Human evolution: a role for culture?

Paulo C. Abrantes
University of Brasília

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Abstract: This paper presents a range of approaches going from the complete rejection of any role culture could have played in human evolution, to the other extreme in the range in which the very dichotomy between nature and culture is rejected. We will also go through middle-range standpoints, such as that of gene-culture coevolution theorists, that attach to culture a central role in human evolution. The clash between these approaches is still going on in the contemporary scene, with implications for the way boundaries are set inside disciplines such as Anthropology, as well as for conceiving how it is related to Psychology and Biology, among other disciplines. We will show that some debates in the Philosophy of Biology, concerning an extension of the neo-Darwinian theory of evolution, have contributed to clarify the issues, and have been followed by some anthropologists who are also concerned by the way human development and evolution are separately addressed in orthodox approaches.

Key words: nature/nurture dichotomy; polemical exchanges; interdisciplinarity; human evolution; critical point theory; gene-culture coevolution; dual inheritance theory; biosocial evolution; developmental systems theory

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In this paper we will show that the topic of human evolution, and especially that of the role culture could have played in this process, has been an arena in which confrontational interactions have been going on in several disciplines, especially in Anthropology.

Marcelo Dascal proposed a distinction between different kinds of polemical exchanges: discussions, disputes and controversies. Discussions and disputes deploy strategies that favor dichotomies which harden standpoints and boundaries, blocking exchanges and

creativity. Dichotomies are, for Dascal "strategic argumentative tools" (2008, p. 33). A controversy is non-dichotomus, what

> ... grants it a flexibility, an open-endedness, a challenging attitude vis-à-vis established beliefs and practices, a non-dogmatic rationality that account for its special contribution to the growth of knowledge and its explanation: the creation of a space where radical innovation within rational boundaries becomes possible (Dascal, 2008, p. 46; 1998).

Drawing on Dascal's terminology and categorization, we will argue that some of the confrontations regarding the relationships between human evolution and cultural dynamics have the properties of a dispute, favoring a nature/culture dichotomization.[1] This dispute is, still nowadays, a major obstacle for dealing adequately with those processes in their complexity and relationship.

This topic offers also a way to ponder on some of the consequences of a dispute, as far as exchanges (or the lack of) between disciplines, and also between areas inside a discipline, are concerned. A lot of ink has been spilt on the issue of interdisciplinarity, but not as much on the cleavages internal to disciplines- often as a consequence of dichotomies that are tacitly assumed-, and the means to eventually overcome them. Again, Anthropology is a good case-study on this regard.

Anthropologists don't agree about the reasons for the divide in their discipline between a biological anthropology (initially named 'physical anthropology') and a cultural anthropology[2]. Foley and Ingold, for instance, have the same concern with the contemporary status of Anthropology, as far as its integrity is at stake, although they have different accounts on this matter. Foley points to a clash that has been going on during the 20th century between an evolutionary perspective and a cultural one:

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[1] We will also refer to that dichotomy as the nature/nurture one. In his 2008 paper, Dascal lists several dichotomies (body/mind, animality/humanity among others) but not the nature/nurture dichotomy. For some reason, this dichotomy is neither explicitly mentioned in any other of his papers we looked at. I am grateful to Oswaldo Melo for his help in doing this search.

[2] This is how this area is named in the USA. In Britain, it is usually called 'social anthropology' and this difference in terminology expresses differences in viewpoints about its objects and methods. We can't go into this here. Both names will be used here interchangeably to refer to the same area and to distinguish it from biological anthropology.

> In 1904, human evolution was the totality of anthropology, including prehistoric archaeology, which came under the Board of Anthropology. Nothing could be more different a hundred years later. Over the course of the twentieth century this grand view of anthropology as the search for human history through the lens of evolution was abandoned. Social anthropology rejected an evolutionary framework in favour of a purely cultural one (…) Malinowski and Boas had become dominant figures and drawn the discipline away from the natural sciences and towards the social ones (2005, p. 1).

Ingold blames not the anthropologists for this situation, but a dogmatic attitude taken towards Darwin's theory, after the accomplishment of its synthesis with genetics:

> Anthropology has always looked beyond its borders for sources of theoretical inspiration, and has sought creative conjunctions between ideas that other disciplines may have maintained in separate compartments. This eclecticism is the very source of its openness and vitality. Conversely, the hegemony of the neo-Darwinian paradigm in 'evolutionary biology' has effectively closed it off, locking it up within a hermetically sealed, intellectual universe of its own (2007, p. 15).

Perhaps these differences in diagnosis amount, at the end, to disciplinary allegiances: Foley is a biological anthropologist whereas Ingold is a social anthropologist.[3] We will see, however, that the disparity of their appraisals is, in fact, rooted in different conceptions about what present day Biology is, or should be, like.

Some anthropologists and philosophers of biology have been doing a conceptual work in the last decades that can offer tools for "tactical moves" (Dascal, 1998) which can turn what can be evaluated as a sterile dispute into a controversy, by means of a de-dichotomization of the opposition nature/culture. This might be an opportunity for making progress in understanding human evolution, among other topics. If this controversy is ever resolved, Anthropology might restore, as a consequence, its integrity

[3] Ingold is undeniably acquainted with research being done in biological anthropology, and more generally in biology for that matter. He blames, however, the other camp to ignore largely the research that is being done in social anthropology (Ingold, 2007).

as a discipline by closing the gap between those two areas and, additionally, a fruitful interchange with other fields in the social and natural sciences be in view.

