AN ECOLOGICAL CONCEPTION OF HUMAN NATURE

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Abstract

Currently, there is significant divergence in scholarly opinion as to whether or not human nature exists. In my PhD thesis, I argue for the existence of human nature. In so doing, I critique rival views on human nature and orthodox entry points into the issue. I also offer a partial explanation as to why such a strong divergence of expert opinion may exist, and argue that accuracy on the issue is important with respect to individual and collective problem solving. The view of human nature I defend is what I call 'ecological.' This construct aligns with the fact that biological systems exist at multiple levels of organization and relative to varying ecologies, developmental stages, frames of reference, and viable systems of orientation. Given this, I contend human nature is not something that 'inheres' and projects out from the organism; rather, human nature is diffuse and exists at simultaneous levels of biological organization, and at the intersection of genetic and epigenetic factors, past and present, and scientific truth and pragmatism.

Acknowledgements

When it came to choosing a PhD topic, I knew what I wanted to write about. For me, human nature has been a topic of near-obsession for a very long time. However, there were many obstacles to moving ahead with this. First, the topic is radically multi-disciplinary, which is risky to take on as a PhD student. Second, scholars have written about human nature for millennia, and thus, this topic does not easily lend itself to a refined critique, even at the maximum length of a PhD thesis. Third, it is difficult to find current philosophers (and thus, supervisors) who are not hostile to the concept.

Given these obstacles, I am deeply grateful for the opportunity to write on human nature for my PhD and to have found supervisors who, not only allowed me to try my hand at it, but who were superb mentors. I would especially like to thank my primary supervisors, Mark Vorobej and Edouard Machery. From the outset, synthesis of the relevant material was difficult and I encountered many twists and turns, and dead ends. Mark, especially, was an anchor point in the early stages, and later, at my most deflated. Both Mark and Edouard read many chapters and paragraphs that had to be scrapped, in addition to the ones that needed significant refinement. Edouard was a fortuitous balance of criticism and tolerance; his diverse, up-to-date, and detailed knowledge made him a great resource. Rama Singh came into my thesis in the later stages, and his comments were timely for carrying the project through to the end.

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(1) Human Nature

> *"Every idea, person, or object is potentially simultaneously many things depending on the perspective from which it is viewed. A steer is a steak to a rancher, a sacred object to a Hindu, and a collection of genes and proteins to a molecular biologist."*
>
> *Langer (1989, 69)*

What is human nature, if anything? Given at least a few thousand years of concerted inquiry, and all the investigative resources available to us, we might assume the answer to this question should be fairly common knowledge by now—as certain, perhaps, as our knowledge of heliocentrism, chemical compounds, nuclear fission, plate tectonics, or even gravity. And yet, this is not at all the case. Recent academic debate on human nature shows that expert opinion on the issue is radically divergent.[1] For example, on the one hand, there now exists a rapidly growing discipline known as evolutionary psychology. Every day, evolutionary psychologists publish new studies presuming that, despite evident variation in our species, there exists a universal human nature on which these studies cast light. On the other hand, we have a faction of reputable academics, many who appear equally well-versed in biology, who deny the existence of human nature and hope to convince the rest of us to abandon the quest.[2] For anyone curious about our species, this extreme divergence of expert opinion, on a question that appears well within our collective ability to solve, should be puzzling, and it prompts an important related question: *why is it so difficult to find significant common ground on the issue of human nature?*

[1] See, e.g., Degler (1991) or Segerstråle (2000).
[2] See, e.g., Ehrlich (2000, e.g., 330), Buller (2005, e.g., 457), or Prinz (2012, e.g. 365).

For my PhD thesis, I will argue that human nature *does* exist. I will also explain why accuracy on the issue of human nature is important and offer some detail as to what human nature is. However, to defend these statements, I take a rather indirect approach. The predominant challenge of trying to gain consensus on the issue of the existence of human nature is that it requires consensus on a vast array of more fundamental philosophical issues that are difficult to confidently answer. This gives us considerable leeway to be very selective in our evidence and argument. For example, whether we believe in the existence of human nature, or not, will depend on whether we believe we can know *anything* with any reliable certainty; it may depend on whether we feel there are any significant properties that humans mostly, or universally, share; it may depend on whether, or not, we think human features are subject to laws, or on the degree to which we imagine modern culture to be an extension of, or separate from, past evolutionary forces; and so on. My solution, then, is to make a worthy effort to hold in check how easy it is for interlocutors to talk past one another in the debate. To this end, I begin by simply *organizing my chapters in a strategic way*. Each chapter represents a quasi-independent perspective with its own point of entry into the human nature debate—much like we find in a crossword puzzle.[3] My hope is that each of these points of entry, once developed, will then be used to cross-reference the content of the other

[3] Another way to depict this style of organization is in terms of a Venn diagram where each chapter reflects a system of orientation, as represented by a circle, with some portion of each circle overlapping all the other circles.

chapters. In turn, this strategy should prevent the live contention of any one chapter from undermining the overall thesis, or the arguments of the other chapters.

The unifying thread of each of my chapters is this: a key reason why the existence of human nature, as an ontological claim, has historically been so difficult to establish is because we underestimate the extent to which the issue is settled by gaining clarity on clear and appropriate 'frames of reference.' A 'frame of reference' is a point of entry (or set of points) into a system of orientation—a system of favored means for making sense of the world, or some portion of it.[4] By 'point,' what I mean is an assumption, factual claim, or axiom which acts as a foundation, or as part of a foundation, for a system of orientation. These frames of reference can be normative (moral or prudential), epistemic, temporal, metaphysical, ontological, or existential. For example, they can be the assumed validity of a moral, pragmatic, or scientific principle, or goal; the assumed plausibility of an existing body of relevant knowledge—or, likewise, the assumed *implausibility* of a rival theory. We might also assume the correctness of a particular definition, or the reasonableness of a certain bounded 'level' of analysis—for example, studying an organism in isolation from its surrounding habitat. Our frames of reference can be assumptions about appropriate comparison groups: conspecifics or intra-species polymorphs; a family of species; a very specific species; or an organism at a particular stage in its life cycle. Our frames of reference can also be quite personal—for example, an implicit assumption about what is required for our life to be meaningful. However, whatever

[4] Related academic terms for a 'system of orientation' might be schemata, and paradigm.

the key assumption, what is crucial to realize is that, while such frames effectively allow us to stabilize interpretively ambiguous phenomena, they are ultimately partial or *conventional*.[5] In which case, whatever the raw matter of human nature may be—that is, whatever its objective reality—*human nature, ultimately, takes shape as a figure requires a ground, and relative to convergent human interest and insight*. When we shift our frames of reference even slightly—for example, when we relax or tighten an investigative standard, modify a definition, or adopt a more incisive investigative heuristic—what we observe, empirically, can shift also.[6]

On the surface, this is a very ordinary point. And yet, there are a number of virtues this way of thinking has with respect to human nature. For now, I will mention just three. First, this perspective should allow us to achieve greater realism by integrating, rather than separating, the perceiver and the object of perception. Second, recent debates about human nature are frequently marked by claims of

[5] I use the word 'partial' to indicate that our knowledge can always be improved—that is to say, humans will never be omniscient. As for the word 'conventional,' I use it in a very broad sense. I do not mean due merely to personal convenience, or cultural agreement, but rather: 'exists for a purpose,' or has a 'pragmatic dimension.' These purposes can be deliberate. But I suspect our deliberate frames ultimately resolve into those that are subconscious, biologically idiosyncratic, or species-typical. For example, seeing the color red can be a species-typical convention. In other words, many species survive *without* seeing red, so there is an aspect of pragmatism to how a species visually divides up the world (which is not to say that seeing red does not have incidental aspects).

[6] A very simple example may help. Imagine we have never seen a mountain. Then imagine the influence of different vantage points: standing 20 kilometers away from the mountain; standing at the base of the mountain; standing on the peak of the mountain; sitting in a helicopter far above the mountain. The mountain has an 'objective reality,' but will be descriptively different from each vantage, and each vantage can be empirically accurate. Many commentators on human nature *think* they are arguing, in effect, about 'the general qualities of the mountain' when, in fact, the argument disappears if they see the partiality of their vantage or that fact that, to be whole, it must be integrated with other vantages.

emphasis.[7] For example, a proponent of human nature might argue that research in evolutionary biology has been underappreciated,[8] while a critic might argue the opposite.[9] However, by stressing precision on our frames of reference, it is possible to see how these contradictory statements might both be true. For instance, it might be the case that, relative to North American sociology, the role of sexual selection has been mostly ignored in making sense of fashion trends, whereas this has not been the case with respect to the field of economics.[10] Despite multiple possibilities, one upshot of this may be greater patience toward views that oppose our own which, in turn, might expedite creative problem solving. Third, a focus on frames of reference can help ensure our descriptions of human beings are suitably interactionist.[11] This has particular relevance when academics argue that some particular research finding, or way of conceiving humans, will lead to some widespread harm or benefit. For example, critics of human nature often suggest that certain claims about involuntary biological limits will erode meaning in human life,[12] or will be used to justify the status quo.[13] A basic understanding of individual

[7] Most key players in these debates do not deny some amount of truth to an opposing side. Rather they stress one descriptive preference, or explanatory variable, over another. Some common areas of investigation where this occurs are as follows: biological versus social causes; genetic versus epigenetic causes; human features as adaptations versus by-products; human minds as domain general versus domain specific; human traits as innate versus acquired; human traits as produced by past evolutionary forces versus present ones.

[8] See, e.g., Carroll (1995).

[9] See, e.g., Stove (2006).

[10] See, e.g., Hammerstein and Hagen (2005); or, for more popular reading (by an academic), see Miller (2009).

[11] To be an interactionist is to commit, at least in principle, to the thesis that 'nature' and 'nurture' are equally important when it comes to explaining humans.

[12] See, e.g., O'Hear (1997). For empirical research relevant to this issue, see Brem et al. (2003).

[13] See, e.g., Rose and Rose (2000), or Dupré (2003).

temperament, developmental stages, sex, ecology, cultural diversity, education, and so on suggests this one-dimensional generalization cannot be true. Whatever the presumed impact of a descriptive or explanatory generalization, it must be parsed out relative to a vast array of mediating factors.

1.1) PhD Thesis Outline

The present chapter is evidently my introduction to the academic debate on human nature. Two points of immediate clarification: first, throughout my PhD thesis, I will often focus on a paradigmatic text, or the writing of a few scholars that represent clusters of academic consensus—or, at least, exemplify an instructive mistake. This tactic is an attempt to strike a balance between the need to generalize about the literature while also achieving enough detail to maintain respectable standards of scholarship. It is also noteworthy that what is, essentially, typological thinking is a practice few academics can avoid,[14] even though it tends to be demonized.[15] Second, as the literature on human nature is enormous, I am forced to impose considerable bias relative to the material I presume relevant. However, it should go without saying that my aim is to restrict myself to critiquing the rival views I consider relatively strong. This means I will generally avoid purely philosophical accounts, such as those advanced by academics such as Sartre, or accounts that identify human nature with a human soul. My focus is, rather, on accounts where academics reference peer-reviewed research and acknowledge at

[14] See, e.g., Buller's distinction between Evolutionary Psychology and evolutionary psychology (2005, pg. 12).
[15] For commentary on this demonization see, e.g., Wilkins (2010).

least some relevance of evolutionary principles. In this vein, I will also focus mostly on academic work dating back to the 1970's and, in particular, dating to the publications of E. O. Wilson and Richard Dawkins.[16] Along with Darwin's work, these publications were a watershed in both the substance and intensity of the debate on human nature, and they brought into sharp focus whether the ancient past or historical present should be emphasized in trying to describe or explain our nature.

In chapter two, I will present my primary argument that human nature exists. In doing so, I will defend what I would call an ecological view of human nature. This argument has multiple layers. By way of a very general summary, I will *a)* justify the importance of attending to frames of reference, *b)* argue that rival views are mistaken, in part, due to their frames of reference, and *c)* attempt to justify my own frames of reference. For my view of human nature as an ecology, I will introduce two important constructs: proximal areas of relevant generalization (PARG) and distal areas of relevant generalization (DARG). There are at least nine PARG: genes, development, physiology, anatomy, psychology, behavior, social ecology, local ecology, and global ecology. On my view, one of the weaknesses of what I would call an 'ecologically nominal' view of human nature is that it is too partial or conventional. In other words, 'nominalist' scholars tend to describe or explain human beings, or a wide range of human traits, drawing on only one or two PARG or,

[16] With respect to Wilson: *Sociobiology; the New Synthesis* (1975/2000), and *On Human Nature* (1978). With respect to Dawkins: *The Selfish Gene* (1976/1989), and *The Extended Phenotype* (1999).

especially, always referencing the *same* one or two PARG. And so, for example, to explain human artistic behavior,[17] or a particular work of art, an academic might claim that genes or anatomy are largely irrelevant, and will repeatedly reference culture.[18] An ecological perspective on humans avoids this while also remaining practical. As a mere summary, an ecological perspective elevates the *relationships* that bound an entity and, as such, offers the possibility that an organism can straddle a variety of phenomenal boundaries *simultaneously*.[19]

In chapter three, I will argue against the orthodox view that typological thinking, classic essentialism, and species fixity contradict our best knowledge of biology and natural history. In philosophy of biology, in particular, a great deal of effort has been spent repudiating the scientific merit of classical essentialism. In assuming success here, critics then equate this with a refutation of human nature. In response, I will try to show the current orthodoxy is in error. In making these points, I will introduce further supporting constructs: organismic constants, ecological imperatives, global and local ecological constants, and ecological heuristics. These constructs will be central to adding viable structure to my own conception of human nature. They should also offer more comprehensive means to understand the so-called species problem.

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[17] See, for example, O'Hear (1997, e.g., 202).
[18] See, for example, Prinz (2012, 12).
[19] For instance, I can be described, or 'experienced' (via technological aid) in terms of atoms, cells, or bio-chemical properties; I can be described in terms of certain intrinsic properties that make me an animal, a mammal, a primate; or, I can be described in terms of relational properties that make me a son, husband, father, and so on. All these descriptions can be 'scientific' and can hold all at once, but one description may be more apt relative to our descriptive purpose.

Having spoken, in effect, to what is human, in chapter four I will turn to the issue of natures, or what is natural. As with chapter two and three, I will again engage in significant conceptual clarification. In effect, I will argue for the value of, and distinctions between, the constructs innate, acquired, socially acquired, natural, and ecological. Just one of the confusing aspects of the traditional literature on human nature is that the term ‘natural’ has no fewer than seventeen meanings. Each of these dimensions of the word ‘natural,’ can appear to contradict other dimensions, and unfortunately, academics often shift between the meanings of the word without awareness. I will mitigate some of this confusion by clarifying the difference between attributing the term ‘natural’ to a species, versus a local population, or an individual. However, the most constructive outcome of this discussion may simply be that awareness of these different dimensions may expedite using the term ‘natural’ with more precision. Two constructs I will introduce here are: ‘lines of expedience’ and, following Gibson, ‘action affordances.’[20]

At this point in my thesis, my argument should be effectively complete. However, in the final chapter of my thesis I will move away from purely theoretical discussion and highlight some of the practical advantages an ecological view of human nature affords. I will begin by showing how an ecological view of human nature can substantially move us toward the resolution of a variety of long-standing philosophical issues. Most important, I will show how an ecological view can reconcile competing positions on the issue of human nature and free will. I will then

[20] Gibson’s view centered on ‘perceptual affordances’ (1979). See Miller (2007) for commentary.

turn to specific applications. Here, my primary aim will be to show the limits of rival views with respect to moral and prudential problem solving and, in particular, excess reliance on didacticism, or consciousness-raising.[21]

1.2) Preliminary Qualification: Relativism versus Integrationism

Biological systems are difficult to study.[22] Not only do they exist at multiple levels of organization (micro and macro), but they exist in various developmental stages, and within varying exogenous ecologies. In turn, all of these elements can be legitimately accessed from multiple systems of orientation and frames of reference. However, this is not a relativist stance. It simply means that, with respect to biology, we should sometimes tolerate *ranges* of truth, rather than insist on singular or unqualified truths.[23]

Two non-biological examples might serve to illustrate this point. First, if I consider the table in front of me, at a certain atomic level, most humans would report it is solid. However, at a subatomic level it is mostly empty space. We can describe the table at two different physical scales, but neither scale, is superior in truth to the other. Each is simply a description of a different level of phenomenal organization and we decide what to emphasize relative to human interest. Likewise, at an atomic level, we can truthfully say that water is two hydrogen and

[21] 'Consciousness-raising' is a term that has been figural in Marxism, environmentalism, and feminism. Opposition to some expressions of these movements is often viewed as a product of 'false-consciousness'—or, effectively, *brain-washing* by a dominant group. 'Consciousness-raising,' or being made aware of the 'correct values' to have, is seen as a fundamental remedy to 'false-consciousness.' See, e.g., Ellis (1998), Patai and Koertge (2003), or Heath and Potter (2004).
[22] By 'systems' I mean interacting parts and processes that occur with enough stability we can draw a descriptive boundary around them and think of them as a distinct, *integrated* whole.
[23] Wimsatt (2007).

one oxygen molecule. However, this claim does not fully describe water because exogenous ecology alters the instantiation of H20. In other words, water can be in a liquid state, a solid state (ice), or a gaseous state (steam). The very different expressions of H20 do *not* nullify the fact that we capture something real, and constant, in describing water's molecular properties as H20. Nor does H20, in any particular ecology, capture the nature of water in a way superior to the expression of H20 in other ecologies. With respect to the issue of human nature, too often we narrow or expand the focus of the microscope and then insist one particular focus is *the* true reality. Or likewise, once we identify particular human properties, or once we see a localized expression of humanity, we then insist that either the properties or the expression is what is real, or most deserving of our attention. The position I defend in my PhD thesis is *integrationist*. I seek to find the truth while trying to balance the often premature and polarizing judgment that a rival view is simply wrong, unintelligent, politically negligent, or immoral.

This still leaves the issue of how we determine which frames are the correct ones. I will address this more fully throughout my PhD thesis, but at this point, a brief answer is this: we search for triangulation across independent lines of investigation and across the relevant phenomenal boundaries. This is no different from how our sensory modalities—such as our vision or hearing—work together to confirm some phenomenon such as a songbird, or how a police detective might rely on eyewitness testimony, finger printing, or DNA samples to determine the cause of a crime.

(2) Foundational Frames

"[W]here you choose to access the phenomena of science makes a difference."
A.C. Love (2009, 59).

The issue of the existence of human nature has, traditionally, been connected to the issue of determining to what degree natural forces external to human culture can be referenced to understand humans. This gained robust scientific purchase with the introduction of the theory of evolution by Alfred Russel Wallace and, independently, Charles Darwin. However, the modern debate arguably dates to the controversy surrounding the publication of E.O. Wilson's *Sociobiology.* Wilson's aim in *Sociobiology* was to extend Darwin's ideas—notably refined by the modern synthesis—and to clarify the biological basis of all social behavior, including that of humans. For the most part, up to this point in intellectual history, academics viewed evolution as relevant to explaining the physical features of humans, but human minds and human behavior were somehow exempt.[24] In her book, *Defenders of the Truth: the Sociobiology Debate*, Ullicia Segerstråle introduced the controversy surrounding sociobiology as follows (which, at that time, had existed for twenty-five years). She wrote:

> The characters in my story are all defenders of the truth—it is just that they have different conceptions of where the truth lies. The truth of these scientists is multi-faceted: epistemological, methodological, moral, political, metaphysical, even esthetic. Still, these aspects are not randomly combined—rather they cluster into identifiable, organized world views, complete with different stocks of taken-for-granted knowledge (Segerstråle, 2000, 1).

[24] Wallace, himself, eventually took this view—unlike Darwin (Cronin, 1991, 353 – 367).

In regard to human nature, the primary reason to focus on frames of reference is because it may help us to get at what Segerstråle called *'stocks of taken-for-granted knowledge.'*[25] Segerstråle states that, in this particular case, the assumed knowledge in various domains of inquiry cluster into identifiable, organized world views. This basic point has wide application, especially in the social-sciences. If we are to make progress on the issue of human nature, we are *not* likely to do so by simply looking to the so-called facts, as the very same facts will be interpreted differently through the filters of our various starting assumptions. In which case, it is often a small correction to an oversight (or bias) in our starting assumptions that is the lynch-pin to change. For example, imagine we are trying to determine who is responsible for a particular crime. If our starting assumption is that eyewitness testimony is reliable (in this case, a proxy for empirical evidence), we will likely assume that gathering more eyewitness testimony will produce an accurate verdict. But this starting assumption is actually wrong, and it skews the outcome.[26] A great deal of the orthodoxy on human nature, both for and against, is similar. Academics are often adamant their particular view is true, or 'scientific,' and a rival view is not, when what is actually the case is the evidence is favorably and selectively interpreted to match a particular starting assumption. In short, even seasoned

[25] Thomas S. Kuhn is relevant here: "The proponents of competing paradigms are always at least slightly at cross-purposes. Neither side will grant all the non-empirical assumptions that the other needs in order to makes its case. Like Proust and Berthollet arguing about the composition of chemical compounds, they are bound partly to talk through each other" (1962/1970, 148).
[26] See, e.g., Loftus (2003).

academics engage in what is known in social psychology as motivated reasoning, or confirmation bias.

In this chapter, I will present an ecological conception of human nature. This view is counter-intuitive in some respects. Therefore, I will present it in relatively small steps.

In terms of a positive formulation of my thesis, an ecological conception of human nature has six facets. First, at the heart of my thesis is the contention that human nature is *not* something that *inheres*, or is necessarily understood by some set of shared intrinsic properties projected out into the world (although this will be an important aspect). Instead, human nature is *diffuse*, partly external to us, and held in place as much by genes, or anatomy, as by factors external to the 'somatic us.' Second, an ecological conception of human nature is a *robust* version of human nature. By this I contend there are features of humans (and other organisms) that are universal and lawful in a way not unlike what we find in the inorganic world.[27] Third, related to the previous point, I will argue that human nature exists in degrees. At one level, there are features that we all share. So human nature exists in singular form. However, at another level, we may be justified in speaking of human nature in mere generalities and in terms of the features *most of us* share. This permits the possibility of speaking of more localized-natures and, on occasion, of speaking of more global natures (e.g., a mammalian or primate nature). Fourth, I will argue there are some features of organisms that do not change. This facet requires

[27] I make this point in direct opposition to academics such as Jesse Prinz (e.g., Prinz, 2012, 13 -14).

qualification as, in a certain sense, change itself is static. But a key virtue, here, is that it matches one of the basic aims of the scientific enterprise which is to isolate patterns of invariance in the universe. Fifth, an ecological conception of human nature requires we view human intentions as inextricably connected to involuntary or *unintentional* factors. And sixth, an ecological view of human nature asserts what I would call 'relative human freedom,' as opposed to 'absolute human freedom.' This last facet requires we modify our traditional view of strict human, or social, accountability. This can help us to see the virtue of what I would call *indirect*, rather than direct (or didactic) problem solving.

As for a critical formulation of my thesis, my conception of human nature has four facets. First, I will argue that human nature is primarily a *pragmatic* construct. By this I mean two things. One is that, contrary to the view of many critics, we need not insist on near certainty, or on especially high standards of empirical research, to benefit from the construct of human nature. Rather, we need only attempt to conduct our research in a way that improves on, or matches, *rival* research. My other meaning of pragmatic is that an ecological conception of human nature places value on tolerating scientific error.[28] This allows us to respect the complexity of the subject matter, as well as human epistemic constraints, and appropriately shifts us toward a long-term temporal frame for achieving a refined understanding of humans. Second, I will argue against the popular notion that humans, in any strict sense, transcend or escape evolutionary forces. Third, I will argue that our

[28] For a lucid discussion see Wimsatt (2007).

constructs, or research, with respect to human nature, do not have any uniform effect on the human population. Rather, the relevant facts or fictions have a varied or '*double effect.*' In other words, due to diversity in the human population, the nuances of global and local ecology, and 'ecological imperatives,' the relevant facts and fictions are subject to a radical range of interpretation. This is not to say that *some* facts or fictions do not have singular human interpretation, or produce a strong valence to convergent interpretation (for instance, no one would appreciate indefinite, severe, and involuntary suffering), but the temporal stability of these interpretations is, itself, a potential argument for human nature. Finally, overlapping my third point, I will argue against the view that involuntary biological limits or constraints are primarily connected to regressive politics, or a justification of the status quo. This last point might be one of the most important of my PhD thesis, as many of the critics of human nature appear to view the existence (or acknowledgement) of biological limits as something *inherently* dangerous or 'bad.'

There are five natural rivals to an ecological conception of human nature. These positions are *a)* there is no human nature; *b)* human nature exists, but only in a weak (or 'gracile') sense; *c)* human nature exists, but is best represented by one or two elements of PARG; *d)* human natures *plural* exists, but not singular; and *e)* human nature exists, singular, and is adequately represented as a summary of species-typical features reflecting human evolutionary history. The brunt of my PhD thesis is directed to a critique of position (b) and (c), but I will, of course, dedicate some discussion toward (a), (d), and (e). Position (b) and (c) often co-exist, but I separate them as position (b) is not necessarily 'ecologically nominal.' As noted earlier, an ecologically nominal position is one that emphasizes any one or two PARG, or the same few PARG relative to diverse human traits, while notably ignoring or minimizing most of the other PARG.[29] However, I mostly reserve the term for views that are strongly *socio-agentic*.[30] A socio-agentic conception of human nature assumes that *human psychology* and/or *human social ecology* are primarily what we need to know to understand humans. On a socio-agentic conception, human minds are said to be mostly free of evolutionary influence, and we are admonished to think of humans as almost infinitely variable and malleable, and primarily as agents (or as self-determining). With an almost exclusive elevation of the importance of the human mind and social influences, this view can valence political polarization and cycles of divisive moral arrogance and moral defensiveness. It also appears to undercut holistic problem-solving.

I have introduced an ambitious project, but I will not try to defend all of these points in the present chapter. Rather, in this chapter, I will outline and critique all the rival conceptions listed above, and then present *only* the basic elements of my own view. My point on human universals, in particular, and the issue of biological

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[29] Some classic statements can be found in Barkow et al (1992). For example, consider Durkheim: "The determining cause of a social fact should be sought among the social facts proceeding it and not among the states of individual consciousness" (ibid. 28). Or see, in the same text, Lowie "Culture is a thing sui generis which can be explained only in terms of itself" (ibid.). See also Pinker (2002, 23 – 26).

[30] This is because, contrary to the accusations of some of the critics of human nature, there are no luminaries on the issue of human nature who presume that genes, or biochemistry, or sex, sufficiently encapsulate what we think of as human nature. Whereas, an emphasis on human psychology or sociality is very popular.

limits and constraints, as well as that of 'relative' versus 'absolute' human freedom, will be developed in subsequent chapters.

I will organize this chapter in seven parts and sixteen short sections. As I move through rival views, my criticism should begin to, indirectly, build my own conception of human nature. In part I, I will critique the denial of human nature—or rival position (a) mentioned above. In part II, I will make some clarifications about evolutionary processes that relate to human generalization. In part III, I move to critique what I will call 'gracile conceptions of human nature.' In part IV, I critique socio-agentic conceptions of human nature. In part V, I critique human nature *plural*. In part VI, I critique what I will call a 'summative conception of human nature'—referring to views that see human nature as a summary of species-typical features. This will involve some much-needed clarification on the difference between conceptions, definitions, and empirical specifications of human nature. And finally, in part VII, I advance my own definition and conceptualization of human nature—or the idea of human nature as a living ecology.

Part I: The Denial of Human Nature

Denials of the existence of human nature exhibit common patterns. However, when it gets right down to it, the most remarkable and peculiar pattern of these arguments is their inconsistency. This occurs at two primary levels. First, the critic of human nature tends to *explicitly* deny or minimize human *universals* (or exceptionless generalizations about humans) while *implicitly* espousing them. Second, if the identification of human nature with human universals is relaxed, and the issue turns to the mere possibility of *generalizing* about human nature, the critic tends to *explicitly* deny or minimize generalizations made by proponents of human nature, while *implicitly* treating their own generalizations as worthy of note.

There are a variety of plausible reasons as to why this occurs but to give a very partial explanation, I suspect it occurs because the issue of what is 'human,' and the issue of what is a 'nature,' or what is 'natural,' are each radically multi-faceted. Therefore, not only does this allow us to regularly talk past one another in debate, but it also might easily hide our inconsistencies from us.[31] To avoid this in my own conception of human nature, and defend the existence of this pattern in others, I will start this part of my PhD thesis by giving a brief overview of the construct 'human nature.' I will then make a series of short arguments that should act as a conceptual baseline for the remainder of my thesis and, I hope, will crystallize the issue as to who to focus on as an appropriate rival.

2.1) Preliminary Overview

The phrase human nature is basically *a compound word* which can be viewed, in principle, as we view words such as firefighter or moonlight. Thus, as we investigate the existence of human nature, we must recognize we are attempting to orient in at least two specific respects. First, we are asking if there is anything in the

[31] The construct 'God' might be an analogous case. As we can mean many things by this word, our focus can be dominated by some preferred aspect and, thus, diverted from inconsistencies. For example, we may like to think of God as an entity that is (among other things) perfect, omni-benevolent, and the creator of the universe. And yet, it might be that perfection and creation are inconsistent. For example, just as when I am perfectly satiated I will not eat, being a perfect entity should imply an absence of acts of creation (as s/he is perfectly complete, s/he should not need to do anything). Just like the phrase 'human nature,' the words 'God,' 'perfection,' and so on, can have so many facets even experts may find it challenging to track them all.

world that counts as human. In other words, we are asking if we can justifiably draw a *boundary* around a particular group of organisms and say these organisms are *alike* in important ways, and *different* from other organisms in important ways. In attempting to answer this question we are also, in effect, induced to answer a host of other questions. One of these is: do species exist—that is, are they real, or a natural kind? Another is: how do we accurately judge what a species is? And lastly: is there a single criterion, or do we require multiple criteria, to delineate humans as a species?

A second aspect of orienting to the issue of human nature, affirms the answer to the first main question, but continues the investigation with two further questions. One is, do humans have a nature? By this we mean, do humans have an 'essence'—some feature, or set of features, that roughly captures something fundamental or important about us. The other question we ask is, is there anything *natural* to humans? In my fourth chapter, I will outline various dimensions to the construct 'natural.' But, succinctly, the construct 'natural' represents what is evolutionarily or phylogentically stable—whether as an adaptation or an incidental feature;[32] what is species-typical; what is readily or easily expressed in a species;

[32] Dawkins writes: "Darwin's 'survival of the fittest' is really a special case of a more general law of *survival of the stable*. The universe is populated by stable things. A stable thing is a collection of atoms that is permanent enough or common enough to deserve a name. It may be a unique collection of atoms, such as the Matterhorn, that lasts long enough to be worth naming. Or it may be a class of entities, such as rain drops, that come into existence at a sufficiently high rate to deserve a name, even if any one of them is short-lived" (1976/1989, 12).

and what brackets human thought, feeling, choice, and action, mostly outside of cumulative human culture or technology.[33]

In isolating the two main parts of our investigation, it is important to realize *they each ask something slightly different*. The question of 'what is human?' is a question of *taxonomy*, a question of determining *species membership*, and a question that may require some estimate of where, historically, 'human' became qualitatively different from 'proto-human.' However, most figural with taxonomic questions: we aim for an answer that is exact. This has two facets. First, we want to know what is it that *all* organisms we call human have in common. Thus, we aim to determine a universal—*or universals*. Second, to clearly establish human membership, we aim for some feature, or set of features, that is exclusive—that is, we look for features that *only* humans have, and that no other entity has.[34]

In regard to the *nature* of humans, or what is natural, these questions are *not* taxonomic. Rather, the constructs nature, or what is natural, are *ethological and approximate*. This means we satisfy the construct by referencing what *most* humans share (as opposed to all) and this is studied relative to varied local ecologies.[35] However, in addition to this, the construct nature, or natural, does not valence *distinction* from other organisms as what most humans share can be significantly

[33] The word 'brackets' refers to the importance of bounded or restricted choice for survival. For example, the capacity to feel pain and having breakable bones makes decisions about jumping off a mountain without a parachute fairly easy, and it helps explain the cultural invention of splints.
[34] I make these comments in direct opposition to views such as Buller: "organisms that belong to the same species need not share any properties" (2005, 498). As Machery and Barrett write, "This view of species seems bizarre. If one could find two organisms that shared no properties, and demonstrate they belonged to the same species, that would make news" (2006, 243).
[35] For example, relative to other species, we might say it is natural for humans to mate. However, what form of mating (e.g., monandry, polyandry, polygyny) may depend on ecological variables.

shared by other organisms. For example, bi-parental investment in offspring may be natural to humans, but it is also found in other organisms, and does not delineate human membership in any refined sense. With a technical understanding of these two constructs, when 'human' and 'natural' come together, what emerges is a *tension* that is resolved by emphasis relative to human interest and purpose.

Having made these clarifications it is also important to realize we do not need to accept, on the one hand, ontologically *singular* (or one-dimensional) claims as to what humans are and, on the other hand, proximate solutions in regard to determining our nature, or what is natural.[36] On each side of the equation our precision can be relaxed or strengthened for any number of reasons. Moreover, *we can build our taxonomic or ethological claims in layers, or by degrees*. For example, with taxonomic questions, we may find the most accurate or inclusive way to understand the label 'human' is to determine if any particular organism can be traced to a certain evolutionary lineage. However, we can then add further criteria (even if less reliable) as supplements. For instance, we might determine whether the organism exhibits a human genome; whether it is produced by human sex cells; is born of a human mother and father; whether the organism has species-typical features, or exhibits species-typical development patterns; and so on.[37] Ultimately,

[36] By 'ontologically singular' I mean we do not need to insist on any *one* ontological level of description as superior. For example, an automobile might be described as composed of mostly petroleum products, steel, or plastic, or we could describe it at the level of atoms, electrons, quarks, and so on. The ontological level we chose to focus on will depend on our purpose.
[37] The same can be said about other categories. Our best description of a cowboy may be: a male whose occupation is herding or tending cattle. However, while less precise, we can add other dimensions to this by studying actual cowboys and their habits. We might then supplement our

it is this supplemental, or weak sense, that most scholars argue for, or tolerate, with respect to the existence of human nature.[38] This is because, for some, it is assumed that neither human universals exist, or exclusive human features, and for others, that even if these do exist they are not that 'interesting.'

2.2) Human Universals and Exclusive Human Features

To reconnect this to a robust denial of human nature, I will begin by attending to the issue of universals. When a scholar denies human nature, they are actually making two universal claims and actually *affirming human nature in the very act of denial*.

The first universal claim is taxonomic: in terms of the organisms that do not have a nature, in their very statement the critic *has already bounded a particular group and labeled it as human*: what entities do not have a nature? Humans! Here, the critic is saying something that has two definite aspects. In one aspect, he or she is cleanly separating humans from other entities, past or present. This implies the construct captures something significant. In other words, the critic is not trying to establish a more accurate grouping by trading the construct 'human' for the construct 'mammal,' or 'primate,' or what have you. Nor is he or she using a hybrid construct such as 'not-quite-chimpanzee-but-not-quite-human.' As for the second aspect, the critic is making a statement that is *all-inclusive, and atemporal*—something that earlier, and all human morphs, share: babies, adults, females, males,

initial description with the following: tends to have a parent who is also a cowboy; lives in rural ecologies; enjoys country music; attends rodeos; often wears a cowboy hat and Wranglers; drives a truck; and so on. The precision we insist on will depend on our purpose.

