THE NATURE/CULTURE DIVIDE

A Difference in Degree or in Kind?

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Abstract: This essay explores the relation between nature and culture and analyses it from the perspective of contemporary evolutionary theory. Both animals and humans are conceived of as attaining both natural and cultural features that interact with each other on a number of levels of varying complexity: nature as cultural, nature as influenced by culture, culture as natural, and culture as influenced by nature. "Nature as cultural" is meant to express a decoupling of behavioral/phenotypic changes of an organism from its genetic determination. "Nature as influenced by culture" is the idea of niche construction, wherein such decoupled changes can causally feedback to genetic reality, thereby influencing the evolutionary features of downstream species. "Culture as natural" portrays how cultural structures of humans and animals persist through the generations, accumulate incurred changes, and evolve in analogous ways to biological natural selection. "Culture as influenced by nature" is the notion that the cultural/linguistic capacities of animals and humans have evolutionarily emerged from pre-cultural history. All this is meant to evaluate the viability of constructing a nature/culture divide. The conclusion is made that the divide seems arbitrary within and between human and animal life when considering how the differences between the natural and cultural dynamics of humans and animals are modelled as differences of degree, not kind. A potential approach in using the concept of consciousness to recontextualize a nature/culture divide in terms of the possession of consciousness is proposed at the end.

Keywords: phenotypic plasticity, niche construction, nature, culture, consciousness.

1. Introduction

The relation between nature and culture is an old philosophical idea, which had probably started mulling over in human mental reflections ever since people have been congregating and communicating to each other. The relation's construal as more of a divide between nature and culture certainly gained in popularity during the time of the Moderns, but now trenchant questions are being asked pertaining to not only the precise placement of the divide, but also to the exact character of nature and culture as concepts. Arguments abound in both ends of the spectrum, from naïve distinctions, portraying nature as mechanistically unmeaning and human culture as the ultimate

arbiter of meaning,[1] to a potentially even more naïve stance in genetic determinism, wherein the nature/culture divide completely collapses under the weight of a superficial fatalism.

This essay seeks to accomplish two objectives. One, conceptualize the nature/culture divide in the light of current debate within contemporary evolutionary theory; and two, recontextualize the approach to spell out what is at stake in any demarcation of a nature/culture divide. Throughout the essay I employ a strategy that pieces together the dimensions of a nature/culture divide along the lines of a human/animal nature seen as cultural and a human/animal culture seen as natural.[2] I find that, from the perspective of this strategic construction, a nature/culture divide becomes arbitrary in many senses and ultimately hinges upon the way in which consciousness is understood. To start us off, we must first gather our bearings by coming to grips with some of the important terms in contemporary evolutionary debate.

2. Setting the Stage: Phenotypic Plasticity and Niche Construction

The dictates of Standard Evolutionary Theory (SET), in which evolutionary dynamism is controlled primarily by gene mutation and natural selection pressures without much causal input from the organisms themselves,[3] have been given increasing scrutiny within contemporary biological studies. One such contestation comes from the phenomenon of *phenotypic plasticity*, or «the ability of an organism to react to environmental cues through changes in form, behaviour, or rate of activity» without a prior change in that organism's inherited genome.[4] You can also conceive of phenotypic plasticity as a form of genetic leniency, whereby an increased potentiality for development other than that prescribed by genotypic mandates is afforded by the degrees of separation between a cell's nuclear environment and the complex biochemical dynamic present elsewhere. D'Ambrosia and Colagè even note that

[1] For an explication of this stance, see, Bruno LATOUR, *Nous n'avons jamais été modernes : Essais d'anthropologie symétrique*, La Découverte, Paris 1991, tr. en. Catherine Porter, *We Have Never Been Modern*, Harvard University Press, Cambridge 1993, pp. 10-13.

[2] I will be loosely appropriating Nathan Lyons' own formulation «that culture is natural and nature is cultural, through and through» (Nathan LYONS, *Signs in the Dust*, Oxford University Press, New York 2019, p. 9). However, I am not preempting any explicit semiotic commitments through this use.

[3] See, for example, John ODLING-SMEE and J. Scott TURNER, *Niche Construction Theory and Human Architecture*, in "Biological Theory", n. 3, v. 6, year 2011, p. 284.