A way to understand what is at stake is to display three contrasting frameworks for dealing with the question in the title of the paper, which are milestones in the debate:

1. Theory of the 'critical point'

This stance thoroughly denies any role for culture in human evolution, sharply distinguishing biological evolution and cultural dynamics. Historically, this position was endorsed by A. Kroeber that claimed a 'superorganic' status for culture, coupled with the idea that there was a 'critical point' in hominin evolution in which culture emerged, after *Homo sapiens*' biological evolution had already came to an end. A position close to that one is still sustained today in different areas of the Academy. It grants to culture a *proximate* role in understanding human behaviour and it emphasizes the notorious diversity of behaviors and social organizations in human groups. This standpoint often goes with a critique of the idea of human nature, understood as a set of biological and psychological traits shared by all human beings, which evolved mainly by natural selection, among other causes. This theory clearly implies a dichotomy nature/culture.

2. Gene-culture coevolution

Dual inheritance theory, proposed by P. Richerson and R. Boyd, is the main theory in this category. It presupposes that at a certain point in hominin evolution, culture started to function as a new inheritance system and to interact with the genetic inheritance system, bringing about evolved psychological propensities and biases that account for cooperation in large, non-kin, groups, besides other species-specific phenotypic traits. In this theory, culture is not only a *proximate* cause of human behaviour but also an *ultimate* (evolutionary) cause of some traits of human psychology. Therefore, culture is able to explain behavioral phenotypic traits in *Homo sapiens*, including our ultra-sociality.

3. Biosocial evolution

The very nature/culture dichotomy is boldly dismissed in this perspective. Anthropologists such as T. Ingold, M. Bloch and A. Fuentes sustain that development and evolution can't be thought as separated processes. They champion this position and argue that, as a consequence, individual development as well as cultural and social history should be seen as sequels to biological evolution: those would be, actually, abstractions from a unique process, namely "biosocial evolution". Although those

anthropologists come from a completely different academic tradition and arrived at their positions in a fairly independent way, their accounts are in notable agreement with those of some philosophers of biology with a focus on developmental systems and not on genes in their account of the evolutionary process.

A conflict between those frameworks[4] has implications for how borders are traced inside disciplines such as Anthropology, Psychology and Biology, as well as for how the relations between them are entertained.[5]

In the following, those perspectives will be worked out in more detail, highlighting their commitments to strategies of nature/nurture dichotomization or, otherwise, of de-dichotomization.

Dichotomization

1. *Culture as superorganic*

The theory of the critical point[6] presupposes the idea that culture and civilization are "superorganic", a term introduced by Spencer and adopted, with qualifications, by Kroeber in a classic paper (1917, p. 188): "... human society [holds] a specific content that is non-organic".

Curiously, Kroeber uses the term 'superorganic' only once, in the title of his paper, what can be interpreted as a sign of the divergences he had with Spencer, that forged it around the idea of "heredity by acquirement" (Kroeber, *ibid*., p. 187-8; Stocking, 1991, p. 298).

Kroeber argues that the "current confusion of the organic and the social is the predominance, in the present phase of the history of thought, of the idea of evolution" (*Ibid*., p. 163). This "confusion" would be a result of the injustifiable extension of an analogy between "organic evolution" and "social evolution".[7] There are, however,

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[4] There are, certainly, other frameworks. We don't aim at an exhaustive presentation of all current proposals but rather emphasize the strategies associated with the chosen three and the tactical moves used by the participants in the relevant confrontational exchanges (refer to note 16).

[5] It is significant that a recent issue of *Current Anthropology* (v. 57, 2016) addresses this very topic: 'Reintegrating Anthropology: from inside out'.

[6] Kroeber gets to an explicit and thorough formulation of the critical point theory only in his 1948 book *Anthropology*.

[7] It stands out that Kroeber uses the same term 'evolution' in both expressions, despite the many differences he underlines between those processes.

disanalogies and Kroeber emphasizes, especially, the impossibility of extending inheritance to social evolution: "... organic evolution is inevitably connected with hereditary processes; the social evolution which characterizes the progress of civilization, on the other hand, is not, or not necessarily, tied up with hereditary agencies" (*Ibid*. p. 167).

He strengthens the same point later in the paper: "… civilization and heredity are two things that operate in entirely separate ways" (*Ibid*. p. 185). It is important to further develop this point here since we will be addressing, below, a theory that claims exactly the opposite: that culture became an inheritance system in human evolution (Richerson & Boyd, 2002; 2005).

'Heredity' means, in the context of Kroeber's paper, "the doctrine of heredity by acquisition or accumulation", championed by Spencer. This meaning has, of course, the imprints of neolamarckism which boomed at the end of the19th century, at the same time Darwinism was in decline, as a consequence of fierce criticism and skepticism about the role natural selection plays in evolution (Bowler, 1983). We hear neolamarckian echoes when Kroeber criticises the ideas of Lester Ward, which are summarized as follows: "Mental qualities are not subject to natural selection; hence they must be accumulated in man by acquirement and fixed by heredity" (Kroeber, 1917, p.187). This kind of claim is, for Kroeber, a consequence of the "habit of mind" of looking at the social "through the glass of the organic" (*Ibid*., *id*.).

The idea that the social is non-organic is presented by Kroeber metaphorically: "The dawn of the social ... is not a link in any chain, not a step in a path, but a leap to another plane" (1917, p. 209).

