethics, i.e. the enhancement of the hominisation process. In the pre-scientific era, the main biosocial function of most major religions consisted of furthering the survival of human societies.³

¹See Edis (2007, 219).

²Hashemi (2010).

³See, for instance, Cole-Turner (2011), Green (2013), Haught (2013).

Furthermore, as modern secular ideologies progress in using findings and insights from science, and more comprehensively broaden their ideological horizon to demographic, genetic, ecological and intergenerational levels, there is even more of a reason to adhere to a long-term conceptualised evolutionary ethics rather than the traditional in-group ideologies.

Convincing religious and secular ideologies about including or integrating an evolutionary ethical approach in their basic philosophies is just one step towards enhancing the potential for universal ethics. Another step is to encourage them to move together in acting in an evolutionarily ethical direction. The same applies to several of the secular ideologies whose goals are often diametrically opposite. Indeed, our modern societies are characterised by an ideological pluralism, composed of several religious faith systems as well as different secular convictions. Religions or religious denominations compete, often fiercely, among themselves about the right God and his prophets; moreover, they also fight secular ideologies, in particular those that do not believe in an almighty and benevolent supernatural power. Secular ideologies, in turn, often exhibit a strong aversion to the religious doctrines and the religions' intrusion in a person's life, wherever those religions succeed in maintaining their political power positions. This repulsion is particularly salient in what is now called the 'New Atheism'⁴ that dissects and discloses the inconsistency and maladaptiveness of the traditional (revealed) religions in modernity.⁵ In turn, several secular ideologies fight each other fiercely—for instance, liberalism versus socialism, ecologism versus capitalism, egalitarianism versus equal opportunities/meritocracy—and lack a solid foundation for common action.

However, it appears that dividing lines in ethical and political decision-making often do not run between religious and non-religious people, but between conservatives and progressives. Among the progressives one finds freethinkers/atheists as well as religious believers who, confronted with present-day problems and taking into account present-day scientific knowledge, appear to find their motivation for innovative global moral positioning or political action in their own religion or ideology. The concrete moral or political outcome of their choices is often very similar. To the extent that both freethinking people and religious believers rely on, or take into account, scientific knowledge in their moral or political decision-making, their ethical viewpoints tend to converge, thereby considerably facilitating the establishment of common ground for action.

Hence, instead of ideologically confronting the traditional religious and modern secular ideological approaches and institutions, it might be more rewarding to take a pragmatic attitude and examine how to mobilise the religiously or secularly inspired drives for moral agency for societal reforms; this would be based on an evolutionarily founded analysis for pushing human development and evolution towards higher levels of quality of life, welfare and well-being. It would be a giant step

⁴Philipse (1995), Harris (2004, 2010), Dawkins (2006), Dennett (2007), Hitchens (2008, 2009), Stenger (2008, 2009), van den Berg (2009), Verhofstadt (2013).

⁵See also Teehan (2010, 204), Zuckerman (2010, 13).

forward if the major, ethically-driven, progressive secular and religious institutions in the world took such a position. Recently, May Evelyn Tucker⁶ pleaded in the same way for making progress in the domain of an ecologically sustainable future.

In parallel, given the often rigid philosophical or theological doctrinarian nature of most ideologies, and in particular their institutions as vehicles of power, there is a strong need for: (1) interreligious dialogue between the different religious belief systems; (2) consultations between various mutually opposed secular ideologies; and (3) cooperation between religious and secular ideologies.

Several initiatives—including the global level—already exist in the domain of interreligious dialogue. For instance, in 1993 the Council for a Parliament of the World's Religions⁷ produced a declaration “Towards a Global Ethic: An Initial Declaration”⁸ in which a common set of values found in the teachings of the

⁶Tucker (2015, 401).

⁷www.parliamentofreligions.org/.