[4] Paolo D'AMBROSIO and Ivan COLAGÈ, *Extending epigenesis: from phenotypic plasticity to the bio-cultural feedback*, in "Biology & Philosophy", n. 5, v. 32, year 2017, p. 709. See also, *ivi*, p. 707, and Mary Jane WEST-EBERHARD, *Developmental plasticity and evolution*, Oxford University Press, Oxford 2003, Chap. 3.

phenotypic changes can also alter the arrangement of an organism's initially inherited genetic programming.[5] Indeed, this capacity for phenotypic change to not only happen apart from genetic change but also to influence genetic change is proper to the study of epigenetics, defined by Goldberg «as the study of any potentially stable and, ideally, heritable change in gene expression or cellular phenotype that occurs without changes in Watson–Crick base-pairing of DNA».[6] A more in-depth discussion of the other ways in which phenotypic plasticity can be modelled is outside this essay's scope, as it suffices for us to at the very least introduce the notion that phenotypic change does not have to translate wholly to genetic change.[7]

Now, important for our purposes here of closing the nature/culture divide at least in non-human animality are some of the answers to how gene-independent phenotypic modification can be elicited. Such an answer would have to be of a particular character so as to not be descriptive of phenotypic change as mere blind progression, as undirected movement, or as mere random variation. In other words, our interest would lie in an answer that attributes to organisms some power in affecting their own developmental and evolutionary futures. Thus, apart from change granted to an organism's phenotype by internally non-genetic or externally environmental influences that gives the organism itself no say in the matter, we have organism-directed/dependent modification in the vein of something like niche construction.

Niche construction, as defined by Odling-Smee and Turner, is the process whereby

> organisms can, by their own activities, modify the spectrum of natural selection pressures in their own selective environments, [wherein adaptation], by which we mean the complementarity of organism and environment, now becomes a two-way street—not only do organisms adapt to their environments, they also "adapt" their environments to themselves.[8]

This "two-way street" of adaptation is termed, by Laland et al., as "reciprocal causation", in which an initial direction of causal influence between two entities – in

[5] See, D'AMBROSIO and COLAGÈ, *Extending epigenesis*, p. 708. For an overview of relevant evidence relating to phenotypic plasticity, see, Antoine NICOGLOU, *Phenotypic Plasticity: From Microevolution to Macroevolution*, in T. HEAMS, G. LECOINTRE, M. SILBERSTEIN (eds.), *Handbook of Evolutionary Thinking in the Sciences*, Springer, Dordrecht 2014, pp. 285-318.

[6] Aaron D. GOLDBERG, C. David ALLIS, and Emily BERNSTEIN, *Epigenetics: A Landscape Takes Shape*, in "Cell", n. 4, v. 128, year 2007, p. 635.

[7] For a discussion of a nuanced modelling of phenotypic plasticity, see, D'AMBROSIO and COLAGÈ, *Extending epigenesis*, pp. 709-713.

[8] ODLING-SMEE and TURNER, *Niche Construction Theory*, p. 284. Another similar definition is given by Buskes in Chris BUSKES, *Darwinism Extended: A Survey of How the Idea of Cultural Evolution Evolved*, in "Philosophia", n. 3, v. 41, year 2013, pp. 669-670.

the case of niche construction, between an organism and its environment – is subsequently met with another direction of causal influence between two entities in the *opposite direction*.[9] For Buskell, «two causal processes are reciprocally linked insofar as they are coupled processes where the state of one is a function of the other (and vice versa)».[10] Reciprocal causation becomes only developmentally, or ontogenically, relevant when the alternating directions of causal influence affects *the same two* entities; it becomes evolutionarily relevant when the two entities present in one causal direction are not the exact same in the other direction. In terms of niche construction, its evolutionary relevance becomes present when «the activities of a population generate systematic changes in the developmental and selective environments of *downstream* generations».[11]

In terms of what explains organism-contingent environmental modulation, some options arise. One is the notion of an organism's directed behavior being a mere product of their genes: an *extended phenotype*, so to speak. This is the view of some biologists like Richard Dawkins,[12] although it is a common espousal in SET in general.[13] The extended phenotype model is obviously a reductive approach that diminishes a nature/culture divide in non-human animality by making animal behavior solely beholden to the seeming randomness of natural selection and gene variation without much input from the organisms themselves. Another option, based on the rationale of phenotypic plasticity, is to try and safeguard organismic agency by progressively extricating behavioral influence from genetic influence in a way that allows for such behavior to be understood as increasingly self-directed – i.e., directed in response to a need and not just seen as involuntarily and genetically reactionary to external pressures. This is similar to what is meant by Odling-Smee and Turner's idea of organisms