In a famous illustration, the "evolution of the organic" is represented by a line that smothly goes up above the "in-organic" horizontal level. At a certain point in that "evolution", another line, representing the "development of civilization", detaches from the previous one and its slope increases quickly upwards.[8]

In our interpretation, the organic/cultural opposition plays, in Kroeber's thinking (and in the following generation of anthropologists'), the role of a dichotomy in a dispute (in Dascal's sense of the term). It is compelling how Kroeber opens the 1917 paper, listing

[8] Kroeber makes explicit that "Height above the base is degree of advancement, whether that be complexity, heterogeneity, degree of coordination or anything else" (*Ibid*., p. 211).

some “complementary antitheses” that have been “characteristic of western civilization”:

> One of these pairs of ideas with which our world has been laboring for some two thousand years is expressed in the words *body* and *soul*. Another couplet that has served its useful purpose, but which science is now often endeavoring to rid itself of, at least in certain aspects, is the distinction of the *physical* from the *mental*. A third discrimination is that of the *vital* from the *social*, or in other phraseology, of the *organic* and the *cultural* (Kroeber, 1917, p. 163).

Strikingly, he embraces the organic/cultural “antithesis” while he is willing to dismiss the other ones. Arguably, this is not a coherent position since the nature/culture dichotomy rests, primarily, on the body/mind dichotomy (Oyama, 2003, p. 173; Ingold, 2007, p. 17). We will not pursue this line of argument here, though.

C. Geertz offers a clear construal of the critical point theory in a 1964 paper:

> In the critical point of view man was considered more or less complete, neurologically at least, before the growth of culture commenced, because the biological capacity for culture was an all-or-none thing. Once achieved it was achieved entirely; all else was a mere adding on of new customs and developing of older ones. Organic evolution proceeded up to a certain point and then, the cerebral Rubicon crossed, cultural evolution took over, a process in itself autonomous and not dependent upon or productive of further nervous system alteration (1964, p. 42).

Geertz goes on challenging this stance:

> The fact that this is apparently not the case, that cultural development was underway well before organic development ceased, is of fundamental significance for our view of the nature of man. He becomes, now, not just the producer of culture but, in a specifically biological sense, its product. This is true because the pattern-of-selection pressures during the terminal phases of the evolution of the human animal was partly determined by the initial phases of human cultural development, not simply by natural environmental factors alone... (Geertz, *ibid*. *id*.).

Geertz pinpoints that one of Kroebers' chief motivations was the need to reaffirm the "psychological unity of humanity" (the latter prefers the expression "equality of racial capacity"), as a barricade against the risks of racism and, fundamentally, of poligenism which had haunted Anthropology since the 19th century (Kroeber, 1917, p. 180-1; Stocking, 1991, p. 313-4; Degler, 1991).

Tylor and Morgan were monogenists but made the mistake to uphold the view that the various human groups follow an unidirectional and progressive 'evolutionary' trajectory. They believed that various extant human groups exhibit an inferior degree of civilization and were, therefore, viewed as "live fossils". Arguably, they couldn't see that this view was in contradiction with the assumed thesis of the "psychological unity of humanity" (Bloch, 2012, p. 28-32).

Since Boas and Kroeber, at least, we have seen a dispute going on, in the first half of the 20th century, to secure the autonomy of their field and the distinctiveness of its subject matter. To assert an organic/cultural dichotomy was crucial in their strategy. Boas set himself apart from 19th century anthropologists such as Tylor, so-called 'evolutionists'[9], by affirming the singularity of the various cultures and rejecting the use of the expressions 'cultural capacity' or 'culture' to refer to a property shared by all humans. Boas' disciples, R. Benedict e Margaret Mead, followed him by favoring the pole 'nurture' of the opposition, the only legitimate way, in their view, to fully explain human behavior and to ground the human predicament. Laland and Brown point, effectively, to the 1930s as a crucial period in the history Anthropology that accomplished a full "transition from hereditarianism to environmentalism" (Laland & Brown, 2002, p. 54).[10]

[9] This 'evolutionism' actually goes back to the 18th century Enlightenment and it would be a mistake to interprete it in Darwinian terms. Stocking (1991, p. 302-14) uses the expression "classical evolutionism" to refer to positions such as that of Tylor. Most of the time, we will be using, in this paper, the term 'evolution' with its established meaning in present-day neo-Darwinian theory. Other meanings of the term, associated with a critique of this very theory, should be clear from the context.

[10] They were, more acurately, proposing a kind of diffusionism as an alternative to hereditarianism (Stocking, 1991).

Some anthropologists in the 1960's and 70's, among them Geertz and W. Durham, started to question the dichotomy organic/cultural and, therefore, the very strategy that was conceived by Boas.[11]

Concepts of culture

At this point we have to be more precise concerning the concept of culture. This is not straightforward, though: it's wellknown that Kroeber and Kluckhohn (1952) listed 164 definitions of 'culture'! A definition embodies, effectively, the problems, objectifs and methods of a particular research program.

Kroeber was pivotal in defending the critical point theory, so we will mention first his definition, proposed in 1948: "... the mass of learned and transmitted motor reactions, habits, techniques, ideas, and values— and the behavior they induce — is what constitutes culture. Culture is the special and exclusive product of men, and is their distinctive quality in the cosmos" (Kroeber & Kluckhorn, *ibid*., p. 44).

Kroeber's notion of culture echoes, in some respects, that one proposed in 1871 by E. Tylor, usually viewed as the first one to forge a technical definition useful for doing anthropological research[12]: "Culture, or civilization is … that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society" (Kroeber & Kluckhorn, *ibid*., p. 43).