⁸Global Ethical Foundation (1993), Declaration Toward a Global Ethic: “The world is in agony. The agony is so pervasive and urgent that we are compelled to name its manifestations so that the depth of this pain may be made clear. Peace eludes us—the planet is being destroyed—neighbors live in fear—women and men are estranged from each other—children die! This is abhorrent. We condemn the abuses of Earth’s ecosystems. We condemn the poverty that stifles life’s potential; the hunger that weakens the human body, the economic disparities that threaten so many families with ruin. We condemn the social disarray of the nations; the disregard for justice which pushes citizens to the margin; the anarchy overtaking our communities; and the insane death of children from violence. In particular we condemn aggression and hatred in the name of religion. But this agony need not be. It need not be because the basis for an ethic already exists. This ethic offers the possibility of a better individual and global order, and leads individuals away from despair and societies away from chaos. We are women and men who have embraced the precepts and practices of the world’s religions: We affirm that a common set of core values is found in the teachings of the religions, and that these form the basis of a global ethic. We affirm that this truth is already known, but yet to be lived in heart and action. We affirm that there is an irrevocable, unconditional norm for all areas of life, for families and communities, for races, nations, and religions. There already exist ancient guidelines for human behavior which are found in the teachings of the religions of the world and which are the condition for a sustainable world order. We declare: We are interdependent. Each of us depends on the well-being of the whole, and so we have respect for the community of living beings, for people, animals, and plants, and for the preservation of Earth, the air, water and soil. Parliament of the World’s Religions Declaration Toward a Global Ethic, page 2 We take individual responsibility for all we do. All our decisions, actions, and failures to act have consequences. We must treat others as we wish others to treat us. We make a commitment to respect life and dignity, individuality and diversity, so that every person is treated humanely, without exception. We must have patience and acceptance. We must be able to forgive, learning from the past but never allowing ourselves to be enslaved by memories of hate. Opening our hearts to one another, we must sink our narrow differences for the cause of the world community, practicing a culture of solidarity and relatedness. We consider humankind our family. We must strive to be kind and generous. We must not live for ourselves alone, but should also serve others, never forgetting the children, the aged, the poor, the suffering, the disabled, the refugees, and the lonely. No person should ever be considered or treated as a second-class citizen, or be exploited in any way whatsoever. There should be equal partnership between men and women. We must not commit any kind of sexual immorality. We must put behind us all forms of domination or abuse. We commit ourselves to a culture of non-violence, respect, justice, and peace. We shall not oppress, injure, torture, or kill other human beings, forsaking violence as a means of settling differences. We must strive for a just social and economic order, in which everyone has an equal

religions is identified as the basis for a global ethic. Although religiously inspired and initiated, the declaration addresses all people, both religious and non-religious.

A somewhat broader initiative is the United Nations World Interfaith Harmony Week, originally proposed by King Abdullah II of Jordan at the 65th UN General Assembly in 2010⁹ in which it is proposed that the first week of February in every year would be celebrated as a time when people of all faiths, and those of no faith, work together to promote and celebrate religious and cultural understanding and cooperation, under the aegis of the motto “Love of God and Love of the Neighbour or Love of the Good and Love of the Neighbour.” Although strongly religiously inspired, the United Nations World Interfaith Harmony Week addresses both religious and non-religious believers, eloquently expressed by the alternative motto “Love of God ...or Love of the Good”.

There is a great need for interreligious dialogue, given the history of interreligious in-group/out-group competition, conflict and war. However, a significant philosophical divide lies between religious and secular ideologies.¹⁰ It is here that dialogue efforts should also be concentrated. Unfortunately, this type of ideological dialogue—certainly at the international or global level—is much less developed, if at all. Humanist or atheist organisations are usually excluded from interfaith dialogues. Neither of the two sides takes effective initiatives.

Equally, a dialogue is needed between various modern ideologies whose fragmented and short-term partial approaches to current and future human challenges prevents them from pursuing comprehensive solutions, but whose fundamental goals, when considered in a more holistic and longer-term perspective, might converge their visions more closely.

Global dialogue among religions, among secular ideologies, and between religious and secular worldviews is often too ambitious or still too high level and is permeated with compromises, which results in agreements at the level of the lowest common denominator—these do not give sense and weight to effective action. A more promising pathway in the near future may be to intensify dialogue between religious and secular progressives who both embrace the challenges of science and technology and are committed to pursuing ways to fill the gaps in the ethical systems.

chance to reach full potential as a human being. We must speak and act truthfully and with compassion, dealing fairly with all, and avoiding prejudice and hatred. We must not steal. We must move beyond the dominance of greed for power, prestige, money, and consumption to make a just and peaceful world. Earth cannot be changed for the better unless the consciousness of individuals is changed first. We pledge to increase our awareness by disciplining our minds, by meditation, by prayer, or by positive thinking. Without risk and a readiness to sacrifice there can be no fundamental change in our situation. Therefore we commit ourselves to this global ethic, to understanding one another, and to socially beneficial, peace-fostering, and nature-friendly ways of life. We invite all people, whether religious or not, to do the same.”