[38] See, e.g., Machery (2008), Griffiths (2009), or Lewens (2012).

and so on.[39] In fact, I have never encountered a scholar denying human nature but expressing it as, say, development specific—saying, for example, that human children have a nature, but adults do not. The denial is sweeping and unqualified. Apparently, if one human does not have a nature, we all do not have one.[40]

One sign this critique is on the right track can be found in how often a critic denies human nature, in the singular, while still speaking of humans as a single bounded group.[41] For example, the critic will use the language of '*the*' brain, '*our*' mind, '*we*' learn, and so forth. In other words, he or she does not write as if amoebas, earthworms, humans, and all other species, are one amorphous, kaleidoscope of life; he or she will admit human patterns in, for example, eating, sleeping, sex, and language, all the way to the classification of flora,[42] seeing poorly in the dark,[43] difficulty in delaying gratification,[44] and being "condemned to be free";[45] likewise, with respect to higher level generalizations, critics will speak of a *human* genome, anatomy, development, psychology, sex differences, behavior, traits, emotions, learning, conformity, altruism, co-operation, and evolution.[46]

The second universal implicit in the critics view is ethological: the very statement of denying there is anything natural to humans, effectively affirms *there is*

[39] By 'atemporal' I mean: to the point we would say the first humans existed to the point the last humans goes extinct.
[40] One irony here is that the claim is actually an essentialist one. The *property* humans have in common, that unifies us, is 'not having a nature,' or 'chaotic traits.'
[41] Ehrlich (2000), Dupré (2003), Buller (2005).
[42] Dupré (2003, 109).
[43] Buller (2005, 103).
[44] Prinz (2012, 312).
[45] Sartre (1957/1990, 23).
[46] Prinz (2012), Buller (2005), Ehrlich (2000), Hull in Hull and Ruse (1998).

something natural. In other words, what is evolutionarily stable, easily expressed, normal, and so on, is that we are all non-natural organisms—or chaotic.[47] The critic may reply that our chaotic nature is not due to the evolutionary past, or is due to something merely social *and* transgenerational. However, this only evades the criticism by one step. For instance, if we go far enough back in time verifying why only other humans have an influence on us (i.e., what is social), we are eventually forced to confront evolutionary time and, thus, the possibility that human chaos is an evolutionary phenomenon. In turn, if we are not going to deny evolution altogether, we will want to forward *some* tentative investigative hypothesis as to why and how we became so susceptible to other's influence, or are so historically stable in our diversity, malleability, unpredictability, and self-determination.

In regard to the issue of exclusive human features, something equally contradictory occurs for the critic. For the biologically uninformed critic we usually find him or her speaking of humans in exclusive terms while denying humans have a nature. Just one example, when Simone de Beauvoir states that 'human beings are the only being whose essence is not having an essence,'[48] she is not saying that any and all descriptions apply to the category human. Rather, Beauvoir is saying something *definite* about humans and is *separating* humans from non-humans—that is, it is humans who are defined as not having an essence and *not* aardvarks, magnetic fields, or tables. Even more intriguing, Beauvoir does not say that having,

[47] I am using the term chaotic as shorthand for 'does not exhibit any stable or predictable pattern.'
[48] Quoted in Lewontin (1991, 123).

or not having, an essence is a non-biological phenomenon, *contingent on culture*; or that, at present, humans do not have an essence, but this may change day-to-day, year-to-year, or millennium-by-millennium. Instead, her writing gives the impression this is somehow an eternal truth!

The biologically informed critic is even more puzzling. This is for two reasons. First, the biologically informed critic will usually claim that humans can, in fact, be thought of as 'human' via some combination of the phylogenetic and biological species concept. For example, in his essay 'On Human Nature,' David Hull tells us that "If species are taken to be things which evolve, then they can, and must, be characterized in terms of ancestor-dependent relations, and in sexual species these relations are dependent on mating."[49] Hull then goes on to criticize a variety of possibilities the proponent of human nature might invoke to establish universal or species-exclusive features. However, Hull has just given a criterion for what is exclusive and universal to humans. So it is difficult to understand what else is required. For the proponent of human nature, *once we have some minimal standard of humanity,* it is possible to then turn to all manner of consolidating generalizations that need be neither exclusive nor universal. In fact, we can now separate these two aspects and begin to look for some features that only humans have, but that may not be universal; or we can look for features that are universal to humans but shared by other species. For example, Hull notes that "for millions of years, no [human] has been able to mate successfully with an organism belonging to another species" and

[49] Hull and Ruse (1998; 384)

he adds, "some combination or combinations of traits must be responsible for this reproductive gap."[50] This seems to significantly capture some *layer* of what it is to be human, without the requirement that sexual reproduction is an exclusive human feature, or that every human is successful in doing so.

My second point as to why this is puzzling is that Hull's perspective is so *scientifically uninspired*. For this type of critic, once we have established something like ancestor-dependent relations, it appears there is not much left to say: the only 'interesting' human science is documenting all the ways humans are diverse or changing. Intuitively, most of us know this is wrong. Humans are not *chaotic* organic systems. Rather, we are rich in notable stable patterns, and these patterns lend themselves to vast descriptive possibility. For example, humans are not, at one moment, thirty feet tall and, at the next, thirty inches; we do not require oxygen one day and, in the next, witness our bodies reconfigure to skirt this necessity; we do not haphazardly care or cease caring about our own, or other's well-being; as we mature, we do not attempt to eat most of our own brain, like the mobile larval form of the sea squirt;[51] we do not enter a torpid state and freeze solid over winter (as a wood frog does) and then reanimate in the spring; and, unlike a trap jaw ant, we cannot shut our jaws with enough force to catapult ourselves the equivalent of over 100 feet away from danger. These types of delineations are mildly facetious. But, my point is: it is *easy* to make generalizations about humans that, taken alone, or in

[50] Ibid. (389).
[51] Llinás (2001, 78).

conjunction with others, are descriptively accurate—and not excessively difficult to make generalizations of value to both science *and* to our ability to navigate the trials and tribulations of daily life. A critic might immediately reply that even if our generalizations are scientifically accurate, they are not stable over *geological* time—the temporal frame many philosophers of biology seem to prefer. But these kinds of criticisms are notorious for their lack of specificity as to what time frame *is* adequate to claim some feature of a species is stable. They also provide little or no justification for privileging large temporal frames of analysis over shorter ecological ones.[52]

Before moving to the core of my PhD thesis, what I hope is clear at this point is that *we cannot take claims about the denial of human nature literally*—in the same way we should not take an epistemic or metaphysical relativist's denial of the truth literally. The denial of human nature is always a denial of some *particular conception of human nature*, and involves at least an implicit substitution of one conception for another.[53] If anything, the denial of human nature might be a kind of 'performance art' directed at having us think about humans in a certain way even if this art requires us to repress a contradiction.

[52] See, e.g., Hull in Hull and Ruse (1998, 383, 391, 392), or Buller (2005, 477 - 480). See Ehrlich for a statement on ecological time (2000, 34).

[53] Other scholars who tend to be skeptical of disciplines such as evolutionary psychology have also understood this. For example Patricia Gowaty writes: "Many evolutionists and feminists explicitly seek to understand human nature. All others harbor beliefs about human nature. I infer this because every political act of those in the social-change business (e.g., feminists or conservation biologists, or any other person struggling with another) is guided by some theory of human nature. Guiding theories may be unconscious and tacit, conscious and explicit, but are there at any rate. Their force is especially obvious when we decide to act in the interest of achieving some social change objective" (1997, 2). See also Richard Lewontin (1991, 87), or Pinker (2002, 1).

Part II: Evolutionary Processes

Explicit denials of human nature are not very common in modern academic literature—at least where the scholar is biologically informed. Michael Ghiselin is one who does so, and David J. Buller is another.[54] However, denials of human nature share at least one key frame with more moderate positions—some of which happen to strongly affirm the existence of human nature. All depict evolutionary processes as fundamentally about organic diversity and change. For example, with respect to diversity, Hull claims, "If evolutionary theory has anything to teach us, it is that variability is at the core of our being."[55] Or Joan Roughgarden writes, "The biology I know tells of endless variation."[56] With respect to change, Ghiselin asserts that, "For Darwin, as for Heraclitus, change was the fundamental reality."[57] And Buller tells us "Evolutionary theory is purely *a process theory*" and goes on to say it is "designed to explain the dynamics of that process…[or] designed to explain *change*."[58]

The frame of evolutionary diversity and change does not automatically undercut an acceptance of stable generalizations about humans. For instance, conceptions of human nature as summaries of species-typical features tend toward this frame.[59] However, it does seem to influence our willingness to view humans as governed by local and global biological laws (which exist much like those of the laws

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[54] Buller writes: "I will argue not only that Evolutionary Psychology's theory of a universal human nature is mistaken, but the very idea of human nature is incompatible with a genuinely evolutionary understanding of our species" (2005, 15). Ghiselin writes much the same: "What does evolutionary psychology teach us about human nature? It tells us that it is a superstition" (1997, 420).
[55] Hull in Hull and Ruse (1998, 388).
[56] Roughgarden (2004, 376).
[57] Ghiselin (1998, 6).
[58] Buller (2005, 479).
[59] See, e.g., Machery (2008).

of physics). I will discuss this further in Chapter 3. For now, I will just make one qualification about evolutionary processes. This will have special relevance to the issue of human generalizations and the remaining conceptions of human nature.

2.3) Evolutionary Processes as Change and Diversity

The frame that evolutionary processes are fundamentally about diversity and change is deceptive because it is partly true.[60] Natural and sexual selection would not exist without genetic variety and without the diverse developmental resources that impact whatever it is genes do and which jointly create phenotypic variety. Nor could new species exist without cumulative change in allele frequencies. The emphasis on diversity and change *also* has tremendous orienting value in parochial contexts—for instance, we might make such statements when arguing with a creationist. And yet, while none of the scholars listed above would insist that change is all there is, even as a claim of emphasis, their statements are not viable. If we consider merely the issue of variation, this faces all manner of biological constraint: phylogentic,[61] developmental,[62] adaptive,[63] and ecological. This helps us to understand why some organic forms are impossible and why many *possible* organic forms are not actual—for instance, why we will never see pigs develop

[60] Parthenogenic species are important to keep in mind here. For long periods of time these species do not exhibit variety or change because their surroundings do not significantly change.
[61] The terms to describe this in the philosophy of biology literature are 'phylogenetic inertia' or trait fixation. See, e.g., Griffiths (1996). Hull even seems to allow for genetic universals (in Hull and Ruse 1998, 392).
[62] See, e.g., Willmore (2010, 220 – 226).
[63] See, e.g., Sterelny and Griffiths for a discussion of mutations (1999, 34, 181).

feathered wings to fly or why there are no vegetarian snakes.[64] In fact, as natural selection works (at least at *one* level of analysis) it tends to drive out variation in a given species—a phenomenon that is analogously found in artificial breeds where unwanted features can be rapidly culled but then run out of steam.[65] Even more surprising, the identification of evolution solely (or mostly) with variation is contradicted by almost any biology textbook given one of the major goals of biology is not simply to account for life's variety, but also for how variety is *limited* in important respects.[66]

The more comprehensive truth is that evolution is compatible with periods of stasis, and with certain patterns of homogeneity.[67] For example, humans have attempted to gauge their social standing, to ensure their well-being, for about 2 million years; the basic body plan of worms has remained the same for 500 million years; and organisms have had an 'interest' in reproduction for about 3.5 billion years. Of course, evolution by natural and sexual selection can be thought of as creating dramatic diversity and change on geological time scales. However, neither static or dynamic, or homogenous or diverse aspects are ascendant in any absolute sense, or independent of human descriptive goals.

Part III: Gracile Conceptions of Human Nature

[64] See, e.g., Sterelny and Griffiths (1999, 26 – 27, 29) or Dawkins (1982/1999, 42 – 46).
[65] See, e.g., Sterelny and Griffiths (1999, 36) or Dawkins (1982/1999, 21).
[66] "With variation the rule, the aim of evolutionary explanations is to explain the constraints on variation rather than the presence of variation" (Wachbriot, 1994, 590).
[67] See Sterelny and Griffiths (1999, 29).

I use the phrase 'gracile conceptions of human nature' to represent the views of scholars who *deny* human nature 'in spirit,' but never *literally* do so. For example, in *Beyond Human Nature; How Culture and Experience Shape Our Lives* (2012), Jesse Prinz always presents the issue of the existence of human nature in an indirect or very qualified way. For instance, he claims in the opening page of the preface: "there is something dubious about the search for human nature."[68] And yet, Prinz never outright denies it; nor does he ever say that biology is irrelevant, or does not matter in understanding humans; Prinz also disavows the so-called 'blank slate view,' and argues that nature and nurture co-produce human traits; and so on. However, as is clear even just from his title, his entire book is an argument to minimize belief in 'human nature.' His final paragraph summarizes this. He writes: "the investigation of our natural constitution should be directed at explaining human plasticity. We can call that the study of human nature, but the label is misleading. It carries with it the dubious idea that there is a natural way to be. This is not the case. By nature, we transcend nature."[69] John Dupré, in his essay 'On Human Nature,' is similar in this respect.[70] In this essay, one of the primary questions he sets himself to is: what is human nature? In his answer, Dupré, like Prinz, never denies human nature exists. Instead, he argues that human nature is not biological in any traditional sense, or in any sense narrow enough to be interesting.[71] For Dupré, human nature is diverse, flexible, and very much the product of a relatively immediate and ever-changing

[68] Prinz (2012, ix).
[69] Prinz (2012, 368).
[70] Dupré (2003).
[71] Ibid. (110, 111).

social context.[72] David Hull is another scholar of this mold. In the essay I referenced earlier, Hull never says, *exactly*, that human nature does not exist. Instead, he cycles through a range of highly contextualized claims with only the overall gestalt of his argument suggesting denial. For instance, on his opening page Hull writes: "it is simply not true that all organisms that belong to *Homo sapiens* as a biological species are essentially the same."[73] Later he declares: "it is extremely unlikely that all humans are biologically the same."[74] And still later he writes: "If by human nature all one means is a trait which happens to be prevalent and important, for the moment, then surely human nature exists."[75]

Gracile conceptions of human nature overlap considerably with the socio-agentic form of ecologically nominal conceptions of human nature. But they are not the same. In socio-agentic conceptions, what is prominent is some assertion or argument about how humans are able to distance themselves from, or override, 'biology.' We see this, for certain, in the work of Dupré, Prinz, Anthony O'Hear, Timothy Taylor, Richard Lewontin, Steven Rose, and others.[76] However, we do not see this in the work of someone like Hull—or not nearly to the same degree. Hull restricts himself to minimizing human nature within the confines of what he imagines cutting-edge biology tells us, and does not go on to elevate the human mind or cumulative culture.

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[72] Dupré (2003, 111, 118 – 119).
[73] Hull (1998, 383). To clarify, Hull's opening line equates the phrase 'essentially the same' with having nature (383).
[74] Ibid. (385).
[75] Ibid. (392).
[76] Dupré (2001), Prinz (2012), O'Hear (1999), Taylor, (2010), Lewontin (1991), Rose (1997).

The distinguishing feature of gracile conceptions of human nature is the pattern of their treatment of human universals and generalizations (whether genetic, developmental, psychological, social, and so on). However, there is a big range. On one side of the scale, some scholars go so far as to downplay or resist *the act of generalization* with regard to organisms,[77] humans as a species,[78] human groups,[79] or human features.[80] For example, Anne Fausto-Sterling approvingly cites Roger Sperry who suggests that our individual brain networks may be more distinct than our individual fingerprints or facial features.[81] She then states: "[Sperry's claim] is radical because it implies that attempts to lump people together according to broad categories such as sex or race are doomed to failure."[82] On the other side of the scale, many scholars partial to a gracile view of human nature, *do* acknowledge the reality of human universals and generalizations, but tend to describe those referencing biology as 'uninteresting,'[83] trivial,[84] permissive,[85] banal, or vacuous.[86]

In this section, I will not critique the view of scholars like Fausto-Sterling. This is because universals can be readily documented at all levels of biological organization. For example, at a human genetic level we can point to features like

[77] See, e.g., Roughgarden (2004, 14).
[78] See, e.g., Jagger (1997, 394). But see, also, Mallon for an informative general discussion (2007).
[79] See, e.g., Degler (1991, 105 - 106); Hubbard in Singh et al (2001, 467), Bjorklund and Pellegrini (2002, 66).
[80] See, e.g., Fausto-Sterling (1985/1992, 199). But see also Griffiths on the social construction of emotions (1997, 165).
[81] Fausto-Sterling (1985/1992, 49).
[82] Fausto-Sterling (1985/1992, 60).
[83] Prinz (2012, 57).
[84] Lewontin, Rose, and Kamin (1984, 244; but compare to page 13),
[85] See Richard Lewens for the term 'permissive' (2012).
[86] See, e.g., Dupré (2001, 40), Hull in Hull and Ruse (1998, 386, 388), or Buller (2005, 478).

HAR1;[87] in development, no human experiences senility before they lose their baby teeth, or non-surgical menopause before puberty; in physiology, humans must nourish themselves to survive; in anatomy, all tissue is composed of atoms, or cells; in psychology, all humans orient to their surroundings, or attempt to minimize involuntary and threatening confusion; in social ecology, all societies have division of labor (even if only in the sense that newborns do not participate);[88] and so on. So the question that is most pertinent is not whether universals exist, or whether we can discover any, but rather, are these universals, or generalizations, 'interesting.' To engage this question, I will make two arguments.

2.4) Triangulated Generalization versus Isolated Generalization

There is an immediate investigative tension in attempting to capture human universals and generalizations. This is because we want our 'human constructs' to be as representative as possible, and yet, the more inclusive these are, the more they appear to lose refined practical application and predictive scope.[89] For instance, we might claim that *all* living humans have interests, or preferences.[90] Yet, plainly, this claim masks enormous diversity. For example, even in genetically identical humans, who have similar developmental resources, interests can be radically diverse.

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[87] But see also research on the genetic species concept (e.g., Baker and Bradley, 2006).

[88] Fausto-Sterling explains away a universal such as division of labor by sex by claiming the phenomenon has no universal meaning (1985/1992, 199). But it is difficult to see why 'meaning' is the only frame that should be ascendant in the analysis. Moreover, one plausible universal interpretation of this is that each person intuitively realizes that, in his or her society, no *one* person must do every job.

[89] See, e.g., Griffiths for a related discussion in Wilson (1999, 217).

[90] I mean this in a very liberal sense. A person may be in a coma, but the fact he or she may still be breathing suggests a 'preference' at a physiological level and one that is species-typical given most humans are born with lungs, and supportive features that allow lungs to function.

Moreover, without refinement, we are left with a fairly narrow band of scientific application between animate and inanimate phenomena—comparing humans to, say, rocks. So there is a sense in which the critics of human nature are correct. However, what is notably strange about the criticism that our (biological) classifications about humans are not 'interesting' is really *the lack of imagination* such a claim is built on.

Consider a single broad human generalization—for example, a hypothetical claim that humans are social organisms, as opposed to solitary, as a pygmy shrew is. This should ignite a whole raft of related questions we will want *generalized* answers to. In turn, these answers and generalizations should break down into even more refined aspects. For example, we might start by considering the issue of if, when, or where, humans exhibit a preference for the company of conspecifics. If they *do not* appear to do so, we might then look to factors that prevent or facilitate this, or look to social behavior toward other species. We might study whether humans require some notable amount of associated reward, or training, to seek out other's company. We might study whether there are any typical human modes of reproduction (e.g., sexual or asexual) or whether mating partners cooperate, or stay together, for any lengthy period. We might study whether or not humans care for their offspring; who or what humans talk about; whether humans imitate each other, or conform to the behavior of other humans; and so on. So merely at a social or behavioral level, the answers to any one investigation can be used to cross-reference, or triangulate, on others. In other words, triangulation can occur, *laterally*, across any PARG. And this may lend itself to a modest taxonomy of the nuances of human sociality, or the lack thereof. However, we can then do the very same *vertically*, or across all levels of PARG. Thus, if humans exhibit certain social behavior, we might then look for genes, biochemistry, or neuro-anatomy that intersect this finding, or that intersect each other—or look for *confounding* intersections across PARG. Think, for example, of mirror neurons, the biochemistry of attachment or ostracism—or alternately, of the neurological or ecological profiles of psychopaths who appear to be only nominally social.

To return to the critics I mentioned earlier, an example of a seemingly vacuous human universal (cited by anthropologist Donald Brown) is that, in all cultures, poetic lines are demarcated by pauses.[91] Dupré references this and states he will leave the truth of it to literary critics, but he claims this cannot be a central aspect of human nature.[92] We may agree with Dupré this is not 'central,' but there is no strong reason to think it cannot provide possibility for special insight into human nature. Pauses in poetic declamation, first, tell us something about an organism capable of poetry; it may suggest a vocal and respiratory apparatus of a certain kind relative to, say, what we find in aquatic life forms; it might tell us something about human status seeking that an organism would engage in such an activity; it may tell us about genes or genomes that correlate with poetic possibility versus those that do not—for example, a human genome versus that of an earthworm; and so on. So

[91] I am taking this from an updated list in Pinker (2002, 437).
[92] Dupré (2003, 110).

scholars like Dupré simply give up the inquiry far too easily. But even worse, they repeatedly treat the universals established by proponents of human nature, in *isolation* from other potentially intersecting generalizations, or universals. This makes much of their view as to what is 'interesting,' or not, rather hollow.

2.5) 'Interesting' or 'Banal' in Relation to Frames

For many critics, the issue of whether some generalization about humans is interesting, or banal, appears to hinge a great deal on the extent to which it renders humans distinct. For example, in his essay, 'On Human Nature,' Hull writes, "some properties may characterize all human beings throughout the existence of our species. After all, we have some mass or other, but possessing mass can hardly fulfill the traditional functions assigned to human nature, because it characterizes all species not just our own."[93] Dupré, in his essay of the same title as Hull, abides by the same principle.[94] For instance, he says that human interest in sex is not likely to reveal much about human nature because it "fails to distinguish us from the majority of multi-cellular organisms", and thus, is not appropriately "interesting."[95] However, the mistake in each case, apart from the fact that each scholar applies a taxonomic emphasis to the issue rather than an ethological one, is that what is banal, trivial, distinguishing, interesting, important, and so on, *are not objective qualities—or qualities that inhere in some object.* This, of course, should be apparent to most scholars, but in the context of the human nature debate, the truism seems hidden.

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[93] Hull in Hull and Ruse (1998, 388).
[94] Dupré (2003).
[95] Dupré (2003, 119).

To start with Dupré's statement about human interest in sex, this is a description that is certainly of use if we compare humans to organisms that are *asexual*, or who alternate between sexual and asexual capacity.[96] However, *it is still of use in comparison to other sexual species*, as there are vast differences in how this interest is expressed! Relative to sexual species—such as, say lions or bed bugs—when we consider statistical patterns on phenomena such as courtship and mate preference, pheromones, speed of sexual arousal, frequency and duration of copulation, concealed ovulation, enabling anatomy, and so on, the entire panoply of diverse sexual expression in humans becomes something quite convergent, distinct, and amenable to stable generalization.

As for Hull, we can apply this same reasoning. It is feasible that mass *is* an important feature of human nature if we are comparing humans to gauge boson particles or photons—or even if only to validate it as a background feature to understand phenomena like the existence of a 'fear of heights' in many terrestrial species of a certain critical mass and cognitive complexity.

Part IV) Socio-Agentic Conceptions of Human Nature

The *baseline* feature of socio-agentic conceptions of human nature is *a)* an acknowledgment of the relevance of biological forces for understanding humans; *but b)* rarely, *if ever*, to an extent they are as figural as relatively non-biological forces, or those of the present;[97] and/or *c)* always in a way that preserves a view of humans as

[96] For great discussion, here, see Daly and Wilson (1978/1983, 59 – 75).
[97] See especially Honeycutt (2006) or Dupré (2001, e.g., 96).

relatively self-determining.[98] This is broadly accomplished in at least one of three ways.

First, biological forces are depicted in a way that is compatible with human diversity or potential for human change. This is something I already discussed in Part II of this chapter. But we see this especially in the writing of those who represent or align with evolutionary developmental biology ('evo-devo'), or developmental systems theory.[99] These scholars de-emphasize the primacy of genes as causes, or units of heredity, and also minimize the idea that humans are *passive* relative to the evolutionary past or the present surrounding ecology. For example, Steven Rose writes: "Organisms are active players in their own fate, not simply the playthings of the gods, nature or the inevitable workings-out of replicator driven natural selection."[100] Susan Oyama says much the same: "We do most violence [to the complexity of human life] by seeing persons and other organisms as mere effects of genetic and environmental causes, rather than as active beings that to some extent determine their own possibilities."[101] And conversely, in criticizing evolutionary psychology, Dorothy Nelkin writes: "By attributing human behavior to

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[98] A classic example of this, and a testament to how 'cheeky' the view can sometimes be, is found in Lewontin (1991). He writes: "It is certainly not the case that our biology is irrelevant to social organization. The question is, what part of it is relevant? If one were to choose a simple biological property of human beings that was of supreme importance, it would be our size. The fact that we are somewhere between five and six feet tall has made all of human life possible as we know it" (122). Lewontin's argument? He claims that Gulliver's Lilliputians could not have done things like mined minerals because they could not have generated enough kinetic energy to break rocks with their tiny pickaxes (122).
[99] See, e.g., Oyama, Griffiths, & Gray (2001).
[100] Rose (1997, 17).
[101] Oyama (1985, 80).

the occult operations of the cell, evolutionary explanations lift behavior out of the social context, denying the influence of human agency."[102]

Second, biological forces are depicted in a way where they are largely potent, or relevant, at a sub-cortical level, or they are seen mostly as a *precondition* to the development of more interesting human features.[103] We see this especially in Jesse Prinz's *Beyond Human Nature; How Culture and Experience Shape Our Lives.*[104] Here, we regularly find statements like the following: "Biology can help explain why we are more likely to flirt with a person than a potato, but that's just where the story begins";[105] or, "appealing to genes to explain how we learn about geography is no more useful than appealing to oxygen. We need to breath to learn about geography, but breathing is a precondition for most things that we do. It doesn't directly explain how we memorize state capitals."[106]

Third, human psychology, sociality, or technology is depicted as very potent relative to 'biological forces.' For instance, Richard Lewontin writes, "the genes, in making possible the development of human consciousness, have surrendered their power both to determine the individual and its environment. They have been replaced by an entirely new level of causation, that of social interaction."[107] Timothy Taylor says something similar with reference to human technology: "Technology can and does supersede biology and lead us to a new form of life, one not primarily

[102] Dorothy Nelkin in Rose and Rose (2000, 24).
[103] Panksepp & Panksepp (2000).
[104] Prinz (2012). From now on I will refer to this as *Beyond Human Nature*.
[105] (Ibid. 363).
[106] (Ibid. 31).
[107] Lewontin (1991, 123). But see also Dupré (2001, e.g., 109)

governed by Darwinian process. The implications of being the first entity on our planet to escape natural selection are immense."[108] And Anthony O'Hear writes: "I attempt to vindicate a traditional view that each human being is possessed of a rationality which means he or she can transcend what is given in biology and culture. We are prisoners neither of our genes nor the ideas we encounter as we each make our…way through life."[109]

In this part of my chapter, I will not take issue with viewing humans as agents (although I will eventually discuss how the issue is framed and validate the idea that humans are 'passive' as well). However, what I *will* challenge is the idea of biology as merely a 'precondition' to the 'non-biological,' and the idea that humans, in any strict sense, *transcend* biological forces.[110] This is a complicated argument, as there are a wide variety of ways that socio-agentic views misrepresent, or misunderstand biology. In order to properly attend to this, I will present my arguments in three sections. In section 2.6, I will establish a theoretical platform by clarifying the construct 'transcend.' In sections 2.7 and 2.8, I will then proceed to highlight more specific problems.

2.6) Transcendence: Local and Global

[108] Taylor (2010, 8).
[109] O'Hear (1997, vii).
[110] I am using the word 'transcend' in reference to socio-agentic theorists. This word usually means 'to go beyond the limits of.' This term is less ambiguous than words such as emergence. When scholars suggest that human minds or culture transcend evolutionary forces the common meaning is that minds or culture escape, or are causally autonomous from, evolution. In a weak sense, some scholars may mean human minds or culture make evolutionary forces less relevant, or important. I deny both senses.

The socio-agentic conception of human nature is very popular and, at the same time, is mistaken; so it will be helpful to start by differentiating between a global and local sense of transcendence. Transcending evolutionary forces in a global sense, at least at this stage of human evolution, is impossible. If an organism dies before it reproduces, then natural selection is working—at least in a modest sense, as a certain unique instantiation of genes, or phenotype, is being eliminated from the available pool. Likewise, regardless of how we might technologically alter ourselves (for instance, some physical enhancement to live 1,000 years), if we have a single viable offspring, sexual selection is still working—although it may take generations to gauge how successfully. So, at best, transcendence is only ever occurring locally, and thus, all our collective efforts ever do is just reset certain individual, and sometimes species-typical *limits*, or extend certain individual or species-typical *talents*. As such, we have *flexibility*: we can count to ten to control our anger; develop a breathing apparatus to swim deep under water; use eyeglasses to correct our near-sightedness; rock climb frequently to control our fear of heights; or use a condom to prevent pregnancy. But these acts do not mean we have *transcended* natural forces. In each case, we only escape a *part* of the entire system: *not the system itself*. And so, we escape a *particular* bout of anger, but not the connection, itself, for our species, between anger (or self-control) and survival and reproduction; or, we escape the lethality of trying to breath underwater, but not the connection between reproduction and human curiosity or risk-taking (risks such as taking the energy to invent and test an underwater breathing apparatus).

This is a point that most biologically informed scholars would agree to. For example, when evolutionary psychologist Jerome Barkow says, “Biology is not destiny, unless one ignores it”,[111] he is saying something, *in principle*, not too far off critic Steven Rose when Rose says, “it is…our biology that makes us free.”[112] To translate: each is agreeing to some local form of transcendence which owes its power (in part) to biology, and each is indicating *some* form of human agency. However, this is a very minor agreement, and this is where an ecological conception of human nature, and a socio-agentic one, part ways.

On an ecological conception of human nature, evolutionary history, and current biology, is fused to everything we do—whether studying state capitals, or choosing the QWERTY letter sequence on typewriter keys. This means an ecological view opposes the idea that biology, or genes, get us to some place where then learning mostly takes over, or some entirely new level of causality exists. Nor is it accurate to envision culture, or consciousness, as some expanding bubble that holds back the past, or phenomena such as genes, or hormones. Instead, humans, like any other species, simply align needs or goals that reflect evolutionary, developmental, physiological, anatomical, and ecological aspects *against other such needs and goals*, which then allows us increasingly refined emotional, cognitive, and behavioral

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[111] Barkow (1989, 379).
[112] Rose (1997, 309).

flexibility.[113] In this picture, biology is not minimized; it is understood and enlisted toward greater human well-being.

2.7) Natural versus Social Selection; Adaptation Execution versus Fitness Maximization; Behavioral By-products; and Social Selection

Socio-agentic scholars adamantly deny a 'blank slate' view of humans, an immaterial free will, or a commitment to mind-body dualism.[114] However, critics often dismiss this as mere 'posturing' because these statements are so clearly in tension with other statements that undercut the influence of evolution or biology on human psychology or sociality. This occurs in at least four key ways. I will mention just three for now. First, socio-agentic scholars neglect, or do not understand, the full range of how sexual selection impacts human sociality and psychology. Second, these scholars do not appear to see the relevance of distinguishing between adaption execution and fitness maximization. And third, overlapping my previous point, socio-agentic scholars fail to recognize that a great deal of human *behavior* is actually a *by-product* of evolution working at more reliable levels of biological organization. As an instance of each case, what usually occurs is some *behavior* is noted that is *a)* altruistic or self-sacrificial; *b)* costly or very impractical; *c)* represents a significant delay of gratification toward some stereotypically selfish goal; or *d)* does not aid in reproduction. This behavior is then interpreted as evidence that humans transcend evolution.

[113] One way to think of this is as a sound or mixing board. We have the motivations that we have, but any one of these can be turned up or down (like treble or base), harmonized, or made discordant. But we are not adding anything more to the mixing board; we can only creatively utilize what is there.
[114] For example, see Dupré (2003) or Rose (1997).

To correct these kinds of mistakes, I will make a series of counterpoints. The initial five are really preliminary clarifications for my main argument, and they present fairly standard evolutionary truisms. The elementary nature of these clarifications is not meant to be disrespectful. Rather, they are necessary given the style of argument routinely made toward biologizing the social sciences and against disciplines such as evolutionary psychology.

Just one caveat before proceeding: I will sometimes speak of natural and sexual selection in relation to an organism's 'well-being' or 'potency,' rather than in relation to an organism's 'fitness' or 'survival and reproduction.' This is, in part, because the language is more discipline-neutral. But, also because the use of the words 'fitness' or 'survival and reproduction' often hide the fact that evolution can be reliably tracked via the *psychology* of an organism.[115]

First, if there were one anchor point for understanding the psychology or sociality of organisms, it would be that, from the perspective of an organism, impotence and vulnerability are a fundamental and pervasive truth. We can, of course, gain localized potency, but this is tremendously fragile: pathogens, a tornado, a predator, can all take away everything in an instant. *This truth has expression in human culture*. For example, the gods we worship tend to be ultra-potent or omnipotent; and our heroes and heroines (in art or reality) are also uniquely potent—that is, they defy great odds and hardship to achieve some rare

[115] The language of potency and well-being also dovetails with my eventual introduction of 'ecological imperatives.'

spiritual, moral, artistic, intellectual, or athletic good. This potency, in turn, has aesthetic dimensions: when we know the dedication that went into Beethoven's compositions, or see Christine Sinclair make another impossible shot that wins the game, we often experience this as beautiful. When it comes to mating, friendship, and various practical alliances, we usually improve our lot, and status, with at least a few select potent friends, and with a few select potent acts. As this connects to understanding natural and sexual selection, survival and reproduction indicate some minimal potency and, relative to some ecologies, considerable potency. (Imagine, for example, the potency of mere human test-tube fertility versus human survival and reproduction during an ongoing war).

Second, to see the full force of evolution, it is paramount to understand *both* natural and sexual selection. With natural selection, well-being is ultimately about conservation of energy. This helps us make sense of the existence of male nipples, or the ad hoc, but functional, design of the human eye. With sexual selection, well-being is usually about showy, extravagant waste. Where natural selection may, for example, pressure a male bird toward better camouflage; sexual selection may push for gaudy, bright color.[116] Each force works together to produce marvels of beauty and complexity. But each are, in fact, different forces: natural selection arises from *competition to survive*; sexual selection from *competition to reproduce*. What seems to be most counterintuitive to socio-agentic scholars is the way that potency (or fitness) is sometimes expressed in an organism. With respect to natural selection,

[116] See, e.g., Weiner (1994).

potency is indicated by designs that are useful and cost-effective—we can think of, say, the ability to run fast. However, in regard to sexual selection, potency is often advertised by the handicap, *injury,* or energy cost an organism can sustain. Here, we can think of a peacock's tail. In either case, organisms are always looking for 'honest fitness indicators'—for instance, is this organism dangerous? Would this person be a kind mate? And so on. So this means, the more extreme the trait, the less potential there is for potency to be faked. As this is expressed culturally, we can consider the example of a tenured academic. A person who is tenured exhibits potency in both respects: s/he indicates, perhaps, various kinds of heritable qualities favored by natural selection—perhaps a certain kind of intelligence; but s/he also exhibits an aspect of sexual selection: costly signaling. Tenure, in other words, is a *proxy* for the capacity to withstand a significant handicap on overall finances and energy.

Third, evolution is a natural process, and so it does not guarantee perfection the way a calculator might. At best, given the varieties of processes, ecologies, and entities interacting, *internal and external* to the organism, natural and sexual selection must start to build organisms out of whatever stable regularities do exist. So this means, it should not be puzzling to us that, in areas that are historically cold, the animals that live there also tend to have features that allow them to deal with the ecological constant of a cold climate. Likewise, organisms that, historically, seem to require the cooperation of other organisms to survive, tend to have features that allow them to successfully recognize and interface with those organisms; and so on. However, we should also not be surprised when an organism cannot meet the more nuanced demands of an ecology. For example, hens can be induced by artificial light to keep laying eggs; ducklings, goslings, turkey vultures, and so on, will sometimes imprint on humans when they are born; a moth can be drawn to the flame; dogs, knowing the difference between their own kind and humans, may still sacrifice their life for the latter; and, likewise, humans can react to internet pornography as if they are interacting with real people.[117] In none of these cases, should we simply assume something non-evolutionary is happening.

