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Chapter 11
Developmental Psychology Without Dualistic Illusions

Why We Need Evolutionary Biology to Understand Developmental Psychology

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*Reality is that which, even when you stop believing in it, doesn’t go away* (Philip K. Dick 1981)

**Abstract** This chapter starts with an epistemological introduction for two reasons: First, if you talk about a human without illusions—as the subtitle of this volume suggests—you refer to epistemological categories. Second, because this book is dedicated to a renowned evolutionary anthropologist and bio-philosopher, this chapter relies on works of other evolutionary theorists, and philosophers also (Bischof 2008; Gadenne 2004; Vollmer 1975; for a more psychological account see Chasiotis 2010 in press). After some epistemological prolegomena on the implicit dualism in psychology, an evolution-based developmental psychology is outlined and selected empirical findings based on this perspective are presented. The chapter concludes with (meta-)theoretical implications of an evolutionary account of developmental psychology. The seemingly paradoxical conclusion is that an evolutionary developmental psychology can help us to gain a more differentiated view of the concept of *environment* without abandoning a naturalistic and monistic view of reality.

### 11.1 The Implicit Dualism in Psychology

It is easier to defend human uniqueness if you divide reality into a hemisphere consisting of the triad of soul, human, and meaning and another hemisphere in which body, animal, and mechanistic causality is located. (Bischof 2008, p. 163).

Psychology, a science in a hybrid position between the humanities and the natural sciences, suffers from a subtle disease. Although it is mainly defined as being an empiricist science where all (mental and nonmental) phenomena are based on one
and the same physical substrate, this unfortunately does not mean that it presents itself as a monistic science, according to which the mind is just a part of the body. Historically, this problem can be traced back to the Aristotelian division of the world into body ("physis") and soul ("psyche"), and his postulate that the goal ("telos") each living creature has ("echein") lies in the soul, a vital force he thus called "entelechy". This Aristotelian dualism more or less dominated science—in biology at least until Darwin (Mayr 1984) and in psychology perhaps until today (see Bischof 1981, 2008). The mind–body dualism peaked in the distinction of the res extensa and the res cogitans by René Descartes in the seventeenth century. While the res extensa deals with all matter and can be described via deterministic mechanisms, the res cogitans is exclusively human and is based on nondeterministic semantics. Accordingly, because of this Cartesian heritage, Bischof calls the implicit dualism in psychology a "cartesian contamination" (Bischof 2008, p. 127). According to this notion, the link of an individual to its environment is either defined by attributing a teleological cause, a meaning, purpose, or intention to the subject without assuming any generalizable regularities with the environment or by ignoring introspection and locating all causes of behavior as being external to the individual. From that latter perspective, a stance held in Behaviorism, the dominating field of psychology in the first half of the twentieth century, everything there is to know lies in the environment and inner mental states are not considered at all. In Behaviorism, the organism is determined by an unspecified general drive, and the environment structures behavior via a virtually infinite set of reinforcing stimuli. Even after the so-called cognitive revolution in the 1950s, which set out to (re-)"establish meaning as the central concept of psychology" (Bruner 1990, p. 2), the dualistic stance did not disappear. In cognitive psychology, the organism is causally determined by so-called primitive, biological drives, while again the environment, now labeled society, offers all secondary or social motives, which are infinite in number and indefinite in quality. Ironically, while considered to be a counterpart to Behaviorism’s notion, the reintroduction of meaning was not achieved by locating it within the individual, as in the traditional Aristotelian notion. Instead, information became synonymous with semantics, coming from outside the organism, although information is a quantitative term defining the frequency of a signal without any qualitative (semantic, meaningful) content. Even in contemporary cognitive science, the impressive results from neuroimaging often mask this hermeneutical leap one has to take to arrive at a meaningful interpretation of the colorful illustrations of activated brain areas (see e.g. Vul et al. 2009).

