

Not Such Nature

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1 Introduction

Sanderson's book is a good introduction to evolutionary psychology, especially if we consider scholars and students in the humanities as the target audience. There is a huge resistance to biological thought in the humanities, with a misperception that biology is destiny, essence, and immutability. Sanderson aims at undoing this perception, bringing arguments and data that give strength to a biological interpretation of human nature, and showing emphatically that biological thinking helps to understand not only human universals, but also the main geographical variations of human behavior.

Sanderson presents evolutionary psychology, particularly the version developed at the University of California, Santa Barbara (SBEP), which is organized around four basic assumptions (Bolhuis et al. 2011). First, it proposes the existence of an environment of evolutionary adaptedness (EEA), which would have existed during the Pleistocene (approximately between 1.8 million and 11,000 years ago). The current human mind would be adapted to this EEA, having been selected when humans lived in small bands of hunter-gatherers. Second, the SBEP takes gradualism as a principle within the evolutionary theory. From this principle it follows that evolution is a long-term process, and there was not enough time for humans to adapt to the frequent changes of selective pressures that took place during the period of rapid cultural changes, within the last 10,000 years. This results in an uncoupling between the behavioral adaptations to the EEA and the requirements of the current environment, leading potentially to a permanent malaise of human nature regarding modern times. A third assumption of the SBEP is the massive modularity of the brain: Human cognition would be made up of hundreds of "computational tools" specialized in the processing of specific informational structures, modules for the efficient resolution of particular adaptive problems. Thus, it would be relatively easy for us to solve

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certain universal problems, such as how to express ourselves nonverbally, or how to learn an oral language, or to detect social cheating, or to choose the fittest sexual partners. We would thus be equipped with hundreds of cognitive modules, each one with relevant information for the task at hand, making us adapted to life in the Pleistocene. Finally, the SBEB defends the existence of human universals that would be the result of the action of these Pleistocene cognitive modules. Notwithstanding being universal, these modules would be sensitive to the context, developing within each individual as a function of exposition to species-typical contexts. We can then characterize these modules as having specific, typical plasticity. So, the SBEB argues that the “human universals” are not simply a fixed behavior, typical of the species, or a human instinct, but comprise instead a typical adjustment to the typically human developmental contexts.

The author incorporates in SBEB ideas from human behavioral ecology and does so by stressing the particular adjustments that the social system would suffer when exposed to different ecological landscapes. Thus, human groups living in environments with low and unpredictable supply of basic resources (prey, fruit, water) would organize themselves in small bands of egalitarian, usually nomadic life; living in places with higher concentration of resources would allow the formation of larger human groups (tribes), which already show a certain hierarchy in the social organization of a sporadically nomadic life. As the availability of resources increases (including the resources obtained through cultural evolution, such as the domestication of animals and plants, or the development of agriculture), it also increases the size of the society (horticulturalist, agricultural, pastoral or industrial societies), the hierarchy within the social group, and the inequality in the distribution of resources. But Sanderson does not restrict himself to the largely theoretical predictions of such socioecological models. Instead, he delves into a wealth of ethnographic information, into the details of the social organization of a diversity of cultures. The integration of the socioecological theoretical predictions with actual ethnographic knowledge brings the book closer to the humanities, a place where Sanderson is at his best, due to his primary education as a sociologist. This also makes the book attractive to an audience focused on the biological sciences, who does not usually have full access to the huge diversity of human societies, at least not from within the evolutionary psychology literature.