Fourth, as evolutionary psychologists have tried to point out for decades, organisms do not strive, above all, toward some abstract goal to survive, or to pass on their genes. For example, human males do not stand in line, day after day, at sperm banks attempting to maximize fitness. Instead, survival and reproduction are *by-products* of organisms successfully executing various adaptations toward more intermediate problems or experiential states—states such as being warm, having sexual pleasure, and so on. Thus, what this means, is that behavior *is* important to an evolutionary analysis, but it is not the only biological domain of relevance. In particular, we must pay attention to the proximate goals that tend to exist for an organism, and the kinds of physiological and psychological heuristics that guide their behavior. When we study these goals or heuristics, what we are likely to see is that even though they have costs and *trade-offs*, they are likely, on average, and in

[117] In technical parlance, these are all examples of what is called 'supernormal stimuli.' See Barrett (2010).

most environments, to promote reproduction. And this means, *they are not likely to be selected out of the organic system.*

Fifth, evolution can be studied at different organic levels. At the level of an individual, traits that lead to a failure to reproduce should be weeded out—and this *will* happen if the cause of non-reproductive behavior is heritable and very idiosyncratic. However, sometimes these failures of behavior are not idiosyncratic. In fact, perhaps all that has happened is a species-typical goal or behavioral rule has gone up against another species-typical goal or behavioral rule, and either lost out, or malfunctioned. For example, a general goal to avoid harm can run up against a general goal for social intimacy; *or*, a heuristic of 'avoid unnecessary risk if possible,' can run up against another heuristic of, say, 'take risks when necessary.' None of these goals or rules, in isolation, produces either adaptive or maladaptive consequences. However, in specific ecologies they can. For instance, if a person is killed by their historically abusive partner (because, in part, they are afraid to be alone), this is not likely a phenomenon that is going to be weeded out at a species level—that is, we will not suddenly see humans turn into a solitary species. And this is because most of the basic goals and rules at play, even though this person did not survive, may be beneficial on average. This, of course, is a very simplified model. Perhaps this kind of stalemate is sufficiently idiosyncratic and can be weeded out, or is not even a problem for the entire species. But, the point is: maladaptive *behavior* is not necessarily what we should focus on in an evolutionary analysis.[118]

So how do these clarifications connect back to the ideas of socio-agentic scholars? Consider just two exemplars. One is found in the work of Jesse Prinz and the other can be found in Anthony O'Hear's book, *Beyond Evolution; Human Nature and the Limits of Evolutionary Explanation*.[119] Each are helpful because they illustrate slightly different errors: Prinz is more relevant to misrepresenting natural selection and O'Hear, sexual selection.

Starting with Prinz, at one point in his book *Beyond Human Nature*, he takes issue with the claim, made by evolutionary psychiatrists, that depression is an adaptation to cope with losing battles—that is, depression leads to behavior such as social withdrawal, and downsizing our ambition, and this helps us recover and redirect our efforts.[120] Part of Prinz's response is as follows. He says:

> even if evolution did have a mechanism for dealing with lost-cause battles, social withdrawal and suicidal tendencies would hardly seem helpful, because both diminish reproductive success. A better mechanism would make low-status individuals gleefully accept their lot after suffering defeat. Evolutionary logic predicts that the poor should be reveling.[121]

[118] If we want to find human traits that are truly non-Darwinian we should look for something like the following: a large cross-section of the population that has a total disregard for orientation when faced with confusion; a total lack of interest in avoiding unnecessary pain; an absence of any feeling of hunger, thirst, or fear; an absence of curiosity or novelty-seeking; an indifference to judicious use of energy; a complete loss of maternal or paternal attachment bias; an absence of desire for skill-acquisition or mastery; a loss of any desire for self-respect, or to be of value to others; a loss of desire to impress or care for kin, friends, or romantic partners; an absence of sexual urges of any kind; and so on.

[119] O'Hear (1997). From now on, I will refer to this text as *Beyond Evolution*.

[120] Prinz (2012, 277).

[121] Ibid.

So we see all sorts of errors here. First, even if 'gleeful acceptance of loss' was a better evolutionary mechanism for dealing with lost battles, there is no perfection in evolution.[122] In evolution, the baseline necessity is simply to have some feature that gets the job done, or is better than the features of our rivals. However, the actual reproductive act is not what is entirely of issue. Even suicidal humans tend to, at some point in their life, have desires to have sex. And, most of the time, these *desires* make reproduction happen. So if we are considering a phenomenon such as suicide, quite likely, it is a behavioral rule such as 'avoid unnecessary suffering if possible' that has 'runaway' from the organism; *or* the adaptation is working exactly as it should given the degree of subjective pain (that is, suicide is not haphazard; the individual simply treats the pain of this life as worse than death). Consequently, evolution will never prevent suicide because often the very imperatives and rules that lead to suicide actually *facilitate* survival and reproduction as well.[123]

Turning to O'Hear, O'Hear starts his book with an anecdote about Socrates' refusal to escape from prison. O'Hear believes the manner of Socrates' death presents grave problems for evolutionary accounts of motivation. In particular, O'Hear believes the story provides an easy example of how a feeling of shame about escape, and/or the uniquely human desire to 'do what is best,' can override evolutionary drives to survive and reproduce. O'Hear does admit that Darwinians

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[122] I suspect 'gleeful loss' is hardly a better mechanism, as the most concomitant feature of depression is rumination, which may tend to involve reflecting on how *not* to behave in ways that make us depressed. See Andrews for a discussion (2009).

[123] For a discussion of adaptations and trade-offs see, e.g., Richerson and Boyd (2005, 158), or Nesse and Williams (1994, e.g., 19).

do have recourse to an account of the nature of shame "showing it to be an adjunct of pride and self-respect…which may well contribute to an individual's ability to survive and reproduce."[124] But he still thinks "This…will not show why, in this specific case Socrates felt he had to die rather than survive…or why Socrates is so widely admired…and why so many people feel Socrates was right to have done what he had done."[125]

As with Prinz, there is a significant amount of conceptual error here. First, Socrates' *survival* is not primarily what is at issue in evolutionary theory: reproduction is. This helps us make sense of organisms that die immediately after reproducing—for example, sockeye salmon, the Australian social spider, the North Pacific giant octopus, or certain species of bamboo. Second, Socrates had children prior to his decision to drink hemlock. So again, even if this were the most morally motivated self-sacrifice, selection pressures would be blind to it—in much the same way they are blind to Huntington's disease. To spell this out, Huntington's disease does not often strike until after our prime reproductive years. So selection seems to miss it. This could be the same for certain self-sacrificial acts that occur late in life. Moreover, even if Socrates committed suicide immediately after having a single child, this would not *necessarily* compromise his global reproductive fitness relative to his current rivals who continue to have offspring. This is because *evolutionary success is not measured in a single generation*. It could be that Socrates' rivals all

[124] O'Hear (1997, 3).
[125] Ibid. See also Prinz (2012, 308).

have eight children, but then, two or three generations later, most of his rival's progeny die in a flood, and the progeny of Socrates' lone child 'catch up.' Third, the manner of Socrates death is a very salient indication of potency. In refusing to escape the prison, and in willfully taking hemlock, Socrates is doing something very difficult for most humans—in much the same way a peacock carrying around a big colorful tail is doing something difficult. In the instant of Socrates' death, what has occurred is more basic goals and rules which, on the odds are rewarded and do not lead to death, take on 'situational momentum,' and *do* lead to death.[126] However, Socrates' act will never disappear from the human gene pool because a basic disposition toward potency, or skill display, caring about our social standing, doing something that is difficult or costly, or even doing something that has a real risk of death, all are evolutionarily stabilized in humans at sub-self-sacrificial levels, or at post-reproductive levels. On the one hand, this stabilization occurs socially. For instance, we can see this in our high esteem of others' moral acts; in paying good wages for those who develop difficult and useful skills; and we see it in our admiration of many forms of risk taking. But we can also see it in the ways we are bio-chemically rewarded for attachment to others;[127] problem-solving;[128] winning minor sports competitions;[129] ascending in hierarchical rank;[130] and so on.

[126] It may be worth reiterating: most of our goals or behavioral rules will have *trade-offs* relative to context. See Nesse and Williams (1994, e.g., 14 – 20, 75, 133) or Helena Cronin (1991, 346).
[127] Taylor (2002) or Ogden et al (2006).
[128] See, e.g., Mazur (2005, 121 – 123). But see also Seligman's discussion of learned helplessness (1991/1992), Csikszentmihalyi (1990), or Haidt (2006, e.g., 109-110, 220).
[129] See Mazur (2005, 118), or Bernhardt et al (1998).
[130] See Weisfeld (1999, 144) or Franks and Turner (2013, 316 -317).

A final comment for this section, most evolutionary experts focus on the forces of natural and sexual selection, as well as phenomena such a genetic drift. However, for social organisms, it is obvious our alliances impact whether or not we have offspring. For example, being part of a group that does not lose wars means our genes do not lose either. Likewise, the same can be said of befriending the king or queen, or of joining a dominant religious group. So it is not implausible to think that, sometimes, natural and sexual selection are filtered through a human social ecology that has enough force it may act as its own form of 'selection.' If this is so, it helps explain why we often advertise our potency in much the same way as we do in sexual selection. As Geoffrey Miller puts it, "making friends often seems like a variant of sexual courtship. There is the same desire to present oneself to best advantage, emphasizing skills, downplaying weaknesses, revealing past adventures, investing extra energy in the interaction."[131] This would also help us understand the importance of gossip to human societies as well as our sensitivity to social praise and blame.[132] Moreover, if we add the phenomena of frequency dependent selection to the mix, we are better able to make sense of the various 'arms races' in fashion and consumerism where high status individuals, to stay distinct, must always shift toward new possibilities to prevent dilution by the rest of the group—that is, like poisonous coloration on an organism, a short hair cut, a Maori tattoo, or a Gucci purse depreciate in potency once most people have the same.[133]

[131] Miller (2000, 216).
[132] See, e.g., Sommerfeld et al (2007).
[133] See, e.g., Heath and Potter (2004, 175).

2.8) Genes and Human Nature

The idea that genes might dictate certain human social or psychological traits seems to have caused considerable alarm for many scholars—and, in particular, those with a socio-agentic view of human nature. This has led to a vast amount of literature that is notoriously hollow. Jesse Prinz's view of genes as merely preconditions seems to merit this description.

In this section, I will establish a conceptual baseline as to the place of 'genes' on the issue of human nature. I will start by trying to ground the debate by countering some of the critical orthodoxy. To this end, I will make three clarifying points. I will then attend to Prinz, as an exemplar, by making three further arguments.

First, perhaps the most needed clarification on the issue is that, contrary to what is often said by critics about sociobiologists and evolutionary psychologists, there are no genetic determinists of the mold who insist that genes are all that matters when attempting to understand organic outcomes.[134] Dupré is a critic who walks a fine line on this kind of accusation.[135] He refers to the occasional fundamentalist Dawkinsian who propagates this, and paints an image of evolutionary psychologists who fantasize (along with much of the public) about

[134] Even a critic as fierce as Stephen Jay Gould, realizes this is not true. For instance, he writes "Sociobiologists are not genetic determinists in the old eugenical sense of postulating genes for complex behaviors. All biologists know that there is no gene 'for' aggression, any more than for your lower-left wisdom tooth. We all recognize that genetic influence can be spread diffusely among many genes and that genes set limits to ranges; they do not provide blueprints or replicas. In one sense, the debate between sociobiologists and their critics is an argument about a breadth of ranges" (1996, pg. 359).

[135] Two others are Licklitter and Honeycutt (2003). For example, they depict evolutionary psychology as dominated by scholars who assume that underlying individual traits "is a heredity unit, the gene, so inherently stable that it *alone* can account for the reliability by which phenotypic traits are transmitted across generations" (823; my emphasis). But see also page 828.

genomes that specify taste in neckwear,[136] or about genomes which are preserved and then used to produce creatures such as those in Jurassic Park.[137] This hides not only the truth, but also significant scholarly diversity. While many subscribe to gene-selectionism, they all make varying claims as to what genes do, and don't do, and use varying deterministic language.[138] There are also no luminaries (scholars such as E.O. Wilson, Richard Dawkins, or Steven Pinker) who do not explicitly deny genetic determinism; who do not take time to qualify the indirect, mediated, and probabilistic nature of genetic influence; or who fail to make reference in their research to environmental influences.[139] Furthermore, even when the language used by these scholars *is* deterministic with respect to genes, we also usually find determinist sounding environmental language as well.[140]

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[136] With respect to what sociobiologists think on this point, this was specifically denied by Barash 24 years before Dupré wrote of genes for neckties (1979, 14).

[137] Three years earlier, evolutionary psychologists Thornhill and Palmer wrote: "Michael Crichton's Jurassic Park is truly fictional. Even if someone were to obtain the fossilized DNA of extinct dinosaurs, transferring those genes to an iguana egg would not yield a dinosaur. The genes of a Tyrannosaurus Rex could express themselves adaptively only in the environment of a T. Rex egg, then in that of a T. Rex embryo, fetus, hatchling and adult—an environment that is as extinct as T. Rex itself (2000, pg. 22). I am not saying I agree.

[138] Dawkins is interesting. At times he switches between some very strong deterministic statements while making other statements that are more modest. For example, in *The Selfish Gene* he writes: "I am trying to build up the idea that animal behavior…is under the control of genes in only an *indirect* but very powerful sense. By *dictating* the way survival machines and their nervous systems are built, genes exert ultimate power over behavior" (1976/1989, 60; my emphasis). Or, see also Dawkins' discussion of a 'gene for' something on page 281 in the same book.

[139] See appendix 'A' for references against this sort of insinuation.

[140] Daly and Wilson make an interesting related point. They write: "Biologists and sociologists alike are committed to the belief that the phenomena under study have knowable causes. We chip away at 'unexplained variance' within our various paradigms, trying to better understand what makes the creatures we study do what they do. The entire enterprise is predicated on determinism…Those who accuse evolutionists of determinism commonly go on to attribute behavioral causation to social and economic factors; ironically, these are the most popular proximal causes in evolutionary theories too. Unfortunately, these critics do not explain how their preferred theories are able to impute causality and yet avoid determinism" (1988, 8).

Second, when deterministic language is used about genes, it is not necessarily the case that this is unreasonable. For instance, many reputable scholars still use the language of genes as recipes or instructions,[141] and we sometimes see even developmentalist critics speaking of 'genes determining behavior' (even while it is also denied).[142] This suggests that apt descriptions of what genes do are actually not as evident as critics insinuate—or at least can suitably vary according to context. There is also research that gives the impression that, as contingent as phenotypic outcome is, there is something about animal genomes that strongly resist dramatic change. For example, there have been a number of experiments where the genes of one species have been implanted in the wombs of other species and, while the end product has so far proven unviable, the offspring all emerge looking like its biological parent, as opposed to its gestational parent.[143] We can also say the same about specific features. It is easy to appreciate the value of what disciplines like evo-devo offer evolutionary theory, and even the notion we cannot, *a priori,* assign causal primacy to genes or environment.[144] However, the latter seems weakly cautionary given ecologically induced change always occurs within species-typical

[141] See Pinker (2002), Ridley (2003), Church (2012). But included in this is even Prinz who uses phrases such as genetic recipes, codes, or genetic control (2012, e.g., 23).
[142] For instance Gilbert and Jorgensen write: "That genes affect behavior and in some sense determine behavior is obvious in humans…Children with Angelman syndrome generally have inappropriate laughter, while boys with Prader-Willi Syndrome have an insatiable appetite. Boys lacking the gene for hypoxanthine phosphosphoribibosyl transferase have an uncontrollable urge towards self mutilation, while those with William's Syndrome tend to be gregarious and empathetic" (1998, 260). But the next paragraph they say the opposite: "genes do not determine behavior" (ibid).
[143] See, e.g., Ridley (2003, 29 - 30), or Church (2012, 9 – 10).
[144] Robert (2001, e.g., 959).

boundaries.[145] In other words, no environment (outside of one that can directly manipulate *the genome* of an organism) changes the sexual features of a blue-headed wrasse into those of an elephant; human jaw anatomy into beetle jaw anatomy; or transforms an oak tree into a maple sapling. These are not facetious examples.[146] Nor do we need to assume *only* evolutionary forces constrain these outcomes. But, short of killing the organism, there *is* an obvious asymmetry between genetics and epigenetics—at least relative to the potential change introduced by epigenetic factors *within a single life-cycle.*[147]

Third, given how strong the criticism is of the idea of 'a gene for' something, we expect critics would show a relatively equal interest in attacking linguistic simplifications in many other domains. But this is not the case.[148] For instance, we might insist that others do not say math teachers are *for* better math skills; or that "learning economics reduces student dispositions to cooperate"; or that exposure to evolutionary psychology reinforces sexist attitudes.[149] Plainly, outcomes such as math, cooperation, or sexism are all due to factors and processes that are vastly

[145] What I mean is that the general pattern of the organism, based on reference to other organisms of the same species, remains virtually the same, while only small aspects change. This view coincides with the fact the most mutations tend to be deleterious. Sterelny and Griffiths (1999, e.g., 34, 180-181).
[146] See related commentary see also Ingold in Rose and Rose (2000, 283), or (Fukuyama, 2002, 137).
[147] To be clear, I am not suggesting pure genetic determinism. I am making a statement about the primacy of the ancestral past and claiming that genes are 'prepared' to act or be acted upon relative to certain cellular environments and ecologies. Plainly, genes do nothing if they are planted in topsoil because, in effect, they do not come with 'instructions' about how to function in topsoil.
[148] Developmentalists do make related points. For example, Gilbert and Jorgensen write "To say that a particular gene 'controls' a complex behavior is akin to saying that a person scored the 'winning' basket in a 100-point basketball game…Similarly, to partition a behavior into its genetic and environmental components is akin to saying that the player scoring that goal was acting independently of his or her teammates and the opposing team" (1997, 261).
[149] Dupré (2003, 121).

complicated—that is, they exist because of functioning sensory modalities, intact information processing capacities, a nervous system permitting the experience of reward and punishment, and so on. And yet, all of this said, few of us see it as unscientific to speak in shorthand of, for example, a math teacher as responsible for good math skills. When combined with data on affective primacy,[150] statements about the dangers of biologizing the social sciences, and the fact that evolutionary views tend to existentially unsettle both proponents and opponents,[151] it suggests much of the fervor around the debate is, at root, not motivated by science at all.

To return to a critique of Prinz, much of what we see in his book *Beyond Human Nature* is, once again, simply very artificial framing.

First, Prinz's entire argument about genes, relative to human psychology, hinges on the idea that, for one thing to cause something else, it must be *directly responsible for it*. Prinz never defines what he means by this but, in context, the basic idea is that a 'cause' must produce the effect in an unmediated way. For example, early in his chapter on genes, he claims it is misleading to think of human psychology or behavior as under direct genetic control because "Crucially, genes do not exert any direct influence on their own."[152] Later, with respect to human

[150] This thesis dates back to Wilhelm Wundt, but was later reinvigorated by Robert Zajonc in 1980. The basic idea is that affect happens instantly in perception and engages faster and more powerfully than reasoning. A secondary aspect is that the cortex, consciousness, language, and reasoning are evolutionary more recent phenomena. Taken together: reasoning is ultimately in service to affective ends. See, e.g., Ledoux (1996, 42 – 72), Haidt (2012, 52 – 92). This work also dovetails with that of Ben Libet (2004).
[151] Brem at al (2003).
[152] Prinz (2012, 17).

psychological traits—which he also does not define, but often reduces to mere 'human behavioral traits'—he says much the same. He writes:

> the impact that a gene has on behavior is often an accidental by-product of the fact that it has an impact on something other than behavior. For example, genes that affect metabolism can sometimes influence behavior as a result. When such genes are found it's seriously misleading to describe them as genes for behavior, because it implies that the gene directly causes us to behave in a certain way.[153]

And still later Prinz writes that human psychology owes more to experience because "Genes do not *dictate* what you believe, what values you have, what occupation you pursue, what clothing you wear or what you eat for breakfast."[154]

So the question is, why should we think of causes only in terms of singular or direct influence? Take, for example, a complex outcome such as winning a rugby match. Any number of variables can play a role in determining this: your team's athletic quality; financial backing; good parenting; the other team's lack of athletic quality; the motivational quality of your team on the day; the weather; the referee; the coach; the injury to the other team's star player; home field advantage; and so on. However, in such a complex system, to say the players on your team did not cause the win because we cannot track this exactly, or because it is mediated by other factors, is to simply impose a subjective preference as to where to draw a line in the face of ambiguity.[155] This is what occurs in regard to genes—and, in Prinz's

[153] Prinz (2012, 24).
[154] Prinz (2012, 31; my emphasis).
[155] I am speaking in a very generic sense. I am not saying we cannot isolate significant causes in any one event. I am saying complexity forces us to make causal assessments that are always incomplete. Moreover, our scientific preferences stop at the point we can use certain descriptions of events to satisfy human interest (or exert control to suit human interest).

case, the line drawn is uncharitable. Take the example of learning state capitals. This outcome is *not* non-genetic; it actually requires perhaps millions of genes acting, in part, to form a reasonably functioning memory; a nervous system that allows you to sit or stand for long periods and memorize; a functional auditory or visual sense; perhaps the ability to register facial expressions with respect to your mentor's approval or disapproval; and on and on. The fact such genetic contributions are *diffuse* does not make memorizing state capitals 'environmental' anymore than the simple environment needed for seeing color makes it 'genetic'—each reflects causation at different levels of complexity.[156] Alternately, we can also ask if there is *any* environmental cause that is, itself, not mediated by other things. In other words, does anything directly cause, or *dictate by itself*, anything else? Prinz selectively capitalizes on human epistemic limits to make his case.

Second, Prinz tolerates the language of genes 'for' something with respect to human features such as seeing color because, he says, "in a normal healthy environment [certain]…genes will ensure that color-sensitive cells are created."[157] He also discusses various graduated cases that are ambiguous as to genetic or

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[156] I do believe that we can, in fact, justifiably say that some phenomenon is environmentally or socially caused, or even genetic. However, this does not have to do with comparison between broad features, like the fact that a gerbil cannot learn state capitals and a human can. At some level, yes, this is genetic or innate for a species. Likewise, I do not believe mere idiosyncrasy makes something environmental, such as Sally learning state capitals, but not Jim. Rather, the difference is in the *relative* volume of repeated trials and voluntary effort, or in the repeated social interaction it takes for the establishment of a feature—or even in the rapidity of extinction in the absence of those experiences. An autistic savant might take an instant to memorize every state capital; Sally might take a year; a gerbil never. Experience, social experience, and genes are all involved in each case, but depending on the comparison group this changes. Sally's memorization might be 'genetic' relative to the gerbil, but environmental relative to the savant. See chapter four.

[157] Prinz (2012, 30).

environmental causes—for instance, schizophrenia.[158] And, at the other end of the spectrum, he lists psychological traits he presumes have little to do with genes. However, what is strange is that a 'normal environment' in this case should apply to all the grades of phenomena he lists—not just, say, seeing color. For example, the normal environment for lighting a match might be the presence of oxygen. But, what makes this a 'direct' cause *for us*, is mostly something fortuitous, which is it is easy to identify. However, if we take a phenomenon such as a happy marriage, this should have a range of normal environments as well. And whenever those environs exist, as with seeing color, then so should any influence genes have on this outcome. Prinz allows for maximal and diffuse environmental variables to explain human psychology, but he does not elevate diffuse genetic variables as well.

Third, genes do not simply initiate instructions for making amino acids and then, once the ball is rolling, leave the rest to the environment. Instead, genes are active throughout life—that is, they are switched on and off by other genes, the cellular ecology and even the ecology outside the organism.[159] For instance, in a relatively recent study it was determined that economic circumstances can impact whether certain genes are activated which, in turn, can impact our ability to store fat, or resist certain autoimmune diseases.[160] So the idea, as Prinz claims, that "[the human] story… begins where biology leaves off" is untenable.[161]

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[158] Ibid.
[159] See Ridley (2003), Edmund and Higgins (2008), Francis (2011), or Church (2012).
[160] See "Poverty Leaves Its Mark on DNA, Researchers Find." CBC.ca
[161] Prinz (2012, 14).

This brings me to my final point for this part of my chapter. The idea that we best describe humans as active in the world, or agents, is simply a framing bias. It is just as easy to say the opposite about humans. For example, we have no choice about entering this life, where we are born, who our parents are, voluntarily dilating our pupils, and so on; and sometimes we have little control over things like eye-color, freckles, height, weight, gender, being sexually aroused by conspecifics rather than cement, preferring sweet food to dung, being depressed in winter, and so on. If we are active in life, we are reactively active. And there are simply zillions of things we cannot control. However, descriptions of humans as 'active' or 'passive,' determined or self-determining, should hardly matter. If any of these were an absolute unqualified fact it would not *automatically* be accompanied by some positive or negative meaning.

Part V) Human Natures

In arguing against the existence of a universal human nature, some scholars tolerate, or even push for, a conception of human nature *plural*. This occurs at varying levels of insistence, and the argument varies.[162] However, what is the same across the biologically informed literature is that most pluralist scholars focus on individual human diversity without too much of a commitment to the idea of distinct group (or sub-species) morphs.

[162] See, e.g., Dupre (2003). In this paper, for the most part, he simply *advises* against human nature singular.

In regard to the argument for human natures, in this part of my chapter, I will focus my attention on the work of Paul Ehrlich in his book, *Human Natures; Genes, Cultures, and the Human Prospect*.[163] Ehrlich's arguments are more generic than those of a scholar like David Buller. To speak briefly to this, Buller's most notable relevant work, *Adapting Minds,* is primarily a critique of evolutionary psychology.[164] Buller does mention his intention is also to debunk traditional notions of human nature whose flaws, he thinks, are similar to those of evolutionary psychology—and he may be correct as to their similarities.[165] However, my hope is to simply refute Buller *indirectly* with the arguments of my next chapter. Buller is wrong in his contention there are no psychological universals that are timeless—or at least that have existed for as long as multi-cellular life has existed. Also, on my ecological conception of human nature, I do not deny human polymorphism or identify what is natural exclusively with what is innate, or with adaptations. So while these may be valid criticisms of evolutionary psychology, they do not apply to my own view.[166]

To make a very succinct case against human natures, I will divide this part of my chapter into two sections. In section 2.9, I will give an overview of the weaknesses of Ehrlich's conception of human nature, but I will also note two of its strengths. In the next section, I will simply note one point of agreement with Ehrlich and one problem.

2.9) Ehrlich's Conception of Human Nature

[163] Ehrlich (2000). From now on, I will refer to this book as *Human Natures*.
[164] Buller (2005).
[165] Buller (2005, 423).
[166] See especially (Buller 2005, e.g., 471, 476).

To his credit, Ehrlich aligns with a number of humanist scholars, including sociobiologists and evolutionary psychologists, who contend that understanding the influence of the evolutionary past is essential to developing effective problem-solving strategies for the present and future.[167] For example, in declaring one of the broad purposes of the book, Ehrlich writes:

> I want to show how deep are our biological and cultural roots and how an understanding of them can inform our decisions about the future. Evolution is the explanatory principle that connects all biological phenomena, including cultures, into a seamless whole; as the great geneticist Theodosius Dobzhansky put it, 'Nothing in biology makes sense except in the light of evolution.' And human natures are, certainly, 'in biology.'[168]

Also to his credit, Ehrlich acknowledges human physical and mental limits. For example, he says, "there are no genetic instructions or environmental circumstances that will allow the development of a human brain that can do a million mathematical calculations in a second."[169] Ehrlich also mentions his own color-blindness as an individual limit. However, beyond these basic entry points, many of Ehrlich's frames of reference are artificial. We can see this in at least four respects.

The first occurs in Ehrlich's typification of human nature *singular*. Ehrlich does make the odd comment about singular concepts that *is* helpful in orienting to the issue, but he overlooks the possibility of rival singular conceptions that *do not* have the features he claims. For example, he claims: "'Human Nature' as a singular concept embodies the erroneous notion that people possess a common set of rigid, genetically specified behavioral predilections that are unlikely to be altered by

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[167] See, for example, Peter Singer (1999) or Anne Campbell (2002).
[168] Ehrlich (2000, x).
[169] Ehrlich (2000, 8).

circumstances."[170] Just two quick points in response. As I mentioned early in this chapter, human nature can be thought of as existing by degree, or in tiers. So while there may be some human features we cannot change, this does not mean this is all we find in human nature. In other words, we may have some unchangeable features *and* some more plastic features—and to complicate things, our changeablity itself may be unchangeable. My other point: it may be that human nature *does* constitute our most rigid features, but there is no reason to assume these features are *genetically specified*. As I will argue, our most rigid features can exist for any number of reasons—physics, for example—or they can be better explained as ecologically specified.

The second artificial frame is Ehrlich's primary reason for choosing to view humans as plural. His basic argument is: the diversity in humans is really what we want to understand. This is rather paternalistic. To back this point he makes one assertion and one quasi-argument. The assertion is that science, in recent decades, has made great strides in documenting how diverse and flexible humans are. So, in adopting human *natures* plural, we honor these findings.[171] His other argument is one of analogy, but is basically the same point. He says,

> *human nature* is to *human natures* as *canyon* is to *canyons*. We would never discuss the 'characteristics of canyon.' Although canyons share certain attributes, we always use the plural form of the word when talking about them in general. That's because even though all canyons have more characteristics in common with one another than any canyon has with a snowflake, we

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[170] Ehrlich (2000, ix).
[171] Ehrlich (2000, 12).

> automatically recognize the vast diversity subsumed within the category *canyons* (2000, 12).

My response to Ehrlich, here, is simply that *a)* as diverse as they are, all canyons are still qualitatively different than snowflakes—a distinction which has scientific value; but also *b)* diversity is not all that science has recently documented. In fact, almost every study in social or medical science, when it is not specifically a study of a sub-group, attempts to generalize its findings to most, or all, other human beings.[172]

Ehrlich's third artificial frame is that he simply defies the basic singular meaning of the construct 'human,' and thus, *its evolutionary aspect*, and makes it something idiosyncratic. Case in point: after providing an explicit definition of human nature, Ehrlich projects ahead saying he will emphasize the diversity of humans "generated especially by the overwhelming power of cultural evolution."[173] He then goes on: "The human nature of a Chinese man living in Beijing is somewhat different from the human nature of a Parisian woman; the nature of a great musician is not identical with that of a fine soccer player; the nature of an inner-city gang member is different from the nature of a child being raised in an affluent suburb" and so on.[174] I will speak to the issue of natures a little more in the next section, and in far more detail in my fourth chapter. However, the very use of the word *human* tells us we are looking to stretch the concept all the way to the border of what we

[172] Evolutionary psychologists Martin Daly and Margo Wilson are lucid on the point: "those who assert that man has no nature would be greatly distressed should their theories of 'social comparison processes' or 'self actualization' or whatever prove applicable to Americans but not Papuans. All social theorists, including the staunchest anti-nativists, seek to describe human nature at some cross-culturally general level of abstraction" (1988, 8).
[173] Ehrlich (2000, 12-13).
[174] Ehrlich (2000, 13).

decide is *not human*—or is not part of our species.[175] While the microscopic detail of our being may tell us something different, there is *some* scientific credence to considering an evolutionary lineage, such as humans, as one kind of thing.[176] Moreover, if anything, before we move to minute natures, we are likely to go bigger. That is, if the construct 'human' was not as scientifically apt as it is, we would likely still move to find *some* wide level of generality and match ourselves to a group such as primates. Contra Ehrlich, I offer that the tendency to simply go narrower, to validate our diversity, cannot possibly be the best, or absolute, answer given all the taxonomic possibilities organisms present.

My previous point connects to Ehrlich's fourth artificial frame. Ehrlich says that if "we are tying to understand anything about human society, past or present, or about individual human actions, we must go to a finer level of analysis and consider human natures as actually formed in the world."[177] Put another way: "ignoring… variance…hides…causative factors" which produces incorrect generalizations and, to boot, is just "intellectually lazy."[178] As an example, Ehrlich mentions warfare or marital discord as explained to the effect of: "all people are 'naturally' aggressive" or "men are 'naturally' promiscuous."[179] In response, it is easy to empathize with Ehrlich's distaste for generalizations such as 'all people are naturally aggressive.'

[175] What is important to clarify is: we can do this while *still* acknowledging our continuity with non-human organisms.
[176] I am making allowance, here, for the fact that sometimes organisms, or species, are better thought of as something like aggregates or collections of organisms. For example, there are microbes that inhabit the human gut and skin that are integral to our health and survival and we to their health. For a recent discussion of the relations between micro- and macro-organisms see, e.g., (Dupré, 2012).
[177] Ehrlich (2000, 13).
[178] Ehrlich (2000, 13).
[179] Ibid.

We can also agree we may need a finer-grained analysis. However, broad generalization and finer-grained analysis are not at odds. In this case, we can simply match the ontological category to a refined catalogue of ecologies or developmental resources. Thus, we do not need to abandon ship on a singular human nature. Rather, we might make statements like the following: all humans are aggressive (as operationally defined as 'x') in these ecologies, or relative to these developmental deficits or advantages.

In the language of my own conception of human nature, the problem, really, is assuming that what is human necessarily ends at our skin, or that our skin is the place where the external world stops. I might even add that much the same could be said about our general tendency to push aside evolution from our explanations: to view the organism as primarily a product of the present—or as starting only at the moment of conception—can be a misrepresentation.

2.10) General Comments on Human *Natures*

There may be any number of reasons why the 'human natures' argument appeals to so many academics. However, three opposing clarifications may be beneficial to this debate.

First, it is possible to hold a singular view of human nature while being deeply appreciative of human diversity. That may be stating the obvious, and yet, this is the general tenor of criticism toward human nature singular. For example, Christine Overall writes, referencing Dixon: "The appeal to nature, to 'monolithic species prototypes,' is incompatible with an appreciation and support for the diverse forms that human life can take."[180] I do not know how this 'incompatibility' is scientifically measured, but Overall's claim itself is monolithic and disaffirming of diversity. Plainly, there is no logical incompatibility to assuming some aspects of humans are the same and some aspects are diverse.

Second, to claim human nature is singular is not at all to deny significant human polymorphism *within our greater unity*—or to deny the possibility of localized natures. In fact, to be consistent with evolutionary theory, we expect some portions of the human population to show the imprint of reproductive isolation, local ecology, demands for specialized problem-solving (such as giving birth), and random mutation, drift, or developmental insult. This is exactly confirmed by the evidence in phenomena such as sickle cell anemia, or lactose intolerance.[181] With respect to what qualifies as a generalized morph, or as a localized 'nature,' there may be some ambiguity as to how we adjudicate this—for example, how widely shared a feature must be, or how distinct, or stable, to consider it worthy of such classification, but the view is a reasonable one.[182] We can also say the same about stages of human development. For example, a pre-pubescent girl may be fundamentally different than a post-menopausal woman (in some scientific and practical respect). We might want to ascribe a slightly different nature to each sex—or to whatever widespread sexualities we find plausibly distinct. We may even

[180] Overall (2003, 35).
[181] See, especially, the work done in niche construction theory: for example, Kendal et al (2011) or Laland and Brown (2002/2011, 177 – 178).
[182] See, e.g., Tooby and Cosmides on morphs (1990, 34 – 45).

consider a variety of organic and developmental anomalies, like color-blindness or autism, and say these constitute their own natures.

Third, many of those who argue for human natures, like Ehrlich himself, imagine they are combating some vast array of undesirable normative side-effects due to describing humans as uniform; but plainly, if we go too far down the polymorph road *while cancelling out our broader humanity*, we play even more into the hands of the kind of sexist, racist, ageist, and other common hierarchical groupings so many of us worry about.[183]

Part VI) Summative Conceptions of Human Nature

In considering summative conceptions of human nature,[184] it becomes important to precisely differentiate between *a)* definitions of human nature, *b)* conceptions of human nature, and *c)* empirical specifications of human nature. Strictly speaking, summative conceptions of human nature are not conceptions, but are rather *definitions* that carry significant conceptual weight. The main problem with 'summative conceptions' is that scholars who favor this view do not often see past the purely metaphysical or empirical dimensions of the human nature debate and, thus, do not properly incorporate the debate's relative aspects. Succinctly, we could say that summative conceptions divorce the subject matter from its proper context, and this 'context' is to be found significantly in the role of human interest

[183] Dupré (2003, 120).

[184] From now on, I will often use the phrase 'summative conception' as a stand in for 'conceptions of human nature that see human nature as a summary of species-typical features.'

and the fact we require inter-species contrasts, present and past, to give 'what is human' a definite shape.

In this part of my chapter, I will begin with an overview of the relevance of definitions, conceptions, and empirical specifications. In section 2.12, I will then turn to some of the specific strengths and weaknesses of summative conceptions. My hope is that my clarifications, here, will also be kept in mind when I put forward my own conception of human nature.

2.11) Overview: Definitions, Conceptions, and Empirical Specifications

If my arguments so far are correct, then we cannot avoid some conception, or other, of human nature. In which case, we do well to have some deliberate and plausible anchors as to the meaning of the phrase.