[9] See, Kevin N. LALAND, Tobias ULLER, Marcus W. FELDMAN et al., *The extended evolutionary synthesis: its structure, assumptions and predictions*, in "Proceedings of the Royal Society B: Biological Sciences", n. 1813, v. 282, year 2015, p. 6.
[10] Andrew BUSKELL, *Reciprocal Causation and the Extended Evolutionary Synthesis*, in "Biological Theory", n. 4, v. 14, year 2019, p. 268.
[11] BUSKELL, *Reciprocal Causation*, p. 269. Emphasis added.
[12] See, Richard DAWKINS, *The Extended Phenotype*, Oxford University Press, Oxford 1982. Animal behavior, both human and non-human, in this essay will be treated as a phenotypic feature of the organism. However, unless specified otherwise, behavior will not be treated as an extended phenotype that is inextricably coupled with an organism's genetic code. This should be most clear in the case of human behavior.
[13] See, ODLING-SMEE and TURNER, *Niche Construction Theory*, p. 284.

adapting «their environments to themselves», that organisms naturally select, or build, their environment «for apt function» that meets their own needs.[14]

Examples abound for this type of directed niche construction: nest-making by birds, dam-building by beavers, termites building their mounds, etc.[15] Notice that, especially in the case of termites, there is no assumed attribution of the property of human-like consciousness that one may feel is required for proper self-directed activity. This is because conscious behavior is immaterial to the notion of niche construction as a non-genetically determined process, for bird nests, beaver dams, and termite mounds are dynamic entities, managed by the individuals/colony responsible for them. These non-human structures are in constant dialogue with the environment within which they subsist, changing in response to differing external factors, directed in their construction by organisms driven towards ensuring the structural integrity of their buildings. Consciousness is irrelevant here, as is the notion of these organism's behaviors having been initially selected for by environmental pressures, since what is important now is that, in the spirit of phenotypic plasticity, behavioral capacity is decoupled at least somewhat from genetic programming. This is obvious in the examples given above, since genetic variation – in the case of the same organism/colony, a lack of genetic variation – is not fully consistent with behavioral variation – i.e., different structural morphologies in response to different environments.[16]

3. Nature as Cultural, Culture as Natural: Non-human Animality

This is one method of closing the nature/culture divide in non-human animality, but an issue remains: is this gene-behavior decoupling enough to viably ascribe culture to non-human animals? If a nature/culture divide depends on some separation of cultural and natural dynamics, then how the divide shortens may be through accurately considering culture and nature in terms of the *same* dynamic. The case of nature

[14] *Ibid*. The summary of Laland, Odling-Smee, and Feldman is of use here: «In the presence of niche construction, adaptation ceases to be a one-way process, exclusively a response to environmentally imposed problems; it becomes instead a two-way process, with populations of organisms setting as well as solving problems» (Kevin N. LALAND, John ODLING-SMEE, and Marcus W. FELDMAN, *Niche construction, biological evolution, and cultural change*, in "Behavioral and Brain Sciences", n. 1, v. 23, year 2000, p. 135).

[15] See, LYONS, *Signs in the Dust*, pp. 139-143, for a list of relevant examples.

[16] Termites, particularly of the genus Macrotermes, are a relevant example here by virtue of the responsiveness of their mounds to a changing environmental milieu «so as to maintain viable living conditions» (BUSKELL, *Reciprocal Causation*, p. 273). See also, Kevin N. LALAND, John ODLING-SMEE, William HOPPITT et al., *More on how and why: cause and effect in biology revisited*, in "Biology & Philosophy", n. 5, v. 28, year 2013, p. 739.

attaining a cultural dynamic was initiated above through gene-behavior decoupling, but this case can also be read in terms of a cultural dynamic influencing an already established natural dynamic. In the case of niche construction, this occurs when a constructed niche affects the evolutionary features of organisms engaging in that niche through natural selection. This has been observed, for example, in the situation of beaver dams visibly modifying gene characteristics of numerous temporally downstream species in and around the dam.[17]

On the other hand, the case of culture attaining a natural dynamic needs treatment. A common method in the literature has been to analyze the structures of non-human animals in the light of natural selection mechanisms, in which an animal mode of *cultural evolution* depicts the persistence of animal structures over time as heritable entities between generations. Chris Buskes, for instance, argues in this way, adding that both genetic and cultural evolution «are characterized by the accumulation of information, resulting in complex adaptations, historical lineages … and descent with modification».[18] This "accumulation of information" takes place when there is a «gradual built-up of information resulting in cultural artifacts or practices of increasing complexity».[19] Now, most animal cultures, in terms of linguistic practices, are not cumulative in this fashion; songbird dialects, for example, while obviously communicative, are not inherited non-genetically through them being, say, written down; here, any changes realized from, for example, phenotypic plasticity and made to the cultural linguistic complex would not accumulate by being heritably persistent. Are there examples of non-human animals featuring cumulative culture then?