⁹United Nations Resolution A/65/PV.34.

¹⁰For instance, Aref Ali Nayed (2006) commented in a reaction to Pope Benedict XVI's (2006) lecture at Regensburg University: “Islam can actually be Christianity's best ally against the arrogant pretensions of scientific positivism, and for a deeper and more spiritual Reason.” (http://www.masud.co.uk/ISLAM/misc/commentary_on_benedict.php).

The pluralist approach might remain a necessary and viable solution in cases where, for reasons of cultural heritage or personal considerations, diversity in moral approaches and solutions is an adequate response to the cultural or behavioural diversity in the population. Alternatively, it might merely be an intermediary stage in the cultural and ethical changes that are inevitably linked to the transition from traditional to modern society and culture, and the evolution of a universal ethic. Moreover, just as the maintenance of individual biological variability is an adaptive safety valve against unexpected or unforeseeable environmental changes, there might be evolutionary (adaptive) advantages in the existence or emergence of a variation in different cultures that would peacefully coexist and include creative specificities for the long-term survival and further evolution of humankind—cf. Raymond Cattell's¹¹ hypothesis of cooperative competition among culturally diverse civilisations. A question to be addressed is whether the multiple modernities hypothesis can be sustained if some cultures deny knowledge and propagate prejudice.

Indeed, a future diversity of worldviews and cultures could not be viable without a universal core ethic, built on the knowledge of the evolutionary sources of human variability and specificity. A universal core ethics needs to be shared worldwide and include rights and responsibilities of cultures regarding the future course of the hominin's biosocial and biocultural development and evolution.

The idea of a move in which spiritual religion and secular humanism could converge is not at all new. It has been advanced and promoted by many people—scientists, philosophers, theologians and politicians—ever since the religious-secular divide took shape. Let us take the example of the American philosopher John Dewey¹² who wrote a book in 1934 entitled *A Common Faith*. An example of a different nature is the renowned '*Nederlands Gesprek Centrum*'¹³ in the Netherlands, whose aim is to promote, by means of 'conversations' and publications, the mutual understanding and appreciation between different ideological and social 'pillars' about important, but difficult and sensitive societal issues. Overall, in many developed countries there are numerous examples of pluralistic dialogue initiatives between religious and freethinking individuals or groups trying to find common ethical grounds to bridge ideological ravines in society.¹⁴ However, these are also examples of how some relevant movements remain limited in their impact to a single country or at best to a particular (economic interest) group of countries. Indeed, nation states (and many national institutions) may be seen today as the strongest obstacles to the implementation of principles of an authentic universal ethics. Strive to preserve own prerogatives is part of the human endowment. Indeed, kin-group ethics challenged in the past the broadening of the circle to include non-kin.

¹¹Cattell (1972, 105).

¹²Dewey (1934), quoted in Kitcher (2007, 161).

¹³www.nederlandsgesprekcentrum.nl/ (in English: 'The Dutch Centre for Dialogue').

¹⁴For example, Duyndam et al. (2005).

Nevertheless, in many modern, advanced societies the confrontation between traditional religious and modern secular ideologies, as well as between various opposite secular ideologies, has resulted in the development of ethical compromises, the establishment of a common minimal ethic,¹⁵ or the establishment of pluralism in personal forms of behaviour. This is the case with moral education (availability of courses in various religions and non-confessional ethics), choice of marriage rituals (religious or civil procedures), choice of type of spiritual assistance in disease or end of life situations, choice of type of partnership (marriage or consensual union), means of birth control (contraception, abortion, medically assisted reproduction), and death control (palliative care, regulated euthanasia). Moral progress does not have to imply absolute normative uniformity. Respect for fundamentally different moral systems already gives a universal status to a particular moral view.¹⁶

A scientific approach, and particularly an evolutionary approach, to ethical questions might be a good way to bring together religious and secular ideologies in order to contribute to the development of a new global ethic. Not only could this deal with the crucial and urgent current challenges that humankind is facing but also focus on a longer-term future, since it is only in such a perspective that a safe future of the hominin phyletic line can be secured.

¹⁵Küng (1996, 2).

¹⁶Tao and Yan (2006, 176).

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