The book is written in an accessible language, and is well edited, with an index and a glossary for more technical terms, and handy summaries and questions for discussion at the end of each chapter. These details help you navigate through the book and allow it to reach a wide target audience, mostly students within the biological sciences and humanities, but also well educated laypersons. This is an excellent choice: escaping from excessive technicality and jargon, Sanderson helps to popularize evolutionary psychology in a correct way, while maintaining a solid scientific basis. This effort to popularize is absolutely necessary in interdisciplinary areas such as evolutionary psychology, which builds on contributions not only from psychology and evolutionary biology, but also, of course, from anthropology, sociology, history, and other sciences: if each of these areas were to be represented by their own jargon and technical language, the book would result in an incomprehensible babel of disconnected voices. Although the book can be taken as a good introduction to evolutionary psychology to scholars and students from the humanities, the same cannot be said with regard to the biological sciences audience. If the strength of the interdisciplinary endeavor is to leave behind the disciplinary castles, reaching a wider audience, its Achilles heel may be exactly the existence of so many distinctly disciplined points of view, leaning all onto one single piece of work.

2 The Evolutionary Biology of Evolutionary Psychology

The SBEP is based on a one-sided view of contemporary evolutionary biology, one that is focused on the evolutionary synthesis. The evolutionary synthesis was formalized between the 1920s and the 1950s, and is a theory focused on natural selection as the main or exclusive evolutionary process, one who acts by changing the frequencies of the hereditary units: the genes. This adherence to the evolutionary synthesis leaves aside evolutionary processes that were incorporated into the evolutionary theory in the last 40 years. For example, Sanderson considers that only the ultimate causes provide truly Darwinian explanations, as opposed to proximate causes (p. 431). This position ignores the results of an extensive contemporary line of research, the research program of evolutionary developmental biology (evo–devo), which includes the development (the ontogeny of proximate causes) as a relevant evolutionary process (Müller 2007; Love 2015). This process either acts negatively, by restricting the changes in the organization of the elements of the body (or, by extension, in the organization of behavior—Cabej 2012), or positively, by the preferential production of certain forms of organization, or even by its effects on evolvability.

Although this exclusion of proximate causes can be seen as a theoretical preference in relation to contemporary lines of evolutionary thought, it is not neutral in relation to the consequences it brings to the rest of the book, because it leads to the misuse of key concepts. For example, the concept of “development” in a book concerning biology or psychology refers to “ontogeny”, particularly when dealing with brain development (e.g., p. 19). However, Sanderson usually refers to “development” as meaning “evolution” (of the brain, language, culture, dark skin—e.g., p. 21). In a book by an author who does not recognize development as an evolutionary process, the systematic substitution of “development” for “evolution” seems to be more than a lapse.

Another example is the definition of natural selection as a “process whereby genes that best adapt an organism to its environment have a competitive advantage over other genes” (p. 430). As to this definition we can say, first, that after more than a century of its proposition, the concept of gene is still the subject of lively debates in biology (Beurton et al. 2000); for the sake of completeness, this and other controversies should be acknowledged, at least within the plethora of footnotes, or in the book glossary. Second, much of the biological literature emphasizes that genes are not the target of natural selection; for this literature, selection would act on the individual as a whole of biologically relevant features, which would be the result of plenty of epistatic and pleiotropic interactions, including interactions with other organisms and the environment. In this case, the gene would not be the leader, but a follower of evolutionary processes that occur first at the level of the phenotype, as well as an element whose primary role would be to preserve the record of what was selected at the individual level (Burian 2010; Sober and Lewontin 1982; Wimsatt 1980). Finally, to define natural selection based solely on the changes in gene frequencies is to ignore the vast literature about the emergence of epigenetic inheritance systems, on which selection is also active. Non-genetic processes can alter the production of new phenotypes, their transmission and, particularly, their fitness. There is an extensive literature examining the evolutionary role of ecological inheritance (Odling-Smee et al. 2003), or social transmission of information (Richerson et al. 2010; Avital and Jablonka 2000), or even individual, transgenerational phenotypic plasticity (West-Eberhard 2003). In particular, the symbolic inheritance system, which organizes the whole set of

human culture (Richerson and Boyd 2008), should be evaluated as an inheritance system in a book about the evolution of human social behavior.