Let us formulate criteria for a possible answer by appropriating Buskes' general construal of cultural evolution:

> in a typical cultural evolution model, a population is assumed to be composed of a set of individuals, each of whom possesses a particular set of cultural traits. Next a set of micro-evolutionary processes is specified that alters the variation in those traits over time. These processes concern the sources of cultural variation, the forms of cultural selection, and the different modes of cultural transmission. Finally, variation is transmitted to the next generation, simulating the process of cultural inheritance.[20]

Taking a look back at termite mounds, we have a structural complex that expresses both cultural variation (different mounds can manifest in different environmental

[17] See, Jonathan W. MOORE, *Animal Ecosystem Engineers in Streams*, in "BioScience", n. 3, v. 56, year 2006, pp. 237-246.
[18] Buskes, *Darwinism Extended*, p. 663.
[19] *Ivi*, p. 667.
[20] *Ivi*, p. 673.

qualities without a coinciding change in termite genotype) and cultural selection (different mounds can manifest *in response* to changing needs and conditions, i.e., a selection of mounds for functional fit). Now, cultural transmission and cultural inheritance are two different modes of informational movement: inheritance is the usual *vertical* movement between different generations, while transmission is a horizontal, cross-sectional movement, «as when cultural information is passed on to contemporaries or nonrelatives».[21] For termite mounds, transmission is obvious, since termite contemporaries in one mound all inhabit the same mound, thus partaking in the transmission of cultural information that is in this case embedded in «a rich language of chemical and sensory cues» permeating the cultural structure.[22] To ensure cultural inheritance of termite mounds in the sense of having the mound persist past a single generation, mounds would have to be capable of accumulating any incurred alterations, potentially in the form of communicative chemical cues lasting long enough to effect behavioral change in individual members of multiple generations over time. This would count as a form of social learning analogous to learning in human culture, wherein information is preserved in various material media that are thus able to engage with posterity. This type of learning potential has not been conclusively observed in the case of termites, although Odling-Smee and Turner acknowledge that even the mere physical «legacy of the mound [could] influence descendant populations' behavior».[23]

The discussion thus far has helped close the nature/culture divide in relation to non-human animals in four ways. One, nature attains a cultural dynamic through gene-behavior decoupling; two, nature is affected by a cultural dynamic through the evolutionary influence of niche construction; three, culture attains a natural dynamic wherein cultural evolution expresses the same requirements of variation, selection, and transmission/inheritance that characterizes natural selection of genetic evolution; and four, culture is affected by the natural dynamic of genetic evolution, such that the animal behavioral capacities for niche construction are causally emergent from a storied natural evolutionary past. The question now becomes, are these four ways also characteristic of a closing of the divide in relation to human life? Let us start with the fourth way by asking how humanity's capacity for culture and the dynamic processes inhering within it may have been naturally selected during our ancient history.

[21] *Ivi*, p. 663.
[22] ODLING-SMEE and TURNER, *Niche Construction Theory*, p. 286.
[23] *Ibid.*

4. Nature as Cultural, Culture as Natural: Humanity

Probably the most common theme in the literature of selective evolution, natural or cultural, is that the historical transition within biotic entities from relatively simple states to ever increasingly complex systems could not have come from nonselective processes. This is the stance of Buskes, for example, who looks at human language as emblematic of the «complex adaptation» characteristic of high functioning systems that «can only be understood as the result of cumulative Darwinian selection».[24] Complex linguistic systems, in this theme, would have evolved out of prelinguistic states by virtue of the greater advantages conferrable by the former as opposed to the latter, «particularly with regard to the transmission of non-genetic, cultural information».[25] Being able to attenuate transmission constraints and increasing the relative speed of informational replication by using material media would have been best suited within situations in which social learning was required. In other words, genetic replication would have been too slow to permit adequate and swift adaptation «to lots of different and changing environments»,[26] a capacity afforded to humans by the larger brains garnered from a historical change in diet towards more energy-rich fatty foods.[27]