This will involve, in part, a clear definition of human nature. For certain this plays only a small role in moving us toward a viable conception of human nature, but this is still important as our definition acts as a bridge between conceptual and empirical work. As for our conception, explicit or implicit, it acts as a fulcrum for how we treat ourselves, other humans, and even non-human organisms.[185] This makes it, as far as conceptions go, fairly unique. A conception of human nature has a wide influence on our life.[186]

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[185] Larry Arnhart writes: "If one defines human nature in a silly way…then human nature does not exist. But if one defines human nature in a sensible way, then human nature surely does exist" (2009). It is an overstatement to think the issue depends entirely on a definition, but the spirit of the message is good. We also must grant that some expertise may be required to detect which is sensible and which is not, but not a great amount is needed to notice the most egregious cases.

[186] E.O. Wilson presents a case in point for being more conscientious about distinguishing between conceptions and definitions. He writes: "a clear definition of human nature is the key to

With respect to the difference between a definition and a conception of human nature, one of the more remarkable oddities of academic debate is the simple failure to distinguish between the two or, at times, to even bother with an explicit elaboration of their structural aspects.[187] A notable instance of the latter is Steven Pinker's tome *The Blank Slate; the Modern Denial of Human Nature*.[188] Janet Radcliffe Richard's textbook, *Human Nature after Darwin,* is another.[189] Of course, in reading these publications it is easy enough to piece together a gestalt of what each author believes. But it is still a curious feature it is not laid out for us in some clear summary or short explanation—and especially knowing that just about everything under the sun has been held to severe scrutiny in academia.

With a formal *definition* of human nature, we are looking to introduce the meaning of the construct with enough clarity to readily communicate, but also to delimit an area of academic inquiry. I will not evaluate the merit of her definition, but Elizabeth Cashdan provides a passable example: "Human nature, broadly speaking, encompasses the ways in which people think, feel, and act."[190] Another

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understanding the human condition as a whole" (2012, 191). In his next sentence he then adds: "the achievement of [a clear] definition…is an extraordinarily difficult task" (ibid). Wilson's view would be more coherent if we substituted the word 'conception' for 'definition.' Surely, a clear *definition* of human nature is not particularly difficult, nor is it the key to understanding human nature in the way a proper conception might be.

[187] Historian Merle Curti writes, "Complex problems face anyone who tries to write [a systematic, full-scale study of human nature]. By and large the meanings of the term have been so taken for granted that historians rarely find formal definitions…[or much that appears] as conscious, conceptually refined, or coherent" (1980, xii/xiii).

[188] Pinker (2002).

[189] Radcliffe Richards (1999/20002).

[190] See Cashdan in Downes and Machery (2013, 73). Jaggar says something similar: "the core of any theory of human nature must be a conception of human abilities, needs, wants, and purposes" (1983, 20).

example is Ehrlich: "Human natures are the behaviors, beliefs, and attitudes of *Homo sapiens* and the changing physical structures that govern, support, and participate, in our unique mental functioning."[191] It is worth mentioning both Cashdan and Ehrlich highlight psychology and behavior here. These two phenomena are easily the most common denominators of definitions of human nature. However, neither scholar argues to justify the emphasis. In fact, it is stated quite cavalierly.

A *conception* of human nature is different than a definition in being more elaborate. A conception of human nature is a generalization or meta-generalization that *tells us what humans are like*. Ultimately, any worthy conception will act as an accurate distillation of important research and, as such, will involve documenting specific details about humans. At the same time, however, a worthy conception will need to comport with 'folk-wisdom' in some modest respect. This is because, if human nature is a partly *relative* concept (as described in my introduction), one key frame for even bothering to establish such a concept is that it be practical. For the 'folk,' despite all the variation present in human populations, we are evidently not plants, dinosaurs, spiders, fish, frogs, birds, tigers, or even chimpanzees. This does not mean we need to then 'water-down' our scientific standards to match the 'folk.' It means only *there are extensive layers to what is real* (even at a purely 'scientific' level) and thus, we may need to simply cordon off our descriptions relative to our purpose. For instance, it may be there are six species of genetically distinct giraffe

[191] Ehrlich (2000, 12).

where, to the naked eye, we can only see one.[192] This truth may be essential to finding a way to prevent the extinction of one genetic specimen, or to understand a failure of interbreeding. But the fine grain of this level of analysis is hardly relevant at the level of sight seeing.[193] Moreover, allowing for a single 'coarse species' of giraffe should not then equate to being ignorant as a few philosophers of biology recently insinuate.[194] The folk simply do not need a finer grain. Moreover, this type of metaphysical or epistemic one-upmanship can be endless when we realize the deepest levels of taxonomic or investigative possibility.

As for the empirical specifications of human nature, this is obviously a cornerstone to a credible conception: that is, we want our conception to connect to the best empirical evidence possible. However, *these specifications themselves are not the conception*. The conception is really the overall pattern, or grouping, of these specifications made *non-trivial* via the specific pattern's elevation relative to some comparison group, or purpose. This has special relevance for summative conceptions of human nature because they are absent of imposing signification on the pattern. Which means they have no way to resolve empirical specifications that are contradictory. In fact, when this usually happens these scholars often resort simply to the view the construct is unscientific as opposed to multi-faceted.

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[192] Connif (2010).
[193] O'Hear (1997, e.g., 15 – 16, 132 – 133, 165).
[194] Griffiths (2009), or Linquist et al (2011). As Michael Devitt writes in regard to the intuitive appeal of viewing species as natural kinds with underlying natures: "I think the children are right, and the philosophers of biology are wrong" (2008, 345).

I will add more to these clarifications when I introduce my own conception of human nature.

2.12) Summative Conceptions of Human Nature: Examples and Critique

Summative conceptions of human nature are essentially lists of properties that *most* organisms of a group share and that reflect the evolution of that group. I have not stated the group is a species for reasons I will later explain. In any case, because the view is so popular it is worthwhile to set out some specific examples. These are as follows along with the scholars name as an introduction so as to make commentary easier to follow.

> Francis Fukuyama: "The definition of *human nature* I will use here is the following: human nature is the sum of the behavior and characteristics that are typical of the human species, arising from genetic rather than environmental factors."[195]
>
> Richard Samuels: "I have articulated a conception of human nature on which it should be identified with a suite of mechanisms and structures—a causal essence—that is implicated in the explanation of species-typical psychological regularities."[196]
>
> Edouard Machery: "[On a nomological notion of human nature]…what is required of the properties that are part of human nature is that they be shared by *most* humans, as a result of a specific causal process—the evolution of humans. Relatedly, the properties that are part of human nature do not have to be possessed *only* by humans…[and] are not permanent."[197]
>
> Jerome Barkow: "Evolutionists do not ordinarily speak of canine nature or cervid nature or human nature (as I do). Instead, they speak descriptively of 'species-typical characteristics,' thereby recognizing that a species generally has no one defining trait, but, rather, a cluster of traits in which no single one is necessarily crucial. The concept of species-typicality is rather similar to that of [a] disease syndrome, where the overall pattern rather than a single

[195] Fukuyama (2002, 130).
[196] Samuels (2012, 26/27).
[197] Machery (2008, 323/324). But see also Machery and Barrett (2006, 235).

> feature is the defining quality. Human nature is not (let us hope) a disease syndrome, but it, too, refers to a cluster of traits rather than a universal essence."[198]

While there are some significant differences between each formulation, the main pattern should stand out: all feel that human nature can be represented as a set of group traits, or properties. With Samuels, as it may not be obvious, the 'sum,' is the suite of mechanisms and structures that explain species typical regularities—and once more, we see psychology given special status.

What are some of the strengths of a summative conception? First, a summative conception aligns very well with the base-line pragmatism of science. The possibility of human generalization allows us to orient and then exert some control over our lives. Machery and Barrett are lucid, here, in their critique of Buller's *Adapting Minds*. They write:

> if there were no human nature, huge swaths of the social and biological sciences, notably medicine, that aim at producing general knowledge about our species would be bound to fail. It would be pointless to study human livers, because there would be nothing that one could say about human livers in general. This is clearly wrong in both theory and practice. Generalizable claims about human physiology are clearly possible, as are claims about human cognition.[199]

Second, summative conceptions align with the base-line pragmatism of norms. In other words, if constant change was the only *accurate* descriptor of the natural and cultural world, and people and cultures were as diverse as the critics repeatedly claim, then good or bad science, fact or fiction about human nature

[198] Barkow (2006, 27/28).
[199] Machery and Barrett (2006, 244).

should hardly matter! Scientific findings would be quickly 'true' or useful at one point and not at another; they might create positive social change for some small portion of the population, and then unpredictably reverse course, or become neutral. Likewise, there would be little need to worry about global human rights as whatever we decide to enforce will be unsatisfactory or aversive to broad swaths of the population—or will at least change across generations. For example, on this view, many of us would be just as content being tortured, or falsely imprisoned, as not; or may feel, at some unpredictable level, as indifferent to having a right to free speech, or education, as partial to it.[200]

Finally, summative conceptions, unlike the other rivals I have treated in this chapter, are not artificial. In other words, the thesis that humans have many properties we can generalize about, across cultures and time, does not lead to any noteworthy contradiction, or to some overt and thin 'descriptive privilege' relative to a plainly ambiguous phenomenon.

What are the weaknesses of summative conceptions of human nature? Three are fairly notable. First, while it is not a *necessary* feature of summative human nature constructs, many representative scholars renounce the idea of any significant human universals, or the idea there are any deep laws to human emotions, thought, or behavior.[201] This amounts, in my opinion, to giving up on one of the highest

[200] The young Pakastani girl, Malala Yousufzai, comes to mind. Yousufzai was shot by members of the Taliban for speaking out for educational opportunities for women.
[201] See, e.g., Griffiths in Wilson (1999, 211/212). However, this seems to hold for almost any homeo-static property cluster theorist—which would appear to represent most philosophers of biology. Also, not surprisingly, other scholars that accept this are Buller, and Dupré.

aspirations of science. Ultimately, scientists look to uncover the deepest regularities of the universe. Moreover, the order and change we see around us would not exist if these laws, or patterns, did not exist at some level. (This point may appear more plausible after my next chapter).

Second, some summative theorists do not explicitly ground what is 'human,' at the Archimedean point of the taxonomic aspect of human nature: shared ancestry.[202] Yet, this is where we find our most significant portion of the 'all and only' aspect of humanity which then allows us to collect generalizations at a more pragmatic level—a level that allows for human exceptions. Machery, for example, specifies that his own conception of human nature does *not* require properties that constitute conditions of membership.[203] But, in relaxing the issue of human membership, Machery simply by-passes any full commitment to explaining the *human* portion of human nature—and a readily available (even if incomplete) option for *why* we can, in fact, so successfully generalize about humans. If *many* entities are 'human,' then some property or set of properties (relational or intrinsic) makes this true and extensive to each organism in the class.

Finally, and most important, even the critics of human nature claim the concept should capture something *non-trivial* about humans.[204] However, a mere summation of traits, on either a taxonomic or ethological emphasis, cannot effectively answer to this. This is for at least two reasons. First, even if it were

[202] Machery writes: "In contrast to Griffiths…I do not single out the relation of descent as the main source of generalizations among humans" (2008, 328).
[203] Machery (2008, 325).
[204] Buller (2005), Dupré (2003).

possible to simply collect, bound, and divide properties just for the sake of doing so, they would not simply accrete into something of significance. Certainly, at a very base level, some portion of 'ourselves' and 'the world' simply *resists* our attempts to experience them differently. So these properties and groupings have a kind of sub-cortical or species-given significance. But, at any refined level, *a purpose* is needed. For example, we form the classification of 'sharp teeth' so we do not get eaten, or the classification of 'storm clouds' because we do not want to be rained on. Aggregates of species-typical properties become something of *scientific merit* only relative to some refined need to know, and that refined need is relative to *our* refined interests. If we consider Barkow, his explanation at least gets at the importance of an overall pattern. But the problem is, standing on its own, this overall pattern will be enormous and include a great deal of relatively trivial stuff—even pauses in poetic declamation. Second, where mere species-typical lists may have the most readily available application is with physical features. For example, when we refer to phenomena like bipedalism, developmental norms, concealed ovulation, height, weight, and so on. However, this is much more difficult with respect to psychological and behavioral phenomena. At this level of relevant generalization, we are more prone to instances of empirical contradiction. This means, for example, we are likely to find species-typical evidence to say that it is human nature to be aggressive while, at the same time, justifiably say that our nature is also to be peaceful; or, we will likely find evidence to say humans are naturally selfish *or* unselfish; brave or cowardly; intelligent or unintelligent; and so on. The ready answer to this problem is to then be more specific. For example, we might say humans are naturally aggressive, as defined by premeditated homicide, in these age cohorts, in these ecologies, and so on. This *is* scientifically helpful, but it does not easily resolve the issue of apt general description primarily because we can also pursue this kind of refinement with the polar opposite of aggression.[205] So *what is really needed are external referents.* This could be a contrast to proto-humans; an earlier generation; another developmental stage; another species (plant or animal); and so on. But this makes human nature *a partly conventional construct*, rather than a construct that represents our effort to simply map what is 'out there'—as summative concepts suggest.

Part VII) An Ecological Conception of Human Nature

In this section I will introduce an ecological conception of human nature. To be very clear, I am doing so in a strongly normative sense—that is, I am outlining not only what an ecological conception of human nature is, but also claiming we *should* adopt this particular conception if we hope for a construct of human nature to be of modest scientific value. I will introduce an ecological conception of human nature in four sections. I will begin by providing a conceptual base-line. I will then turn to introducing both a conception and a definition. Finally, I will close this chapter by adding a few qualifications.

2.13) Preliminary Comments

[205] This is not too say that all this diversity cancels itself out. Examples such as humans are social, or care for their young, and so on, are accurate descriptions of human nature. Only that, at this level of generality, they are substantive with external referents.

An ecological conception of human nature is built on four conceptual table legs. These are as follows.

First, as I have just developed in response to summative views: an ecological conception of human nature is organized around the idea that human nature is ultimately a relative construct. In isolation from a specific ecology, or in isolation from comparison to other species (past and present), the very broad generalizations we tend to make about humans, lack substance, or end up prone to refutation. This can by remedied by offering specific empirical generalizations. For instance, we might say it is natural for humans, with 'x' nutritional resources, to be approximately 6ft tall or less. But of course the capacity for this statistic to be of maximal value will still require we elevate it for a particular purpose. For example, we may want to know some minimum height for building doorways for public buildings, or creating the appropriate leg space for public airlines.

Second, as 'human nature' is a compound phrase, our conceptions must strike a balance between what it is that reflects species membership and what is merely 'natural.' This means we should immediately rule out the kinds of claims made by scholars such as Buller that human nature, as a construct "has *always* referred to what…distinguishes humans from other animals on the planet."[206] Buller's statement simply emphasizes taxonomy over ethology. He is also misleading: for any biologically informed scholar, human nature has never referred to *only* what is distinct about humans. This is because saying as much would contradict

[206] Buller (2005, 420; my emphasis).

evolutionary principles. In other words, one way Darwin truly revolutionized our thinking about biology is that he convincingly explained how *humans are connected to other life-forms*.[207]

Third, related to the previous point, the construct of human nature should be seen in tiers or ranges. In particular, at one end of the spectrum we need to look to a *minimal* species nature in terms of species-typical *limits* or constraints. This will usually be found in features we share with other organisms. But these still have scientific value in the fact these features are made species-unique via species-typical ecologies and via their constraint by networks of other species-typical features. At the other end of the spectrum are species-typical *talents*. These mark a *maximal* species essence, or nature, in the sense these talents demarcate features that only humans are likely to have. In turn, such features can be a matter of kind, or merely a matter of degree. For example, Ehrlich speaks of humans as the only organism known to make a conscious connection between copulation and reproduction, or he speaks of humans as the only organisms that compose operas, or pray to the gods.[208] Francisco Ayala, on the other hand, speaks of humans as the only organism that can significantly change their environment to suit the needs of their genes.[209] In either case, it is important to note that a species minimal or maximal nature ultimately has root in our species-typical ancestry.

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[207] See especially: *The Descent of Man, and Selection in Relation to Sex* (1871/2010), and *The Expression of Emotions in Man and Animals* (1871/1965).
[208] Ehrlich (2000; 71, 203-204).
[209] Ayala (2001, 293).

Fourth, an ecological conception of human nature *explicitly acknowledges how involuntary biological (and ecological) limits and constraints aid in human problem-solving, survival, and well-being.*[210] In the orthodox philosophy of biology literature, there *is* some acknowledgment of various kinds of biological constraint—and especially developmental constraint. But, by and large, this is denied or minimized when it comes to explaining the influence of genes in human life or, at the other end, when it comes to describing those features of human psychology usually associated with the human cortex. There are, undoubtedly, a variety of reasons as to why this occurs—some of which I will speak to in the final chapter of my thesis. However, my basic argument should not be difficult to embrace.[211] With respect to survival, take just the dimension of our sensory modalities: if a human could, all at once, see like a hawk, smell like a blood-hound, hear like an elephant, or navigate by electrical impulse like a mormyrid fish, the increase in information would demand additional energy to process and integrate; it would be more difficult to orient; and the sensory overload would interfere in our ability to survive.[212] So, not surprisingly, no

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[210] Bjorklund and Pellegrini are interesting here: "[Our] mind is not a general-purpose problem solver and…some things will be very difficult or impossible to learn. Stated differently, this perspective proposes there are constraints on learning…Constraints imply restrictions and restrictions are usually thought of negatively. The human mind is notable for its flexibility. We, more than any other species, live by our wits, and have been able to adapt to a more varied range of environment than any other large animal. But constraints from this perspective, enable learning, rather than hamper it. Children enter a world of sights and sounds, objects, language, and other people. If all types of learning were truly equiprobable, they would be overwhelmed by stimulation that bombards them from every direction. Instead, infants and young children are constrained to process information in certain 'core domains' in certain ways. They come into the world with some notion of how the world is structured, and this leads to faster and more efficient processing of information" (2001, 19).

[211] For some relevant discussion, see Barkow et al (1992, e.g., 103). But see also chapter four of my thesis.

[212] This example, of course, can simply be expanded if the reader finds it unconvincing. In other words, simply keep adding more sensory possibilities and the system collapses at some point.

organism faces an open-ended, unbounded, equipotent, or even highly pluri-potent field of choice: it would be a disaster! With respect to problem-solving and well-being, again, these comments should not raise an eye-brow. For instance, if we hope to run a marathon, we should begin by considering not only if it is possible, but also what the constraints are that we face. Some of these limits and constraints will be idiosyncratic: we might need to respect the fact we have asthma and give ourselves an extra month to train. Some of our limits and constraints will be species-specific: we might need a certain amount of water to complete our goal, whereas a camel may need something different. So, there are tremendous benefits to honest assessment. It may be the case the goal is impossible—perhaps we are 100 years old and 400 lbs overweight—but an honest assessment allows us to direct our energy to better effect elsewhere. Or, in acknowledging difficulty, we draw together information that will help us actually accomplish this goal. However, when human limits and constraints are raised with respect to our species—and, of course, sub-groups such as males or females—discussion quickly turns to politics. I do not deny politics enter into these issues, but every discussion of involuntary biological limits and constraints *must weigh the potential moral or prudential abuse against moral and prudential wheel-spinning.* The latter hardly seems to be a real possibility in the social sciences and humanities when an evolutionary minded scholar voices this. If a scholar claims there are, say, genetic or biochemical elements that figure strongly in mental illness, crime, hierarchy, drug addiction, divisions of labor, male and female differences, and so on, they are often subject to all manner of abuse and even stand to lose their job.[213]

2.14) Conceptual Frame for an Ecological Conception of Human Nature

In speaking of an ecological conception of human nature, what I really mean is that human nature, itself, exists *as an ecology*. While the latter is perhaps an awkward phrase, it captures more accurately the reality of humans, and our conceptions of humans, as fluid, *living things* that are defined as much by the properties they exhibit as by their relationships to other entities, and the properties of those entities.[214]

On an ecological view of human nature, *humans are not any one layer of biological organization,* such as genes or behavior, and *humans are not merely their relations to other entities*. Nor are humans entirely defined by the present or past. Rather, *humans exist somewhere at the intersections of all these things.* This view, in particular, helps us to understand a great variety of perennial philosophic issues such as that of human responsibility and free will, the nature-nurture debate, and that of humans as defined by adaptations or by-products. For example, on an ecological conception of human nature, free-will does not exist *inside* the human agent as some disembodied executive power to be expressed during various difficult moral choices. Instead, free-will is something that exists every bit as much *outside*

[213] See Segerstråle (2000) or, e.g., Silverman (2003).
[214] This conception bears on the unit of evolutionary inheritance debate. Some scholars insist on the gene, itself, as 'the unit;' others claim that we need an expanded view of inheritance, one that draws a far wider boundary incorporating epigenetic or developmental resources (Licklitter and Honeycutt, 2003, 824). On my view, neither is strictly correct, and the truth lies somewhere in the middle.

the agent, in particular *packets of information*, provided a developed, and sometimes fortuitous capacity to process and use this ‘freeing’ information. In which case, the quality of our surroundings and our relationships to other entities is crucial to apprehending why and how some humans exhibit great adaptive flexibility, and others do not.

To support this construct, it is important to see humans relative to what I introduced in my introductory chapter as PARG: proximate areas of relevant generalization. There are nine of these areas: genes, development, physiology, anatomy, psychology, behavior, social ecology, local ecology, and global ecology. Human nature exists, in its most scientifically robust form, where stable or invariant PARG intersect. For example, if being an omnivore is an aspect of human nature, we should expect this trait to exhibit stability across many generations, and find evidence of it in our genes, hormones, digestive system, cultural practice, and so on.[215] In turn, these points of intersection themselves will be stabilized by ‘distal areas of relevant generalization’ (DARG). DARG represent not just the natural forces or phenomena that are commonly used for description and explanation in biology (forces such as natural and sexual selection, kin selection, frequency dependent selection, genetic drift, and so on), but also the forces used to explain all the inorganic phenomena referenced in such disciplines as geology, physics, and cosmology.

[215] For a related discussion see, e.g., Milton (1993).

On an ecological conception of human nature, human nature is best seen as a *gestalt*—something that exists over-and-above any particular area of analysis. Of course, for descriptive or explanatory convenience, we can accept that some particular aspect of humans might be best accounted for by reference to a single area. But my point is, *strictly speaking*, all areas co-produce even the most singular and idiosyncratic human features and traits. Perhaps a rough analogy for this approach can be found in a multiple dial combination lock. We can imagine each level of generalization as one tooth on a long pin each with a corresponding and perfectly cut notch inside a rotating dial. When each dial is turned so that all the notches align with all the sequential teeth, the pin pulls free and unlocks.[216] With human nature, each level of roughly correct generalization can give us something substantial (the 'click' sound of correct alignment), but what we are really looking for is continuity across all areas of generalization.

Further distinguishing features of this conception of human nature are as follows.

First, what is central to an ecological conception of human nature is simply how human emotions, thoughts, decisions, and actions are stabilized, or *'bracketed*.' This means that human nature cannot be identified simply with adaptations as how we feel, think, and act will also be influenced by *incidental features*. For example, having a tail bone, and not a tail, means that humans hang by trees, find their

[216] This analogy can be found in Wimsatt's discussion of generative entrenchment, although I arrived at it independently (Bechtel; 1986, 185 – 208).

balance, or express happiness, by using other means. Likewise, human males have nipples that are not functional for lactation and yet this may still reliably steer us toward certain forms of stimulation and bonding with other humans; and so on.

Second, an ecological view of human nature is meant to be interactionist. In other words, it is designed to acknowledge the contribution of both nature and nurture, or genetic and epigenetic factors, to account for what humans are like. This is not to say that we cannot separate these factors for methodological convenience; for instance, that in a roughly correct manner we may justifiably say this particular gene causes this phenotype, or this particular type of education, or lack of education, creates a certain phenotype. But at a theoretical level, we will maintain that genetic and epigenetic factors are entwined. In which case, this view exists in opposition to most claims about human nature that are absolute or unqualified relative to context. So, for example, claims to the effect that humans are, *by nature*, good, bad, solitary, gregarious, aggressive, and so on.[217] Such claims will tend to make sense only when they are paired with a refined ecology or set of ecologies. In other words, we can say that it is human nature for humans with 'x' developmental resources to be aggressive (however operationally defined) in these contexts and not in these ones; to be happy in these contexts, but not these ones; to have a life-expectancy of 'x' years in these conditions, but not when these conditions change; and so on.

[217] For example, see E.O. Wilson's *On Human Nature* (1978). In answer to the rhetorical question 'Are human beings innately aggressive?' Wilson replies, "The answer…is yes" (99).

Third, on an ecological view of human nature, human nature is not in any scientifically robust way *causally* explanatory.[218] Rather, human nature is best viewed as a descriptive construct. By this I mean, the phrase 'human nature' is scientifically and pragmatically *orienting* on at least two fronts: there are things in the world the are clearly human or *not* human, and there are things in the world that are natural and unnatural (or artificial) for humans.[219] Human nature is not of much help regarding causal explanation because it quickly breaks down to more refined constructs that do a better job. For instance, we might wonder about homicide over human history, but simply stating this is due to human nature does not accomplish a great deal.[220] Alternately, variables such as testosterone, poverty, child abuse, and so on, do a lot better.

Fourth, it is important to recognize that claiming human nature is a valuable descriptive construct is distinct from documenting the *specific details* of what human nature is. Human nature as an ecology is, effectively, a meta-generalization or paradigm. This means its value depends on the credibility of a network of more specific generalizations and these will, in turn, depend partly on a network of confirming research about humans. But given the size of the topic, it is also the case *this construct can exist for some time on the mere probability of confirming evidence.*

[218] Griffiths says something similar (2009, 53).
[219] The idea that phenomenon are natural or unnatural, with respect to humans, is disputed by many philosophers. Prinz, for example, claims the whole "effort to figure out what comes naturally [to humans] is a fool's errand"(362). See chapter four of my PhD thesis for a discussion.
[220] For an evolutionary discussion of homicide see Wilson and Daly (1988).

Finally, it is important to recognize that *a particular conception* of human nature does not require an exact *explanation of why* specific human features or traits exist. Critics of sociobiology and evolutionary psychology seem to assume this—at least in spirit. Sweeping denouncements of these disciplines are based significantly on the fact that many of the explanations given about the origins and history of certain human traits are hypothetico-deductive or not straightforwardly empirical.[221] In turn, this seems to cast doubt on the very idea of human nature—perhaps as much as the more specific claims put forward. But the domains of near present and distal past *can* exist independently of each other. In other words, our ability to document presently reliable generalities—which will at least have some indirect evolutionary history—is not seriously compromised if the source of origin is still a mystery. This clarification has at least two relevant implications. One is that, *investigating the pre-historic past is really its own academic specialty, or sub-specialty, which should come with a few of its own investigative standards* and its own exemplars derived from the success of other investigations into the past. Another is, the goal of making non-trivial and law-like generalizations about humans is a goal of virtually all social science and humanities disciplines, even though most of these disciplines do little or no investigation into evolutionary, or ultimate, as opposed to proximate, natural causes.[222]

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[221] See especially Robert (2008), or Buller (2005).
[222] Wilson and Daly go so far as to say: "[the] entire social scientific enterprise is concerned with the characterization of human nature" (1988, 8). This is surely an overstatement as many portions of the social sciences investigate and make generalizations merely about various sub-groups of humanity or make generalizations constrained to various bounded historical periods. But it is not too

2.15) Definitional Frame for an Ecological Conception of Human Nature

Intersecting PARG provide a way to track and collate stable layers of descriptive phenomena about humans. However, to be clear: widespread phenomena at any isolated level that appear modestly stable and non-trivial, are enough to at least begin talking about something as human, or even as natural.

There are two layers to my definitional frame. In less technical language, human nature represents the overall pattern of the most stable features that exist primarily due to our evolved history and present ecology. More technically, *human nature is what emerges at the intersections of PARG*. Intersecting DARG are a way to further situate why these stabilities exist. This means: we do not just reference evolutionary forces to explain the stability of what we are. Furthermore, while we need to recognize the power of triangulating humans across levels of PARG, there are certain areas of generalization that are ontologically more dependent on other areas. For example, it is evident that *local and present* ecology, and a person's regular state of mind and activity, can influence fairly stable changes in our physiology, biochemistry, development, and anatomy—and it is maybe less evident that 'ordinary' events and states can also impact the expression of genes. However, human psychology is asymmetrically vulnerable and 'downstream' in this conceptualization. To clarify, PARG such as genes and anatomy can remain functional and intact without, say, human consciousness (as is the case when we

far off the truth. A more modest statement is Griffith's: "The humanities and social sciences can hardly avoid making claims about human nature" (2009, 30).

sleep), whereas various features of human psychology can be seriously compromised due to relatively minor perturbations in 'upstream' areas of relevant generalization—and especially during various critical stages of the human life-cycle.[223]

2.16) Final Qualifications

An ecological conception of human nature goes against a long tradition of identifying human nature with human psychology, or sociality. I have alluded to this already in debating socio-agentic conceptions, but it may be useful to make some final clarifications. As a platform consider Donald Brown or Geoffrey Miller's definitions of human nature. To his credit, in his paper, 'Human Nature and History,' Brown states: "it should be borne in mind that human nature includes such matters as bipedalism, a nine-month period of gestation, moderate sexual dimorphism, and much more", but he still says, "for the purposes of this paper I will equate the human mind with human nature."[224] Evolutionary psychologist Geoffrey Miller says something similar; he writes, "The human brain is where human nature lives."[225] As for human nature as social we have someone like Dupré—who I mentioned earlier.

Starting with human psychology, there is a great deal of data that cross-reference the notion that the human brain (anatomically), and by implication, human thought and feeling are fairly unique phenomena on our planet. For

[223] For example, we can imagine here the impact of having an extra chromosome, or something like having a shortage of the neurotransmitter dopamine.
[224] Brown (1999, 139).
[225] Miller in Gangestad and Simpson Eds. (2007, 287).

instance, the human brain is the most metabolically expensive organ in our body;[226] the size of our brain and our cortex, and the density of neuronal connections in adult humans relative to the same in other organisms is highly evident;[227] and human minds invent technology and solve certain problems in a way that is far beyond what any other organism can accomplish.[228]

The phenomenon of human sociality is similar in its empirical alignment. For instance, at birth we are all completely dependent on other humans and are vulnerable for a longer period of time than any other species;[229] when deprived of adequate early care and bonding with other humans, we are prone to serious psychological and relational difficulties as adults;[230] we are radically vulnerable to pressure to imitate high status members of our group and to conform to what they do, and we exhibit negative affect (often subconscious) when we perceive social indifference or rejection even from humans we hold in low esteem;[231] loneliness is strongly correlated with depression;[232] solitary confinement and exile from our native or adopted social group (as opposed to social interaction and inclusion) is viewed as a harsh form of punishment and is common in many societies; altruism seems to be intrinsically pleasurable for most of us;[233] suicide is more likely for

[226] See, e.g., Armstrong (1983), Allman (1999).
[227] See, e.g., Allman (1999).
[228] See, e.g., Taylor (2010), or Pagel (2012).
[229] See, e.g., Meredith Small (1998)
[230] See, e.g., Blum (2002), Haidt (2006, 112 – 117).
[231] See Eisenberger et al. (2003), Williams (2011, 30 – 37)
[232] See, e.g., Cacioppo et al (2006).
[233] See, e.g., Moll et al. (2006); Tankersley et al (2007), Rizzolatti and Craighero in Changeux et al 2005 (107 – 120).

those of us who do not have a long-term mate or close friends;[234] life-expectancy is greater for those who are in a long-term relationship; and the death of other humans is a considerable source of negative affect and anticipatory anxiety.

So while there may be confounding studies to all these observations, they are certainly suggestive. But do I deny this data? No.

On an ecological conception of human nature, I only claim that these types of observations *do not provide a complete picture*. The richness of the human mind seems equally matched by a richness of a somatic and extra-somatic ecology—and especially a technological ecology that is unlike that of any other animal. Moreover, there are also thousands of cross-referencing studies that suggest we are far more than just linguistic or cultural animals. These studies do not often seem to hold much weight for a certain faction of academics—and especially, it seems, for many scholars in the humanities. But they are dramatically important. We know, for instance, that the presence or absence of certain stretches of DNA correlate to the presence or absence of certain phenotypes (and the same can be said about various developmental resources); morphology encourages or constrains behavior; hormones and neurochemicals correlate with the presence or absence of various feelings and moods (as does the presence or absence of daylight or darkness); we are impacted by daily bio-rhythms, or by interruptions in our sleep cycle;[235] we have different mental and emotional capacities at different stages of development;[236]

[234] See, e.g., Haidt (2006, 133),
[235] See, e.g., Ackerman (2007), or Cartwright (2010).
[236] See, e.g., Wallis et al (2004).

brain injuries correlate with the loss of very specialized mental functions;[237] there are various mental health regimes that do not rest on voluntarily changing our thoughts, but rather on altering what we eat, changing our body chemistry or metabolism through exercise, or ingesting pharmaceuticals;[238] and so on.

On an ecological perspective, human sociality and human psychology are merely the exposed portion of an ice-berg, with the greater portion of what humans are existing below the surface or held intact by the water and atmosphere surrounding the iceberg. Contra someone like Miller, human nature does not exist *in* the human brain; the human brain is rather a bi-directional hub where the spokes of genetic and epigenetic factors, past and present, meet. As such, we are better to think of human nature as expressed *through* the brain. This is a crucial distinction. To imagine human nature as residing *in* the brain hides all the many factors of what we are that are not 'the brain proper.'

[237] See e.g., Demasio (1994).
[238] See, e.g., Ratey and Hagerman (2008), or Milkman and Sunderman (2010).

(3) Typology, Essentialism, Species, and Being Human

To sum up, I believe that species come to be tolerably well-defined objects, and do not at any one period present an inextricable chaos of varying and intermediate links…[In] any one region and at any one time, we ought only to see slight modifications of structure in some degree permanent*; and this we assuredly do see.*

Darwin (my emphasis; 1859/2008, 181).

A major difficulty in making a case for human nature is that there is a well-established tradition, at least in philosophy of biology, of associating the phrase with three philosophical positions that are imagined to contradict not only evolutionary principles, but also our best knowledge of what species are, and what is deemed necessary for membership in a particular species. These three positions are *a)* typological thinking; *b)* classical essentialism;[239] and *c)* species or organic property fixity (TES).[240] Treating each of these positions as distinct may seem unusual as many academics see all three, or any pair of them, as basically synonymous.[241] However, one aspect of the greater argument that follows is that this is a mistake. Certainly, as critics tend to represent them, these positions, or any combination of them, are incommensurate with 'evolutionary thinking.' But the important question is whether or not there is more than meets the eye on this issue.[242]

In this chapter, I will show that a viable concept of human nature is compatible with very qualified versions of all three positions—even species fixity—while also being consistent with our best biological and taxonomic knowledge. The

[239] For the term 'classical' I have borrowed from scholars such as Dupré in R. Wilson ed. (1999, 3-22), and Chung (2003). The term classical dovetails well with the story of how pre-Darwinian naturalists were "frozen in the grip of Plato and Aristotle, and medieval scholasticism" (Winsor, 2003, 388).
[240] See Stamos for intermittent commentary on species fixity (2005).
[241] For commentary, see Amundson (1998), Levitt & Meister (2006), or Love (2009).
[242] See Sokal for related commentary (1962, 231).

centerpiece of my argument is that there are, in fact, features of organisms—that *do not* significantly change. Foremost of these are what I call ecological imperatives, or organismic constants, which are held stable by global ecological constants. These imperatives have been overlooked by most academics perhaps, in part, because they can only be indirectly observed and are not, strictly speaking, corporeal. If correct, my perspective reveals that species *are* natural kinds and are subject to laws much like we find in the physical sciences. Moreover, my perspective suggests the recent but longstanding trend in the humanities, and some factions of the human sciences, to avoid or reject claims of *organismic stasis* is a detriment to achieving scientific consilience,[243] a full understanding of evolution, *and* a balanced view of humans as a species.

In order to advance my present thesis, I will need to attend not only to some of the ideas of the key critics of TES, but also to some of the popular views regarded as correctives to these original critics. To this end, I will divide this chapter into fourteen sections. The volume of sections here reflect a variety of challenges, but the biggest of these is a long history of thinking about TES from a perspective which appears largely due to 'motivated reasoning.'