In the next section we will be discussing Richerson and Boyd's dual inheritance theory, so it is appropriate to introduce here, for ease of comparison, their definition of culture, which plays a crucial role in their program: "Culture is information capable of affecting individuals' behavior that they acquire from other members of their species through teaching, imitation, and other forms of social transmission" (Richerson & Boyd, 2005, p. 5).

This definition is of another ilk, contrasting strikingly with Kroeber's and Tylor's concepts of culture, presented above. It focuses on the *individual* (and not in society or the group), as well as on the *psychological process* of social learning, and not on

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[11] The acrimonious reaction to the publication of E. O. Wilson's book *Sociobiology: the new synthesis* in 1975 possibly acted as a hindrance to the development of these early proposals of gene-culture interaction. It is beyond doubt that it strengthned the longstanding dispute between hereditarianism and environmentalism. We can't give here empirical support for this historiographical hypothesis. Segerstråle (2001), Durham (1991, 2, 17-20) and Laland & Brown (2002, p. 97-8) offer relevant evidence.

[12] This historical claim has been challenged, however, by Stocking (1991, p. 302-3).

historical tradition, like the former definitions. Richerson and Boyd also put an emphasis on *cultural transmission*, since dual inheritance theory presupposes that culture became an inheritance system at a certain point in the evolution of the hominin lineage, functioning in parallel to genetic inheritance (1985).

In relation to cultural dynamics, Boyd and Richerson point to the fact that the notions of culture concocted in the 19th century were *descriptive*, such as that by Tylor. Their proponents had nothing to say about the causes of that process (that is, they were not *explanatory*). Those conceptions were also committed to an idea of progressive stages in human societies, associated with an increase in complexity or some other quality, as we made explicit above (Abrantes, 2014; cf. note 9).

Furthermore, Boyd and Richerson propose an ideational concept of culture (Keesing, 1974) that contrasts with concepts that do other jobs, as in Kroeber's theory for instance.[13]

De-dichotomization

2. *Gene-culture coevolution*

Dual inheritance theory is one of the main contemporary approaches to human evolution which presuppose that several human traits are the result of gene-culture coevolution (Richerson & Boyd, 2005; Laland & Brown, 2002).

If we adopt Richerson and Boyd's definition of culture, presented above, many animals surely have culture. However, the evidence presently available is that cultural *accumulation* is a very rare phenomenon.[14] In the human case, culture functions as

[13] It is appropriate to quote Kroeber on this regard: "Mentality relates to the individual. The social or cultural, on the other hand, is in its very essence non-individual. Civilization as such, begins only where the individual ends…" (Kroeber, 1917, p. 192-3). Kroeber refuses to accept an individualistic stance as a way to objectify culture and he correctly associates it with Darwinism (what later will be named "population thinking"). This is another aspect in which, for Kroeber, the social and the biological are distinguished. Boas and his disciple Kroeber diverged on this point. Boas "neither eliminated the individual nor hypostatized society", although inconsistencies can be found in his work (Buckley, 1996, p. 264). It is beyond our aims to go into this point of contention, albeit revealing.

[14] It is important not to conflate the question about the origins of culture with a totally different one, about cultural evolution. To model cultural dynamics is a different task from devising a scenario of how culture, as a new kind of inheritance system, evolved in the first place, on top of the genetic system.

another inheritance system, making available, therefore, a faster way to meet adaptive problems in a wide range of environmental conditions.

Gene-culture coevolution was supposedly responsible for bringing about specific traits in our species, especially the ability to cooperate in large non-parental groups. Richerson and Boyd claim that it is not enough to explain the observable variation in human behavior on the basis of just genes and environment, a mistake we find in other approaches to human evolution, such as in evolutionary psychology and in behavioral ecology[15]: "The evidence accords better with the traditional views of cultural anthropologists and kindred thinkers in other disciplines: heritable cultural differences are crucial for understanding human behavior" (2005, p.19; cf. Laland et al. 2010). Culture is in their theory an evolutionary cause of a psychological profile that shapes human behavior (Richerson & Boyd, *ibid*., p. 8).[16]

Concerning cultural evolution (refer to note 15), Richerson and Boyd model it by assuming "forces" which are *not* analogous to those acting on genetically-based evolution (2005, p. 68-9). Among those, we have several biases in the way we assimilate and transmit culture, as well as a special kind of natural selection acting specifically on cultural variation. Cultural evolution is not, therefore, strictly analogous to biological evolution as understood in neo-Darwinism. This is not an unsurmontable obstacle, however, for conceiving a coevolution between those two processes. Conformism as a psychological bias plays a prominent role in supressing variation inside each cultural group, at the same time that it increases variation between groups and sustains this variation along the time. Therefore, culture as a new inheritance system provided the necessary variation between groups for natural selection to act also at the group level. Cultural niches were responsible, at another level of selection, for different selective pressures on the agents in each group. In a scenario of competition between groups, the interplay between selective forces acting simultaneously at several

[15] We don't have space in this paper to go into those other contemporary approaches to human evolution. For a good overview, see Laland & Brown, 2012. Anyway, in those approaches culture doesn't play a significant role in evolution, if any.