In effect, this increased cognitive capacity «could in turn support further developments in technology and social relationships», thereby favoring further evolved capacities, such as language, that would better aid in «the diffusion of forms of verbal teaching granting higher fidelity transmission» of social and tool-making information.[28] It is thus through the evolution of this cultural linguistic capacity that realizations made by that capacity naturally outstrip those made by genetic evolution by the sheer difference in informational transmission rates. Indeed, according to Richerson and Boyd, «[c]ulture would never have evolved unless it could do things that genes [cannot]».[29] This cultural capacity of environmental responsiveness is a general

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[24] BUSKES, *Darwinism Extended*, p. 667. Martins espouses this view as well when describing an evolutionary theory consisting of progressively complexifying developments «from atoms towards molecules, cells, humans and societies» (Nuno MARTINS, *An Evolutionary Approach to Emergence and Social Causation*, in "Journal of Critical Realism", n. 2, v. 10, year 2011, pp. 199-200). See also, Eva JABLONKA and Marion LAMB, *Evolution in four dimensions: Genetic, epigenetic, behavioral, and symbolic variation in the history of life*, The MIT Press, Cambridge 2005, p. 228; and, Eduardo KOHN, *Further Throughs on Sylvan Thinking*, in "HAU: Journal of Ethnographic Theory", no. 2, v. 4, year 2014, p. 278.

[25] BUSKES, *Darwinism Extended*, p. 667.

[26] *Ivi*, p. 677.

[27] See, D'AMBROSIO and COLAGÈ, *Extending epigenesis*, p. 718.

[28] *Ibid*.

[29] Peter J. RICHERSON and Robert BOYD, *Not by genes alone: How culture transformed human evolution*, University of Chicago Press, Chicago 2005, p. 7.

disposition that is enabled by an underlying neurobiological structure, yet it can also support subsequently more specified dispositions towards other forms of cultural practice, such as when a general linguistic capacity can aid in the manifestation of new social structures and rules through the accumulation and development of a thriving tradition.[30] Furthermore, only once these more specified dispositions have been instantiated as culturally heritable entities, e.g. the passing down of legal texts, would we have taken further steps in decoupling our cultural behavioral dynamic from our purely genetic dispositions, i.e., the first way discussed above of our human nature attaining its cultural dynamic.

Notice, however, how this decoupling rationale between behavioral and genetic effects does not aim to close the nature/culture divide in humans the same way it does for non-human animals. This is because the decoupling works to bring non-human animal behavior closer to our conception of human culture – i.e., such animals, considered initially as solely within nature, now attain characteristics resembling that of human culture – while for humans the decoupling only serves to bring us further away from our own more determined genetic natures. Still, this is not to say that human culture is completely unbiased and unhinged from biological dictates. Indeed, an evolution of cultural dynamics that does not favor the survival of our genes will eventually die out in favor of more fecund dispositions.[31] Nonetheless, given that we still have to treat the second and third aforesaid ways, respectively of nature being affected by culture through niche construction, and of culture attaining the natural dynamic of selective evolution, we have additional means through which to close the nature/culture divide as it applies to humans.

In the case of our own cultural niche constructions, the most famous example would be the development of prolonged lactose tolerance (genetic change) in communities that have continued regular milk consumption into adulthood (cultural change). The rationale here is that the increased milk consumption would have biased the emergence of a capacity that could exploit the energetic fuel from milk for longer time periods than just infancy, i.e., the persistence of the lactase enzyme able to digest milk. This sole example is meant to illustrate how our cultural actions can ramify in their consequences even to the point of influencing our internal biological make-up. We could even extend

[30] For a discussion on this notion of disposition, see MARTINS, *An Evolutionary Approach*, p. 209. D'Ambrosio and Colagè recapitulate the point being made here, in «that phenotypic [i.e., behavioral] novelties induced by cultural practices become effective in the lifestyle and cross-generational dynamics of (human) populations *before* the genetic level is affected» (D'AMBROSIO and COLAGÈ, *Extending epigenesis*, p. 719).