Where does this bias for dualistic conceptualizations come from? Obviously, we love symmetrical dichotomies, not only for aesthetic reasons, but also because of their seemingly exhaustive explanatory value: If it is not A, it is (i.e., is defined to be) non-A. Is that not all there is to know? But the problem with dichotomies, as philosophers of science know, is that they are irrefutable and therefore scientifically useless: Epistemologically speaking, if one is dissatisfied with the notion of God as an explanation for the evil in this world, introducing the notion of a devil does not make God any more plausible either (Vollmer 1988, 1995; see also Frey 2007).
To understand this affinity for symmetric aesthetics in our meta-theoretical models in psychology, it might be informative to draw on the work of Gestalt psychologist Wolfgang Metzger (Metzger 1954). He postulated that psychological concepts can be conceived in two different ways: The first, which he calls Eleatic (referring to the pre-Socratic school of Parmenides and Zenon in Elea, 500 BC), claims that our senses cannot be trusted and that every phenomenological experience should be scrutinized by rational reasoning to justify what intuitively has been perceived as true. The second he calls Phenomenological: here it is claimed that every psychological phenomenon should be described as it is experienced, regardless of how unusual, unexpected, or even illogical it might seem to be. It is important to note that these two conceptualizations are not just another dichotomy, because they are not opposites, but interchangeably used, sometimes we follow the one stance, while at another time, we argue according to the other (see Chasiotis 2008). One main difference concerning the validity of psychological concepts lies in this distinction between evidence and veridicality: While the Phenomenological School claims that everything that is evident is also true, the Eleatic perspective postulates that every evident phenomenon needs to be scrutinized to avoid misconceptions (see the motto of this chapter). For many scholars (e.g., Bischof 2008), the difference between the Eleatic and the Phenomenological stance still lies at the heart of many problems where interdisciplinarity is involved (see also van de Vijver and Chasiotis 2010). In empirical psychology, there are many terms describing these two differing views on our psyche: the Eleatic principle is more associated with behavioristic, syntactical, positivistic, or quantitative approaches, whereas the Phenomenological principle is associated with semantic, hermeneutical, and qualitative approaches. According to Bischof, they also differ in their heuristic principles: While the Phenomenological perspective has teleology as a heuristic guideline and searches for meaning and goals that in the final analysis can only be discovered within the individual, the Eleatic perspective uses aesthetics as a heuristic guideline (Bischof 1988, 2008). Here we re-encounter the numerous symmetric dichotomies in Psychology. There are dichotomies in emotions (positive ↔ negative affects), in social psychology (pro-social ↔ antisocial), in psychoanalysis (Eros ↔ Thanatos), and in cross-cultural psychology (Individualism ↔ Collectivism, see Chasiotis 2010 in press). Finally, there is a dichotomous view in mainstream developmental psychology in which endogenetic factors are identified with biological determinism and maturation while exogenetic factors (society, culture) provide all meaning required for ontogenesis. It is to this psychological discipline we will turn now.

### 11.2 Evolutionary Developmental Psychology as an Environmentalist Discipline

Organisms did not evolve to survive, but to reproduce: Life is finite and our psychological makeup is ultimately not aimed at merely surviving or well-being but on reproductive success. This perspective helps us in explaining not only the
psychological, proximate causes of a behavior (e.g. by trying to show how we pursue a happy life), but also why we strive to obtain one certain state of mind and not another, that is, why some things, like having children (and grandchildren, see Voland et al. 2005), make us happy while others do not.

The Darwinian concept of adaptation is crucial to understanding why and how individual traits fit environmental conditions, and thus have ultimately resulted in reproductive success. Adaptations carry environmental information that has become represented in phenotypes during evolution because it helped organisms to (survive in order to) reproduce. Accordingly, there are no organism-independent environmental factors: without an organism, there is no environment. It is important to note that this is not a solipsistic stance in which reality does not exist at all, but the evolutionary epistemological stance (Vollmer 1975): We can only know something because it reflects something that is in an adaptive relation to reality. Contrary to the common miscomprehension of evolutionary biology as fully deterministic (if it is in the genes, it cannot be changed), the epigenetic view of development is bidirectional: if a gene is switched on, its genetic activity is a cause for the development of an organism, but the expression of the involved genes during ontogenesis is also influenced by the ontogenetic experiences (i.e., maturational processes and behavior; see Bischof 2008; Bjorklund and Pellegrini 2002; Gottlieb 1991). From this perspective, the phenotype is the result of epigenetic processes during development: genes interact epigenetically with the environment to produce the behavior we study in psychology. So there is neither a “pure” genetic nor “pure” environmental determination of behavior but an environmentally mediated, epigenetic relation between a genotype and a phenotype.

But if one claims that the nature–nurture dualism is not useful because there are no pure genetic or environmental effects, does it mean that we cannot say anything about the interaction of genes and environment? Of course not, quite to the contrary: if we abandon the traditional dichotomy of nature versus nurture, we only discard the extremes of the continuum lying between what we call “genes” and “environment”. What is gained instead, though, is a much more differentiated, epigenetic description of the interactions between these postulated poles. As I will show in the following, the dualistic misconception is not due to an all-encompassing and therefore useless conceptualization of biology or nature, but an undifferentiated view of environment.