[16] Less speculatively, there is much empirical evidence for asserting that adult lactose absorption, a non-behavioral trait in our species, was a relatively recent effect of the coevolution between a dairying culture of pastoral groups and genes responsible for lactase production.

levels brought about conspicuous evolutionary effects, including those psychological traits that underly our ultra-sociality.[17]

In the next section we will look at anthropologists which argue that we should reconsider the terms of the two previous programs, since they would both be committed to a dichotomy nature/culture. It is explicit in Kroeber, as we have shownn; Richerson and Boyd would also have implicitly assumed it. Ingold places the latter's approach under the category 'interactionism', to stress the fact that they presuppose a connection between the genetic and the cultural inheritance systems (Ingold, 2000a, p. 386).[18]

Ingold distinguishes four stages in the history of Anthropology: the Enlightenment, the Consensual, the Interactionist and the Relational stages (Ingold, 1986, p. 48; 2008, p. 23). The first one is at the origin of Tylor's anthropology; the second started with Boas and Kroeber. Geertz would be a representative of the interactionist stage, and we think Durham should also be included here.[19]

3. *Biosocial evolution*

In order to get rid altogether of the dichotomy nature/nurture, the proposals we will present next vindicate some kind of revision, more or less profound, of the theory of evolution that came out of the great synthesis.

Ingold is the most radical on this regard: he goes as far as saying that "Darwinian theory is dead" and calls for a new biology, in which developmental processes would be at the center (Ingold, 2000b, p. 260). Only an approach that integrates development and evolution can convey, in his view, a revision of the ontologies presupposed by

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[17] Kin selection and reciprocal altruism are not enough to support cooperation in groups whose members are not genetically-related or, else, in large groups. Richerson and Boyd point, therefore, to other mechanisms for the suppression of variation between cultural groups: moralistic aggression and symbolic markers (Abrantes, 2013; Bernal & Abrantes, submitted).

[18] Gene-culture interaction should not be conflated with the interaction between genes and environment, which is more consensual. Actually, Richerson and Boyd don't incorporate culture in the environment, since the former is taken as a kind of inheritance system that has a degree of autonomy with respect to the dynamics of the environment. This autonomy is assured even if we accept that a generation inherits the environment constructed by the previous generation. Odling-Smee et al. (2003) distinguish, effectively, ecological inheritance and cultural inheritance.

[19] At first sight it might seem odd to place Geertz side by side gene-culture coevolution theorists. Nonetheless, Richerson & Boyd (1985, p. 281) and also Durham (1991, p. 4) praise Geertz's contribution to their approaches (cf. Bloch, 2012, p. 41).

biologists and anthropologists today: “There can [...] be no separation between ontogeny and phylogeny, development and evolution. Ontogenesis, far from being accessory to evolutionary change, is the very fount from which the evolutionary process unfolds” (Ingold, 2000a, p. 385).

He argues that in place of the theory of evolution accepted nowadays we need, instead, a "general theory of the evolution of biosocial becomings" (Ingold, 2013, p. 12). He expects that this new standpoint will, eventually, reunify Anthropology. Genes and culture, when abstracted from the development system, exist just “in the eyes of the investigators”, that is, biologists and anthropologists (2007, p. 13).

The reification of dichotomies in the disputes going on in Anthropology and in other disciplines will be avoided if we come up with a new biological construal: “Despite Boas’s strictures, there is nothing wrong with accounting for ... any aspect of cultural form on a “purely biological basis”, so long as the biology in question is of development, not genetics” (2007, p. 13; 2004, p. 217).

This construal would be a contribution to the relational stage in the history of Anthropology. Before further developing these ideas, we would like to look at other anthropologists’ viewpoints. Despite their differences with Ingold, they also emphasize the need to integrate development and evolution.

Agustín Fuentes is more moderate than Ingold: he acknowledges the need of an extended theory of evolution, looking for a new theoretical toolkit that includes niche construction and that postulates other inheritance systems besides the genetic one. He also calls for a closer relationship between evolutionary and developmental processes (Fuentes, 2007, p. 106-8; 2016).[20]

Natural selection is not taken, anymore, as the main cause of “human becomings”: “... development over the life course and current and past niche construction are the co-architects, in addition to natural selection, of expressed behaviour ...” (Fuentes, 2013, p. 48).

He argues that humans are not static “evolved systems” and rejects the adaptationism that goes with that “traditional view”.[21] Fuentes refuses, therefore, optimality models-

[20] Several attempts are presently being made to extend the synthetic theory of evolution by taking into account those processes. For an overview, refer to Odling-Smee et al., 2003; Pigliucci & Müller, 2010.

[21] The classic critique of adaptationism, with an early plea for niche construction, can be found in Gould and Lewontin’s 1979 paper.

evolutionary psychologists are clearly a target here, as well as human behavioral ecologists.

The focus in his account is on 'becoming' and not on 'being': humans are "evolving bioculturally in the past and present". The biological and the social are not taken as distinct "domains of being" but rather "... as intertwined processes of becoming [what] presents a powerful approach for anthropology" (Fuentes, 2013, p. 42).

Fuentes and Ingold agree on the basic requirements for handling complex processes such as human evolution:

> We need an integrated anthropological framework for asking evolutionary questions about humanity—one that is inclusive of ethnographic and sociocultural theory and data as well as evolutionary approaches. I believe our challenge is to figure out how to effectively engage human cultural systems, individual actors, and group and community-level dynamics with biology, history, and human niche complexity (Fuentes, 2016, p. S23).