[31] For Buskes, human «culture will be constrained in accordance with its effects on the human gene» (BUSKES, *Darwinism Extended*, p. 676).

the causal influence forward by conceiving of a likely situation wherein persistent lactose tolerance has led back to cultural change, maybe even in terms of a boon to the dairy industry.[32] Moreover, even in the case of sustained culturally dependent phenotypic changes that do not attend genetic changes we have examples of cultural practices involving long-term learning lastingly effecting neuronal reorganization.[33]

In the case of the third way of cultural evolution occurring analogously to biological selective evolution, the same features of variation, selection, and inheritance apply as well to human culture. Nuno Martins formulates this application as follows:

> Human agents, and the organizations in which they are placed, can be seen as possessing three different sets of capacities or dispositions: (i) capacities or dispositions to action and creativity; (ii) capacities or dispositions to maintain their structures and functionings in a relatively stable manner in relation to changes in the environment; and (iii) a capacity to respond to changes in the environment. These capacities or dispositions will support: (i) variety-generating mechanisms; (ii) replication mechanisms; and (iii) selection mechanisms, respectively.[34]

First, how human culture is inherited or replicated is easy to conceptualize, as the numerous realizations of cultural practices and norms are supported by the trove of multimedia texts and works that we have materialized and can pass down to future generations and among contemporaries. Next, the selection mechanisms are harder to piece out in detail, for the traditional understanding of selection pressures is that they are ensconced within an environment external to the organism; however, given our heightened capacity for cultural change, hitherto external environmental pressures end up either becoming insignificant in their selective influence – e.g., we are no longer as susceptible to predator-prey relations as before – or being assimilated into the culture itself – i.e., culture dictates its own evolution.

Of course, sufficiently global environmental influences, such as climate change, a global pandemic, or destructive interstellar phenomena, could exert enough pressure that human cultural practice is significantly altered and forced to change in order to ensure our survival. Other than that, for the most part, many see our culture as evolving for its own sake and under its own influences. This has led some, like Martins, to regard «human [cultural] action [a]s shaped by the general environment of social practices,

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[32] See, LALAND, ODLING-SMEE, and FELDMAN, *Niche construction*, p. 133, where this phenomenon is described in general terms as a causal feedback look involving organisms and their environments. See also, *ivi*, pp. 285-286.

[33] See, D'AMBROSIO and COLAGÈ, *Extending epigenesis*, pp. 720-723.

[34] MARTINS, *An Evolutionary Approach*, p. 212. Replication mechanisms here are synonymous with the feature of inheritance mentioned above.

[such that cultural evolution] operates through the selection of social practices that materialize certain social rules».[35] Martins also notes that the environment in this case «exercises selective pressure as a coercive power»,[36] no longer beholden to external powers but acting as its own "external" power unto itself. In other words, the social practice that is the most assertive at the time sets the standard of the day, portraying an «environment of [cultural] selection [that] has some sort of causal influence on the variety-generating mechanism[s]» of the culture.[37]

Is this the only way whereby cultural action is selected? Surely not, for it seems all too hasty to assume that cultural selection proceeds via a singular modality when cultural systems are large and complex enough that numerous iterations and instances of different cultural practices can take place at the same time. Are assertive pressures working on each and every one? It is feasible that some just fall through the cracks of a seemingly authoritarian sieving process, progressing through culture as instantiations of genuinely persistent creative acts. Martins acknowledges these creative acts as indeed generating something like a new cultural environment, but he does so in a way that couples them with the imposition of their selective standards on the environment.[38] I disagree, but maybe this is due to differences in our conceptualization of "assertion", for I am not willing to just define it in terms of coercion and imposition, as if social practices that do not abide by some assertive rule are doomed to oblivion. Indeed, popular practices do feel as if they are reducing the prevalence of once prevalent variants, but this is ostensibly due more to our limited capacity to pay attention and be engaged with a lot of information than to some inherently coercive power of the practice.

Of course, I am not denying that coercive social pressures exist; I am just exploring alternative explanations for the emergence of persistent cultural practices. To that extent, I do see how the inception of a social practice spreading in popularity and relevance can modulate selective mechanisms in the culture, either in a directly coercive fashion, especially if done purposefully, but also in an indirect and incidental fashion, as when people simply just end up paying attention to something else. All in all, what I am trying to emphasize here is that, as Buskes remarks, in any sufficiently complex system, like our deeply stratified culture, whether a particular variant will eventually persist or be selected against is something we can never «predict *in advance*», as in, «[w]e will always need the hindsight of a selective system» to understand how a

[35] *Ivi*, p. 204.
[36] *Ibid.*
[37] *Ivi*, p. 213.
[38] *Ivi*, p. 214.

particular variant came to be.[39] This therefore opens the door for selection to simply be by chance, by the vicissitudes of the time; not that persistence is random and irrational, for there is no shortage of reasons why someone may be drawn to a specific practice, but that its persistence over time could be a function just as much of the practice's own self-assertion as of the assertiveness of other practices.