It is noteworthy that the SBEP, as a school of thought derived from sociobiology, is clearly an inappropriate guide to a meaningful dialogue with the human sciences. Although we share Sanderson's effort to promote a closer relationship between the biological sciences and the humanities, the central focus of the SBEP on ultimate causes (that is, in the natural selection of genes) does not facilitate the dialogue with the human sciences. The incorporation of advances in contemporary evolutionary biology to the scope of SBEP would greatly expand this dialogue. Such theoretical advances, which are culminating in an extended evolutionary synthesis (Pigliucci and Müller 2010; Laland et al. 2015), in fact introduce some of the characteristic properties of human biology into evolutionary theory. Thus, the extended evolutionary synthesis incorporates the evolution of culture, the massive inheritance of modified ecological landscapes, or the immense transgenerational phenotypic plasticity that characterizes humans (Bolhuis et al. 2011). Leave aside these major characteristics of human beings, and we will certainly have an evolutionary theory that provides a very partial view of human evolution. It is true that the SBEP has clearly promoted advances by moving from the famous universal invariants of classic ethology (instincts) to an idea of a typically human plasticity (a programmed plasticity, in the form of behavioral and social adjustments typical of the species, which are selected as a response to recurrent environmental fluctuations along human evolution). But still another move is needed in order to incorporate aspects of our behavior that are very relevant to the human sciences, and which relate to an open-ended, an unrestricted behavioral plasticity. The origin of novelties is greatly facilitated by open-ended behavioral plasticity, and we humans are great innovators. Differential innovation is what renders societies singular, and cultures diverse.

One should also take a closer look at the idea that the SBEP allows us to explain adequately the programmed flexibility of human behavior. The idea that oscillatory regimes of selective pressure (which alternate on a time scale of up to a few generations) favor the evolution of adaptive plasticity has indeed received strong support from evolutionary models and empirical tests (West-Eberhard 2003; Schradin 2013). However, to apply this general idea to the specific case of human beings, we would need clear evidence of environmental fluctuation in the time scale of up to a few generations, recurrent throughout the EEA, fluctuation which would have then selected for a massive number of flexible cognitive modules, precisely adjusted to these predictable fluctuations of environmental challenges. The missing key in this fluctuation/plasticity argument is convincing evidence of the recurring alternations of selective challenges in the human past. One of the main sources of selective pressures for man is man himself: The emergence of social life is one of the driving forces of human evolution, leading to the evolution of many social skills (Byrne and Whiten 1989; Whiten and Byrne 1997; Call and Tomasello 2008). Since social selection pressures are certainly linked to the number of individuals in a group, the complexity of social life has grown exponentially in the last tens of thousands of years. Following this reasoning, the major selective pressures appearing on the course of human evolution (i.e., social life) are most probably not oscillatory, but progressive and directional. This strongly reduces the argument for adaptive plasticity. The progressive increase in human social complexity, in directions most often unpredictable, does indeed require plasticity, but mostly a plasticity that we might call open or unlimited: It requires a constant innovation capacity.

Finally, the idea of a supposed permanent malaise in civilization (resulting from the functioning of universal cognitive modules adapted to the past, and not to the present—

Tooby and Cosmides 1990; Barkow et al. 1992), urgently needs updating (Buller 2005). Contemporary evolution, which may occur in a few dozen generations, has been widely documented in nature, and “appears to be especially common in response to anthropogenic changes in selection and population structure” (Carroll et al. 2007). Since we, humans, change our own selective pressures, we are continually evolving, and our cognitive modules, although they can be adapted to the remote past (EEA, Pleistocene), are also likely adapted to the recent past (a few centuries), which includes life in modern civilizations.