[243] By scientific consilience I mean: what we advance as 'scientific' about humans in the humanities or social sciences should be consonant with our very best knowledge in the life sciences, which in turn should be consonant with broader bases of knowledge—such as physics. This does not mean *reducing* our scholarly pronouncements about humans to physics equations; it means making specialized knowledge informed by, and consistent with, more general knowledge—where possible. For example, what we say about altruism in moral philosophy, should be informed by our best research in psychology which, in turn, should align with established biological knowledge and what we know about phenomena such as inclusive fitness, reciprocal altruism, indirect altruism, and so on. See, e.g., Barkow, Cosmides, and Tooby (1992, 12 – 13), or Pinker (2002, 70). The anomaly to this may sometimes be found in what turns out to be 'revolutionary science.'

In section 3.1 - 3.4, I will outline and evaluate how some of the recent key players in such debates view TES. If these academics did not effectively *invent* the modern opposition to TES, they are certainly highly referenced. An unavoidable challenge of this section is that, in establishing my own construct as to what recent experts have said about TES, I risk misrepresenting the true diversity of academic thought on the matter. This comes with some potential for irony as my own account is meant to show that many of the established depictions of TES are themselves inadequate. To combat this possibility, I have tried to follow what little meta-history there is on the subject and to stick with what I take to be the original sources.

In section 3.4 – 3.12, I will outline and evaluate what are considered to be important correctives to TES. This will involve some discussion of Elliot Sober's early ideas on TES; Richard Boyd's refinement of essentialism via his construct of 'homeostatic property clusters;' A.C. Love's views on typology; and Michael Devitt's recent defense of intrinsic essentialism. I've chosen these academics due to their influence on the debate and have avoided more eccentric views. Of course, my selections will likely draw criticism but my hope is that, in the end, my own position will render these concerns largely irrelevant.

In section 3.12 – 3.14, I will offer my own version of essentialism. In the process I will also offer a new species concept. In effect, what I am trying to do in this chapter is establish what I mean by the human portion of the phrase 'human nature.' My fallback, however, is that even if the very robust version of human nature that I am pushing fails, it will not doom more modest arguments for human nature. One of the reasons for this is that conceptions of human nature do not require knowing exactly what humans are as a species. In fact, we can leave this question unanswered and simply adopt an approach that begins with the evident generalizations we can make about humans. As for explanations as to why these generalizations may be the case, we can simply investigate these as a separate issue.

3.1) Overview of the Typology/Essentialism Story

To the extent there is such a thing as orthodoxy in philosophy of biology, one plausible contender is a rejection of TES with respect to biological species.[244] For example, regarding classical essentialism, Wilson et al write, "a near consensus in the philosophy of biology holds that traditional essentialism is a mistaken view of biological kinds, such as species."[245] Others go even further. McOuat refers to essentialism as "the foremost term of abuse in just about all social and natural sciences."[246] Winsor claims much the same, writing, "essentialism as a valid category of analysis [with respect to biology] keeps company with the divine right of kings, with the everlasting damnation of atheists, and with racism" and, she adds, "anyone unwilling to condemn essentialism must mount a very clever explanation to prove he or she is not a bigot, or at best terribly reactionary."[247] Similar sentiments to those just noted can also be found with respect to typological thinking. Sokal claims that "among the biologists who care about systematics…typology is a point of

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[244] For historical anti-classical (or anti-intrinsic) essentialist sources see Popper (1944); Quine (1960), Hull (1965); Ghiselin (1969); Mayr (1976). For historical pro-intrinsic essentialism see Kripke (1972/1981), Putnam (1975), Kitts and Kitts (1979), Wiggins (1980).
[245] Wilson et al (2007, 189).
[246] McOuat (2009, 212). Rosenberg says something quite similar (1985,188).
[247] Winsor (2006a, 151).

view discredited to the extent that to call someone a typologist is to employ a mild form of invective."[248] Almost four decades later, the spirit remains mostly unchanged. Love writes "'Typological thinking' is not something you want to get caught doing in evolutionary biology. It involves committing the cardinal sin of ignoring variation and a tacit appeal to essentialism."[249] As for species fixity, we can turn to Hull, writing in 1964.[250] Concerned about the state of taxonomy in his day, he cites Mayr in support: "It is a curious paradox that so many taxonomists still adhere to a strictly static species concept, even though they admit freely the existence of evolution."[251]

To orient to these claims, it is obviously important to know what each construct stands for and their key distinguishing features. However, this is not easy for a variety of reasons. For one, academics—and especially those from different disciplines—apply slightly different meanings to each construct (and also imbue each construct with different normative significance).[252] Moreover, how academics interpret these constructs has also changed over historical time. McOuat traces the word 'essentialism' to the French and aesthetics in the early 20th century.[253] But a growing historical consensus suggests that our present understanding of the word gained currency with the publications of a cluster of academic figures based mostly

[248] Sokal (1962, 232).
[249] Love (2009, 52). See also Farber (1976). Winsor also says something similar (2006a, 159).
[250] Darwin (1859/2008, 8).
[251] See Hull (1965, 315).
[252] Consider a statement by Charlotte Witt in Mallon (2007, 146): "showing a position is 'essentialist' can [in contemporary feminist theory] function in and of itself as a good reason for rejecting it".
[253] McOuat (2009, 212)

in England and North America: John Dewey,[254] Karl Popper, Arthur J. Cain, David Hull, and Ernst Mayr.[255] Mayr, in particular, has been implicated by historians as playing *the* starring role in creating of what is now known as 'the essentialism story.'[256] I will align with this perspective, but not without the caveat that to do so is to take on a particularly agentic view of history. In other words, it might easily be the case that Mayr, and the academics listed above, simply articulate a view that gained purchase because it matched the zeitgeist and was what many academics (of the day) would have soon believed, or articulated, regardless of the so-called truth. In any case, I will focus on Mayr and Hull not simply because the pair were among many who co-opted the multifaceted word, 'type'—a term that had respectable, even if specialized, scientific status—as short-hand for virtually all things anti-evolutionary.[257] Rather, Hull and then eventually Mayr made the word 'type,' or more accurately 'typology,' synonymous with the word essentialism.[258] One corollary of all this is that, to this day, many academics who consider themselves Darwinist and, in particular, those with an interest in developmental biology, morphology, and paleontology, have been forced to fight for reclamation of the term.[259]

3.2) Mayr and Typology

[254] I will not speak of Dewey in my PhD thesis as it is difficult to trace his influence to modern beliefs.
[255] Four other influences in the rise of academic opposition to essentialism might be Oliver L. Reisler, Mortimer Adler, W. R. Thompson, or G. Simpson (see Winsor 2006a, 162, 163, 167).
[256] See Chung (2003) and especially Winsor (2003; 2006a).
[257] For commentary on the word type see Farber (1976), Daston (2004), or e.g., Amundson (1998, 157), or Winsor (2003, 396/397). For commentary on Mayr's treatment of typology see Chung (2003, 293).
[258] For commentary see Winsor (2006a, 168)
[259] See especially Amundson (1998) or (2005); Love (2009); Lewens (2009).

The phrase 'typological thinking' was invented by Mayr as a contrast to another phrase he invented, 'population thinking.[260] In regard to species, 'typological thinking' was a construct meant to represent the views of the majority of pre-Darwinian naturalists, perhaps the lay-person, and those of some apparent academic holdouts nearly a century after Darwin.[261] In the present-day, we can say that *Mayr's* 'typological thinker' (about biological species) is not likely to apply to more than a few rare academics.[262] However, what eventually became the textbook view of pre- and early post- Darwin orthodoxy is now facing strong academic scrutiny, and it remains to be seen if Mayr's version of history will hold up.[263] Before delineating the key diagnostic features of both typological and population thinking, some historical qualification is useful.

At the time Mayr formulated the typology/population distinction, he was navigating a variety of social and scientific currents. A prime interest of Mayr's was to promote the modern evolutionary synthesis. But, of course, he had many other notable concerns. Just one of these is that Mayr hoped to legitimize the natural historical sciences and, perhaps his own expertise as a taxonomist, against the criticisms of 'reductionist' disciplines such as genetics.[264] As part of this, Mayr strove to establish what we now know as the biological species concept. Within a

[260] For commentary on the invention of the distinction see Chung (2003, 295).
[261] See Mayr (1976, 27) or for commentary see Levitt and Meister (2006, 283).
[262] See especially Levitt and Meister (2006).
[263] Evidence suggests Mayr's view of taxonomic history has already collapsed. See e.g., Stevens (1994); Winsor (2003; 2006a; 2006b); Winsor in Williams and Forey (2004, 1 – 17); McOuat (2009); Wilkins (2009; 2010). See Stamos (2005) for a criticism of Winsor's stance.
[264] Chung (2003, 294)

more extra-scientific frame, Mayr was also deeply concerned about racism.[265] All of this seemed to converge in a curious denigration of the morphological species concept and, by association, the practice of taking a single specimen, or small sample, analyzing their observable features, and then matching to a wider group.[266] Extenuating cases, like sibling species, plainly indicated the morphological species concept was inadequate. But trade-offs have been the case with all proposed species concepts—which, at present, number well over twenty. Mayr himself even resorted to morphology to delineate asexual populations—although he amended this later with emphasis on niche specialization.[267] As is now becoming increasingly clear, to achieve his ends Mayr also engaged in a variety of polemic sleights of hand that capitalized, for instance, on typological practice applied to taxa (or kinds) *other* than species.[268] With special reference to Plato, by 1959 Mayr 'officially' fused idealistic morphology with a 'typology' that appeared mostly rhetorical.[269] A few of the most basic points of Mayr's depiction of typological thinking (which remained steady through his life) and a few key auxiliary points, are as follows.[270] While it makes for cumbersome reading, so as not to misrepresent Mayr, I will often quote him directly.

1) The "formal codification" of typological thinking is best found in Plato. There are a *limited number* of Forms (or *eidos*); these are *fixed*, and real; they are

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[265] See, e.g., Winsor (2006a, 156), or Chung (2003, 294).
[266] For commentary see Winsor (2006a, 157–159). Winsor points out that Mayr was careful to avoid criticizing of what is known as a ''collection-type' (2003, 397).
[267] For commentary see Rosenberg (1985, 194-195).
[268] Winsor (2006a, 159).
[269] Mayr, himself, thinks he is the first to give a full articulation of the distinction (1976, 26).
[270] See, e.g., Mayr (2001) for a short account that matches very closely what he wrote in 1976 (1959)—and this goes all the way to his association of typology with racism. This was 4 years before his death in 2005.

discontinuous from other Forms—or sharply delimited; and they underlie all observed variability.[271] As this translates specifically to biological species, what is key is the typologist (or essentialist) holds that variation in a population is an "illusion" and the type is what is *real.*[272]

2) The "type concept postulates that all members of a taxonomic category conform to a 'type'."[273] There is "no gradation between types, and gradual evolution is basically…a logical impossibility."[274] This means that typologists either *deny evolution* or claim that it proceeds in saltations.[275]

3) "For the typologist, everything in nature is either 'good' or 'bad,' 'useful' or 'detrimental.' Natural selection is an all-or-none phenomenon…Evolution is defined as the preservation of superior types and the rejection of inferior ones… Since it can be shown rather easily that natural selection does not operate in this described fashion, the typologists comes by necessity to the conclusions: (1) that natural selection does not work, and (2) that some other forces must be in operation to account for evolutionary progress."[276]

4) With respect to race, "The typologist stresses that every representative of a race has the typical characteristics of that race and differs from all representatives of all other races by the characteristics 'typical' for that given race. All racist theories are built on this foundation. Essentially, it asserts that every representative

[271] Mayr (1976, 27). See also Mayer (2001, 491).
[272] Ibid., (28).
[273] Mayr et al in Chung (2003, 286).
[274] Mayr, (1976, 28).
[275] Ibid.
[276] Mayr (1976, 29).

of a race conforms to the type and is separated from the representatives of any other race by a distinct gap."[277]

Given these four points, a few qualifications that are immediately worth stating. One is that, while Plato's theory of forms may appear to be a great example of typological thinking, there is no necessary connection between the two. In other words, it is certainly possible to be a typological thinker without the influence of Plato or needing to adopt any of the metaphysical baggage of Plato. This comment applies even to the academics of Darwin's day. Mayr, for instance, seemed to have Louis Agassiz in mind as at least one exemplar of a typological thinker.[278] And yet, Agassiz made no mention of Platonic forms and, even as a creationist and a vocal opponent of Darwin, he apparently "had a keen eye for individual and varietal differences and…urged his students to study variation."[279] This is not to say that Mayr insisted on some absolute connection between Plato and typology. It is only to make the point that, while certain typologies may appear to be the same, their superficial characteristics do not necessarily make it so. A second qualification, and one that I will develop later, is that it is evidently possible to be typological thinker without needing to accept Mayr's point 3) and 4) above. In fact, there is no reliable connection at all to being a typologist about species or, say, some minor aspect of functional morphology, and having an accompanying belief that evolution is an 'all or nothing phenomenon;' or that *all* members of a group, or species, conform to

[277] Mayr, (1976, 28).
[278] Winsor (2006a, 161).
[279] Winsor (2006a, 162). But see also Winsor (1979).

type; or that race exists in a way that the members of one group are separated from another by some clear ontological gap. Finally, there is no contradiction between being a typologist and believing in the existence of gradual evolution; nor must a typologist advert to some occult or non-evolutionary force to account for notable changes in a species—both points I will later develop.

Turning to the phrase 'population thinking,' this is not a phrase that Darwin ever used. Nor was Darwin mentioned when Mayr first introduced the contrast between the 'type concept' and 'the population concept' in 1953.[280] Rather, Mayr was well into his academic career, in 1957, when he first claimed the latter as a major achievement of Darwin, and he did not do so in public print, until 1959.[281] So the connection between Darwin and population thinking, or the *opposition* of population thinking to typological thinking, does not seem to have been especially obvious to Mayr, or any other academic up until Mayr.[282]

Since Mayr, the phrase 'population thinking' has been whole-heartedly endorsed by most of the academic community as the 'correct' way to understand evolution relative to particular species or similar populations.[283] At the same time, the term is not without ambiguity. In fact, what is strange about the present state of

[280] Chung (2003, 287)
[281] See Winsor (2006a, 152).
[282] The word 'population' was a technical term circulating widely in biology at the time and Mayr admitted the difficulty of defining it (Winsor, 2006a, 157).
[283] Ariew writes: "When speaking abstractly about Darwin's great contribution to biology, commentators of all sorts habitually sum up Darwin's innovation in one phrase, 'population thinking.' Ever since Ernst Mayr introduced the phrase in the middle of the twentieth century, you find population thinking attributed to Darwin in most historical treatises and evolutionary textbooks. Depending on the commentator, population thinking is supposed to have changed the way we think of species, extinction, diversity, and adaptation, that is, all of the main concepts associated with Darwin's theory of evolution" (in Ruse, 2008, 64).

affairs is that the phrase ‘population thinking’ now stands for something quite amended from how Mayr imagined it. The basic points of Mayr’s original formulation are as follows.

5) Population thinking as the exact opposite to typology: “No two ways of looking at nature could be more different.”[284] Mayr also adds: “differentiating these two basic philosophies…cannot be overemphasized.”[285]

6) Population thinking “stresses the uniqueness of everything in the organic world.”[286] As a consequence, “All organisms and organic phenomena can only be described in statistical terms...of which we can determine only the arithmetic mean and the statistics of variation. Averages are merely statistical abstractions; only the individuals of which the populations are composed have *reality*.”[287]

7) For the population thinker, the “individual changes continuously throughout its lifetime and when placed in different environments.”[288] Likewise, “nearly every character varies to a greater or lesser extent independently of the others.”[289] This means, “Every individual will score in some traits above, in others below the average for the population…In other words, the ideal type does not exist.”[290]

[284] Mayr (1976, 28).
[285] Ibid.
[286] Mayr (1976, 27/28)
[287] Mayr (1976, 28; my emphasis).
[288] Ibid.
[289] Ibid.
[290] Mayr (1976, 28/29)

8) For the population thinker, natural selection is not an all-or-none phenomenon: "Every individual has thousands or tens of thousands of traits which may be under a given set of conditions selectively superior or inferior in comparison with the mean of the population."[291]

9) The population thinker "regards race as potentially overlapping population curves. For instance, the smallest individual of a large-sized race is usually smaller than the largest individual of a small-sized race."[292]

I will evaluate Mayr's ideas on population thinking later in this chapter. But once again, there are a few points worth immediate clarification. First, standing on its own, without reference to Mayr's *particular* conception of typology, there is not much that anyone familiar with modern biology can disagree with. The image of species as 'pools of variation and change' seems absolutely essential to Darwinian thinking. Moreover, as Mayr presents his construct with special reference to the terrible reality of racism, population thinking shines bright: indeed, nearly all of us will want to defend it with full conviction, or even force. And yet, perhaps this is what makes this Mayr's presentation of population thinking slightly deceptive. For example, is it really the case that the average of a population is not, in any important sense real, or that our statistical methods can 'determine' only variation in a population as opposed to typicality or similarity? Second, to discern whether an ideal type might exist will depend on what we mean by 'ideal' and on our frame of

[291] Mayr (1976, 29).
[292] Mayr (1976, 28).

reference. If by 'ideal' we mean 'best' or 'superior to most' then with respect to, say, athletics surely we are warranted in asserting that an ideal type will have something to do with features such as being strong, healthy, free of debilitating illness, and so on—and we might even be able to state this ideal in a way that is largely fixed, provided the context does not change.[293] Likewise, if by 'ideal' we mean something that is simplified, or at a distance from what appears to be extraneous detail, then again this is also something that *exists* and, of course, is something that not only allows organisms to survive, but is absolutely required of scientific practice. In regard to both, the validity of idealization depends on the phenomena referenced and our goals.

3.3) Hull on Essentialism/Typology

David Hull's initial view on essentialism/typology appears in his 1965 paper, 'The Effect of Essentialism on Taxonomy—Two Thousand Years of Stasis.' The origin of the paper is relevant. Around this time, Hull, a graduate student at Indiana University, took a philosophy of science course with visiting professor and eminent philosopher, Karl Popper.[294] One assignment for the course was to support a view that Popper himself espoused. To meet this requirement, Hull wrote the above

[293] Mayr allows that the "greater the number of superior traits an individual has, the greater the probability that it will not only survive but also reproduce" (1976, 29). But he goes on to highlight this is *only* a probability as under certain circumstances, "even a 'superior' individual may fail to survive or reproduce" (Ibid). This is true, but what I am saying is that sometimes these circumstances may change little and, thus, these probabilities are virtually guaranteed, barring accidental factors—which, of course, is to acknowledge things like genetic drift.
[294] Winsor (2006a, 166).

paper affirming Popper's noted disdain for essentialism—or what Popper himself had coined: 'methodological essentialism.'

The term 'methodological essentialism' first appeared in Popper's 'The Poverty of Historicism, I.' in 1944.[295] But the thesis of Hull's 1965 paper is built around a specific quote Hull drew from a 1950 reprinting of Popper's *The Open Society and its Enemies*, first published in 1945.[296] In this book, Popper makes a sweeping and surprisingly crude claim about "the development of thought since Aristotle."[297] This claim actually has three parts. One is a contention that, insofar as a discipline has relied on "the Aristotelian method of definition" it has, as it were, "remained arrested in a state of empty verbiage and barren scholasticism."[298] A second part—the most easily contested—is Popper asserts that the degree to which various sciences have been able to make progress has "depended on the degree to which they have been able to get rid of the [Aristotelian method of definition]."[299] And third, is that the Aristotelian method of definition is an "essentialist method."[300]

What Hull does, with Popper's three-part claim, is vaguely extend it to biological science, asserting that biology has "lagged behind" disciplines like physics in terms of scientific maturity,[301] and extend it more specifically, via the influence of

295 Popper (1944, 95).
296 Winsor (2006a, 166).
297 Hull (1965, 314).
298 Ibid., 314, 315.
299 Ibid., 314/315.
300 Ibid., 315.
301 Ibid., 314.

Cain, to the science of taxonomy.[302] Stated succinctly, Hull driving thesis is that essentialism is responsible for taxonomists retaining a static species concept, contra Darwin.[303] Hull also claims essentialism is responsible "for species being divested of reality" as taxonomists cannot possibility classify organisms in the way essentialism demands.[304]

So what is essentialism according to Hull? In 'The Effects of Essentialism on Taxonomy,' Hull uncritically accepts and elaborates on Popper's formulation in *The Open Society and its Enemies*. From a direct quote of Popper, Hull then claims that essentialism has three tenets. However, before outlining these tenets Hull simply equates typology with essentialism, saying that, in taxonomy, essentialism is known as typology.[305] Mayr, in his first in-print equation of essentialism with typology, in 1968, at least gives a very thin explanation as to why.[306] Using some of Popper's exact phrasing, he writes: "[the essentialist] considers it the task of pure knowledge

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[302] Ibid., 315.

[303] Ibid., 316/317

[304] Ibid., 316. While Darwin may have had a different understanding of 'essences,' Hull draws on a quote from *The Origin of Species* to support the main point of his paper: "In short, we shall have to treat species in the same manner that those naturalists treat genera, who admit that genera are merely artificial combinations made for convenience. This may not be a cheering prospect; but we shall be at least free from the vain search for the undiscovered and undiscoverable essence of the term species" (Darwin in Hull 1965, 320). This quote is interesting in its ambiguity. Darwin seems to be making a statement about epistemic limits, not realism. But, if we accept that typological thinking is the same as essentialism, then the very next sentence in 'The Origin' seems odd. Darwin writes: "The other more general departments of natural history will greatly rise in interest. The terms used by naturalists of affinity, relationship, *community of type*, paternity, morphology, adaptive, characters, rudimentary and aborted organs, &c., will cease to be metaphorical, and will have plain signification" (Darwin 1859/2008, 509; my emphasis).

[305] Hull (1965, 317). For expedience, with respect to essentialism/typology, I will use the term essentialism for both in this section. Hull's title places 'essentialism' at the forefront, not typology. But there is lots of ambiguity. He describes his three tenets as "The three essentialistic tenets of typology" (317).

[306] At this point Mayr had met Hull and had encouraged him to study philosophy of biology (Winsor, 2006a, 166).

to discover the hidden nature (or form, or essence) of things. When applied to organic diversity [she or he] believes that all members of a taxon share the same essential nature; they conform to the same type. This is why essentialist ideology is also referred to as typology."[307] For now, I will set aside any discussion of Mayr's explanation, and the missing explanation in Hull, and return to this after outlining Hull's three tenets

The first of Hull's three "essentialistic" tenets of typology is "the ontological assertion that Forms exist."[308] This is plainly diagnostic of *one version* of typology. But, as with Mayr in 1959, it is unclear whether the reader should expect all postulates of 'Form' to necessarily connect in some way to Plato, or whether Hull is using 'Form' in a more symbolic way—that is, as a stand-in for something that might be similar to Plato's theory: viewing species as unchanging and bounded categories of divine thought, for instance.[309] This ambiguity is important to consider for at least two reasons. One is that similar clarifications were already established in the literature of the era. Just one example: writing on typology in 1962, Robert Sokal made clear there are many viable biological typologies that are *not* connected to Plato, or any idealism of that nature, though it may still be fair to translate these

[307] Mayr (1968, 546).
[308] Hull (1965, 317).
[309] Aristotle is the problematic figure in this paper, but Hull builds his three tenets on a citation of Popper, so Plato comes to the fore slightly. When Hull finally outlines a modern understanding of essentialism he notes that it is suited to defining "eternal Forms", but not evolving species (318). He also claims that, with evolution, most taxonomists abandoned the first two of his three tenets. So perhaps Hull is referencing Plato specifically when he talks of Forms.

positions as mildly saying that 'forms' exist.[310] Knowing this helps us see the difference between the view of Plato, and say: Louis Agassiz,[311] Michel Adanson,[312] William Whewell, or even Sokal himself.[313] If we take just Whewell alone, he was a typologist of sorts, and yet, like many of the naturalists of his day, he was evidently *not* an Aristotelian essentialist.[314] Another reason has to do with Hull's perception of Darwin's impact. Hull claims that we should treat each of his tenets as distinct. One justification he gives for this is that Darwin's revolutionary theory led most naturalists to abandon the first two of Hull's tenets, but unfortunately, not his last tenet. But this jeopardizes Hull's case as it leaves us with a rather specious dichotomy: without the possibility of non-Platonic typology, it appears we are either

[310] Sokal (1962, 255). Hull does view Adanson as unique in being anti-essentialist before Darwin (1965, 319).

[311] Farber (1976) is interesting on Agassiz. Apparently Agassiz had a static view of morphological types not "because he believed that types were part of God's design, but for what in his day were solid scientific reasons" (112): change from one form to another was not supported in the paleontological record (112). This is something that Darwin himself admitted. However, Winsor lends clarity to the matter: "Agassiz's 'typological thinking' had but a slight affinity to Plato or Aristotle's, and however impossible the modification of *eidos* might have been in their systems, there was, as far as I can see, no logical impediment to the alteration of a species in Agassiz's." This was because, like Farber, Winsor sees Agassiz's view as, in part, scientifically motivated: there was little in the fossil record to suggest otherwise (1979, 111).

[312] Adanson was not an essentialist, but there is some confusion as to whether he was a forerunner to some versions of modern typology or numerical taxonomy. This seems to have been Sokal's view for a while, but see Winsor for commentary in Williams and Forey (2004).

[313] Hull does give reference Sokal and numerical taxonomy (1965, 316,319). What is puzzling here is that, contra Cain, Hull actually understands that Sokal, and like-minded numerical taxonomists, are *not* Aristotelian essentialists. This can be gleaned from Hull's first footnote (316). But the connection Hull does not seem to make is that numerical taxonomist *are a kind of typologist* (Sokal, 1962, e.g., pg. 251). In this footnote Hull claims that the purpose of his paper is the 'species category' (316). So perhaps he discounts numerical taxonomy because he sees it as focused on particular species. This is also echoed in the statement of his thesis on pages 316 - 317. However, Hull ambiguates this thesis before proceeding to the main body of his argument by saying "it will be argued that Aristotelian definition is just as inappropriate for 'species' as it is for *the names of taxa*" (my emphasis, 317).

[314] McOuat writes: "Kinds for Whewell do not have essences, but were clustered around 'Types', which were at best exemplars of the class. The Types need not have all the characteristics of the group, nor must all the members of the kind have the 'essential' characters in common with the type. Moreover, Types themselves are not permanent, stable. (Types can move)" (2009, 220).

essentialist about species, or we are 'Darwinist.'[315] At a more basic level, it also leaves us uncertain as to what extent Hull would allow an academic to abstract from empirical detail before they sink to the depths of 'genuine typologist.'[316] I believe some refined distinctions would have benefited Hull as he could have used them to give his own view wider application—or at least he could have accounted for typologists who are *not* Platonists or Aristotelian essentialists.

Hull's second tenet is that essentialists stand by the methodological assertion that "the task of taxonomy as a science is to discern the essences of species."[317] This tenet is also a curious one. On the one hand, we might agree with Hull: the business of taxonomy—at least in this case—is *not* to discern species' essences, but rather species' membership and proxies for that membership. However, this is only one part of Hull's statement. The other half makes a claim as to what essentialists *are committed to* with respect taxonomy. This is different because to properly evaluate it we cannot be mere philosophers: we need to know with some precision what an 'essentialist' is, and then look back through history and see what they were, and are now, doing.[318] It may be the case, that Hull is right: the 'Aristotelian essentialist' *is* committed to looking for species essences.[319] But it may also be the case that Aristotelian naturalists, as Popper or Hull would paint them, are actually a rather

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[315] Hull does note that some typologists embraced evolutionary theory (Darwinism) but not phylogenetic taxonomy. This suggests the way we group organisms is separate from whether we believe in natural selection, and thus, species change. I will leave the issue unresolved.
[316] Hull's position is not rescued by restricting it to the years post Aristotle and pre-Darwin; he makes it very clear he is also complaining about taxonomy in his own day.
[317] Hull (1965, 317).
[318] To insist on more precision does not mean pluralism is not possible in how we define essentialism.
[319] Hull makes allowance for 'other essentialisms' in speaking of an "Aristotelian version of it" (1965, 317). But he does not explain what this would look like.

rare group. This is, in fact, what many historians are now saying is the case.[320] When this is joined by the fact that Popper and Hull's conception of Aristotelian essentialism is challenged by scholars such as David Balme (1987), James Lennox (2001), Pierre Pellegrin (1987), and Denis Walsh (2006);[321] and the possibility that a credible variety of biological essentialism can exist without the need to specify any exact criteria for species-membership, Hull's account appears artificial.

Hull's third tenet is that essentialists stress the importance of (Aristotelian) definition.[322] Hull explains, starting with a quote from Popper and then expounding:

> 'According to essentialism (especially Aristotle's version of it) a definition is a restatement of the inherent essence or nature of a thing. At the same time, it states the meaning of a word—of the name that designates the essence'…The name names the essence. The definition gives a complete and exhaustive description of the essence…
>
> Disregarding all talk about essences, what Aristotle was advocating in modern terms is definition by properties connected conjunctively which are severally and necessary and jointly sufficient. For example, being a three-sided plane closed figure is necessary and sufficient for being a triangle.[323]

To fully amplify the problem Hull sees for taxonomy, I also add what he writes next.

> Such a mode of definition is eminently suited for defining eternal Forms. It is not very well suited for defining the names of evolving species or for [the species category] itself, and yet it is exactly this mode of definition which has been assumed to be the only mode of definition permissible until recently. Evolutionary theory necessarily challenged the ontological assertion that species as Forms existed...Typologists could ignore the untidy distributions of properties among living organisms and the variety of methods of reproduction to perpetuate species. Evolutionists could not.[324]

[320] See footnote #263 on page 104.
[321] With respect to Aristotle, many scholars separate species fixity from essentialism—in fact, all of the above. But Sober does also (1980, 356/357).
[322] Hull (1965, 317).
[323] Hull (1965, 318).
[324] Ibid. Hull seems to slight Mayr's BSC here in talking of varieties of reproduction.

In regard to classifying species, Hull's perception of the options Darwin leaves open to us is revealing.[325] Hull imagines that Darwin supplied the unifying principle for how taxonomists might make classification 'natural.' According to Hull, this is phylogeny.[326] Technically speaking, this may be true.[327] But what is ironic about Hull's propping up of phylogeny is that phylogeny, without a commitment to the practice of cataloguing and comparing genotype or phenotype, is purely theoretical.[328] We can say, for example, that to be human is to share human ancestry, to be born of human parents, or to share a particular lineage between speciation events. But what this tells us about a species is comparable to what we learn in the statement 'a bachelor is an unmarried male.'[329] Phylogeny is inscrutable and completely non-operational, without some reference to organic features—or *properties*.[330] So any hope to purely separate out 'the essentialist' (as focusing on constituent properties) from 'the Darwinian' is, ultimately, a shell game. This is also the very reason why some of Mayr's friends were disenchanted with his rendition of taxonomic history—for instance, as Carl Epling was, responding to an early draft of a 1955 paper Mayr had sent him. The paper associated biologist A.H. Sturtevant with morphologically defined species and also with Plato. Epling replied to Mayr: "I

[325] We could also says the same of Mayr.
[326] Hull (1965, 320).
[327] However see, e.g., Hey (2006).
[328] What's also important to realize here is that if we accept that natural kinds have relational properties, then Hull's view of phylogeny for species demarcation is also essentialist, e.g., (Okasha, 2002, 201).
[329] Sokal is lucid on this point: "Describing taxon as all the descendants of a monophyletic line, existing at a certain point in time provides a logically unequivocal definition. However, from a practical point of view such a definition is no more of use to the taxonomist than the definition of red as the color of blood would be to a re-green color blind man" (1962, 239). But see also 240, 246.
[330] For a related discussion see Okasha (2002, 208).

would resist the implication that the morphological criteria which I used in my own monographic work was typological any more than yours. Look back my dear friend. What we both did, I believe, was use morphological criteria as a guide to determining where reproductive barriers lay."[331]

Given these three tenets, it may now be easier to understand why Hull connects essentialism with typology and why, in part, he and Mayr are so dismissive of either phrase. (We might also now make sense of Mayr's idea that if all members of a taxon share the same essential nature, this is equivalent to saying they conform to the same type). One readily available reason why Hull does not explicitly discuss the connection between essentialism and typology is that he assumes it is obvious. In other words, Hull's reasoning might be that because Aristotelian essentialism insists on invariant or unchanging species properties, *this necessarily implies species fixity* (or types) which, in turn, is plainly at odds with the pre-requisites of evolution: diversity and change. Darwin, himself, stated: "no part of the organism is universally constant."[332]

If this is the case, as a great deal of literature since suggests, then I believe this view is problematic in two ways. First, it contradicts the other obvious aspect of both natural and sexual selection: all organisms that do not orient to *proximate ends* that facilitate survival and reproduction do not last long enough to register as living organisms (or species). So there are, in fact, things that *do not change* in organic

[331] Winsor (2006a, 160).
[332] Darwin (1859/2008, 432).

evolution. For now, I will simply use an umbrella term for all proximate ends that facilitate survival and reproduction and call this *well-being*. This, of course, must be unpacked and it may also be subject to seemingly bizarre subjective interpretation —for instance, as with the case of suicide or masochism—but I will leave the claim, for now, as stands. Second, invariant or unchanging organic properties (with some later qualification) *do not imply species fixity*, or *fixity of corporeal traits*, if these invariant properties themselves are partly *non-corporeal*. Take, for example, an imperative to well-being: this can manifest itself in an astronomical number of physical forms and features.[333] It might express itself as a sub-imperative to orient to surrounding ecology, as set of sharp claws, as evasive concealment, as a sickle cell gene, as a ruminant stomach, as accelerated sexual maturity, as behavior such as sociality and altruism, or as asocial and belligerent behavior.

The major implication of this point is that, evolution is not what Hull, Mayr, or perhaps even Darwin, say it is. To truly understand evolution, we must understand that *the changing physical constitution of individual organisms, and the*

[333] It may be tempting to think of these imperatives as partly psychological. In humans, this is perhaps the case. But this is not the case for plants, or for simple animals like as sponges. A better descriptor is ecological. Provided some potential for a state of ill-being in an organism (e.g., for a plant this might be a loss of soil nutrients or sunlight); means for an organism to apprehend this ill-being; and an ecology that can introduce ill-being; an orientation to well-being self-organizes. We find something much the same if we shake a plastic container with different size marbles in it (and enough space for the marbles to move): things being what they are, small marbles gravitate to the bottom of the container, large marbles migrate to the top. This is due not just to the inherent properties of the marbles, and their relation to each other, but also external factors such as gravity. What emerges is a *by-product* of the parts and relationships of the system. We find much the same in the schooling behavior of Atlantic pollock, or the swarming behavior of starlings. In schooling or swarming there is no one organism orchestrating the movement of the group. Rather, in regard to say, schooling, research suggests each fish follows simple *rules* which then allow the group to move as a unit: a) follow the fish in front (if there is one), and b) keep pace with the fish along side you (Fisher, 2009, 12). These rules themselves are not completely determined by the internal properties of the fish, or the external properties of the ecology: they exist at the *intersection* of both.

appearance or disappearance of species, would not be possible if some things, in fact, did not change. These organismic constants are shared across all species, as the phrase implies, so they do not, in themselves, act to distinguish one species from another. What makes every organism and every species unique is the distinguishing evolutionary history, present developmental contingencies, and present local ecology that channel these non-corporeal constants into corporeal organization (including the corporeality of genes).[334] By this argument, there are organismic properties that are *necessary* (because there is a universal predicament or global ecology—constancy of transient well-being), *and* these properties radically resist change even though they are, strictly speaking, contingent.

I will return to develop this point in section '3.12' of this chapter and will continue to develop it throughout my thesis. However, one way we might better imagine the relationship between stasis and change is by analogy. For example, we typologize seasons, and use these seasons to represent reliable patterns that are due to something that does not change (significantly): the rotation of the earth around the sun and the fact the earth exists on a constant tilt relative to the plane of revolution. Another example is gravity. We experience falling objects, in part, because gravity itself is a constant. And, a final example, changing tides exist as they do because of the gravitational constants exerted by the moon, the sun, and the

[334] Of course, what is especially notable, here, is not the fact of individual differences, but the fact that many organisms appear to adopt the same corporeal features which then provides scientists proxies for identifying distinct species.

earth's rotation. Species generally change as they do because other aspects of the surrounding ecology, and the organism, do not.