Additionally, one other reason why cultural practices get selected for: fit of function. As D'Ambrosio and Colagè indicate,

> the human cultural horizon is essentially composed of practices aimed at objectives set according to human-specific, conscious representation[s] of the external world and "abstract" planning … In a nutshell, human cultural dynamics seem to be distinctively characterized by *intentional processes*. Intentional processes involve the capability of consciously addressing both external reality and internal states, choosing specific goals, and accordingly behaving in accordance with deliberate courses of action.[40]

From the perspective of cultural selection, the rationally directed cultural practices that end up persisting are those that best meet valued human-specific goals and address "external reality and internal states". In terms of how practices get selected, I disagree with the idea above that pressures are brought to bear on human acts simply on the level of the latter being goal-directed, since selective pressures can exert influence on practices that seem aimless and spontaneous. Also, even when numerous individuals are participating within a practice, it is not impossible for such participation to be due to reactionary desire as opposed to "deliberate courses of action."[41]

Lastly, cultural selection mechanisms are intimately connected with variety-generating mechanisms, because how variant practices manifest themselves is related to why they are selected: a practice could instantiate in response to assertive selective pressures exerted by more coercive practices; a practice could be spurred on by the need to address a pressing human need; or, a practice could manifest spontaneously in

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[39] BUSKES, *Darwinism Extended*, p. 684. Emphasis in original. This is possibly what Pratten meant when stating that «[t]he theory of natural selection does not provide a mechanical explanation since it seeks to explain a particular set of processes by referring to the general types of outcome toward which they tend» (Stephen PRATTEN, *Critical Realism and Causality: Tracing the Aristotelian Legacy*, in "Journal for the Theory of Social Behaviour", n. 2, v. 39, year 2009, p. 208). The outcome in this case would be a cultural practice's persistence or lack thereof, and the practice tending towards such an outcome being informed by the reasons why people engaged in it.

[40] D'AMBROSIO and COLAGÈ, *Extending epigenesis*, pp. 719-720. Emphasis in original. This is similar to the stance by Buskes in, BUSKES, *Darwinism Extended*, p. 686.

[41] See, ODLING-SMEE and TURNER, *Niche Construction Theory*, p. 288, wherein they stipulate that, in a cultural system, even what counts as a function that best meets a goal is up for debate, arguably including a scenario in which the best function for a practice is to be self-functioning and self-directed, i.e., when a genuinely self-affirming creative act is manifested.

response to its own reason for being – a genuinely creative human act.[42] Thus, in considering all three cultural evolutionary factors of variation, selection, and inheritance, the argument thus far concludes by granting cultural practices the capacity to evolve analogously to biological evolution. This analogy can be taken in a number of ways: when spontaneous cultural manifestation is analogous to random gene mutation and/or changes in phenotype that are decoupled to gene mutation; when, as a response to a human need, the manifestation of practice is analogous to phenotypic plasticity being evoked as an environmentally driven adaptive mechanism; when, as a response to assertive culturally selective pressures, it is analogous also to phenotypic plasticity, although this time the environment is specifically the assertive practice; finally, biological niche construction attains its closest analogue to the process in which the modification of either the natural environment – e.g., through climate change – or the cultural environment – e.g., through the creation of coercive cultural practices – elicits selective pressures on subsequently spontaneous iterations of novel practices.

Now, it is important to note here that the fact that the similarities between cultural and biological evolution outlined above are only analogous should not imply that cultural variety-generating mechanisms are categorically different from biological ones. The human ability to diversify cultural practice is not some distinct reality from that of our bodies' ability to be modified. A system's capacity in reality is always actualized within a surrounding context, wherein internal states of the system and external environmental factors both work in tandem to constrain possible modulations to the system.[43] This occurs regardless of the size of the system in relation to its external environment, since both biological and cultural structures subsist upon inherently limited substrates: the material body for the former, the cultural body (multimedia works/texts plus neurobiological matter) for the latter. Regarding the biological context, the system can be small in comparison with a vast environment, while for a human cultural context, the system is much larger, developing in part due to an assimilation of hitherto external selective pressures into itself with a consequentially broader jurisdiction of control. This is thus one striking way in which the nature/culture divide is closed further in the human context, not through human culture's general attainment of the natural dynamic of selective evolution, but now through the culture's specific attainment of a natural limit it shares with nature.