Another anthropologist, Maurice Bloch, also looks for a "dynamic synthesis" between several processes, including evolution by natural selection and the development of individual human beings:

> The root of the problem caused by the dichotomy [nature/culture] has been its fundamentally static character while we are dealing with complex dynamics. Thus, implied by the concept of nature is a unified combination of processes: the processes of natural selection, the developmental process of birth and maturation, the ecological process of the life of particular species occurring amongst the dynamic of other living things, other individuals and even the non-living world. Similarly, implied by the concept of culture is the process of history. It is the unity and co-occurrence of all these processes that we, as social or natural scientists, should make the object of study (Bloch, 2012, p. 67).

There are clearly commonalities between the views Ingold, Bloch and Fuentes argue for. Despite their disagreements concerning other topics, they all promote an integrative approach in Anthropology but also a new relationship between this and others fields, including Biology and Psychology.

Ingold was criticized very early for his heterodox standpoint, even inside his own camp. A paper he published in *Cultural Dynamics* in 1995, "People like us", was subjected to criticism in a 1996 issue of the same journal (Oyama, 1996; Dunbar, 1996), followed by Ingold's replies.

He questioned in this paper the concept of an "anatomically modern human" that amounts, in his view, to accept that the ancestors of our species (he takes the Cro-Magnon man as an example) had the same biological endowments as we have, and that the relevant differences would be uniquely historical-cultural. If we accept that a developmental system underwrite our capacities, that we are "human beings-in-an-environment", argues Ingold, then our ancestors of the Upper Paleolithic were, after all, *not* "like us", even biologically speaking (Ingold, 2000a, p. 376).

For Ingold, as far as Anthropology admited, in the first half of the 20th century, that the only way to reject racism and poligenism was to assert the "psychological unity of humanity" on a genetic basis, it was forced to disconnect biological evolution from cultural dynamics. As we have shown, the critical point theory was a clearcut expression of this strategy. However, it amounts, in Ingold's interpretation, to go back to a view that prevailed in the 18th century: "Once again human beings figure in a dual capacity, on the one hand as a species of nature, on the other as creatures who– uniquely among animals – have achieved such emancipation from the world of nature as to make it the object of their consciousness" (Ingold, *ibid*., p. 389; 2004, p. 210-11).

A way out is to reject the dichotomy altogether and to mingle cultural dynamics and biological evolution:

> ... my conclusion, that the differences we call cultural are indeed biological, carries no racist connotations whatever. By refocusing on the human-being-in-its-environment, we can dispense with the need for a species-specific characterisation of humankind, and so also with the opposition between species and culture. People inhabit one world, not because their differences are underwritten by universals of human nature, but because they are caught up – along with other creatures – in a continuous field of relations, in the unfolding of which all difference is generated (Ingold, 2000a, p. 391).

R. Dunbar, an evolutionary anthropologist, criticized Ingold for conflating Nico Tinbergen's "four why's". The famous ethologist is well-known for distinguishing four questions one can ask about the causes of a behavioral pattern: 1) What are its

proximate mechanisms?; How does it develop?; What is its function (or survival value)?; 4) How did it evolve?[22]

Dunbar pinpoints that these questions correspond to different "grains of analysis" that are conflated by Ingold: "To claim that Cro-Magnons are not the same as living humans because their cultural milieu was different is a specious argument. Cultural contexts are not part of the formula, and are not relevant to the questions of historical speciation that are the concern of palaeontologists" (Dunbar, 1996, p. 367).

What culture "has allowed us to do" is "constrained by our genetic heritage", claims Dunbar (*Ibid*., p. 367). In his reply, Ingold argues that the privilege conceded to the genes configures a kind of preformationism that revives "the opposition between form and substance", that goes back to Aristotle, and the "priorization of form over process" (Ingold, 1996, 379).

Dunbar uses the awkward stratagem to apply Tinbergen's four questions to cars and not to the behavior of organisms! The way Ingold replies is relevant to what we discussed earlier:

> Would any one seriously suggest that a history of people could be written as a sequence of types, each defined as an assemblage of character traits, without regard to their experience of living out their lives in an environment? In the early part of this century, there were indeed some ethnologists and culture-historians who thought along these lines, but it is a point of view that has been long since abandoned in anthropology. It survives today only in the works of biologists who have attempted to handle the phenomena of culture within a neo-Darwinian explanatory paradigm (Ingold, 1996, p. 382).

He mentions as examples of this paradigm the research of gene-culture coevolution theorists such as Boyd, Richerson, Cavalli-Sforza, Feldman and Durham.

Tinbergen's four questions presupposes that the processes of evolution and development are separated. This would be, for Ingold, a tacit "epistemological assumption" of biologists: "that every form is the embodiment of a design that pre-exists its realization in the material" (*Ibid*., p. 383).

[22] If we adopt Mayr's and Sober's terminology, as we have been doing in this paper, the first question is about the *proximate* causes of the behavior and the last one about its *ultimate* causes.

Another presupposition of this approach is that the organism is the "effect" of genetic and environmental causes. To question this, Ingold refers to Oyama's 1985 book, where she offers a radical alternative to the orthodox theory of evolution.
Dunbar and Ingold are clearly talking past each other in their confrontation.Dunbar is criticized for adopting a neo-Darwinian framework, whereas Ingold calls for an entirely new, developmental approach to the issues at stake. We will turn now to disclose what this approach is all about, given the influence it had in the debate.