3 The Nonstandard Social Science Models

Sanderson groups the theories of human sciences under a broad umbrella, called Standard Social Science Model (SSSM), which is opposed to the SBEP model (the Integrative Causal Model—ICM, Barkow et al. 1992). This single standard social model allegedly puts in relief the role of culture, minimizing or excluding the role of any biological explanation about human nature. There are two things that are worth pointing out regarding SSSM. First, the SSSM and the SBEP models try to explain distinct qualities of the human phenomenon. While the SSSM has as a starting point and main target of his explanation the sociocultural diversity, evolutionary psychology departs from, and seeks to understand the unifying foundations of humanity. Much of the conflict between these approaches is the result of this simple fact: Their subjects are largely distinct. That is why evolutionary psychology seems unattractive to the human sciences: It explains very little of our immense sociocultural diversity. Incidentally, in this regard Sanderson goes beyond traditional evolutionary psychology (although probably not enough for human scientists), using the approach of human behavioral ecology (a line of research that is traditionally concerned with the behavioral variability among human groups, with the adjustment of the populations to different ecological contexts) to explain ethnographic patterns.

A second point of discussion concerns the alleged coherence of the SSSM. Any standard requires shared aspects, but often theories under one same umbrella definition only share a common external enemy: the rain outside the umbrella. When someone brings together a plethora of theories, many of them in open opposition to each other, and unites them under one “standard model”, often the final result is closer to a patchwork quilt than to a coherent whole. The reader would gain a lot from a more extensive review of the main theories that are hidden under this large and fragmented umbrella, in addition to the theory of social roles and social constructionism that are presented in the text. Even social constructionism, which is portrayed as denying the importance of human biology completely, could be presented with less tainted words. For example, not all social constructionists are anti-realists, or relativists: The socio-contextual constructionism does not deny the existence of material, concrete individuals or social groups. It only states that knowledge, in itself, does not match up with these concrete realities, since knowledge exists only in the subjective interaction of the individuals with these realities. Thus, society would have both an objective and a subjective existence, and social constructionism would be concerned not with an ontological position, but instead it would be committed to an epistemological view of the world (Andrews 2012). Therefore, at least some versions of social constructionism are not in the business of denying human biological reality: They simply want to install properly the subjective knowledge in the midst of these objective biological bases.

Many important theories are openly ignored in the book, thus remaining conveniently hidden under the label SSSM. Socio-constructivist and educators who follow the propositions of Vygotsky, for example, do not deny the existence of (biological) phases within human cognitive development. They only claim that such phases can be modified by the social environment in zones of proximal development, and this certainly does not configure any denial of a biological human nature. We believe that a more comprehensive review of the theories that supposedly fit into SSSM would result either in the demolition of any “standard model”, or at least in a complete distortion of it. It is telling, for example, that Sanderson does not include Durkheim and Tarde in his review of the SSSM. Durkheim and Tarde are authors who shaped the sociological debate of the twentieth century, and they present opposing views with regard to the individual’s contribution to the evolution of society and culture. Although the founders of the SBEP school do cite Durkheim, and assign to him the formulation of SSSM (Barkow et al. 1992), there is a misconception in this quote, because Durkheim never ignored the evolutionary approach, nor opposed himself to it: He just leaned toward more ecological parts of the Darwinian text (Layton 2010). Tarde has a position even very compatible with SBEP (with the Integrative Causal Model—ICM—of Barkow, Cosmides and Tooby—1992), because of his emphasis on interpersonal relations, on imitation (social transmission of information) as the smallest unit of sociology and, therefore, on the individual psychology as the basis for the spread of knowledge, development of culture and emergence of collective behavior (Tarde 2012). In addition to these fundamental theories of sociology, Sanderson also ignores contemporary approaches of cultural/social anthropology, which use ethnographic knowledge and anthropological theories to infer about the origins of sociality, within an evolutionary framework (Barnard 2011). We could go on, but the above seems sufficient to show that the SSSM could be considered as a conceptual umbrella only if we ignore and misrepresent entire lines of thought within the human sciences. Therefore, it does not seem appropriate to characterize the SBEP as a theory that opposes itself to any standard social sciences model. Perhaps it makes more sense to characterize evolutionary psychology¹ simply as one more thread in the rich tapestry of human knowledge.