To know more about an organism, we need an environmental theory explaining the species-specific epigenetic effects of the environment on the organism. According to Bischof, there are three different segments of the environment determining the relations of genotype and phenotype: selection, alimentation, and stimulation (Bischof 2008).

1. **Selection** is responsible for the finality (or semantic quality) of an organism. Finality is a function of a system that acts as if it had an interest in adapting or a goal to adapt to the environment. This gives the system a semantic quality, i.e. meaning. To distinguish it from the metaphysical notion of teleology, this naturalistic goal-directedness is called teleonomy (see Mayr 1984; Bischof 1995, 2008). The notion of teleonomy provides us with a meaning of a behavior:
A behavior is shown because it had an adaptive value leading to reproductive success in the evolutionary past. Hence, selection deals with the phylogenetic development. Its adaptational pressure is aimed at reproductive success.

2. **Alimentation** is the term subsuming all intra- and extra-uterine environmental influences that lead to a macroscopic development of the genetic code. The phenotype, thus, is the result of the interaction of a genotype with alimentative aspects of the environment. Alimentation deals with the ontogenetic development, its adaptational pressure aims at survival and its typical developmental mechanism is maturation, mainly affecting the morphology of the organism. A striking example of environmental alimentative pressure is monozygotic twins raised apart in dissimilar environments (see Tanner 1978).

3. **Stimulation** from the environment does not alter the phenotype, but affects the behavior of an organism. The organism is evolutionary prepared (by selection, see the next section) to detect stimuli from the environment and to react accordingly. Environmental stimuli are telling us something about the current state of the selective environment, and thus lead finally (but only ephemerally) to the psychological adaptation of well-being. Its typical developmental mechanism is learning.

With these specifications, the epigenetic perspective on which evolutionary developmental psychology is based can be formulated as the interplay of stimulation and alimentation leading to selection. The underlying process can be described as if the genetic adaptation copies the learned adaptation: if the environment is stable enough, there will be a genetic adaptation irrespective of the flexibility/plasticity of the organism’s learning capacity. The proportion of fixed genetic programs in the behavioral output of the organism increases with the stability of the environment (a process coined *obligatory genocopy*, see Lorenz 1965; see also Dennett’s notion of “genetic learning” 1995).

### 11.3 Childhood as a Sensitive Period

One of the most obvious manifestations of the just presented epigenetic interplay is the evolution of life spans. This view implies that different developmental stages are not transitory phases toward adulthood but evolutionary end-products per se, because many features of childhood can be considered *preparations for adulthood* (Alexander 1987; Bjorklund 1997): if environmental change is slow compared to an individual lifespan, the optimal mode of adaptation is to establish sensitive learning situations early in life as preparations for adulthood that guide later development (Draper and Harpending 1988). These sensitive learning situations are characterized in our terms as stimulative alimentation, where certain environmental stimuli during a certain sensitive period are needed additionally to alimentative processes (e.g. the presence of a parental figure in imprinting, see Lorenz 1965).

This evolutionary perspective fits with empirical evidence in the psychological literature and in mainstream developmental psychology, in which the first 6 years...
of childhood are considered as psychologically the most important for individual development (Lamb and Sutton-Smith 1982). Every child is reared in a unique environment characterized by contextual variables such as number of siblings, specific birth order, and socioeconomic conditions. According to his/her ordinal position within the family, the child receives a specific form of parental treatment (Toman 1971; see also Moore et al. 1997). The ordinal position that thus shapes the developmental context has been shown to explain a huge array of phenomena, ranging from differences in personality traits to scientific discoveries and political revolutions (Sulloway 1996). Extensive value surveys in sociology (Inglehart 1997) and cross-cultural psychology (Allen et al. 2007) provide evidence for the importance of socioeconomic factors for developmental conditions: For example, the financial situation during childhood has been found to be a better predictor of the endorsement of values in adulthood than the current economic situation of the adult respondent. Such effects are typically summarized under the notion of “economic determinism” to refer to the impact of the economic situation on psychological outcomes. In the following, recent empirical evidence will be presented regarding these two building blocks of childhood context, birth order and socioeconomic status during childhood, and their explanatory power for cultural differences in pubertal timing, parenting motivation, social values, and autobiographical memory.