Philosophers of Biology are implicated in the debate

The interlace of developmental and evolutionary processes has been controversial among philosophers of biology, and even biologists. Actually, the disputes inside Anthropology mirror, in some ways, debates that have been going on in the Philosophy of Biology over topics such as: units of evolution and levels of selection; adaptationism; niche construction; the role of other causes of evolutionary phenomena besides natural selection.
Against neo-Darwinian orthodoxy, some philosophers and biologists alike advocate a rejection of the gene's eye view of evolution, point to the existence of other inheritance systems besides the genetic one and postulate multi-level natural selection.[23] Besides, they give a prominent place to niche construction alongside other processes in evolution and reject the dichotomy proximate/ultimate causation in dealing with human behavior. Most important to the perspective we adopt in this paper, some of those critiques focus on the need to bring together evolutionary and developmental processes. Developmental system theory (DST) is one of the radical views in support of this program. It promotes a profound revision of the theory of evolution handed down by the great synthesis.[24] In a nutshell, developmental system theorists assert that:

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[23] R. Lewontin, D.S. Wilson, E. Jablonka, F. Odling-Smee and K. Laland are some of the most influential critiques of the 'gene's eye' view of evolution (Laland et al., 2000). This view goes back to Williams' book, *Adaptation and natural selection* (1966) and to the successful attempts, by Hamilton and others, of explaining some cases of altruistic behavior invoking the concepts of 'kin selection' and 'inclusive fitness'. This view was popularized by Dawkins in his influential 1976 book *The selfish gene*. Bernal & Abrantes (submitted) offer a detailed analysis of these attempts.

[24] The central ideas of DST were set up by the developmental biopsychologist Gilbert Gottlieb at the beginning of the 1960s (Griffiths & Gray, 2005). More recent and influential contributions can be found in the publications of the psychologist S. Oyama, the philosopher of biology P. Griffiths and the

1. the full range of developmental resources are inherited (including constructed niches), and not just genes;
2. genes interact with many other resources in development and don't have any privileged role in this process;
3. all resources in the developmental system carry information, and not just genes;
4. the life-cycle of an individual is self-reconstructed in each generation.

It follows that evolution is the differential reproduction of cycles of developmental processes, and not just the differential reproduction of organisms, which are not viewed as mere phenotypic expressions of genotypes, like in the received evolutionary theory. In Oyama's words: "Evolutionary change is better viewed as change in the constitution and distribution of developmental systems" (1966, p. 356-7).

Many commentators emphasize the non-reductionist stance of DST, since it denies that any sub-set of resources, including genes, control ontogenesis. Evolution is still being described using the formula 'variation + differential replication', but there is a great change in standpoint since the organism is not isolated from the physical, biological, social and, in the relevant cases, cultural environments.

Especially in the human case, genes and cultures are both implicated in the processes of development and evolution, bringing about species-specific traits, including at the psychological level. Social structures, for instance, are "elements of culture" required for the "stable replication of human evolved psychological characteristics" (Griffiths & Gray, 1998, p. 141).

Despite the powerful insights offered by DST, it is far from being consensual among biologists, and it has been criticized also by philosophers for its extreme holism.[25] This theory might better be taken as a philosophy of nature, partially assimilated by its scientific counterpart: evolutionary developmental biology, also known as 'evo-devo'.[26] Ingold targets ironically even evo-devo: "… devo comes after the evo, when it should be the other way around" (2016, p. 111). Anyway, he assimilated in his original

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behavioral ecologist R. Gray (Oyama, 2000; Griffiths & Gray, 1988, 2005; Oyama & Griffiths & Gray, 2001).

[25] We don't have space in this paper to go through those critiques in detail. For a sample, refer to Sterelny & Griffiths, 1999, p. 108-9; Godfrey-Smith, 2001; Mameli, 2004.

[26] Godfrey-Smith, 2001; cf. Griffiths & Gray, 2005, p. 418. Evo-devo, as a scientific research program, focuses on morphological development, while DST encompasses psychological and behavioral traits, what places culture, as a resource of the developmental system, in the front stage (Krohs, 2006).

conceptual framework (that was rooted in other philosophical traditions[27]) some elements of those debates on the foundations of biology: “[The objections of DST and evo-devo people] to neo-Darwinism have much in common with those often expressed by social and cultural anthropologists, and (…) this commonality holds real promise for a future synthesis” (2007, p. 13).

He takes issue with DST, though, since life-cycles are still taken as bounded entities. "Forms of life" are, instead, unbounded- they actually emerge, claims Ingold. Organisms are, for him, embeded in a field of relations with other organisms in an environment. Social anthropologists regard persons as "ensembles of relations", “biosocial becomings” in a "biosocial field". Organisms should be regarded, likewise, as evolving within a “matrix of relationships” (Ingold, 2013, p. 8). This would amount to a “topological” view of evolution[28], as opposed to the “statistical” view that prevails in neo-Darwinism (Ingold, 1986, p. 133).

Like DST theorists, Ingold argues that “the capacities are properties of developmental systems and not of genes”, fighting against those that presuppose the existence of a specific human capacity for culture (Ingold, 1994, p. 8; 2014). Here the target could be the critical point theory but is, in fact, Geertz.[29]

Ingold goes further down this path, pointing to one implication of a developmental approach: history comes to be seen as a continuation of evolution. In other words: “The domains of the social and biological are one and the same” (Ingold, 2013, p. 9), a view also espoused by Fuentes, as we pointed out.

In an early paper, Ingold claims that “... the questions being asked by developmental biologists and by social and cultural anthropologists are not just analogous: when it comes to human beings they are, in effect, one and the same” (1996, p. 378).