¹ It is possible that the main point of conflict between the humanities and the biological approaches to the study of human behavior lies not in the friction between a false model of tabula rasa (SSSM) and a model where universal modules govern behavior (ICM). In retrospective, evolutionary psychology made indeed a proper critique of the idea that the cognitive mechanisms are basically free of informational content. The richer in content a cognitive mechanism is, the more specialized is its functioning. If the operation and structure of a cognitive mechanism (neural module) are dependent on, and vary with its informational content, and vice versa, then functionalism falls apart: the independence between structure and function breaks down (Churchland 2005). Basically, this is a critique of Cartesianism, a critique of the incommensurability between the body (biological neural mechanisms) and the mind (dominated by “immaterial” cultural processes). This critique of Cartesianism, however, is much older than the emergence of evolutionary psychology, consisting itself in an inner movement within the human sciences (e.g., Merleau-Ponty 1942, pp. 287–345; Merleau-Ponty 1945, pp. 493–548). In turn, to say that mind and body are effectively interconnected does not imply that they are one single phenomenon, nor does it mean that one predominates over the other; i.e., the interdependence thesis does not imply that biological phenomena (the factor for body construction) dominate cultural phenomena (the inputs of informational content), or vice-versa. No one doubts, for example, that individuals do change as a function of the relationships they establish within their social group. Thus, even if Cartesian dualism is dead, one has to recognize a tension between the causalities that run from the individual to the upper levels of organization (and in this way make up the social tissue) and the causalities that run down from the social tissue and, in this way, impart form to the individual.

4 Ethnographic Flavor

Leaving behind these criticisms concerning the theoretical framework of SBEP, it is clear that Sanderson has managed to integrate a huge amount of knowledge, merging areas of research that do not usually stand side by side. In particular, the approximation between the theoretical insights of human behavioral ecology and the ethnographical knowledge about diverse societies is very productive. This approximation helps understand variations in foraging patterns of hunter-gatherers. Hunter-gatherer societies show less hunting at lower latitudes: the greater diversity of resources and the lower abundance of each dietary item favor generalist foraging strategies. It helps also understand certain cultural practices, such as the worship of cows among Hindus, or food taboos of the Jews (in relation to pigs): Ecological advantages have selectively favored such practices in a particular moment of the history, leading to its posterior fixation as traditions (traditions that can also establish themselves as cultural identity markers). This is how we understand the correlation between dairying practices, the expression of the lactase gene in adults, and the latitudinal gradient of insolation, a well-known coevolutionary history that Sanderson merges with ethnographic knowledge, enriching the explanation with details of particular cultural practices.

Variations in human mating systems, from polyandry to monogamy (social or environmental) to polygyny, are also shown to be correlated with the ecological and social distribution of resources, and again Sanderson goes beyond the theoretical predictions to explain cultural deviants that do not fit the pattern. The preferred investment (in non-industrial societies) in caring for the female daughters (versus the preferred investment in sons) is also explained by scarcity (versus abundance) of resources. We understand then why societies of hunter-gatherers or horticulturalists are more egalitarian in their gender relations: There are few resources to be monopolized. In turn, in pastoral or agricultural societies (with more resources) men dominate the means of production, generating a huge power asymmetry. From the point of view of evolutionary psychology, this asymmetry arises mainly as a function of gender differences in preferences: universally, females value parental care more than males, whereas males value risky activities more than females.

The evolution of social organization is associated with the size of the societies, which in turn is correlated to socioecology (distribution of resources). Associated with increases in the size of society (from bands and tribes, through chiefdoms and states, eventually reaching the size of empires) is an increase in the number of command positions, and eventually a hierarchy of command emerges. Increases in the size of society are also associated with a specialization of powers (religious, political, economic, military) and of occupations (onset of professions).

Given the richness of these socio-ecological explanations seasoned with ethnographic knowledge, one cannot hide discontent when Sanderson discusses human sexuality. At this point, the author does not explore differences between societies, nor emphasizes societies that appear as outliers to the SBEP model. There is only the repetition of the general, predicted pattern of male and female universal sexual preferences. Males prefer multiple young female partners, with a low waist-to-hip ratio, symmetrical faces, and characteristics that are close to the population mean. What about females? Females prefer partners with high status and many resources. Some variation within the theme do appear when the context changes from long- to short-term relationships, but again these variations are universal.