3.4) Correctives on Classical Essentialism

While the hub of Mayr, and Hull's depiction of essentialism/typology has had historical staying power, various features of their *particular* gestalt have certainly been emphasized or muted over time. Moreover, versions of essentialism quite unlike the supposed original have, if not newly emerged, then have at least come out from the shadows.[335] To properly evaluate Mayr, Hull, and other depictions of essentialism/typology, I will first reference an older paper of Elliot Sober's. What is remarkable about it, from a socio-scientific vantage, is that it was widely affirmed, and yet, in many important ways, ignored.

From now on I will refer to Mayr and Hull's version of essentialism/typology as 'classical' to distinguish it from other varieties. I will also pair 'classical' with essentialism *or* typology rather than continuing to state both terms separated by a slash.

As should be clear by now, while Mayr's and Hull's accounts have a different accent, both felt the term essentialism, and the term typology, were largely interchangeable and, what seemed to permit this was that each phrase suggested invariance either across a population, or over time which, with respect to the latter, implied species fixity. One confirmation of this overview is that, not long after Mayr

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[335] Winsor (2003, 388).

and Hull had written, biologist Michael Ghiselin, and later Hull,[336] formulated what they hoped was a properly scientific solution to the presumed inconsistency classic essentialism posed with respect to biological species.[337] The very intellectual awkwardness of this solution,[338] not to mention its present popularity,[339] indicates the seriousness and perhaps even revulsion that many academics have to classical essentialism getting anywhere near modern biology.[340] Ghiselin's solution was to treat species, not as natural kinds, but rather as *individuals*—something like the Mona Lisa, Fido, or the Milky Way. On this account, organisms are *parts* of an individual, like cells in a human body, rather than members of a class. And because of this, we are better to think of the science of particular species as a series of *case studies*, rather than an endeavor to find exceptionless laws—as scientists might do in chemistry or physics.[341]

As it stands, Ghiselin's solution is creative. But it is also unnecessary.[342] Part way through Ghiselin's attempt to establish his view of species as individuals—a

[336] See Ghiselin (1997, 14 – 16).
[337] Ghiselin (1966; 1969; 1974). Hull (1976; 1978).
[338] Even Ghiselin acknowledges his idea as striking some as counter-intuitive (1997, 43).
[339] Ghiselin (1997, ix). Or see, e.g., Brigandt (2009, 77/78).
[340] Griffiths captures Ghiselin and Hull on species very succinctly: "*Individualism* about species is an idea with close links to anti-essentialism (1999, 211). Brigandt also captures the essence of the issue: "The most significant motivation for the idea that species are individuals stems from the fact that individuals are the kinds of entities that persist across time and undergo change, changing as a cohesive unit. The fact that species evolve has often been viewed in conflict with the assumption that taxa are kinds" (2009, 82).
[341] See Rosenberg (1985, 219 – 223).
[342] Even Ghiselin treats typology and essentialism as one and the same. In the appendix of *Metaphysics and the Origin of Species*, he chooses not to give essentialism and typology separate definitions (1997, 304). The definition is worth citing as it is unjustifiably linked to a very subjective moralization. Ghiselin writes: "Essentialism, or typology, is conceiving of groups in terms of stereotypes, norms, and the like: it is especially pernicious when it attempts to treat those groups which are individuals as if they were classes" (ibid).

project that has spanned decades—philosopher Elliot Sober published a paper that convincingly revealed how the depiction of essentialism by scholars such as Mayr and Hull is a straw-person. Sober's goal was not to rescue essentialism—he famously said "essentialism about species is today a dead issue."[343] Rather, his aim was to recast essentialism in a way that would better distinguish it relative to population thinking and, in so doing, show essentialism's true flaw.

Sober's paper, entitled 'Evolution, Population Thinking, and Essentialism,' was published in 1980—14 years after Ghiselin published his idea of species as individuals. The first portion of his paper is mostly where Sober explains how Mayr and Hull's depiction of classical essentialism were off the mark. The point most relevant to my present purpose has to do with species fixity.

Sober noted that many academics assume classic essentialism is discredited because the essentialist must believe that species are static.[344] Sober's rebuttal to this *stereotype* has many facets. But I will now discuss just three. One is that Sober finds this perspective implausible—at least as of 1859 given the evidence Darwin marshaled. Another overlapping point is that Sober sees an alignment with species fixity as untrue from what we know historically about essentialists. Sober does acknowledge that Agassiz "asserted a connection between essentialism and stasis", but he notes that many so-called essentialists, from Aristotle through Linnaeus, and beyond, *did* allow for new species.[345] Third: Sober correctly asserts that

[343] Sober (1980, 353).
[344] Ibid.
[345] Ibid.

countenance of "such species need have no effect…on deciding which characters of organisms to view as diagnostic."[346] This is because "the question of *when* there started to be various kinds of things in the universe seems to be quite independent of what makes for differences between kinds."[347] Sober conveys the idea pointing to an example where classical essentialism is thought to be entirely appropriate: chemical kinds. Sober writes,

> notice that the discovery of the transmutation of elements has not in the slightest degree undermined the periodic table. The fact that nitrogen can be changed into oxygen does not in any way show that nitrogen and oxygen lack essences. To be nitrogen is to have one atomic number; to be oxygen is to have another. To change from nitrogen to oxygen, a thing must therefore shift from one atomic number to another. The mere fact of evolution does not show that species lack essences.[348]

This trenchant point has been vastly under-appreciated by many academics. Alexander Rosenberg, Samir Okasha, and Michael Devitt are at least a few that do understand its implications.[349] But given the rarity of the acknowledgment, it is worth discussing in further detail.

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[346] Ibid, 356.
[347] Ibid.
[348] Ibid.
[349] Rosenberg (1985, 189); Okasha (2002a, 195/196); Devitt (2008, e.g., 376). Devitt's paper is a strong supplement to this aspect of Sober's argument. His basic view of essentialism and change is that a *nucleus* of distinguishing features can stay relatively constant while other features may be more diverse or transient. As Devitt would have it, this nucleus is likely to be partly *genetic*, or partly *intrinsic* at least, and *explanatory* of other parts. But we do not need to agree to this. The 'nucleus' could be some feature that is merely descriptive; it may be necessary, like having a minimally functional nervous system; it might be a feature that on average, or when it matters most, propels an organism toward mate recognition, or reproductive opportunity; *and* it also might be a partly extrinsic feature—maybe something to do with a niche that is especially constant, predictable, and determinative. Whatever we emphasize, Devitt gives a fine analogy for how essentialism is compatible with indeterminacy and change. He writes: "gradual change is obviously compatible with having essential intrinsic properties: rivers, mountains, continents, planets, and so on, are all the result of gradual change and yet all have partly intrinsic natures" (2008, 372).

As may have been gleaned already, one feature that has come to be regularly associated with essentialism—and not merely classical essentialism—is a defense of species as natural kinds.[350] To apply the term natural kind to a specific species is to say that this species is not merely an invented class, but exists *partly* independent of the perceiving subject.[351] It is also worth stressing that natural kinds can be human-made kinds—for example: cars, chairs, books, telephones, computers, and so on. But among other things, such kinds can also be predominantly physical phenomena, such as sun burns; psychological phenomena, like euphoria; or developmental phenomena, like childhood. Furthermore, the point of these denominations is not *necessarily* to get them metaphysically exact because many of them are highly transient and a measure of degree.[352] Instead, our operational base-line is to divide the world around us, and the 'world in us,' into tokens that are accurate enough to allow us to effectively orient, and aid us in meeting our needs and desires.

As this applies to particular species, it is only a slight overstatement to say *species* themselves do not change. The term Homo-sapiens, for example, is a place-holder for something that, by social custom and cognitive constraint, is relatively

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[350] McOuat writes: "The history of essentialism is intimately tied up with the history of natural kind (2009, 213).

[351] Griffiths writes, "Natural kinds are ways of classifying the world that correspond to some structure inherent in the subject matter being classified. They contrast arbitrary schemes of classification about which the nominalist claim that members of a kind share only a name is true" (in R. Wilson; 1999, 217). In using the phrase 'exists partly independent of the perceiving subject,' what I mean is the organism, itself, sometimes *partly* determines the boundaries of a natural kind. Take the color red. Photo-receptors, light rays, and light rays reflected off objects, combine to create this natural kind. But the color red does not exist as a natural kind 'out there' entirely on its own. Designating particular species as natural kinds may be like this.

[352] For example, when are we merely happy versus euphoric, or when does a sunburn cease to be one? These are difficult demarcations to establish accurately.

frozen in time.[353] Likewise, the natural kind 'sweetness' (while covering a vast range of graded sensation), is useful to us only insofar as it has some stasis and *is qualitatively distinct from the natural kind* 'bland,' *or not-sweet.*'[354] The latter can refer to an entity, or entities, that can transform into something sweet. But each term does not designate the same 'thing'—and in much the same way, to speak informally, a walrus is not a spider. *What really changes* are allele frequencies, developmental resources, organisms, and the like—and this is not too far off how adding juice crystals may change a non-sweet drink to a sweet one, or how sunlight may change the taste of a bitter apple.[355] In essence, an *organism*, or a fundamental *property* of an organism, changes and this eventually eliminates the rest of the population—*or* an ecology rapidly changes and leaves only certain morphs intact.[356]

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[353] Sokal is interesting here: "While it is, of course, true, that evolution is dynamic and that evolutionary processes must be studied as changes in form and shape, these changes can only be described as modifications of fixed stages, arbitrarily chosen at any given point in time. The actual comparison is never made while forms are in a state of flux, but is at certain fixed developmental and evolutionary stages (1962, 248).

[354] Rosenberg acknowledges the validity of this way of thinking and, accordingly, he does not reject essentialism as incompatible with evolutionary thinking. But he thinks it is an 'unnatural' stance (1985, 189).

[355] If you are a person who imagines that to be Darwinist is to emphasize change, then this way of thinking may be challenging. It is not as challenging, however, if we understand Darwin as straddling both change and stasis. One way to conceptualize the above is to realize that intermediate states between kinds are simply *indeterminate*. We can, as it were, remain agnostic and just say that there may be some stage between not bald and baldness that seems to be neither. Being non-essentialist does not help the issue in the slightest. As Devitt writes, "everyone agrees that there comes a point where two organisms that have some common ancestor are nonetheless different species. Yet there is no determinate matter of fact about precisely where that point is" (2008, 373).

[356] This phrasing is far closer to our best knowledge of evolutionary processes. To speak of species changing, or species as 'individuals,' is to speak at the higher level of abstraction and of *an entire entity* changing when we know that it is many smaller concrete aspects that must first change to eventually signify the entity warrants a different designation. For instance a child does not, strictly speaking, shift directly into a teenager: hormones change, cells, bones, and so on, until the entire gestalt seems worthy of a new label. This phrasing may seem nitpicky, but the usual phrasing *hides* that fact that biology is, in fact, essentialist through and through.

Thus, it is more accurate to say that species *go extinct* or are overrun by something *indeterminate,* whereby we eventually attach *a new place-holder* to the group.[357]

Strangely, this seems to be something even Ghiselin allows. Writing in wariness about a statement of Mayr's that species are the real units of evolution, Ghiselin adds qualification: "doubtless organisms and species both specialize. And probably organisms become adapted, but species do not, except insofar as they consist in adapted organisms".[358] To round this out, we should add that *organisms* also become *maladapted,* which is often why one particular kind of species may cease to be that particular kind of thing.

This argument might be rejected by saying that essentialists *must* abide by species placeholders that reference sharply delineated sets of necessary and sufficient properties.[359] In turn, we might assume that saltative evolution is a comfort to the essentialist given this will allow for relatively discrete property integrity between species 'x' and species 'y'—that is, no confusing property-continuity or blending. But again, Sober argues this is not "tenable."[360] Creating boundaries for a natural kind has always been problematic for scholars. Sober claims that asking the essentialist to be precise about the *exact* constituent

[357] This reflects our knowledge that major mutations are usually disastrous to an organism (Sterelny and Griffiths, 1999; 34, 180). This means two things (in natural environments): a) changes in a population will tend to be small and cumulative over long time-periods before we can affirm a qualitative difference between an old and an emerging species; or b) even in the event of major change to a population (say a new predator), the strain that endures is really a strain of the original species. So, it is arguable the remaining strain of a species is actually a *new* species. Rather, we are likely to require some further critical mass of mutations before we label the strain something new.
[358] Ghiselin (1974, 543).
[359] See, e.g., Sober (1980, 358).
[360] Sober (1980, 356).

properties a species must possess is about equivalent to asking when exactly we have a heap of stones, or asking for the precise dollar amount that distinguishes rich from poor.[361] Sober does not deny there may be “a precise and principled answer” to these types of questions,[362] but he feels this precision is not the *decisive* issue in undermining essentialism with respect to evolution.[363] In any case, Sober is not just highlighting that “Essentialism is in principle consistent with *vague essences*”,[364] he is effectively saying *there can be more than one type of essentialism*.[365] I will explain this further in the next sections.

3.5) Preliminary Orientation to Other Correctives

While some scholars did grasp the richness of Sober’s inaugural salvo, it has been difficult for many to embrace it without dissonance. Judging from the related literature following Sober’s 1980 paper, many scholars are radically averse to the reductionism of classical essentialism. Reductionism is not all the badness so many philosophers ascribe to the word, or practice. But in this case, the simplicity of classical essentialism *is* bad. Classical essentialism misses something. Fortunately, there is a trail to follow.

The reasoning goes that if all the members of a species, or class, share some of the same non-trivial properties, then we can expect scientists will discover, if not

[361] Ibid.
[362] Sober (1980, 357).
[363] Sober (1980, 359).
[364] Devitt also advances this argument (2008, 373).
[365] Sober (1980, 358 – 359). Sober’s views on vagueness anticipate my own views. In footnote number four Sober says “It is probably a mistake to talk about concepts being vague *simpliciter*” (358). Sober then goes on to say we “should formulate matters in terms of concepts being vague relative to a particular application” (ibid). This ‘relative to’ is a key aspect of a reasonable concept of what is human and what is natural to humans.

laws that apply, then broad generalizations that allow for reliable description, induction, and explanation.[366] And yet, with respect to *scientific laws*, biology has not found its stride. As Rosenberg notes, general statements in biology like "beavers build dams" are not candidates for "nomological respectability".[367] The reason why is that such statements are, strictly speaking, false. Rosenberg's discussion on the matter is very accessible. He runs through a variety of candidates for laws that are broad enough in scope to apply to all species, yet do not pass muster as they still exhibit exceptions; for example: "Unspecialized species tend to avoid extinction longer than specialized ones"; or "Contemporary species living in the same environment tend to change in analogous ways"; and so forth.[368] As many biologists themselves concede, this presents biology with an alarming problem; for it suggests that *biology is not a science.* As Paul Griffiths writes, "If there are no biological laws, biology is merely the study of how things happen to be around here right now".[369]

The essentialist and the anti-essentialist are each faced with trade-offs. On the one hand, if particular species are natural kinds that share *necessary* properties, we seem on the right track scientifically. Best of all, there is the potential to 'officially' connect biology to the greater human scientific enterprise. And yet, if necessary and sufficient properties really existed *in* biological forms, we should be

[366] Entities that are the same should allow for universal or lawful descriptions because they impact, or are impacted by the world, in the same way.
[367] Rosenberg (1985, 207).
[368] Ibid.
[369] Griffiths in R. A. Wilson (1999, 212).

able to track organisms far easier than we do and accumulate a raft of exceptionless generalizations. Alternately, the options that present if classical essentialism is false are equally perplexing. One option, as already outlined, is to take the route of Ghiselin's 'species as individuals.' Another is to follow Mayr and say that biology *is* a genuine science, but it is a relatively autonomous science subject to unique constraints—as other sciences may also be.[370] A third option, a variation of the former, is to persist in viewing species as natural kinds but accept that, due to organic complexity or dynamic historic, developmental, social, and ecological forces, robust generalization is the best we can do.

If we take this last option, we have a new problem: how do we get natural kinds without classical essentialism?

3.6) Cluster Concepts and Homeostatic Property Clusters

One way to allay the *intuitive* resistance we may feel to classical essentialist conceptions of species may be to simply *emphasize* species membership as somewhat inexact rather than as something absolute. This is a position Hull favored in his paper 'The Effects of Essentialism on Taxonomy.' Here, Hull used the phrase 'cluster concept,' with reference to species taxa (and as a foil to an Aristotelian definition of taxa).[371] What he meant by this was that particular species could be thought of as exhibiting clusters of statistically covarying properties, with no particular property, or set, necessary for membership. However, any one of

[370] Mayr (1996).

[371] It appears Sneath had earlier coined the term 'polythetic' to refer to these types of classes. Wittgenstein also captured this idea in his notion of 'family resemblance. But see Winsor for commentary (2003, 391)

numerous sets could be sufficient. Hull, others before him, and since, claim these sets of properties can be "arranged in indefinitely long disjunctive definitions".[372] Hull gives the example of a lemon.

> A description of a lemon would contain such properties as coming from a particular type of tree, having a sour taste, an ovoid shape and so on. None of these properties is necessary since fruit could lack any one of them and still be a lemon. Several different but overlapping sets of properties are accordingly each sufficient.[373]

Hull maintained that using cluster concepts was a recent innovation in taxonomy.[374] It is not necessary to elaborate on this topic at the moment. But, as alluded earlier, momentum is fast accruing toward consensus that if we give epistemic *practice* due weight relative to ontology, we find that many naturalists since the Renaissance were not, in fact, classical essentialists (as Hull and Mayr claimed), but were actually clusterists with respect to species taxa, and certainly so with respect to higher taxa.[375] Historian Polly Winsor is particularly severe on this score. She writes: "The most extraordinary thing about the essentialism story is the contrast between the enormity of its reputation and the flimsiness of its basis in historical evidence."[376] From a slightly different angle, Atran matches Winsor: "I have so far failed to find any natural historian of significance who ever adhered to the strict version of essentialism so often attributed to Aristotle."[377]

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[372] Hull (1965, 323).
[373] Hull (1965, 323).
[374] Ibid.
[375] Stamos claims it was only for higher taxa (2005, 81).
[376] Winsor (2006a, 150).
[377] Atran (1990, 84).

A more recent refinement of species as property clusters was initiated by Richard Boyd. Just as Mayr and Hull were reacting to the precision of Aristotelian definitions applied to the flux of life, Boyd formulated his own ideas on property clusters in reaction to very constraining peer protocols for categorization. Boyd's target, however, was not Aristotle, but what he saw as the lingering influence of logical positivism.[378] Inventing the term 'homeostatic property cluster,' Boyd forced our hand to achieve an appropriately *holistic* and dynamic conception of natural kinds. He felt traditional kinds—those constituted by strict necessary and sufficient conditions—were ill-matched to account not only for the diversity of natural kinds, but also the degree to which natural kinds are shifting *social and psychological* artifacts.[379] Specifically, Boyd was also concerned to show how the naturalness of kinds—their suitability for explanation and induction—is loosely 'discipline relative.'[380] By this, he did not mean that kinds such as psychological states *only* make sense, or are of use, to the science of psychology; he meant that kinds are *bounded* by families of "inferential practices united by common conceptual resources, whether *or not* these correspond to academic or practical disciplines otherwise understood" (my emphasis).[381] In other words, a psychological kind could have stability relative to most academic disciplines and beyond.

This conceptualization of natural kinds is an important paradigm shift because it asserts that what we experience as 'natural,' as 'out there' or 'in me,' is

378 Boyd in R. A. Wilson (1999, e.g., 143, 146).
379 Ibid., e.g., 162, 175.
380 Ibid., 148.
381 Ibid., 149.

actually an intersection of the imposition of an internal reality, and the imposition of an external reality. As Boyd, writes, "asking whether a kind exists independently of our practice is the wrong way to inquire about its reality. No natural kind exists independently of practice. The kind *natural kind* is itself a natural kind in the theory of our inferential practice."[382]

Fully understanding this point helps us to see why Boyd is not overly concerned about whether we call particular species natural kinds or individuals. This was not to say Boyd saw the distinction as *merely* a pragmatic one. Rather, Boyd felt there was enough similarity between the two conceptions of species, in terms of their inductive and explanatory power, that the distinction is mostly one of fashion.[383] Of special note, this rather lighthearted view about species is possible because Boyd is willing to give up the possibility that organisms are subject to universal and exceptionless scientific laws.[384]

So what is a homoeostatic property cluster (HPC)? While Boyd and others do not see inviolable *laws* as applying to certain natural kinds, and biological kinds in particular, it is evident that 'families' of properties occur reliably over time. These properties may imperfectly co-instantiate; they may have boundaries and features that fluctuate, fracture, mutate, expand or contract; but the important thing is: such families manifest in *stable patterns* and *support successful and often significant*

[382] Ibid., 175).
[383] Ibid., e.g., 162, 163.
[384] Ibid., e.g., 151, 156. Virtually all advocates of HPCs have followed suit.

generalization, induction, and explanation.[385] For Boyd, it is the latter two-thirds of this equation that ultimately create a kind's naturalness.[386] In other words, the initial universalization or representation of something—for example, the color yellow—is not what is crucial for discerning what is *natural.* What is natural about a kind is best determined by evidence of how it facilitates other inferences leading to important generalizations. And so, we may find we can use the term yellow to describe orchids, bananas, canaries, and so forth, and this may help us orient in our decisions of what to smell, eat, or place in our mining tunnel. Boyd clarifies the point:

> [The] naturalness of a natural kind is not a matter of its being somehow fundamental, with less fundamental kinds being somehow less natural than more fundamental ones…the naturalness of a natural kind is a matter of the contribution that reference to it makes to the satisfaction of the accommodation demands of a disciplinary matrix, in the context of a system of compositional linguistic resources for the representation of the phenomena.[387]

This leads us to a final important aspect of an HPC. As a construct, an HPC is meant to be an improvement on other kind constructs by drawing out the significant *relational* nature of natural kinds. This is accomplished by factoring in the tractable causes of a kind, or what Boyd calls 'homeostatic causal mechanisms' (HCMs). In short, causes that were once exogenous to a natural kind now become part of the natural kind's 'properties.' Thus, an HPC kind is ultimately a sort of *macro-natural-*

[385] Ibid., 141 – 144. See also Boyd (1999b).
[386] Boyd (R. A. Wilson; 1999, 157/58).
[387] Ibid., 158.

kind. In practice, we symbolically expand a 'thing' to its outer causal edge and annex the entire diverse and flickering causal field into its identity.

3.7) Correctives on Correctives: Sober versus Mayr

In attempting to capture the *essence* of recent writings on species and essentialism, a few themes standout. One of the most encouraging is we can see that error and misrepresentation, in the big historical conversation, is still a force for improving our understanding of the world and ourselves. For instance, Mayr and Hull may not have represented Aristotle or the practice of naturalists very well. Yet, their insights still move us along philosophically. This is not just because they are capable philosophers; they also seemed to arrive on the scene at just the right time. Likewise, cluster theorists on natural kinds often highlight that, relative to classical essentialism, a key virtue of their view is its capacity to account for the diversity and change we expect from biological natural kinds.[388] And yet, as Sober correctly notes, classical essentialism can *also* account for diversity and change (even if, as Sober would have it, it does so superficially).

For many scholars, these stalemates are unacceptable: many of us want to find the truth, and behind this, we sense reality *is* a certain way. If this is the case, it will help to go back over Mayr's *idealization* of population thinking, and take an

[388] Brigandt writes: "the notion of [an HPC] kind was developed so as to do justice to natural kinds as they are studied in biology and other special sciences. It attempts to reconcile the fact that such kinds are typically heterogeneous and cannot be defined by necessary or sufficient conditions, with the fact that such kinds are not formed in an arbitrary fashion and permit scientific generalizations and explanations…the HPC view *permits variation* in the distribution of properties that are characteristic of the kind, which is necessary for taxa to count as natural kinds" (2009, 79).

intermediate step to consider Sober's reaction to it. I will then offer my own critique.

For Mayr, the key difference between the typologist and the population thinker—or, ironically, what makes each *type* the exact opposite of the other—is a difference in metaphysics. Mayr claims that Darwin's genius was to see the uniqueness of the individual in any population and, that it was this uniqueness, or generalized uniqueness, that was *real*—not a type.[389] Yet, what is alarming when Sober enters the picture is the dramatic plasticity 'population thinking' is suddenly able to acquire. For Sober, Mayr's depiction of essentialism is too simple. Sober writes,

> presumably no population thinker will deny that there are such things as averages. If there are groups of individuals, then there are numerous properties those groups possess. The *average* fecundity within a population is no more a property we invent by 'mere abstraction' than is the fecundity of individual organisms. Individual and group properties are equally 'out there' to be discovered. And similarly, it is unclear how one could suggest that typologists held that variability is unreal; surely the historical record shows that typologists realized that differences between individuals *exist*.[390]

Sober's starting position lends some much needed level-headedness to the debate—a debate that still proceeds on the misconception of classic essentialists denying variation. But then the question remains: what is the difference between population thinking and typology—indeed, if there even is any? Sober's answer is

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[389] See Ariew in R. A. Wilson (2008, 65).
[390] Sober (1980, 352). Darwin supports Sober here. For instance, in his third chapter of *Origin of Species*, he writes, "It has been seen in the last chapter that among organic beings in a state of nature there is some individual variability; indeed, *I am not aware this has ever been disputed*" (my emphasis; 1859/2008, 72)

convoluted, but his base-line answer is that population thinking is *the opposite* of what Mayr claims! This is explained as follows.

According to Sober, *all* scientists are engaged in identifying "the properties of systems which remain constant in spite of the systems changes."[391] Poetically, he consolidates the idea saying, "typologists and populationists seek to transcend the blooming, buzzing confusion of individual variation."[392] However, the *essential* difference between the two, for Sober, is that typologists and populationists tame this confusion by *looking for invariance at different levels* in an organic system.[393] If we take Sober at his word, this seems perfect: we can adopt a pluralist view and accept that scientists prefer studying phenomena at different 'layers' of reality—and this should make a certain sense given what we all know of, say, atomic and subatomic physics (or even of genes relative to organisms, relative to populations, species, orders, and so on). But this is not the path Sober takes. He tells us the population level is really the best one for evolutionary biology.

> The population is an entity subject to its own forces, and obeying its own laws. The details concerning the individuals who are parts of the whole are pretty much irrelevant. Describing a single individual is as theoretically peripheral to a populationist as describing the motion of a single molecule is to the kinetic theory of gases. In an important sense, population thinking involves *ignoring individuals*: it is holistic, not atomistic.[394]

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[391] Sober (1980, 370).
[392] Ibid.
[393] Ibid. Consider evolutionary psychologists Cosmides and Tooby in *The Adapted Mind; evolutionary psychology and the generations of culture*. They write: "Sciences prosper when researchers discover the level of analysis appropriate for describing and investigating their particular subject: when researchers discover the level where invariance emerges, the level of underlying order. What is confusion, noise, or random variation at one level resolves itself into systematic patterns upon the level of analysis suited to the phenomena under study" (1992, 63).
[394] Sober (1980, 370).

Sober does go on to soften his position slightly. He concedes that Mayr is right in one sense: "natural selection is a force that acts on individual (organismic) differences."[395] He embellishes:

> This standard way of viewing evolution assigns a causal role to individual idiosyncrasies. Individual differences are…*the causes* of events that are absolutely central to the history of evolution. It is in this sense that Mayr is right in saying that evolutionary theory treats individuals as real in a way that typological thinking does not…thus interpreted together we might say that population thinking endows individual organisms with more and less reality than typological thinking attributes to them.[396]

The core of Sober's paper was, ultimately, not to prop up population thinking—which was already, in 1980, a sacred cow. Sober's primary aim was to describe what makes essentialists essentialist. Accordingly, one thing he says is required of essentialism is the advocacy of constituent definitions.[397] By this he means, "wholes are to be defined by their parts, sets are to be defined in terms of their members, and so on."[398] Furthermore, as this translates to species, species are "defined in terms of the characteristics of the *organisms* which belong to it."[399] As for the essentialism story, Sober tells us evolutionary theory "emancipated" the species category from required constituent definitions.[400] As Sober would have it, this was due to the fact that "articulation of population models…makes such demands unnecessary."[401]

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[395] Ibid., 371.
[396] Ibid.
[397] Sober (1980, 350).
[398] Ibid., 355.
[399] Ibid.
[400] Ibid.
[401] Sober (1980, 372).

The other defining property of essentialism was where Sober parted ways with many critics: Sober described the essentialist as abiding by what he called a ‘natural state model’ (NSM). Sober saw this as a vestige of Aristotle which had currency with “17th and 18th century biologists, whether they argued for evolution or against it.”[402] I will attend to this view in my next chapter. For the moment, it is useful to know that Sober held essentialists to declare species, or populations, as a type, and understood variation as a deviation from type due to interfering forces frustrating a natural tendency.[403]

One justified criticism of Sober came decades later from Andre Ariew.[404] In an oddly self-fulfilling prophecy of sorts, Ariew charged Sober with misrepresenting Darwin on population thinking, but most important, this was due to the fact that Sober had *ignored* many relevant details of Darwin’s life. Ariew writes: “The problem with Sober’s account of population thinking is that it excludes Darwin. If population thinking amounts to, as Sober would have it, thinking about variation as irreducible statistical features of a population that are both law-abiding and causally efficacious, then Darwin is no population thinker.”[405] Ariew also argued that Darwin’s theory was not about debunking “the metaphysics of essentialism”; Darwin was actually motivated to “debunk a particular brand of natural theology that

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402 Ibid., 353.
403 Ibid., 364/365.
404 Ariew in Ruse (2008).
405 Ibid., 68.

provided interventionistic explanations for adaptations."[406] Ariew grants that some of these natural theologians were essentialists, but he claims this was secondary.[407]

Ariew's interesting argument is worth considering—though it veers from my present purpose. But it is possible to build on this basic idea while provisionally giving credit to what we know of Boyd's HPC argument. What we claim about natural kinds is they are likely to be culture, discipline, and organism relative. To give just one example, it may be the case that the best knowledge we have of physics tells us a brick wall is mostly space. This may fit some greater disciplinary matrix for physicists allowing them to make further inferences and generalizations. But even if the wall *is* technically space, me being the organism I am, and my society not placing much premium in walking into walls, I am not likely to test the theory. (An elephant on the other hand, might). The point is: *there is no justifiable a priori reason why we should insist on some absolute frame of reference, or make an absolute judgment as to what is metaphysically more or less real!*

The weakness of Sober's view is fully evident when he explains the possible compatibility of his own idea with Mayr's and then fails to recognize the full significance of his admission that natural selection acts on individuals. If the starting point of selection is individuals then it would seem populations always supervene on individual traits; thus, disconnecting them is artificial.[408] We can see this best in one of the first examples Sober uses to explain why Mayr is wrong. Early on, Sober

[406] Ibid., 72.
[407] Ibid., 72/73.
[408] This is not to rule out instances of group selection. See Sober and Wilson (1998), or Nowak et al (2010) for recent trends.

mentions Lotka-Volterra equations “that describe the interactions of predators and prey.”[409] Sober uses these equations to show that, on Mayr’s view, “it would appear that much of population biology [has] its head in the clouds.”[410] But there is something quite ironic here. For one, predators and prey are not strictly speaking, species. But, for another, if we accept Sober’s view then we may find we are not essentialist’s anymore, but this is possible only by now being a full-fledged typologist. In other words, if evolutionary theory is only, or mostly, about what we can capture statistically at a group level, *then we are justified in speaking in very broad generalities!* In which case, it is accurate to say: beavers build damns; human males are more aggressive than human females (based on homicide rates, etc); rams butt heads; fish swim; and so on. To reconsider Sober’s Lotka-Volterra equations, we can agree with Sober “there is something real over and above individual organisms.”[411] But it makes little sense to see this world of predators and prey existing in a separate metaphysical universe. The laws of predator and prey are unfathomable without being able to reference particular instantiations of predators and prey—say, foxes and rabbits. In turn, this reveals other common or even universal features with respect to each type: stalking behavior or organic weaponry, versus high vigilance, refined evasive abilities, and so on. There is no immediate reason why holism *and reductionism*, or invariance at multiple diagnostic levels

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[409] Sober (1980, 352).
[410] Ibid.
[411] Sober (1980, 352).

cannot co-exist. In fact, I will argue through my thesis that it is impossible for them not to.

With these tentative conclusions, we can now start to see why evolutionary theory *is not* just about population thinking to the exclusion of typology. However, we did not need anyone to reveal this to us. The whole trend of 'evolution is about population biology' is only possible to accept if we ignore about half of what Darwin wrote in *The Origin of Species*! For sure, Darwin was adamantly opposed to the scholars of his day who argued for *species fixity*, in the sense that the organisms we now see are the only ones that ever, or will, exist (even if some go extinct).[412] But, at the same time, *Darwin would have had nothing to write about if he did not see species as types in the sense of an expedient idealization or general organic pattern!*[413]

In *The Origin of Species*, Darwin talks of organisms descending from one original ancestral form, or prototype; he uses the generic terms 'form,' 'pattern,' 'type,' or 'variety,' constantly;[414] he specifically acknowledged "the unity of type" or the "fundamental agreement in structure, which we see in organic beings of the same class";[415] he spoke of some species having retained the same specific form for "enormously long" periods;[416] he acknowledged the challenge to his idea of gradual evolution due to the absence of many intermediate forms in the fossil record (at the

[412] See Stamos for commentary (2005, 84/85).
[413] For related commentary see Amundson (1998, 170).
[414] Darwin (1959/2008, 456).
[415] Darwin (1959/2008; e.g., 204, 458). See Heyer for related commentary (1982, 178-183).
[416] Darwin (1859/2008, 484).

time);[417] he encouraged the practice of classifying organisms, and commended the naturalists who used an exemplar method to make further generalizations about other organisms, and so on.[418]

The popular rebuttal to this is that Darwin did not view these idealizations as real. On this score, anti-essentialists or anti-reductionists often cite a few well-known passages where Darwin spoke of species as being a construct that was largely one of convention.[419] But, there are good reasons to argue otherwise. One reason is simply because Darwin, himself, spoke against it. For instance, at the start of chapter 8, in *The Origin of Species*, Darwin writes "From the dawn of life, all organic beings are found to resemble each other in descending degrees, so that they can be classed in groups under groups. This classification is evidently not arbitrary like the grouping of the stars in constellations."[420] But, of course, a single quote does little to get a broad picture of Darwin's true thoughts on the matter. I will not attempt to resolve this. My main point is only to bring more ambiguity to the discussion of Darwin than many contemporary scholars allow.[421]

3.8) Preliminary Orientation to the Issue of Essentialism or Typology

Given the philosophical ground covered to this point, it should be clear that while there may be areas of overlap, equating essentialism with typology is correct

[417] Ibid., 485.
[418] Ibid.,456.
[419] For example, "From these remarks it will be seen that I look at the term species, as one arbitrarily given for the sake of convenience to a set of individuals closely resembling each other, and that it does not essentially differ from the term variety, which is given to less distinct and more fluctuating forms (Darwin, 1859/2008, 63).
[420] Darwin (1859/2008, 424).
[421] For related commentary see Ariew (R. A. Wilson; 2008, 70).

only in rare instances and likely in those involving very specific or idiosyncratic versions of both. However, we are unlikely to get traction on this issue without some explicit delineation of both. To this end, I will start with a very rough sketch of essentialism, but because I will be introducing my own version of it through the course of my paper, in the next two sections I will focus mostly on saying what essentialism *is not*.

This comes with a caveat. A few scholars warn us against a rigorous definition of essentialism. Mary Winsor, following Ghiselin, asserts, "The great irony of the subject…is that once you grasp the concept of essentialism, you discover that it is naïve to expect a precise definition of such a word…Asking for a precise definition is to imagine there is an essence to essentialism itself."[422] I disagree with Winsor on this point, and this dispute may get at the very heart of the historical matter. On the one hand, we can give a precise definition for almost anything, if we opt for a definition that is analytic or stipulative. For instance, in the same way we can say, a bachelor is an unmarried male, or a triangle is a plane figure with three sides, we can do the same for essentialism (although this may be more complicated with complex constructs such as culture, racism, and so on). The unifying feature of any essentialism, from Aristotle to Boyd, is a belief in essences. In addition to this, considering Winsor's last sentence, why should we equate a *precise* definition with an essence? If we consider essentialism in its most practiced form, it is used as virtually *the opposite of delineating something precisely*! When asked what the

[422] Winsor (2006a, 151)

essence of something is, our response will generally be to express the 'gist' of something: we try to extract and isolate what is fundamental, or important, but also do so in a way that is 'good enough.' If we fail to fairly summarize all the diverse essentialisms, or miss some features in a definition, it should not worry us too much, as this expectation is built into the word's ordinary use. *This* particular meaning of essentialism may sound the alarm to a scholarly mind: an attempt to isolate what is relatively important about something is likely to be riddled with the subjective or arbitrary. There is, of course, this risk. And yet, engaging in this process is *vital* to survival and also expedient scientific practice. Many scholars, when not in a direct confrontation with essentialism, have argued about to the need to simplify the phenomena they are investigating. Jason Robert makes the point well.