In Oyama’s reply to Ingold’s 1995 paper, she strikes that same chord and distinguishes ‘evolutionary History’, the ‘historians’ History’ (both with a capital ‘H’) and the ‘history of development’ of an individual. Usually those histories are assumed to be

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[27] Bergson, Whithead and Merleau-Ponty are, avowedly, major influences in Ingold`s thinking (Ingold, 2014). In his first book, *Evolution and Social Life* (1986) he attempted to reinterpret neo-Darwinism using the insights of Bergson's and Whitehead's ontologies. A new edition of this book came out in 2016.

[28] Evolution is described by Ingold as the unfolding of a “tapestry”. To picture his view of life-forms as “becomings”, he uses also metaphors such as that of ‘field’.

[29] In a famous passage Geertz claims that we are naturally pre-equiped “to live a thousand kinds of life but end in the end having lived only one” (1973, p. 45; cf. Ingold, 2000a, p. 379).

disconnected, but Oyama regards them as intermingled: “From a developmental systems perspective, the History of peoples and cultures is not a sideline somehow appended to the biological story of humans. It is part of the biological story of humans” (Oyama, 1996, p. 357).[30]

She argues, like Ingold, that dual inheritance theory doesn’t dissolve the nature-nurture dichotomy, as we might think:

> We are constantly being told that the nature-nurture problem was solved when we realized that nature and nurture (or culture, learning, experience, or environment) interact. But if, as developmental systems theorists argue, the very concepts of nature and nurture are incoherent, then saying that the two interact is hardly an improvement, however conciliatory it may sound (Oyama, 1996, p. 355; cf. Ingold, 2004, p. 217).

The proliferation of “information channels” as we find, for instance, in Jablonka and Lamb (2006), would not be a solution either, but rather an indication that the relevant dichotomies rest untouched (Oyama, 2003, p. 175).

Oyama denounces other related developmental and evolutionary dichotomies, such as those of inherited/acquired, ridigity/flexibility, genotype/phenotype, passivity/activity, external selection/internal constraints, among many others she lists (Oyama, 2003, p. 171-2).

Another relevant issue is that one can’t fully address the development of organisms that have a mind without mentioning cognitive processes. Psychology has, therefore, to be included in any attempt to mingle development and evolution, in our species at least. In his approach, Bloch emphasizes cognition going on in individuals that share a species-specific kind of mind: “What anthropologists, psychologists and other cognitive scientists are dealing with is a mind, for which evolution has made the historical process part of the natural. This unified natural phenomenon is these disciplines’ only and common subject matter” (2012, p. 74).

Bloch goes through a discussion of evolutionary psychology (EP) and what he calls the ‘modularity revolution’ showing its relevance for Anthropology. However, the research

[30] A more conventional way to argue for this continuum is to invoque the idea that each generation creates a richly structured environment in which the next one will develop (Odling-Smee et al., 2003; Fuentes, 2013, 2016).

about child development from Piaget on calls for, in his interpretation, a dynamic kind of modularism. D. Sperber's more acceptable version of EP is praised but Bloch in the end rejects his approach for not being able to address how the individual's ontogeny changes her psychological predispositions, for instance through learning (2012, p. 71-3).

Despite their agreement in highlighting developmental processes, Ingold conceives very differently knowledge, learning and how one generation contributes to the next one's education, among other issues. In the second edition of his 1986 book he acknowledges that the first edition lacked a thorough discussion of psychological processes. In his later work, he tried to fill this gap by drawing especially on Gibson's ecology of perception. Ingold's critique of EP comes with a more general critique of cognitive science and the role played, in this approach, by the ideas of information processing, mental content, problem-solving, innate structures, etc. Effectively, he does not presuppose a cognitive science standpoint, as Sperber and Bloch do: "… the process of cognition is tantamout to the historical process of social life itself. And the latter … is but a continuation, into the human domain, of a more encompassing process of evolution" (Ingold, 2001, p. 143).

Ingold distinguishes knowledge-as-information and practical enactement; knowledge as representation and knowledge as skill; enculturation and enskilment. Furthermore, his constructivism makes salient that the development of an individual, since childhood, happens in the environment that has been set up by previous generations: "the contribution that each generation makes to its successors amounts to an education of attention" (2001, p. 139; 2013).

We hope this brief excursion in Psychology can clarify how Oyama's various 'histories' are embricated and how developmental dichotomies can also be questioned, besides the evolutionary dichotomies that were central to our analyses in this paper.

Final remarks

We have been discussing three influential frameworks that address the problem of the role culture might have played in human evolution, which we can sum up as follows:

1. Human evolution is strictly a biological phenomenon that preceded the emergence of culture. Cultural dynamics doesn't affect human's biological make-up;

2. Evolution in the hominin lineage was embedded in culture from its beginnings. Genes and culture coevolved;

3. Biological evolution and sociocultural dynamics can't be distinguished and the nature/culture dichotomy is dismissed.

We tried to identify the types of debate and kinds of tactical moves (in Dascal's sense) associated with each of those frameworks. The first one deploys clearly a strategy of nature/nurture dichotomization. The other two attempt de-dichotomization, a strategy most effective in the third, biosocial-evolutionary, perspective. The rejection of the nature/nurture dichotomy, which is explicit in the tactical moves of the latter framework, favors a more controversial type of debate. It has, therefore, a potential to unblock the communication channels between different disciplines in the social and natural sciences, or even between different areas inside the disciplines concerned. What is fundamentally at stake is a more adequate understanding of the human predicament.

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