11.3.1 Pubertal Timing

Evolutionary developmental psychology offers a theoretical framework to conceptualize the influence of resource availability in childhood on consequent somatic, psychological, and reproductive development (Belsky et al. 1991; Chisholm 1993): Psychosocial contextual stressors such as inadequate resources or unstable employment lead to marital discord and foster insensitive parental behavior, which in turn induces behavioral problems in the child. If ecological conditions are largely held constant, as is the case with the majority of citizens in industrialized countries, the theory arrives at the critical prediction that aversive childhood experiences accelerate sexual maturation.

In a research project aimed at investigating the social changes in family development that occurred after the reunification of Germany in 1989, my colleagues and I provided support for this perspective (Chasiotis et al. 1998; Chasiotis 1999; Chasiotis et al. 2003). We confirmed the importance of birth order and its interaction with socioeconomic status in childhood by predicting somatic as well as psychological developmental outcomes in a comparison of samples from Osnabrück (West Germany) and Halle (East Germany). In one study, we used the subsample of all mother–daughter dyads from West and East Germany to test the assumption that the onset of puberty is affected by childhood experiences (Chasiotis et al. 1998). A comparison of the two samples of mother–daughter dyads showed that what seems to be inherited is not the timing of puberty per se, but the sensitivity for the prepubertal childhood context. The consideration of social status and
birth order in other subsamples of the same research project led to the assumption that childhood context variables could also determine the East–West differences in intergenerational context continuity. Results of a reanalysis showed that birth order displayed significant and (mainly) expected effects of childhood variables on the age at menarche for women who do not have younger siblings (i.e. only children or later-borns) (Chasiotis et al. 2003). In contrast, participants with younger siblings (i.e. first-borns and middle-borns), showed no such effects. In the previous study differences in intergenerational context continuity between the parental and filial generations in East and West Germany were interpreted as being caused by different socio-cultural milieus prevalent in the former Federal Republic of Germany and the German Democratic Republic (Chasiotis et al. 1998). The reanalysis of the data revealed that the intergenerational context discontinuity affecting the onset of puberty was primarily due to different childhood experiences of last-born daughters and their mothers. It seems that the absence or existence of younger siblings influences the age at menarche, and not the “cultural” origin of the subjects.

11.3.2 Parenting Motivation

Parenthood constitutes an investment in genetic offspring as a part of reproductive effort while at the same time transmitting cultural values and practices between generations. Although much contextual and cultural variation in parenting behavior has been reported (Keller 2007), the motivational roots of this culturally divergent parenting behavior are barely known. Chasiotis, Hofer, and Campos proposed that interactive experiences with younger siblings should be considered an important factor for the emergence of parenting motivation (Chasiotis et al. 2006). Taking a cross-cultural, developmental perspective, they suggested that the presence of younger siblings triggers prosocial, nurturant motivations and caretaking behaviors. In turn, this implicit parenting motivation results in positive, loving feelings towards children on a conscious level, which finally leads to parenthood. Using structural equation modeling, they demonstrated that this developmental pathway is verifiable in both male and female participants, and in all cultural samples from Germany, Costa Rica, and Cameroon.

A further investigation of the relationship was warranted because implicit parenting motivation showed cultural variation and was associated with the existence of younger siblings—which was different across cultures. To investigate the impact of this childhood context on cultural differences (aiming to “peel the onion called culture”, Poortinga et al. 1987), implicit parenting motivation was first regressed on the variable “younger siblings”. In the next step, the unstandardized residual of implicit parenting motivation of that regression analysis was reentered in an analysis of variance (ANOVA) with culture as predictor. The ANOVA with the residual of implicit parenting motivation as dependent variable and culture as predictor showed a remarkable decrease in effect size of culture (in statistics, an effect size is a measure of the strength of the relationship between two variables.
in a statistical population), which meant that 62% of the original effect size of culture on implicit parenting motivation could be traced back to sibling effects. This impressive effect was replicated in three additional samples from Cameroon, Costa Rica, and Germany (Chasiotis and Hofer 2003), in which the effect size of “culture” decreased to 50%, and with three recent samples from Cameroon, Germany, and PR China, in which the reduction even approached 100% (Bender and Chasiotis 2010 in press).