[42] See, *ibid*.
[43] See, for example, BUSKES, *Darwinism Extended*, pp. 685-686.

5. Concluding Remarks: Making a Case for Consciousness

However, we must ask ourselves whether the nature/culture divide can be closed completely, so as to legitimately conflate nature with culture, or if it is still genuinely reasonable to construct one at all. To conclude this endeavor, I shall be setting up future methods of approach that will be helpfully guided by employing the formulation given here of natural dynamics attaining and/or being influenced by cultural dynamics, and *vice versa*. In the case of non-human animality, wherein nature attains a cultural dynamic through gene-behavior decoupling, the nature/culture divide is weakened by the fact that genes, phenotypic structures, and behavior are all systems that react, as far as we can tell, via causal mechanisms: genes and phenotypic structures are composed in a molecularly dynamic fashion, wherein any changes occurred are, from the molecular perspective, driven in a completely reactionary, i.e., nonconscious, capacity. Organismic behavior would also fall within the scope of this analysis, for even the phenomena of phenotypic plasticity and niche construction are determined as direct, i.e., causal, responses to environmental pressures. Moreover, even in the case of nature being affected by a cultural dynamic, such as when a constructed niche affects the evolutionary features of subsequent generations, nothing much different is at play here. In the end, effecting evolutionary change through a non-human animal structure is given as a reactionary causality, whether or not the change is to be construed as a non-consciously directed response to said change or as a randomly emerged variation at the mercy of selection pressures.

In the case, again of non-human animality, wherein animal culture attains a natural dynamic, cultural evolution along the line of natural selection still occurs causally, whereby features such as, for example, termite mounds are passed down through the generations in one of two ways: either we have the persistence of chemical/sensory cues in the mound that interacts with the termites, or we have the persistence of the mound itself, influencing termite behavior by its spatial morphology. Nevertheless, these interactions and influences are all causal relations. This applies even more so when cultural structures are influenced by the natural dynamic of biological evolution, since, in this case, culture is seen as emerging from prior pre-cultural nature, which can also be characterized causally. In effect, in terms of non-human animality, the nature/culture divide ultimately looks arbitrary because wherever the line is eventually placed will become bookended by causal and dependency relations of differing degrees of complexity. To justify, just because a cultural structure interrelates with an external environment and the organisms with which it is engaged in a more spatiotemporally complex fashion than what is involved with, say, a set of genes, this does not detract

from the fact that fundamentally we are still talking about a difference in degrees of complexity – nothing categorically distinct is at stake here.

We can further extend this argument down the scale to even include simple abiotic reality, for the causal relations directly relevant to single molecules is still only divergent from those of whole non-human animal structures by degrees of complexity. Extending the argument up the scale to include now human nature and culture, the same logic still applies, in that nothing changes except in terms of increasingly complex causal/dependency relations. Note that this argument is not undermined even if causality itself is sceptically denied, since what matters for the argument is that there be something fundamentally different between what we consider as nature and what we consider as culture for a nature/culture divide to not be arbitrary. If such a difference cannot be found, then the divide can only be arbitrarily made. There is no such difference if whatever differentiates what we consider as culture and nature is couched in terms of a difference in degrees. We have just offered a description of the nature/culture divide as it applies to humans, animals, and abiotic reality in terms of different degrees of causal/dependency relations. Therefore, through this description, constructing a nature/culture divide is *ubiquitously* arbitrary.

One way to render the argument fallacious still remains, that of the issue of consciousness; specifically, this means the conscious awareness present in deliberative human acts that are either addressed to some external need/pressure or self-directing, as in the spontaneous manifestation of a cultural practice as a creative act. If it is indeed an open possibility to fully close the nature/culture divide within humans and between humans and non-human animals, this issue of consciousness needs to be addressed, because the ability to consciously self-represent meaning without it simply eliciting non-conscious adaptive processes, e.g., biological niche construction, would seem highly relevant. For one, if this property is unique to some animals only, then there is a theoretical demarcation concerning the nature/culture divide along the line of what possesses consciousness and what does not; otherwise, if consciousness is not a unique feature and instead exists along a continuum of differing *degrees*, then the divide can only be arbitrarily constructed, as nothing *categorically* different would be at stake, therefore denoting that in theory nature can be conflated with culture. One possible way of garnering consciousness' uniqueness is by describing the emergence of consciousness out of a brain substrate as truly distinct from any other instance of non-conscious emergence. Nonetheless, how all this pans out in argumentation is another matter entirely and must be pursued elsewhere.

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