Another point that deserves more attention is the origin of power and social inequality. For the SBEP, the status striving tendencies of humans lie at the base of power inequality. For this argument to hold still, one has to take for granted that status striving is universal and that properties of individuals (status striving) do translate easily into social properties (inequality). As to universality, Sanderson himself shows that individuals in societies of hunter-gatherers are less worried with status and that their hierarchies are pretty unstable. This piece of data in itself shows that there is variation between societies in the relevance of status, thus eroding the universality of status striving. Also, for someone adhering to the main idea of the SBEP, namely, that cognitive modules were selected in the EEA, the small status inequalities between hunter-gatherers (and in small societies in general) should be telling. Small groups were certainly the norm in the EEA, and thus under the SBEP principles, cognitive modules for social performance (including status striving modules) should be tuned to life in small groups, those that actually show small status inequalities.

Sanderson argues that, given the competitive nature of humans (individuals seeking status), the emergence of political power is inevitable with a few individuals monopolizing the surplus produced in some socio-ecological settings. This subtle naturalization of politics, that is, the building of political systems beginning from innate characteristics of individuals, may sound somewhat naive, and deserves further inspection. This naturalization requires a very unproblematic, smooth leap from the individual level to the social level, since the properties at the former level of organization seem to be the main or sole cause of the properties at the latter level. Nevertheless, there is a vast accumulated knowledge, coming from the complexity sciences,² showing that this is not an unproblematic leap. Sanderson is certainly aware of the emergent properties (non-existent in the parts that make up the system) that appear not only at the social level (built up from interactions between individuals; Couzin and Krause 2003; Buhl et al. 2006; Sumpter 2010), but also at the individual level of organization (built up from epigenetic interactions—Juarrero 1999; Bechtel 2008; Cabej 2012). Thus, it seems that the emergence of social properties deserves more attention, especially when dealing with human societies, where the individual behavior is promptly adjusted to the social requirements. Perhaps this situation is still reminiscent of the adoption of the evolutionary synthesis, which clearly emphasizes the causation from the genes up to the construction of the social edifice. Perhaps this is still another reason why the extended evolutionary synthesis (Pigliucci and Müller 2010), which takes into account the self-organized developmental processes, could be a better theoretical basis for a new and extended evolutionary psychology.

5 Morality, Religion, and Arts

Sanderson does not shy away from controversial issues such as race and racism, always confronting rival theories in an elegant way. He argues that racism is probably derived from the evolution of perceptual systems focused on the recognition of distinct ethnic groups. In this line of reasoning, the adaptive value of these enhanced perceptual systems could arise from a mild form of kin selection. Since genetic similarity within the same

² Complexity sciences comprise a remarkably interdisciplinary field of research, dealing with how properties of a system emerge from the interaction of its constituent parts, thus explaining how the parts engage in collective behavior. Researchers from disparate fields, such as economics, biology, chemistry, physics, and others, build on statistical physics and nonlinear dynamics to model complex, natural systems. Usually, the recursive and nonlinear nature of the interactions within the system, and also between the system and its surroundings, lead to the emergence of organized and unpredictable collective behavior.

ethnic group is greater than the similarity between different ethnic groups, it would be genetically advantageous to help members of one's own ethnic group. This advantage would select for the evolution of the discrimination between groups. In seeking support for this position, Sanderson quotes a famous passage in which Darwin points out that tribes with several men, who sacrifice themselves to help in-group members, are favored by natural selection, in relation to tribes with few altruistic men. Nevertheless, while Sanderson interprets this quote as a support for kin selection, one can interpret it, even more directly, as supporting the opposite thesis: that group selection is an important factor in human evolution.³ If group selection was the driving force behind racism (or ethnic identity), these moral behaviors could be obtained, for example, via the evolution of different cultures in the different groups, or via cultural niche construction (Laland et al. 2001). Given the effervescent current debate about the evolution of sociality, with kin selection advocates in sharp opposition to group selection defenders (Nowak et al. 2010; Liao et al. 2015), it seems extremely harmful to make a unilateral statement on the issue. In addition, much of the thinking about the origin of moral behavior (within the humanities) focuses on the development (or evolution) of social rules that increase group cohesion through ethical behavior. This logic fits perfectly to the logic of selection at the group level: More cohesive groups would be more difficult to defeat and therefore would have more success than groups with low cohesion.