11.3.3 Social Values

Building on these results of previous studies on implicit prosocial (parenting) motivation, we investigated whether explicit prosocial values are also influenced by childhood context variables. In two studies, data on social value orientations were collected (Chasiotis and Hofer 2003, Bender and Chasiotis 2010 in press). The first study with the Schwartz Value Survey (SVS, Schwartz 1994), and samples from Cameroon, Costa Rica, and Germany, reveals that 36% of the cultural differences of social values constituting the higher order value type of conservation (consisting of the subscales tradition, conformity, and security) can be traced back to sibling effects. After combining the effect of siblings with that of socioeconomic status in childhood (i.e. paternal profession), the amount of explained variance in conservation even increases to 55%. Analogous to the findings on economic determinism by Inglehart (1997) and Allen et al. (2007), present occupation was not related to conservation value orientation. In the second study (Bender and Chasiotis 2010 in press), the importance of sibling effects for social value orientations was further corroborated in samples from Germany and Cameroon: measuring conservation with the Portrait Values Questionnaire (PVQ, Schwartz et al. 2001), the number of siblings explains 72% of the cultural variance in conservation. These strong sibling effects only occur in scales in which intimate relationships with close relatives are almost explicitly mentioned (see, e.g., the definition of the Benevolence scale, Schwartz 2009: the welfare of people with whom one is in frequent personal contact), but not in scales dealing with more individualistic, autonomous social values such as self-direction and achievement.

11.3.4 Autobiographical Memory

Storytelling and narratives represent human universals (Brown 1991), and autobiographical narratives are a “natural kind” of human cognition (Bruner 1990). At age 3–4, children start to participate actively in “memory talk” with their parents (Nelson 2005), a process by which children begin learning to refer to themselves in the past. This emergence of autobiographical memory (AM) in the preschool years is an important event in human development: it is considered a unique feature of the psychological endowment of the human primate on the ultimate phylogenetic level (Bischof 2008), and on the proximate psychological level it seems to mediate the relationship between the development of implicit motives and theory of mind, thus
constituting an important building block for a culture-specific development of the self (see Chasiotis et al. 2010).

An increasing number of studies have found differences in the content and structure of AM across cultural contexts, which have been traced back to different parental socialization practices (for an overview, see Nelson and Fivush 2004; see also Chasiotis et al. 2010). There are some indications that not just parents, but siblings (or their absence), may play a crucial role in the formation of AM, which are corroborated by recent findings from a study in Cameroon, PR China, and Germany (Bender and Chasiotis 2010 in press). Two of the most widely investigated variables in cross-cultural research on AM, namely the age at which the earliest memory took place, and the specificity of the mnemonic account, have been related to childhood contextual variables. These measures were supplemented with a measure for cognitive complexity, which allows the identification of “separated” (differentiation) and “connected” (integration) ways of processing autobiographical information also in cross-cultural samples (see Chasiotis et al. 2010). The number of siblings had a substantial effect: while 30% of cultural differences in the age of the earliest childhood recollection can be explained through the number of siblings, for cognitive complexity (99%) and specificity (99%) the sibling effect even renders cultural group membership insignificant (Bender and Chasiotis 2010 in press).

11.3.5 Childhood Context Explains Cultural Differences

These results on childhood context effects on diverse psychological variables across cultures imply that the family context during childhood is a powerful tool for explaining cross-cultural differences in developmental outcomes. Context variables such as socioeconomic status during childhood, birth order, or number of siblings can be expected to exert similar influences on somatic, psychological, and reproductive developmental trajectories across different cultural contexts. On the basis of the explanatory power of these childhood context variables for cultural differences in such highly diverse areas as pubertal timing, implicit motivation, social value orientations, and autobiographical memory, it can be suggested that many psychological characteristics that are typically attributed to cultural differences may reflect systematic variations in family constellations across cultural contexts. For example, differences in self-construals, which are interpreted as due to culture-specific socialization (Markus and Kitayama 1991), could be at least partially dependent on relevant characteristics shared by participants from cultural samples such as systematic biases due to having (or not having) siblings.

11.4 Conclusion: A Developmental Psychology Without Dualistic Illusions

With these reflections on an evolutionary developmental psychology in mind, what are the implications of a naturalistic and monistic view for environmental effects on human development? In this concluding section, some main themes revolving
around an evolutionary view of environmental effects on human development will be reconsidered to illustrate the strengths of this approach. In short, the seemingly paradoxical conclusion is that an evolutionary view of development helps us to obtain a more differentiated view of the somewhat shallow concept of *environment* without abandoning a monistic and naturalistic view of reality.