> Any biological system to be studied must be simplified in various ways to make it tractable for agents like us. We build simplified models because we are limited beings, and most of the systems we want to understand are too complex in their natural state. So we abstract from them what seem to be the most important or the most easily manipulated variables in order to generate a manageable representation of their workings.[423]

This aspect of essentialism as 'reasonable simplification to expedite knowledge' is the core of the conceptual system of essentialism that I will advocate and it is also the core of the conceptual system of human nature I will defend.

3.9) Essentialism and Causes

One of the main reasons why many scholars misunderstand essentialism is because they assume the essence of something is equivalent to, or *should* be

[423] Robert (2003, 977).

equivalent to, stating what *caused* it. This was, in fact, rampant in early discussions of essentialism and it persists widely to this day.[424]

Consider Sober's paper 'Evolution, Population Thinking, and Essentialism.' As noted earlier, Sober is dissatisfied with explanations such as Mayr and Hull's as to what is wrong with essentialism, and why it is incompatible with evolutionary theory. He follows Hull, and most biologists, in saying that biological species are individuated by historical criteria and spatio-temporal continuity.[425] But then Sober reveals something many commentators overlook, and he uses it as a foundation for introducing his 'natural state model' of essentialism. Sober says, "If essentialism is simply the view that species have essential properties (where a property need not be purely qualitative), then the doctrine remains untouched".[426] He then gives an example of why this is the case paraphrasing essentialist Saul Kripke: "each individual human being has the essential property of being born of precisely the sperm and egg of which he or she was born".[427] Sober thinks this kind of essence is a "far cry from the…characteristics traditional essentialism thought it was in the business of discovering".[428] All the same, it seems the 'end of story:' essentialism is correct! And yet, could it *really* be the case that essentialism is vindicated by such

[424] Refer back to my summary of Robert Boyd's views on HPCs. But see also Stamos' distinction between 'character essentialism' and 'explanatory essentialism' (2005, 85); Love's discussion of metaphysical approaches to kind individuation (2009, 60); or Amundson (2005, 14).
[425] Sober (1980, 359).
[426] Ibid.
[427] Ibid.
[428] Sober (1980, 359).

truths?[429] Sober assumes this cannot be right; surely, essentialists are committed to more. To get around this problem, Sober says the following:

> [For the essentialist, the] key idea, I think, is that the [species] membership condition must be *explanatory*. The essentialist hypothesizes that there exists some characteristic unique to and shared by all members of Homo sapiens which explains why they are the way they are. A species essence will be a causal mechanism which works on each member of the species making it the kind of thing that it is.[430]

The phrase 'causal mechanism' should remind us of Boyd. But Sober follows this with something equally important: "the characterization of essentialism just presented is fairly vague. For one thing, a great deal will depend on how one understands the idea of *explanation.*"[431]

Sober is correct that essentialism might involve explanations of some kind; but he is incorrect the essentialist requires a *causal* explanation.[432] This is why Boyd, and many other like-minded scholars misconstrue essentialism.[433] When we orient to our surroundings, or if we want to know what something is, we isolate properties that are distinguishing or important. This can be satisfied at a modest level by simply noting features that indicate non-trivial similarity and difference. This will *descriptively* or representationally explain why an organism is different

[429] Sober (1980, 354).
[430] Ibid.
[431] Ibid.
[432] An important qualification, here, might be *proximate* casual explanation. This is not required of essentialism. At the same time, essentialism that aligns with evolutionary theory will reference distal evolutionary explanations and forces such as genetic drift and natural selection.
[433] The point I am making is directly opposed to someone like Rosenberg. He writes, "The proponents of contemporary species definitions are all agreed that species have no essence, no causally determinative, distinctive properties on the basis of which we can discriminate them. But if they are right, species have no properties on the basis of which we can explain them either, for discriminating and explanatory properties are one and the same" (1985, 203).

than another, but this may have little to do with causal explanation.[434] More important, the reason why this *layer* of essentialism is central is because it matches the order of ordinary experience. There are certainly features of objects that immediately delineate *and* semantically explain something to a perceiving organism. For instance, sharp teeth might explain that some 'natural kind' is a predator kind, and simultaneously, bracket information that this kind of thing is *not* the kind of thing you are. But this is not to invoke any casual aspect yet. Our interest in a more sophisticated causal understanding—an explanation for why the kind exists or how this kind may itself be an explanation of something else, is secondary; it comes after. *Brute similarity and difference is correlational.*[435]

This distinction between *descriptive* and causal explanation is key to understanding not just essentialism, but also why typology is *compatible* with evolutionary theory. All a typologist needs to care about, to make their case, is that there are evident correlations of properties that indicate grouped similarities and differences. It is also important to realize that if one aspect of essentialism and typology is correlations, then distinctions between genotype and phenotype may not be relevant to certain types of categorization. A human genome can be just as

[434] Samir Okasha makes the point well in an introductory philosophy of science text. The discovery that water is H20 tells us what water is, but H20 does not *cause* a substance to be water. The same can be said of the discovery that an objects temperature is the average kinetic energy of its molecules (Okasha, 2002b, 52).

[435] What may be worth clarifying is I am not doing away with the explanatory or inferential aspect of natural kinds. I am only establishing an intermediate level of natural kinds, or essentialism.

corellational with being human, and as important, as features such as being bipedal, pair-bonding, and so on.[436]

Perhaps one reason why so many philosophers adopt the assumption that causes *are* essences has to do with transference from non-living taxonomies. For instance, chemical elements may be descriptively fairly simple relative to organisms. They also share a common property: all have an atomic structure. The differences in this structure explain the unique features of chemical elements. As Rosenberg writes: "[atomic structure] explains transmutation and decay, the existence of isotopes, the character of chemical bonds and the stoichiometry of chemical reactions, the physical structure of quantities of elements at various temperatures and pressures, their magnetic and electrical properties, etc."[437] In this case, as causation is readily available, it may be easy to slip into the habit that we should focus causes in order to know essences.

3.10) Essentialism versus Typology, and Love's Perspective

We now have enough of a foundation to distinguish between essentialism and typology. At this stage, I will only put forward one conceptual qualification and five representational properties of essentialism. This will allow me just enough of a contrast to outline a form of typological thinking that is in accord with our best knowledge of evolutionary principles and processes.

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[436] Sokal writes something similar: "With increase in our knowledge of the fine structure of DNA we may be returning to a 'morphological' interpretation of genetic differences and typology based on the genetic code. However, such a typology would bear little if any resemblance to that of the idealistic morphologists" (1962, 244).
[437] Rosenberg (1985, 202).

First, an essentialism that will best represent evolutionary thinking is *not* adequately typified by cluster concepts such as Boyd's, or classical essentialism.[438] However, each of these types of essentialism capture something important that we might eventually pair to create a hybrid of sorts. Second, as for the process of defining essentialism, whether we presume organisms are subject to natural laws, or not, a base feature of essentialism is a *commitment to the postulate that natural kinds have essences*. I will leave the word 'essence' undefined as I will eventually argue that we can partially equate an essence with 'what is *natural* for an organism.' This will be the goal of my next chapter. Third, a biological essence is best described as *macro-structural*, as opposed to merely micro-structural.[439] This characterization may shift depending on the scientific context. But this frame should invite us to see how the 'overall pattern' of the organism, its anatomy, behavior and so on, is stabilized by relatively small elements, such as neurochemicals, and big ones, such as the size of the global human population.[440] Fourth, a biological essence can be thought of as *interwoven*: all 'intrinsic' features—genes, hormones, and so on, can be muted, exaggerated, or terminated by other intrinsic *or* extrinsic features.[441] Fifth, a particular organism or species' essence is a complex construct. In this instance, what I mean is that no single characteristic, or property, completely marks a

[438] To be clear, Boyd considers his own view as essentialist. He writes: "I'm offering an alternative approach to the problem of essentialism. I'll argue that species (and probably some higher taxa) do have defining real essences, but those essences are quite different from the ones anticipated in the tradition that Mayr, Hull, and others criticize" (R. A. Wilson; 1999; 146).
[439] For commentary on micro-structural essences see Griffiths (R. A. Wilson; 1999, 219), Okasha (2002a, 194 – 195), or Lewens (2012).
[440] For a fascinating popular (but academic) read on the impact of larger and distant ecologies on humans see Shubin (2013).
[441] See Wilson et al (2007, 199).

biological entity; instead, an organism or species essence is something diffuse (an ecology).[442] Sixth, to honor the complexity of organisms, changing exogenous and endogenous ecologies, and our practical and scientific aims, we must tolerate *representational simplification*. But, it will not be the case that anything goes. These simplifications must be justified relative to scientific, practical, and even normative frames, and weighed against rival simplifications.

Turning to typology, in a very generic sense, the word refers to the act of identifying some phenomenon that is distinct, or categorizing some phenomena with shared or recurrent features. However, the word is ambiguous, discipline specific, and has changed over time. A testament to this parochialism is the meaning of the word 'type,' *with reference to natural history*, did not appear in most dictionaries of the first half of the nineteenth century.[443] Also peculiar is the gulf between the degree to which categorization, or typologizing, is of utmost expedience to survival and the degree to which the term is presently one of ill-repute. With reference to the former, if it were available to us to treat all the minutiae of experience as utterly distinct, or as an amorphous experiential haze, we would likely die fairly quickly due to cognitive and behavioral paralysis.[444]

The surge of recent scholarly activity to reinvigorate the term type, or typology, comes in a variety of forms. Some of this has been historical. Here, what has generally occurred is that a scholar will draw attention to the compatibility of

[442] See Darwin (1859/2008, 432).
[443] Farber (1976, 93).
[444] See the challenges faced by people with synesthesia, e.g., Cytowic & Eagleman (2009), or the challenges for those with autism, e.g., Grandin (1995/2006, 58-83). See also Bloom (2004, 39 – 41).

typology with evolution.[445] This usually means that refined distinctions are made as to what the word meant in Darwin's day; what ideological camps Darwin was primarily opposed to; and what scholars were and were not typologists of the right or wrong sort. Farber, for instance, documents three kinds of common type concepts in the early 19th century that were respectable relative to the scientific standards of the day.[446] Amundson returns to 19th century biology and makes a case for the heterogeneity of the idealistic morphologists, or transcendental anatomists, and then disassociates various typologists from the natural theologians and anti-transmutationists of the day.[447] He also treats transcendental anatomy as a precursor to modern developmental biology and argues that the most important debate at the time of Darwin was not evolution versus creationism inasmuch as biological functionalism versus structuralism—a debate that, he correctly notes, exists to this day. Levit and Meister also present 18th, 19th, and 20th century typologists as a more diverse lot than Mayr depicted. They argue that the typological thinking of the German idealistic morphologists was neutral with respect to population thinking and evolution.[448] This was because, the ultimate goal of typology was classification. Thus, typologists could be *agnostic* about causation, species fixity, or phylogeny.[449] Levitt and Meister admit that some of typologists of the day had accompanying beliefs such as essentialism, creationism, or neo-

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[445] See Amundson (1998, 156).
[446] These are the classification-type concept, the collection-type concept, and the morphological type-concept (Farber, 1976). See also Daston (2004).
[447] Amundson (1998, 159).
[448] Levitt & Meister (2005, e.g., 303).
[449] Ibid. Amundson makes a similar argument (1998, e.g., 169).

Platonism.[450] But these were *peripheral* to typology, and thus, the villain was not typology per se.[451]

All of this historical detail is enormously relevant to gaining a nuanced perspective on the whole 'anti-essentialism, anti-typology story.' But for my present purpose all I need is a viable exemplar of typology as a practice, and my immediate argument holds. For this, I will use A.C. Love—though mostly as a foil.[452] Love's view of typology is pertinent because it is modern, but also because it connects to the ideas of scholars like Amundson as well as Levitt and Meister. Love's primary argument for the importance of typological thinking is, that it helps us with respect to science at the *intersection* of evolutionary theory and developmental biology.[453] Love argues that epistemological and metaphysical issues are not separate, but he claims we can gain an appreciation for typology if we *shift emphasis away from metaphysics* to an emphasis on epistemology.[454]

The issue of metaphysics versus epistemology is important. Love is not especially clear about what he means by metaphysics, but his ideas are similar to Boyd in at least one respect. His baseline answer is that metaphysics involves a focus on realism;[455] truth as opposed to mere empirical adequacy;[456] natural

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450 Levitt & Meister (2005, 201).
451 This is also a stance taken by Love (2009, 66).
452 Love (2009).
453 Ibid. (2009, 52 – 53).
454 Love (2009).
455 Love (2009, 52 – 53, 56).
456 Ibid., 57.

kinds;[457] essentialism;[458] and natural properties.[459] However, what most stands out from all this is that metaphysics, for Love, is strongly associated with *causal powers* or causal explanation.[460] As for epistemology, Love's view is also conspicuous in its informality. Love states in a *footnote* that epistemology refers "to a multiplicity of epistemic activities associated with scientific inquiry."[461] In the body of the paper, he is also vague. For instance, early on he gives examples of epistemological issues that warrant our attention, listing "styles of explanatory reasoning, modes of representation, and methodological preferences."[462] He later also gives some examples.

Perhaps the best way to depict Love's version of typology is to see it in overlapping layers. First, Love asserts that typology is a form of thinking, reasoning, or conceptual behavior that involves "grouping and distinguishing [natural] phenomena according to different characteristics, as well as *ignoring* particular kinds of variation."[463] The last portion of this statement is crucial. When we consider what naturalists were and are actually doing, it is radically implausible to think they did or do not see variation in organisms.[464] Naturalists are not sitting in their armchairs designating species *a priori*. Rather, many are obsessed with

[457] Ibid., 59, 60.
[458] Ibid., 52.
[459] Ibid., 53, 60.
[460] Ibid. 55, 60, 68.
[461] Ibid., 53.
[462] Ibid., 52.
[463] Ibid., 64, 65. This matches the etymological root of 'typology' which Love *acknowledges* as "the study of symbolic representation' or 'the study of classes with common characteristics'" (2009, 57).
[464] In 'The Origin,' starting chapter 3, Darwin writes: "It has been seen in the last chapter that among organic beings in a state of nature there is some individual variability; indeed *I am not aware that this has ever been disputed*" (1859/2008, 72; my emphasis).

taxonomy and are immersed in mountains of empirical data. This goes for some of the most presumed anti-Darwinian types like Agassiz, to the more difficult to classify—like Buffon—to the more amenable.[465] Here is an anecdote, by Farber, on Georges-Louis Leclerc comte de Buffon (1707 – 1778).

> The first part of [Buffon's] *Histoire naturelle, generale et particuliere*, published over a period of close to twenty years, consisted of fifteen volumes of individual histories of each of the two hundred known quadrupeds. When Buffon began the next section, the birds, he was confronted by a staggering two thousand species and varieties.[466]

If most children can see differences in the people around them—young, old, tall, short, female, male, kind, mean, and so on—an expert naturalist, who is also a typologist, must be saying something more complicated than types *oppose,* or are more important than, diversity.

Second, Love claims that typological thinking can best be understood as a scientific tactic.[467] By tactic, what Love means is "the specific actions" taken in service to a scientific aim that is accompanied by a general plan—or strategy.[468] In particular, Love is referring to things like "the actual experimental set-ups and data gathering methodologies, the web-interface for blind peer review at a journal, or the pictorial representation of a molecular model at the end of a scientific paper."[469] He also notes that tactics "are specific to different disciplines."[470]

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[465] See Winsor on Agassiz (1979).
[466] Farber (1979, 94).
[467] Love (2009, 53).
[468] Ibid., 58.
[469] Ibid.
[470] Ibid.

Third, Love asserts, "typological thinking…involves representing natural phenomena using idealization and approximation…These representations facilitate explanation, investigation, and theorizing via increased abstraction and generalization."[471] Love's explanation of approximation is pertinent. He says that it "involves representing phenomena as close to accurate as possible *while knowing that the representation is not fully accurate*."[472]

Finally, Love rounds out his view noting that exceptions to a typology do not necessarily abrogate the typology. This is because typologies are often "layered or hierarchical and used in conjunction with one another."[473] An analogy, here, might be to think of typologies consolidating each other as the words in a crossword puzzle might.[474]

When these points are combined with some of the examples Love gives of typological practice, Love's description is fairly convincing. It also seems to capture what a typologist basically does—and without all the political baggage that often attends these discussions. However, there is at least one noteworthy error in Love's schema. Love stresses the scientific value of shifting away from metaphysical concerns to better appreciate typology. But Love over-identifies metaphysics with a focus on properties that are causally explanatory. If we want to best understand why and how typology can be effective, we need to take a more traditional view of

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[471] Ibid. 53.
[472] Ibid. 64. It may be worth stressing that our idealization should involve reference to some concrete or 'anchor' phenomenon.
[473] Ibid.
[474] This way of thinking will be an important to consider when critics of human nature suggest that most generalizations about human are uninteresting. But see Haack (2003, e.g., 58, 253).

metaphysics (of which causality is merely an aspect). On a traditional view, which Sober makes reference to, "the problem is not how things are causally related, it concerns what in fact *exists*, and whether what exists exists 'independently' of us."[475] To translate with an eye to my present discussion, typologies are best when they are *inescapable*! This is not to say that what imposes itself on us, or resists us, does not veil earlier or fundamental causes, or automatically suggest potential ones. It is to say, that the *brute force of the world* is something we need to simply *register* first! Of course organisms may partially create this 'structure-as-given.' But, at times, even when we know our contribution (such as with optical or auditory illusions, like a Kanizsa triangle or the McGurk effect) we cannot help ourselves to avoid it! This aspect of metaphysics should combine with causal analysis. Yet both have scientific value.[476]

How else can we see typology in a favorable light? One way is to realize that actual *attention to empirical detail and variation* can lead us to envision something constant. Ironically, this may have a Platonic quality to it. For instance, if we take an expert in any field, what is common to each is that they are adapted to their niche in a way that sometimes makes them appear a very different species than the rest of us. The Michael Jordan's or the Wayne Gretzky's of the planet, do not seem to process athletic information the way you or I do. In the heat of a game, in all the confusion of what to do next, calculating the defensive options of opposing players,

[475] Sober (1980, 371). But see also, for instance, Love (2009, 54).
[476] In fact, we are inspired to investigate only when some pattern, or constant conjunction, repeats itself, or when an *established* pattern acts as a backdrop allowing us to notice a singular or rare event.

hearing the screaming fans, seeing the dying seconds on the clock, they seem to find the Form of the Good—or the *type* of challenge or weakness their opponents pose. These experts are not overwhelmed in the blooming, buzzing, confusion, of their bounded competitive universe, distracted by irrelevant detail. Instead they seem to know exactly what is important to see, feel, think, and do, and they do it![477] We can witness the same when a chess grandmaster, like Bobby Fischer, plays simultaneous games: he moves from one opponent to the next and seems to find the best move on each board in a rarified, almost instantaneous way.[478]

While I will elaborate on this in my next chapter, 'seeing' human nature depends on attending to brute features (similarities and differences), discerning what is *causally* stable about humans, *and* knowing when to *intentionally* stabilize phenomena for the purpose of orientation, generalization, inference, and explanation.[479]

3.11) Devitt: Intrinsic Essentialism Redux?

[477] See Gigerenzer and Gaissmaier for a related discussion (2011, 466).
[478] Lorrain Daston is relevant here. She writes: "Because natural phenomena, flora and fauna very much included, exhibited considerable variability, naturalists worthy of the name based their species descriptions on as a wide a range of specimens as possible. Only seasoned judgment based on *broad experience* could distinguish the genuinely characteristic in any given phenomenon. These views were not only shared by the majority of eighteenth century botanists but also contemporary practitioners of other descriptive sciences, such as anatomy, conchology, entomology, anthropology, and geodesy. These were *sciences of the trained* eye, accustomed by years of experience to distinguish the essential from the accidental, the normal from the pathological, the typical from the anomalous, the variable from the constant. In principle, this was just as much a problem for the observational astronomer as for the field naturalist. The astronomers who tracked comets with telescopes were plagued by observations that strayed from any smooth path—hence the habit, continued well into the nineteenth century, of discarding outliers (Daston 2004, 166; my emphasis).
[479] See Love for the phrase 'intentionally stabilize' (2009, 67).

In 2008, Michael Devitt published a paper entitled 'Resurrecting Biological Essentialism.' This paper has not been as appreciated in the philosophy of biology (and other related disciplines) as it should be, but perhaps this will be just a matter of time.[480] Devitt's thesis is a defense of partly intrinsic, likely genetic essentialism, with respect to "Linnaean taxa."[481] Presently, I will not attend to any of the detail of Devitt's own positive argument for his thesis. Instead, I will mostly draw attention to some of his key criticisms of biological orthodoxy. This is because, in the end, I hope to move beyond Devitt's thesis which is correct *in principle,* but is mildly incomplete in its substance.

Devitt's paper begins with an outline of the consensus in philosophy of biology—although he does mention this may hold for biologists as well.[482] The consensus as I have already summarized it, is that classic or intrinsic essentialism is naïve and wrong;[483] while relational or extrinsic essentialism is correct.[484] In saying essences are relational, what is usually invoked these days is some version of Boyd's HPC view. However, open endorsement of relational essences is still of limited academic currency except when it comes to the issue of understanding the species category or species membership. In regard to each, the popular view is that *historical relations* properly define them—that is, for example, a relation to a

[480] For criticism of Devitt see Barker (2009) and Ereshefsky (2010). Devitt does have a rebuttal that has not been formally published yet.
[481] Devitt (2008, 346). A qualification of this thesis is that, at the very least, the consensus in biology needs to make a better case (349).
[482] Devitt (2008, 345).
[483] Ibid., 345, 348 – 9.
[484] Devitt, (2008, 347). See also Okasha (2002a, 202). The obvious exception to this view might be Ghiselin.

particular evolutionary lineage.[485] Devitt lists a number of statements from the work of other philosophers to highlight the opposition to *intrinsic* essentialism, but two citations capture the consensus very succinctly. The first is from Ereshefsky; the second from Sterelny and Griffiths: *a)* "there is no unique factor common to all species";[486] and *b)* "no intrinsic genotypic or phenotypic property is essential to being a member of a species."[487]

Devitt offers two main reasons for believing his positive thesis. The first, he posits, is superficial but "indicative of where the truth lies."[488] Devitt says that "essential properties seem to be what human 'genome projects' are discovering" and he goes on to mention recent research comparing chimp, human, and Neanderthal DNA.[489] Devitt correctly notes that many philosophers of biology disparage this view. In my opinion, these critics do so at an increasing risk to their credibility. Not only are species' genomes being mapped at a rapid pace,[490] but these studies are further supplemented by research revealing genes and mutations in process. The kinds of differences we see among species gives us enormous insight into why and how we all act, think, feel, and appear as we do. For example, the investigations into HAR1, FOXP2, MYH16, AMY1, RNF213, LCT, ad infinitum, provide powerful evidence that genes are very important for gaining a sense of what makes us human.[491]

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485 Devitt (2008, 348 – 350).
486 Ibid., 359.
487 Ibid., 350.
488 Ibid., 351.
489 Ibid.
490 See, e.g., Baker and Bradley (2006).
491 See especially C. Wilson (2012); Pollard (2009); Shadan (2007).

Genes, of course, do not tell the full story as all sorts of epigenetic factors mediate them.[492] Furthermore, the impact of genes is far more revealing when cross-referenced with the trajectories of other genes and developmental resources. All the same, genes are a cornerstone to a proper understanding evolution.[493] This fact has created great alarm in much of the social sciences and humanities.[494] And yet, we did not need the various genome projects to help us see their relevance to explanation. The fact that offspring look like their parents, more than they look like unrelated organisms, is enough to be confidant that some genes are preserved across generations, they *do something,* and we should try to figure out what.

Devitt's second reason is that the *generalizations* scientists make about organisms and species—the stuff of nature programs—demand *explanation*.[495] Devitt claims these explanations can reference evolutionary history or the present environment, but he claims this is not enough: there has to be something about the very nature of the group that determines the truth of these generalizations and he thinks this must be partly genetic. In fact, he says, "what else could it be?"[496] Devitt summarizes the point:

> The fact that an individual organism is a tiger, or an Indian rhino, an ivy plant, or whatever, explains a whole lot about its morphology, physiology, and behavior. At first sight, the explanation…may seem rather superficial, but it is not really. For, when biologists group organisms together under the some name on the basis of observed similarities, they do so partly *on the*

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[492] See Francis (2011).
[493] See especially Dawkins (2004). But see also Haig (2007).
[494] See especially Segerstråle (2000), but also e.g., Ellis (1996), Pearson (1996), Marsland and Leoussi (1996).
[495] Devitt (2008, 352).
[496] Ibid.

> *assumption that those similarities are to be explained by some intrinsic underlying nature of the group.* It seems to me clear that this is their practice, whatever they say about essentialism. So the apparently superficial explanation points to the deep fact there is something intrinsic, probably unknown, partly in virtue of which the animal is [what it is]. That something is an essential intrinsic property. The sum of those properties, together perhaps with some historical ones, constitute the essence…"[497]

Standing on its own, the second reason may not be convincing, but much of Devitt's paper goes on to defend his second point very well. These arguments are worth considering, but as Devitt's paper relates to my own, I will focus only on the gestalt of his view and I will reference some specific points of his argument only indirectly. I think the major philosophical contribution of Devitt's paper has to do with the fact that he presents a serious challenge to what appears to be a half-century, or more, of mostly inconsistent dogma. I will start by relaying what I think is Devitt's most powerful main points. But I will also establish why Devitt's argument is not entirely accurate.

Starting with the biological species concept (BSC), the ecological species concept (ESC), and the phylogentic-cladistic species concept (PCC), Devitt shows that applied to what he calls *the taxon problem*—the problem of *membership* to a particular species—they all fail. However, what is noteworthy about this is not so much that each of them fail—as over the years each has been shown inadequate—rather, it is the reason Devitt gives for their failure. Devitt makes clear something that should have been fairly obvious to most experts; while not his exact words, each of these species concepts are recursive (Aristotelian-style) definitions. The phrase

[497] Ibid., 352 – 3.

Devitt uses to describe each is that they are "explanatorily hopeless" (with respect to the taxon question).[498] But the real reason they are hopeless is because they are rather circular. For instance, the PCC is *basically* a species concept that states: you are a member of a particular species, if your parents, or the organism that reproduced you, are members of that species.[499] The BSC says you are a member of a species if you can successfully interbreed with organisms like you, but not successfully with others (i.e., in part, your group must be reproductively isolated).[500] The ESC says you are a member of a species if you share the same resources of an adaptive zone in a way minimally different from others who do not have the same ancestry.[501] In other words, beyond giving a *definition* as to what the species category is, or for being a member of a particular species, as Devitt puts it: these concepts "tell us nothing at all!"[502]

This leads to a second point. To actually tell us something with respect to species membership, any relational species concept must advert to *some* intrinsic properties.[503] For example, the BSC places emphasis on actual or potential interbreeding. And yet, this cannot happen without bearing a massive constellation of intrinsic features to make it possible. Not only is compatible interbreeding equipment required (imagine what organisms in the world might be compatible

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498 Ibid. 363.
499 In Devitt's paper, Ruse is representative: "if we suppose that humans first appeared about a half million years ago, *Homo sapiens* is the name for he group that descended from the original organisms" (361).
500 In Devitt's paper, Griffiths is representative. Devitt leads into the citation: "what makes something human is 'being born of human beings *and/or mating with human beings*'" (2008, 361).
501 Devitt (2008, e.g., 356 358).
502 Ibid., 360.
503 Ibid., 354

with a blue whale penis, other than female blue whales), but there are biochemical, psychological, developmental factors, and so on. In fact, for something as important as sex to occur at all, it could not possibly be left to entirely whimsical, open-ended choice, in the face of equally potent choice options. This is one reason why, for humans at least, sex happens to be pleasurable! With respect to the PCC, it is also not possible to identify a lineage without indentifying certain intrinsic properties as proxies: genomes, morphology, and so on.[504] And finally, with respect to the ESC, and a group sharing the resources of a particular niche—say, fruit—this could also not occur without intrinsic properties as resources: perceptual abilities, ingestive capacities, digestive capacities, and so on.

Devitt arrives at these conclusions in a series of small intermediate steps. He claims it is crucial to distinguish between the species category problem, the taxon problem, and also still, the conspecificity problem (although the first pair of the trio he holds primary).[505] He follows Mayr in claiming the importance of separating *historical* (or ultimate) explanatory frames from *structural* (or proximate) ones.[506] Devitt also shows how combinations of these species concepts do not circumvent the issue of intrinsic properties.[507] However, what all of this points to is that the intrinsic essentialist, the relational essentialist, the anti-essentialist, and any hybrids, all face the same conundrum. We can have our idealized definitions of what counts as an answer to the species category, and these may work in a largely

[504] Morphology is particularly diagnostic for paleontology—or extinct species.
[505] Devitt (2008)
[506] Ibid., 355.
[507] Ibid., e.g., 362

philosophical way, but we also need to determine properties that are essential for the taxon problem.[508]

Does Devitt bring closure to the essentialism debate and some related issues on species? I think he gives a commendable effort. Yet, I will respond to this rhetorical question with a bit more detail. I have two relatively minor points, and one major one.

First, like many philosophers on this issue, Devitt accepts Sober's description of essentialism as needing to reference metaphysical causes.[509] Thus, Devitt is too quick to dismiss the significance of brute (and iterated) features, as well as similarities and differences, and this leads him to overlook essentialist pluralism.[510]

Second, Devitt assumes that an essence is mostly the *sum* of intrinsic causal properties.[511] This creates the problem of knowing what is important among these causes—or establishing what is non-trivial among *many* causally significant variables. Devitt understands there will be arbitrariness in choosing where to draw

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[508] Of note, this problem does not go away for those who espouse the 'species as individuals' hypothesis. Instead, this just shifts terminology. As Devitt notes: we now look to determine "in virtue of what organisms are *parts of* a certain species"(2008, 348).

[509] Ibid., 353. One example of this is that Devitt simply sets aside a phenetic species concept that includes genotype as observable and factored into overall species similarity (ibid., 355).

[510] Ibid. e.g., 348, 352, 363. I make this claim with many other scholars in mind. Take, for example, Lisa Gannett. Gannett writes about the appellation 'genetic' as something highly socially negotiated. She says, "referent classes do not thrust themselves on passive observers" (1999, 365). This is easy to agree with: humans are not passive observers. However, some aspects of our experience impose themselves so forcefully that variety in interpretation is rare. For instance, provided a person has the usual functioning sensory modalities (e.g., eyesight) some conclusions are unavoidable: a whale can easily be described as physically bigger than a mouse. The same can be said of many scientific descriptions. For example, the reason it sometimes fits to say that there is a 'gene for x,' is because, at the very least, the description cannot be surpassed in explanatory power by other descriptions, or as easily translated into working technology. Granted, it is important to add that what 'forces itself on us,' will sometimes not occur all at once, and can developmentally unfold.

[511] Ibid., 353.

the line in such cases, but he feels our *explanatory purpose* can mitigate this to a reasonable degree.[512] I have also argued for this thesis, but Devitt's view can be supplemented by attending to the contrast of other organisms, and by the anchor-point of an organism's interest in its own well-being.

Finally, by emphasizing the essence of particular taxa as mostly intrinsic, Devitt must allow that given evolutionary forces and time-lines, these properties change. Devitt does not deny this. However, by focusing so much on *corporeal* intrinsic properties, Devitt is left with a 'biological science' than must settle for robust generalization as opposed to genuine laws.[513] This is to concede too much too soon: we *can* have an organic system responsive to almost any change, yet stable in many features—such as genes—while also being *invariant* in others.

3.12) Invariance, Ecological Imperatives and Heuristics

In section 3.3 of my PhD thesis, I established there are some features of organisms that do not change. One feature I gave as an example was the proximate orientation to well-being which is partly non-corporeal. I also described this as an imperative and as something that holds across all living organisms. How can this thesis is supplemented by the work of some of the scholars on essentialism I have discussed?

We now have a set of intermediate conclusions about how to represent organisms and species. One of these is that classical essentialism is inadequate. To

[512] Ibid., 374 – 375.
[513] Ibid., 377.

put this another way: the distinguishing features of organisms are *not* something merely proximate, metaphysically causal, and internal to an organism—and this may make living things very different than something like Gold which can be *adequately* understood by an intrinsic essence: the atomic number 79. Another worthy conclusion is we need to understand organisms as relational and historical entities. Boyd, and many others since, show the epistemic benefit of viewing many of the properties of organisms as stable due to causes *external* to them. Furthermore, traditional species concepts, such as the biological species concept, *can* help us understand the importance of evolution for grouping organisms and how, very minimally, we can define a group by its history of reproduction or ancestry. A third conclusion is that essentialism is not typology, and *neither is incompatible with evolutionary theory*. And lastly, Devitt's argument on intrinsic essentialism makes clear that relational species concepts—standing alone—are not explanatorily adequate when it comes to the taxon problem (or even the species category problem) and thus, ultimately, these concepts must advert to some intrinsic features of a species.

With these conclusions providing a solid foundation, we can now integrate them. I think the best way to do so would be to start from our typical view of the organism, consider its apparent opposite, and then work back to the organism.

What I would call 'the standard paradigm' for biology and psychology is a view of organisms as discrete units—that is, most organisms are imagined to end at their exoskeleton or epidermis. Humans, in particular, are treated as moral and prudential *agents*. In other words, they are seen as islands of reason, intention, self-regulation, causation, judgment, and so on. This is certainly a simplification of sorts: and many scholars *are* keen to stress the relationship between development and evolutionary, social, or natural ecology. But generally, this commitment is often linked with the elevation of 'culture' as an almost all-powerful force.[514] With respect to humans, our tendency to see the agent as isolated from context (past or present ecology) can be seen especially in regard to moral judgment in situations where an individual has committed a particularly heinous crime. Just one example: psychologist Philip Zimbardo was an expert witness on the U.S. military men and women who tortured prisoners in Abu Ghraib in the fall of 2003. Zimbardo attempted to show how the actions of the prison guards must not be viewed as discrete from their surroundings and the local events leading up to the tortures. Zimbardo's expertise was denied. The service men and women were held fully accountable while those like the higher military brass were exonerated.[515] Almost all of us take a similar attitude with crime of this nature, or toward marked success: responsibility is not usually collectively awarded, or seen as mostly a reflection of developmental resources, but rather is imagined circumscribed in the agent's will—which is why one person tends to go prison for a murder, instead of that person's

[514] See, e.g., Lewontin (1991, 123).
[515] Zimbardo (2007). To be clear, the example is meant to be one in principle and, thus, suggestive and plausible. I am not saying Zimbardo was correct in his assessment.

key influences, and one person gets the Olympic medal—as opposed to a the person's parents, their high school basketball coach, and so on.[516]

An ecological view of organisms is different; it takes seriously the idea that individuals and ecologies are better seen as an 'amorphous but united Necker- cube.' It begins with the fact that certain environments are *a given* for the organism. For example, any terrestrial organism must deal with the problem of an atmosphere of oxygen. To survive, animals must have something like lungs. There are daily and annual rhythms to the planet. Many organisms, then, must have a solution to night and day; seasons, fluctuating temperatures; extreme cold or extreme hot environs; and so on. For the remainder of my PhD thesis, I will call these contingent regularities *local ecological constants*.

There are also some challenges posed to organisms that are of a slightly different nature. For example, whatever organic form natural selection creates, it must deal with the problem of finite energy or resources. As there is never any guarantee for an organism that it will flourish (that its energy needs will ever be conclusively settled), this means that *all* organisms will be organized around a priority of how to manage (conserve or expend) their energy. In which case, to understand the essence of any organism, we will need to attend to how it answers to this *universal predicament*—what I will call a *global ecological constant*—and we

[516] What may be important to acknowledge is that many scholars do, in fact, see humans as more diffuse. So perhaps the singling out of individuals aligns with practical resolution of these matters—rather than being an expression of some perceived metaphysical truth.

must look to see how this universal predicament is mediated through a historical and local predicament.[517]

One way of seeing this is to consider convergent evolution. The wings of most species are quite similar in structure, not because of any recently shared ancestry, but because the same laws of aerodynamics occur everywhere.[518] In plants, Fibonacci phyllotaxy occurs all around the world as some generalized solution to some general problem. In certain ecologies, a coat of prickly spines serves as a good defense for certain kinds of predators. Thus animals in different parts of the world have the same defense—hedgehogs, echidnas, and porcupines, for instance. By the same token, anteaters, armadillos, pangolins, aardvarks, and most woodpeckers all have long sticky tongues to deal with a local ecology of 'available-stationary-but-hard-to-get-food.'