With regard to religion and the arts (visual arts, literature, music), that is, with respect to a traditionally cultural domain of investigation, Sanderson again discusses elegantly many contrasting evolutionary theories. Some theories posit that these cultural attributes are the by-product of human cognitive adaptations that have been selected for other purposes. Other theories suggest that there are modules for distinct cultural domains and that these modules have been selected because of direct fitness gains. He presents alternative theories that are based either on natural selection or on sexual selection. Some of these theories are based upon selection acting at the level of the gene, others at the level of the individual, and others at the level of the group. Sanderson goes as far as to discard completely these evolutionary theories, considering them misleading or difficult to test, when it comes to artistic production. This is one of the rare moments in the book where Sanderson clearly distances himself from the SBEP, presenting a critical stance.

With regard to religion, Sanderson subtly criticizes the New Atheists such as Richard Dawkins, by their fervent devotion to the anti-religious crusade. Religion can be seen as

³ Darwin obviously does not advocate for group selection, or kin selection, since these theories arose much later in the history of evolutionary thought. The discussion is about the compatibility of Darwinian thought with these views about the selection process. In kin selection, the units of selection are the genes: some alleles are more successful than others; besides that, it may be advantageous to help relatives because this helps perpetuate the common genetics that unites the interactors. In group selection, the selection unit is the group: some groups are more successful than others, and so some groups propagate more than others. Darwin (1874) explicitly writes that "A tribe including many members who, from possessing in a high degree the spirit of patriotism, fidelity, obedience, courage, and sympathy, were always ready to aid one another, and to sacrifice themselves for the common good, would be victorious over most other tribes; and this would be natural selection". It is clear in this passage that the difference between the tribes is the relevant factor. To make this interpretation even more straightforward, ruling out individuals as the unit of selection, Darwin explains in the same paragraph that "It must not be forgotten that although the high standard of morality gives but a slight or no advantage to each individual man and his children over the other men of the same tribe, yet that an increase in the number of well-endowed men and an advancement in the standard of morality will certainly give an immense advantage to one tribe over another". There seems to be clear, looking at both quotes together, that Darwin considers the tribes as the main locus of fitness differences (some groups are more successful than others: group selection), and that for him fitness differences between individuals seem less relevant when it comes to explaining the evolution of these moral behaviors.

adaptive, to the extent that empirical studies show a correlation between religiosity and health gains, or longevity. Alternatively, religion could be simply a by-product of mental modules selected for other functions such as the detection of preys and predators. Perceptual modules, such as prey or predator detectors, could overshoot their goal, for example, they could be more sensitive than necessary, leading to a small percentage of wrong detections. These hypersensitive agency detection modules could lead us to detect agency in images (visual art), thus inducing the faith in supernatural entities. In any case, if religious behavior has been selected in our evolutionary past, anti-religious crusades will hardly be successful, simply because religion would have strong biological basis.