**Epistemological distinctions reconsidered.** The presented distinction between the Eleatic and the Phenomenological perspective would only then entail methodological consequences for conducting research if the two perspectives were based on an actually inherent dualism of our psychological apparatus, in which the Eleatic perspective just dealt with bodily sensations and the phenomenological perspective with the soul. However, if one takes the monistic stance—as is the case in the naturalistic worldview of modern evolutionary theory—these two perspectives are just two sides of the same coin: what can be *described* eleatically, is *experienced* in a phenomenological way (see also the concept of “qualia” in the philosophy of mind literature, e.g., Dennett (1995) and Gadenne (2004)): What we experience as meaningful can be described as goal-directed at the same time (in system theory, see Bischof (1995)). Thus, psychology, as an empirical science, cannot ignore our phenomenological experiences and should treat them seriously by describing them as they are, but should also distinguish between their evidence (face value) and their veridicality (validity) without adding any metaphysical attributes to them.

**Psychological functionalism reconsidered.** A nonevolutionary view of our biological heritage considers stimulation and alimentation at most: if we talk of biological (or so-called primal) needs, we often refer to alimentative processes (like hunger) that evolved for survival purposes. If we only consider stimulation and alimentation and ignore selection as a driving environmental force, this is as far a “biological” view of the psyche goes: its function seems to be confined to guaranteeing survival (alimentation) and well-being (stimulation), but not reproduction.

**Criticism of sociobiology reconsidered.** Exactly the opposite can be observed in some sociobiological notions: an epigenetic perspective also clarifies why the sociobiological view of selection as the driving force of the adaptational efforts of the organism is often criticized as being too “unpsychological”: it often deals only with the selective segment of the environment, although adaptations occur in the alimentative and on the stimulative part of the environment as well (Bjorklund and Pellegrini 2002).

**Behavioral genetics.** What behavioral genetics measure are therefore not genetic or environmental effects per se, but genotypic or phenotypic variance based on alimentation (for a more elaborate discussion on the relation of behavioral genetics and evolutionary theory see Chasiotis 2006, 2007).

**Gender differences.** The more stable the considered environmental features are over time, the more probable is a genetic fixation: The intrauterine conception in mammals leading to obvious gender differences in parental investment first occurred 400 million years ago. That is why it is very unlikely that gender differences in behavior such as competitive aggressiveness and risk proneness are only learned during differential socialization (see Chasiotis and Voland 1998).
Biological versus cultural transmission. Another example of a misleading dichotomy between nature/biology and nurture/culture is the distinction of the modes of informational transmission. One way of clarifying the difference between biogenetic and tradigenetic transmission (Boyd and Richerson 1985) is by contrasting it with individual learning (stimulation): learning allows for fast adaptations to changes in immediate actual-genetic circumstances. While genetic changes (genetic “learning”, see Dennett 1995) need at least hundreds of generations, sociocultural changes (via stimulative alimentation during childhood (see above) and individual learning) are normally observed within a generation (Chasiotis 1999; Chasiotis et al. 2003; Voland et al. 1997). If we dichotomize these learning rates, we reify the underlying processes and implicitly assume different units of transmission, while the unit of information that is intergenerationally transmitted is still the same, namely the gene (Chasiotis 2007).

The environment of evolutionary adaptedness (EEA) reconsidered. The EEA is often mentioned in debates on evolutionary approaches in psychology and is often misconceived as the specific environment of the Pleistocene (Daly and Wilson 1999). This misconception is rightly regarded as one of the most important weaknesses of the evolutionary approach in psychology (Panksepp and Panksepp 2000). Properly considered, the EEA is neither a habitat nor a phylogenetic period, but a statistical term for all stimulus-relevant environmental features of our phylogenetic past (Tooby and Cosmides 1990). Interestingly, this conceptualization of the EEA by Tooby and Cosmides (1990) is synonymous to Bischof’s notion of the “inborn environment”:

If a genotype builds a phenotype via alimentation which reacts to stimulation of the environment in such a way that selection does not have to change the genotype, this natural environment can be labeled in an almost paradoxical way the inborn environment. (Bischof 2008, p. 153f)

From that perspective, it is not surprising that the adaptivity of human reproductive behavior is historically and culturally far less restricted as a vulgar understanding of the EEA as just the Pleistocene period might suggest (see also Chasiotis 2006, 2007). On the contrary: empirical evidence in evolutionary anthropology suggests that not only in foraging peoples, but also in agrarian, pre-industrial, and historical societies until the nineteenth century at least, that is, before the demographic transition of a society, adaptive mechanisms have still been at work at least until very recently, if not even until today (Voland 1998, 2000, 2009).

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