In discussing some of these strongly sociocultural attributes of humans, Sanderson sometimes separates too clearly the biological and the cultural, notwithstanding the interconnections revealed by the coevolution between these domains (Richerson and Boyd 2008; Feldman and Laland 1996). He states that natural selection acts on genes, while social selection is based on the fulfilling of the needs of individuals (who ultimately select the best sociocultural system). One point where this didactical separation seems to be prejudicial is in the analysis of the evolution of social organization. First, he shows that the sociocultural systems (hunter-gatherers, horticulturalists, pastoralists, tribes, chiefdoms, states) evolve one into the other as a function of ecological and demographical selection pressures. The system that fulfills better the needs of the individuals will prevail over the other. Population growth and environmental changes could reduce the fitness of some sociocultural systems, pressing for the change to other social organizations. For example, the hunter-gatherer system fits the needs of their members when resources are scarce and unpredictable, but in other circumstances horticulturalists will prevail. The climax of this evolution would be capitalism, which is up to now the system with the highest fitness, because it promotes the greater welfare for the individuals (pp. 69–70). So here again we see a kind of naturalization of social systems, and we are told of a natural course to the evolution of society, with capitalism at its apex. And again, this kind of naturalization seems overly simplistic, and a note of precaution against the naturalization of such complex systems seems necessary.

As a first critique to this naturalization of capitalism, it is worth remembering that in many societies there is no such thing as the selection of a particular sociocultural system by citizens (not even metaphorically): Many citizens of the world live under regimens where they simply cannot choose much about their lives, sometimes for centuries. As a second critique, one should be aware that, from a strictly evolutionary standpoint, selection for the most efficient socioeconomic system (with capitalism at its apex) will not necessarily promote the welfare of the individuals; there can always exist conflicting demands from selection operating at distinct levels (the individual and the social levels). Extremely high levels of socioeconomic efficiency can be achieved at the expense of individual (or even social subgroups) welfare. Selection improves the cost-benefit relation, and high costs can be maintained when associated with higher benefits (productivity gains); when costs and benefits are not equally distributed through the individuals or social subgroups (some paying the costs, others receiving the benefits), this introduces social costs on top of individual costs. Also, it is well known that selection “sees” more easily the short-term effects, so that strategies that have short-term benefits are selected even if they have formidable costs, when these costs appear only in the long run (Hoglund 1996; Rankin et al. 2007; Korb and Foster 2010; Tsuji and Dobata 2011). This seems to be exactly the situation we are in at this very moment of our global civilization: Industrialization is being selected because of the immediate profits and satisfaction of consumer desires, even if scientists, united around intergovernmental panel studies, repeatedly announce the

immense costs we will have to pay in the near future, because of global climate changes. As a third, and final critique, the naturalization of capitalism is misguided because there is a lot of contingency in evolutionary processes. Nowadays we have even clear-cut empirical evidence for the importance of contingency in evolution. Because of contingency, evolution does not repeat itself, and the idea of old school evolutionary ecology that the same optimal behavioral strategy will evolve over and over again, because populations are climbing the same adaptive peak, is not guaranteed, not even for the evolution of such simpler organisms as bacteria (Blount et al. 2008). Thus, if one could run again the evolution of humanity from the very start, there are no guarantees that capitalism would even appear again, much less that it would prevail.

6 Concluding Remarks

Sanderson performs an admirable synthesis of a vast literature and gives a very positive ethnographic and sociological flavor to evolutionary psychology (of the Santa Barbara school). The SBEP has certainly done a great service to the humanities, by embracing evolutionary thinking and by insisting on a biologically oriented human nature: biology, particularly evolution, cannot be left outside of any realistic theory about human nature. However, the biological guidance adopted, the evolutionary synthesis of the last century, is outdated. Contemporary evolutionary biology is richer and far more complex than in the days of Mayr, Fisher, Simpson and the other founding fathers of the synthesis. The richness of theoretical approaches within contemporary evolutionary biology allows for a better dialogue and a greater proximity to the human sciences through a number of fronts, such as gene-culture coevolution, cultural niche construction, ecological engineering, epigenetic inheritance systems, and evolutionary developmental biology. All these theoretical advances introduce greater speed to evolutionary processes, thus changing the explanations about the human evolutionary process. This extension of evolutionary theory acknowledges the long-lasting insight of human scientists that the human mind has a much more agile nature than that Pleistocene mindset imagined by evolutionary psychology. Our current human nature is definitely more dynamic than the one derived from the premises of the evolutionary biology of the last century: There is no necessary malaise in the civilization.

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