The story of the global ecological constant of finite resources, and its impact on organismic form, does not stop at the appearance of very parochial designs to meet to meet this constant: photosynthesis, digestive systems, Krebs cycles, and so on. Global ecological constants create another kind of constant; what I will call an *organismic constant*. Given the universal problem of finite energy, organisms will develop, in response, a universal mandate for a certain kind of self-regard (or, more crudely, selfishness). If a vital orientation to overcome finite energy exists in an

[517] To simplify my argument for now, I will set aside discussion of how evolved organic form is a constraint on how present predicaments are now solved.
[518] To clarify, I am saying similar in 'structure,' not similar in how they accomplish flight. A dragonfly's wings are different than a robin's, but both, for instance, exist within a certain weight or length ratio relative to body mass.

organism in any whimsical manner—in a manner that can be easily subverted—the organism in question is unlikely to prosper relative to an organism where this is constantly monitored and resistant to disruption. At the same time, we all know the organism has other problems to solve, many of them simultaneous and equally as pressing: for instance, all organisms are faced with the certainty of impotence or vulnerability; certainty of unstable orientation; certainty of finite reproductive opportunity; and some organisms face an ecology of acute social vulnerability. In which case, these constants cannot exist completely as absolute commands. Instead there must be some modest flexibility to them, so that all these other universal challenges can be sequentially or timely met. This leads me to another technical term. The term I will mostly use for organismic constants—and one that better reflects, specifically, how they work—is what I will call *an ecological imperative*.

An ecological imperative is a construct with a few layers. First, I've chosen the phrase 'ecological imperative' to create distance from the word 'instinct.' The latter construct suggests something primarily genetic, physiological, or inherited from the past, whereas the term ecological imperative better conveys the possibility that organic behavior is held in place by more comprehensive influences (influences which might be internal or external, or a hybrid of these). Second, the term 'ecological' should indicate something holistic—a short hand for the entire gestalt of what makes an organism an organism. In particular, my hope is the term will undermine disputes with respect to the species question, or human nature, that insist on making the past or present a privileged source of causal or semantic explanation. Third, with respect to a definition of the construct: *an ecological imperative is an orienting priority, or proximate goal, that acts as a decision-making heuristic helping an organism to problem solve.* These priorities are essential to survival primarily in their capacity to act as *anchors* or *brackets* in a sea of possible choice. As such, ecological imperatives prevent information overload and decision paralysis. The understanding that these imperatives are proximate is one of the more crucial aspects of this phrase as it help us avoid being confused by behavior that does not seem to support survival and reproduction. For example, choosing not to have children is often used as an argument that humans transcend or defy evolutionary forces. But what is happening here is that critics are simply mistaken as to the most appropriate level of evolutionary analysis—a point I will later explain: people mistake organisms for 'fitness maximizers' instead of adaptation executors. Fourth, ecological imperatives are *disjunctive* and *homeostatic*.[519] In other words, they exist as a kind of command to 'do 'x,' if possible' relaxing or accentuating relative to life history and ecology.

There is one further term I will use to support the conceptual system I have now outlined. This term is *ecological heuristic*. While ecological imperatives are primarily orienting goals, ecological heuristics are the operating rules by which these fundamental goals are accomplished.[520] The most vital of these are the least

[519] I have chosen the term 'disjunctive' even though it is not technically correct so as to better identify these imperatives as operating as *laws*. The more appropriate term is probably 'conditional' but this confuses the matter.

[520] There is a big body of academic literature on heuristics and 'bounded rationality.' Gigerenzer defines heuristics as "strategies that *ignore information* to make decisions faster, more frugally

subject to voluntary interference. However, this is not because they are instantiated biochemically or physiologically. Instead, they exist primarily because they are rules that work—that is, almost any organism would benefit from them provided they are faced with a similar problem.[521] An example of a very ordinary heuristic is 'look both ways before you cross the street,' or 'don't drink milk after the expiry date.' Less facetious operating rules might be seen in perceptual illusions;[522] the way our brain categorizes information before it enters consciousness; how our immune system determines friend from foe; a freezing response when an organism suddenly perceives danger; or how humans have processing rules to quickly calculate where they need to be to catch a fly ball.[523]

What is important to keep in mind is that the basic skeleton of my ecological system can be applied to any complex, teleological natural kind. If we take a chess game, for instance. There are imperatives that structure the nature of what it is to play chess. An ecological imperative for success in chess—the equivalent of an imperative to well-being in an organism—would be: *win the game, or draw, if possible*. A sub-imperative would be: *a)* avoid checkmate, if possible; *b)* put your opponent in check-mate, if possible. Some operating heuristics would be: *ab1)* do not sacrifice any piece arbitrarily; *ab2)* capture your opponents best pieces, if

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and/or more accurately than complex methods" (Gigerenzer and Gaissmaier, 2011, 453; my emphasis). In colloquial terms, it is a 'rule of thumb.' Of note, *a heuristic is considered rational to the extent it is adapted to the structure of the surrounding environment* (ibid. 456).

[521] My view on ecological heuristics dovetails nicely with E. O. Wilson's idea of human nature as constituted by 'epigenetic rules' (e.g., 1998, 178). But see also the work of Helen Cronin (1991, e.g., 346).

[522] See, for example, Gigerenzer's discussion of the 'bumps and dents illusion' (2005, 3 – 5).

[523] See Gigerenzer (2005, 17 – 19).

possible; *ab3)* avoid losing your most powerful piece, your queen, if possible; *ab4)* study the winning moves of chess experts in the past, and learn from them, if possible. What is important to realize is that, other than the first imperative to win, all subsequent imperatives and heuristics *can be* violated, but their preservation is regularly associated with success. As well, on the basis of a few constant goals, and rules of movement, combined with playing heuristics, almost infinite passages of play develop.

3.13) Outline of Ecological Imperatives

I will now outline what I take to be the eminent imperatives for organisms. But, before doing so, a number of qualifications are in order.

First, ecological imperatives are constructs or idealizations. This means they are a rough distillation of experimental research in biology, psychology, and social science. The statements of each ecological imperative also exist within the evident limits of language. This is not to say we cannot improve the precision of each imperative, but a ball-park phrasing of each should be sufficient on the principle of academic charity. To this end, I will state an imperative in its simplest form to make it appropriate for simple organisms, but this form might not readily capture the sophisticated possibilities of how they might be experienced or expressed in humans and other cognitively complex organisms. To deal with this challenge I will offer a cluster of words after each statement of an imperative that are either synonymous with the subject of the imperative, or that might better apply to different species.

Second, with these ecological imperatives, I am not saying that every organism literally needs to 'think' or articulate these formulations to itself, or be conscious that it is, in fact pursuing this imperative, or adopting various operating rules to meet it. If these imperatives apply to an amoeba as much as Einstein, then what we are looking for is various proxies for their existence from all proximate areas of relevant generalization—for example, genes, development, physiology, psychology, behavior, and so on.[524]

Third, keep in mind that imperatives are *homeostatic*. What this means is they are developmentally, ecologically, and, in certain species, socially sensitive. In which case, they are relatively dynamic: they will dilate or constrict as do our pupils relative to sunlight or as our body regulates its temperature through shivering or sweating, as we try to find 'right amounts.' In addition to this, all these imperatives exist only in a loose hierarchy. This means: beyond the overarching imperative of well-being, all the other subsidiary imperatives can be in conflict which each other and are operative simultaneously. This can help us understand why we can feel divided in ourselves and also more eccentric behavior such as somatoform disorder —which I will explain in my final chapter.

Fourth, whatever ones reception to this system, I am using it as a proxy. I am saying that while the detail may be wrong, *something like this exists in principle.*[525]

[524] One possible way to think of ecological imperatives is as the success of a magnet indicates a magnetic field (even though we cannot see it directly).
[525] Rosenberg is relevant here; "Every successful scientific typology is a miracle of question begging and the result of pulling oneself up by one's own bootstraps. One starts somewhere, anywhere, with a special theory, or with presumptions embedded in ordinary descriptions of the phenomena, and

To this end, I will not try to document the entire system in detail. I need only make it plausible. For example, I suspect that all organisms have an imperative to novelty that is also opposed by inhibitive or non-exploratory orientations. Some evidence for this would be exploratory behavior or habituation effects. However, I will not mention the latter in the system that follows.

Fifth, I must reiterate: this system is different from the way biology is usually conceptualized in that each imperative below is a proximate orientation to flourish —not to survive and reproduce. Each imperative is fitness-critical, but biological fitness is a *by-product*. Also, these imperatives are homeostatically constant because there are global ecological constants to hold them in place. As such, *they exist as laws* at an almost meta-evolutionary level: an organism like humans can turn away from survival or reproduction, it cannot turn away from proximate imperatives.[526]

Each imperative is as follows. At times, I have subdivided the imperative into more concrete formulations and, in particular, *human-like formulations*. On occasion I have also added an ecological heuristic (see small Roman numeral).[527]

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attempts to construct a taxonomy. This is roughly how Mendeleev did it for the periodic table, arranging elements according to similarities and differences between well-known properties of chemicals, and without any knowledge of the underlying atomic structure. It was only in the next generation that such knowledge vindicated his typology as the correct one. Doubtless a philosopher could have hamstrung Mendeleev's 'operationalism,' and it was probably fortunate that he did not offer any philosophical justification for the procedure (1985, 186).

[526] Conceptually it may help to initially see these imperatives as *absolute* because their absence would immediately be a disaster for an organism. But then we know that if they did operate absolutely, without flexibility, *this would also be a disaster for the organism*. So this should help us get a sense of their unique nature.

[527] It is important to realize that the operating heuristics of an organic system as complex as humans would be massive. Perhaps we can conceptualize this much like the mapping of the human genome: not impossible, but certainly difficult. See Gigerenzer's discussion of heuristics approximating something like the periodic table (Gigerenzer and Gaissmaier, 2011, 456).

For a more human articulation of each eminent imperative we might preface each of them with something like: preserve, construct, pursue, or find….'x.' We might even prefer to phrase them in a negative as well as positive manner—such as 'avoid ill-being, if possible.' With respect to well-being, what constitutes some full measure of it will be the transient satisfaction of the subsidiary imperatives listed (2 - 10). In humans, we may find a few local ecological imperatives that appear transcendent to well-being: articulations like 'find meaning, if possible;' or 'obey God, if possible.'[528] These exist at levels that are perhaps too abstract and are not developmentally universal. Human 'meaning,' for instance, is likely a gestalt of all the imperatives listed, can be captured by some emphasis of one or more of them, or may fit with some rephrasing of an imperative. If many local ecological imperatives exist simultaneously, then we may get hybrid heuristics such as 'be of value, if possible;' or 'have a purpose, if possible;' and so on; and together these may all translate to a sustained interest in 'meaning.'

Global Ecological Imperatives

1) Well-being, if possible (IP)

Cluster words (CW): eudemonia, flourishing, the imperatives listed below.

Relevant or exemplary phenomena (REP): pain and pleasure receptors; the body's regulation of itself: physiological homeostasis, sustained metabolic functioning, immune system functioning; risk aversion; etc.. But see all the exemplary phenomena below.

1a) Kin well-being IP.[529]

[528] See Frankl (1946/1992).

[529] For an assertive and concerted defense of inclusive fitness, see the responses to Nowak et al in Nature 466, 1057 - 1062 (2010).

REP: eusocial insects.[530]

2) Orientation IP [531]

CW: relative spatial location, order, certainty, prediction, retrodiction.[532]

REP: sensory receptors; distress at involuntary confusion; neuroticism (or hyper-rule bound or redundant behavior);[533] science, history, religion, geography, astronomy, maps, family stories; etc.

2a) Respond to/or do what makes sense IP

i) Follow best reasons to secure well-being.

2b) Respond to/or do what feels best IP

i) Avoid unnecessary pain IP

REP: research congenital insensitivity to pain.[534]

ii) Gain necessary pleasure IP

REP: classical conditioning; drug addiction, inability to delay immediate gratification.

3) Energy/resources IP (i.e., use energy wisely)

3a) Compensate (or get 'a return' on) energy expense IP.

REP: exhaustion; moral concerns with fairness, free-riding, or fair distribution;[535] the tragedy of the commons.[536]

3b) If there is minimal or no energy return, only expend energy if you can afford it.

i) Track/find interactions with adequate probability of return.

4) Potency IP[537]

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[530] See, e.g., Hamilton (1964).
[531] See, e.g, Ogden et al (2006, 65 – 85).
[532] It may be difficult to think of an organism like a sponge orienting. But this does seem to occur. For example, a sponge will accept a graft of its own tissue, but reject that of another sponge. So sponges sense a difference between self and non-self. They can also communicate with one other.
[533] See, e.g., Baer (2002).
[534] See, e.g., Nagasako et al (2003); Cox et al (2006).
[535] See, e.g., Fehr and Gächter (2002).
[536] See, e.g., Ostrom (1990/2006).
[537] See, e.g., Haidt (2006, 220).

CW: adaptation, control, problem-solving, skill-mastery, accomplishment, competence, freedom, empowerment, achievement; self-actualization.

i) Physiologically/affectively privilege or reward success in problem solving.

REP: self-esteem in skill acquisition; testosterone surges or deficits with vicarious wins or losses; learned helplessness;[538] the connection between appropriate challenge, tight feedback loops, and happiness;[539] presumed divine attributes of omnipotence, omniscience, omni-benevolence; the attributes of heroes and heroines in art, literature, cinema; imitation of 'successful people' in their habit, dress, etc.

Local Ecological Imperatives, Phylogenetic, or Development-specific Imperatives'

5) Sexual Pleasure IP [540]

CW: reproduction or replication (in sexual organisms); sexual consummation; sexual arousal.

REP: dating; babies; masturbation; pornography; homosexuality; human difficulty with professions that demand celibacy; bestiality.

5a) Find and secure adequate mate/s IP

6) Care for offspring IP [541]

REP: the physiology of attachment; protective displays of organisms toward threat to offspring.

7) Hygiene IP [542]

CW: cleanliness; purification.

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[538] Seligman (1990).

[539] Csikszentmihaly (1990), Haidt (2006, 109).

[540] Csikszentmihaly is interesting here: "The saying that 'love makes the world go around' is a polite reference to the fact that most of our deeds are impelled, either directly or indirectly by, sexual needs. We wash, dress, and comb our hair to be attractive, many of us go to work so as to afford keeping a partner and a household, we struggle for status and power in part so as to be admired and loved (1990, 101). But see especially Miller (2000).

[541] See, e.g., Bell (2001); Blaffer-Hrdy (1999); Kinsley and Lambert (2006); Small (1998). Small writes: "Like eating and breathing, he desire to conceive, give birth, and care for infants is one of the most elemental urges on earth" (1998, xiv).

[542] This might be listed as a global ecological imperative, but in humans it is likely developmental.

REP: disgust response; nausea; immune system functioning; self or cooperative grooming; symbiotic relationships, e.g., 'cleaner fish;' avoidance of disgusting smells; waste proximity or disposal; waste burial by non-human animals.

8) Self-respect IP [543]

CW: dignity; self-appreciation, self-esteem, self-worth, self-value

REP: goal oriented behavior that is irrelevant to physical survival; cooperation that does not have a high 'return;' confabulation; self-serving biases (e.g., actor/observer asymmetry); selective memory; cognitive dissonance; defensive attribution; depression even when biological needs are secured.

9) Social Status IP

CW: prestige, social appreciation; social approval; social acknowledgment; notoriety; fame or infamy.

i) Foster favorable alliances IP

REP: costly signaling, skill display, fashion, risk taking; cooperation; moral behavior; gossip; verbal exaggeration; conspicuous consumption; conformity; imitation; participation in extreme sports; confabulation.

10) Social Affiliation IP[544]

CW: belongingness, love, intimacy, social connectedness, social engagement, social appreciation,

REP: research on the experience of ostracism;[545] loneliness; social emotions such as jealousy, shame, embarrassment; cooperative behavior with low return.

3.14) Conclusion

If the conceptual system I have advanced is approximately true, this means, first and foremost, humans have essences. It may also be possible on this system to offer a better answer to the general question of what a species is, and the question of

[543] See, e.g., Taylor (1989); Hirstein (2005); Trivers (2011); Sharot (2011).
[544] Haidt (2006, 133)
[545] See, e.g., Gonsalkorale and Williams (2007); Eisenberger et al. (2003).

how we can determine particular species membership. If the essence of organisms is ecological—or partly non-corporeal—then it is possible for the corporeal features of organisms to undergo constant change while ecological imperatives remain constant. This allows us to understand how scientific laws and invariance can be reconciled with the change we expect from evolutionary forces. Moreover, it should help us to see that genetic and phenotypic features *are* important, but what really counts is how each of these are forever organized around problem-solving.

As I am mostly making a point in principle, I will not attempt to argue the strengths and weaknesses of all the available species concepts. Instead I will simply offer an alternative below. I see an appropriate concept as existing in tiers. One objection to anticipate before going ahead is that the system I present would be difficult to apply to extinct species. I think this is true, but it is also a difficulty faced by all other species concepts as well.

> **Tier one:** a species taxon is a natural kind. This means to some degree they are real and subject to scientific laws.
>
> **Tier two:** a species taxon is a pragmatic (or merely ideal) designation to the extent such designations are effective only in contrast to other species, and relative to our own interests. In which case, focusing on diversity within a species is inappropriate unless we are using this as a standard for comparing ourselves against the diversity or similarity of other species. However, the primary search engine for identifying a species is invariance—even if this is only invariance of a certain process of change.
>
> **Tier three:** we can defer to expert biologists on species concepts, if we are looking for a terse definition. The best definition might allow us to see species as a lineage, or as having common ancestry, as exhibiting interbreeding potential, mate recognition, and so on. But we also need an *operational* concept of species!

> **Tier four:** species are a class of organisms delineated by straight comparison across PARG. This is different than merely comparing morphology as, for example, genes and developmental resources, are treated as aspects of morphology.
>
> **Tier five:** species are a class of organism circumscribed, significantly, by *their problem-solving talents* (opportunities), *and handicaps* (boundaries) *over a life-cycle.* The proxy for this is that we analyze organisms on ecological imperatives and heuristics as *mediated* by PARG. Thus, we will look for how a population of organisms are more alike across PARG, than not, and this will reliably follow from shared DARG. Evolutionary forces will be one of many kinds of forces that tend to create convergence in PARG.
>
> **Tier six:** to understand a species it helps to understand the bigger picture of what is natural to them: *their nature*.[546]

This tiered conceptual system accommodates population thinking *and* typology, past and present, phylogeny and phenetics, without assuming any is more fundamental. I will mention just one ecological imperative as an example: use energy wisely, if possible. This is, above all, *a problem to be solved*. Focusing on the talents and handicaps of an organism, in relation to solving this problem, acts immediately to isolate distinguishing features and insinuates shared evolved history. We then consider these shared talents and handicaps relative to stages of development over an entire life-cycle to see how this orientation changes; we can study the impact of present ecology; we can look at the heuristics by which this problem is solved; which genes are connected to this orientation; what physiology, morphology, psychology are recruited; and so on. This system is also inclusive of all animals because none will require sophisticated brains to embody these imperatives—just something akin to a nervous system.

[546] This will be explained in my next chapter.

(4) Innate, Acquired, Socially Acquired, Natural, and Ecological

Proponents of rival paradigms don't so much disagree as talk past each other in mutual incomprehension.

Susan Haack (2003, 43; paraphrasing Thomas S. Kuhn)

At this point, I will pause and review some of the key aspects of the conceptual system I have advanced. In my introduction, I made the claim that human nature does exist and put forward the hypothesis that whatever the objective reality of human nature, it is conceptually helpful to view the construct, primarily, in integrative terms. To draw on my earlier discussion of typology, to argue for human nature is *not* to ignore messy empirical details; rather certain patterns are emphasized or deemphasized relative to practical, and normative goals, and our need to stabilize what is sometimes interpretatively ambiguous.[547] There are a number of reasons we should acknowledge this process. One is that by clarifying our starting assumptions, we can better see what we, as human investigators, impose on the subject matter. Another is that, by attending to our frames of reference, we might understand why there has been relatively little progress on the issue of human nature, and how experts can be at odds in their descriptions of humans while still being, more or less, correct. In my second chapter, I establish the frames I, myself, work from. One foundational point, for my argument on human

[547] The phrase 'interpretively ambiguous' means that stimuli can have more than one meaning. My claim is more specialized. I am saying that some phenomena can be mapped *scientifically*, and with reasonable success, from different starting assumptions and an emphasis on different aspects of a phenomenon. For example, one aspect of the so-called 'parity thesis' (favored by developmental systems theorists) is that nature and nurture cannot be meaningfully partitioned (Perovic and Radenovic, 2008, 12; Licklitter and Honeycutt, 2003, 823 - 824). This seems useful for balancing our attention to *all* the influences on developmental outcomes. But it is *not* a particularly useful starting point for explaining, say, the formation of a callus, or the accuracy and ease with which scientists trace human ancestry (inheritance) using mitochondrial DNA.

nature, is that biology and evolution are not fairly represented by focusing primarily on organic diversity and change. Another is that as a single species, the search for human nature should be a search for a singular nature, and what we all have in common—although I also argue this project is compatible with evident human polymorphism or there being more particular 'natures' within our species. A further series of key points is that human nature is not represented merely by sums of species features; nor is it, strictly speaking, about exclusive species features, or species membership.[548] I also argued that human nature is better viewed as a descriptive rather than an explanatory construct. In my third chapter, I argued against the now almost unanimous view that essentialism, typology, and species fixity, are at odds with our best biological knowledge. And finally, I argued for an ecological view of human nature (or a combined micro- and macro-structural essentialism).

So where does this now leave us? Having made a preliminary case mostly for the human portion of the human nature construct, I will now defend the word 'nature,' or 'what is natural,' as it connects to our species (though also as it applies to other genera). However, there are significant challenges to doing so. One is that the construct is not easily amenable to scientific delineation even though it seems to be a category that comes easily to humans. Another is that what is natural, with respect to humans and other species, is often associated merely with what is

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[548] To re-clarify, essences (or natures) do not determine exact species membership. At best, they are elements of, or proxies for, membership.

innate—a construct that has, itself, drawn considerable controversy over the last sixty years or so.[549] And third, like innateness, what is natural is commonly over-identified with evolutionary adaptations as opposed to prehistoric by-products or incidental features. To meet such challenges, and articulate a version of human *nature* that will have maximal scientific, practical, and normative purchase, I will use an approach similar to the one I used in the first three chapters: I will establish a conceptual foundation; I will reference exemplars of the positions I am for or against; and I will treat the construct nature, or natural, as something multi-dimensional, dynamic, as opposed to something one-dimensional, absolute, and static. The entire project of this chapter will involve fifteen steps.

In section 4.1 - 4.7, I will outline and evaluate some of the recent criticisms of the innate construct. This is, in part, not only because of the lack of formal literature on the construct nature,[550] but also because, many of the challenges that apply to the innate construct apply, in principle, to 'what is natural.' To be clear, my aim is not to extensively engage the literature on innateness. Rather, I will merely use some recent writing as a platform for my own ideas. One of the most important of these is that to properly understand what is natural to humans, it will be helpful to preserve the distinction between innate and acquired, but also add the construct 'socially

[549] For a history see Johnston in Oyama, Griffiths, and Gray (2001, 15 – 23).
[550] I will eventually give a full explanation of what I mean by the construct 'nature.' However, for section 4.1 – 4.12 of this chapter, I will use the word to denote the properties of an organism that equate to something structural, fundamental, stable, basic, essential, pure, or aboriginal. I do not mean 'nature' as, roughly, the physical world beyond human habitation.

acquired' and 'ecological.' For many philosophers of biology, this will seem inane, and amounts to taking a scientific step backwards.

In section 4.8, I will introduce the most elementary features of the constructs 'nature' or 'natural.' I will eventually return to add detail to these constructs in the final sections of this chapter.

In section 4.9 – 4.12, I will return to Elliot Sober's view of essentialism. I will also introduce a paper by philosopher Marc Ereshefsky, who builds on Sober. Sober's paper 'Evolution, Population Thinking and Essentialism' is already over three decades old, but it still acts as a foundation for contemporary philosophy of biology. Both philosophers argue against the idea there are natural human states, features, acts, or environments. I will criticize their position.

Finally in section 4.13 – 4.15, I will present my own view of what is natural. This argument will mark the end of the theoretical portion of my PhD thesis, and I will then turn to details and practical applications. What is worth pointing out is the group of scholars I critique, here, proceed as if essentialism with regard to biology is a doctrine that is clearly wrong. The basic thrust of their project suggests their aim is to reveal how scientists that are proponents of the innate construct are actually corrupted by archaic essentialist thinking. However, if this *is* the case, and my argument for essentialism is sound, then there is no 'corruption' and their project is one better directed merely toward innateness as a construct independent of essentialism.

4.1) Innateness: the Ongoing Critique

With respect to criticism of the scientific credibility of the construct 'innate,' there are a few modern scholars that are prominent in the literature. I will focus on the following philosophers of biology. These are Matteo Mameli, Patrick Bateson,[551] Paul Griffiths, Edouard Machery, Stefan Linquist, and Karola Stotz.[552] The first pair, independently and together, have written some influential papers on the subject; Griffiths has written extensively on the matter; and the last three of the group, notably, and in various combinations including Griffiths, have conducted a series of experiments to determine what non-scientists intuitively think of the construct.[553] In their relevant written work, there are basically two themes. Most eminent, these scholars challenge the scientific value of the construct innate.[554] Their basic argument is the construct is ambiguous and appears to conflate a variety of properties that are distinct.[555] But this thesis is put forward with some qualification. All of these critics encourage ongoing empirical work to discern cases where the properties typically associated with this construct might, in fact, reliably co-occur.[556] However, this qualification reads largely as an option unlikely to confirm traditional property groupings—by laypeople *and* scholars.[557] The favored option is to avoid the construct (at least until a more robust amount of data is collected) and, instead,

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[551] See Mameli and Bateson, (2006; 2011). Bateson is actually a biologist—though one with philosophical leanings.
[552] See Griffiths (1997), Griffiths et al (2002), Griffiths et al (2009), and Linquist et al (2011).
[553] See Griffiths (2009, e.g., 610).
[554] Mameli and Bateson sometimes read as if the innate construct might show itself to be of some value. But see Mameli (2011, 441).
[555] See Griffiths (1997, e.g., 59, 73); Griffiths (2002, e.g., 73); Griffiths et al (2009, e.g., 606, 623); Mameli and Bateson (2011, 436).
[556] See Mameli and Bateson (2006, e.g., 155; 2011, e.g., 441); Linquist et al (2011, e.g., 446).
[557] See Mameli and Bateson (2006, 156); Griffiths et al (2009, 627); Mameli and Bateson (2011, 442).

speak in specifics fostering conceptual precision.[558] For example, Griffiths writes in an early paper on innateness:

> Substituting what you actually mean whenever you feel tempted to use the word 'innate' is an excellent way to resist…slippage of meaning. If a trait is found in all healthy individuals or is pancultural, then say so. If it is developmentally canalized with respect to some set of inputs or is generatively entrenched, then say that it is. If the best explanation of a certain trait difference in a certain population is genetic, then call this a genetic difference. If you mean the trait is present in early development, what could be simpler than to say so?[559]

A second theme, though one that has more of a biographical aspect, is this group is genuinely puzzled as to why so many scholars would continue to defend the innateness construct in the face of such a long history of what they imagine to be trenchant criticism.[560] Griffiths at al (2009) speak of some of the typical non-empirical efforts to clarify the construct as if the 'reformists' should know better.[561] For instance, they describe the reformists as using "philosophical analysis to *side-step* scientific criticism of the concept."[562] In fact, the whole research project now being carried out by Griffiths et al (2009), and Linquist et al (2011), is directed not at the metaphysics of the issue, but rather focuses on the psychology or interpretive structure of the innateness construct. There are also normative undertones here. Griffiths (2002) writes, for example, that *a)* "Human nature is used to argue for the futility of interference", and *b)* that "Human nature is a near synonym for the *innate*

[558] See Griffiths (2002, 72); Griffiths et al (2009, 624); Mameli and Bateson (2011 441).
[559] See Griffith (2002, 82). But see also Linquist et al (2011, 445).
[560] Mameli and Bateson (2006, 156) or Linquist et al (2011, 441).
[561] See Linquist et al (2011, 445). For the term reformist see Griffiths et al (2009, 623).
[562] Griffiths et al (2009, 623; my emphasis).

features of human beings."[563] Mameli and Bateson suggest that one explanation for why the construct 'innate' persists is because it is central to issues people think are 'important.' To make this point, they reference research on IQ heritability.[564] The issue is: people want to know if they should invest money in education to correct IQ deficits, or if this is a waste. Mameli and Bateson claim, if we want the right answer, we must get our concepts right. However, on this occasion, innateness appears the culprit. They write: "One can argue…that in the case of these [debates]…the mistaken inference from 'high heritability' to 'difficult to modify through education' was made via the use of the concept of innateness."[565] Linquist et al (2009), claim "the folk concept of innateness stands in the way of a genuine evolutionary understanding of human behavioral and psychological diversity."[566] Later they add, "there is a plausible overlap in meaning between 'innate human traits' and 'human nature'" and, they go on to say, the latter comes with strong intuitions about "how people are *meant* to be and that no good can come from trying to fight against it".[567] Griffiths et al (2009) compare the construct 'innate' with that of race, insinuating it is not only misleading to "lay consumers of science", but "dangerous"—though in a way that is "obviously less immediately catastrophic."[568]

As for specific arguments in service to these themes, each publication, of course, differs in detail, sequence of presentation, and emphasis. But, as can be

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[563] Griffiths (2002, 80).
[564] Mameli and Bateson (2011) have Herrnstein and Murray in mind (1994), and also Jensen (1969).
[565] Mameli and Bateson (2011, 442).
[566] Linquist et al (2011, 445; see also 449).
[567] Linquist et al (2011, 449).
[568] Griffiths et al (2009, 625).

gleaned from the preceding comments, all have a strong family resemblance. Each scholar, or team of scholars, build out of a tradition that notably gained traction via Daniel Lehrman's 1953 critique of Konrad Lorenz, and via the subsequent work of scholars such as Robert Hinde, Gilbert Gottlieb, and Susan Oyama. However, there is a marked shift in this tradition due to the way scholars such as 'Mameli and co' interpret and use the recent work of psychologists and anthropologists on biological classification—or what is now called folk biology.[569] One finding is especially figural for this group. With respect to organisms, humans across cultures, appear to be essentialists.[570] In other words, people imagine organisms to have an underlying essence, or inner nature, and this is held to define membership to a biological kind and to cause members to posses the same "kind-typical properties."[571] Phrased in terms of the innate/acquired distinction, Mameli and Bateson even entertain the idea (put forward by other scientists) that the distinction, itself, is innate, and they suspect *this* may explain scientists continued use of it even when it "tracks no interesting phenomena."[572]

I will not immediately elaborate on how this research is used in the publications in question, except to say that it seems to propel Griffiths et al (2009) and Linquist et al (2011) strongly in the direction of trying to *empirically* ascertain the connection between folk biology and scientific biology. As for the Mameli and Bateson publications selected, this connection is also their main focus, but they stay

[569] See, for example, Atran (1990).
[570] See, for example, Bloom (2004).
[571] Griffiths (2002, 75, 77).
[572] Mameli and Bateson (2006, 156); Mameli and Batson (2011, 442, 441).

within traditional philosophical analysis. In both Mameli and Bateson (2006), and (2011), there are two argumentative threads. One thread focuses on reductive constructs. Here, various singular candidates for the meaning of 'innate' are introduced, and they set aside those that plausibly overlap across vernacular and scientific form, for further scientific consideration. The second thread stipulates that innateness may well be a cluster concept,[573] but Mameli and Bateson warn it is not possible to decide this at a mere theoretical level.[574]

Griffiths (2002), Griffiths et al (2009), and Linquist et al (2011) all orbit around what are presumed to be the three main traits "that are expressions of the inner nature that organisms inherit from their parents."[575] These are: fixity, typicality, and teleology.[576] The first of these refers to the idea that a trait is hard to change—or "its development is insensitive to environmental inputs".[577] The second, refers to the idea that a "trait is part of what it is to be a member *of that kind*" and is possessed by *all* members—or everyone of a certain age, or sex, or natural subgroup that is not malformed.[578] And the last construct refers to the idea that a trait reflects how an organism "is *meant* to develop".[579] One pertinent question with respect to this triumvirate is that, while these terms may be scientifically expedient, we may wonder whether Griffiths and co have missed phrasing or features even more

[573] Mameli and Bateson (2011, 440).
[574] Mameli and Bateson (2006, 157, 183; 2011, 441).
[575] Griffiths (2009, 609).
[576] Griffiths et al (2009, 609, 607).
[577] Griffiths et al (2009, 609).
[578] Ibid.
[579] ibid.

fundamental.[580] Linquist et al (2011), build on this triumvirate, but refine earlier experiments in a number of ways. One involves changing the study design to examine if the construct innate is synonymous with the phrases "in the DNA" or "part of its nature", or if these express the triumvirate in a distinct way.[581]

4.2) Foundational Criticism of the Critics

In response to this anti-nativist group, it is easy to appreciate the idea we must be as precise as we can with the constructs we use. Beyond this, however, their collective critique has many problems. The impact of framing is especially salient on this issue. In this section, I will start with three very general criticisms and, in the following two sections, move to more refined ones.

First, there is an immediate tension in the select publications by Mameli and Bateson. Right after the introduction of their 2006 publication, they concede their methodology will "rely on what seem to be widespread intuitions and beliefs about which traits count as innate and which traits do not."[582] The reason for this is there are, apparently, *no* empirical investigations on the matter.[583] This is confirmed by Griffiths et al (2009), who claim *they* are the first to empirically document what the 'folk' believe about innateness.[584] And yet, this seriously undercuts the basic argument of Mameli and Bateson (2006). As noted above, Mameli and Bateson's

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[580] Griffiths et al (2009) themselves hint at this. They write "It should be noted that a substantial amount of interpretation is involved in reducing the three hypothesized features associated with innateness to these three information items" (612).
[581] Linquist et al (2011, 448).
[582] Mameli and Bateson (2006, 156).
[583] Ibid. What they do reference to start this paper is a dictionary definition of innateness.
[584] Griffiths et al (2009, 606).

approach in this paper has the following general structure: they introduce a candidate for a scientific version of the innateness construct, and then they meet it with counterexamples to indicate that no one notion is adequate. For example, they might offer a candidate such as "a trait is innate if and only if it is present at birth", and then tell us that "many traits that are not present at birth are classified as innate by folk intuitions", and thus, this candidate does not work.[585] However, regardless of whether Mameli or Bateson are actually correct here, the insinuation over the paper is we should take their word for it on what the folk believe.[586] The reply to this might be that in their 2011 paper they reference the studies by Griffiths et al 2009. But this is still thin. In this seminal research, Griffiths et al's first study tests 244 subjects, and their second study, tests 37. This is a small sample matched against several billion humans that might be relevant to the issue. To be clear, this is not to say the studies are not valuable! *Most* social science research extrapolates from limited data; and, there are *other* ways to triangulate on the data. But the point is—as I hope to show—the whole project (at this stage) rests on a series of dubious assumptions that reinforce each other in a rather circular way.

Second, Griffiths (2002), Griffiths et al (2009), and Linquist et al (2011), simply assume a one-way direction in the interpretation of the folk biology research. As this group correctly point out, folk biology is a label that encompasses a very broad array of findings. One is that biological categories are hierarchically

[585] Mameli and Bateson (2006, 158).
[586] Ibid.

structured.[587] Another is that, within this hierarchy, generic species categories are of special importance.[588] However, beyond these claims, the group presumes that key aspects of the vernacular concept of innateness *derive* from essentialism.[589] For example, Griffiths (2002) states that "The innateness concept is an *expression* of 'folk essentialism'."[590] Griffiths et al (2009) claim that if their theory is correct, "then the cognitive structure that underpins the use of the term 'innate' is an implicit theory that views organisms as having inner natures."[591] And Linquist et al (2011), summarily state, of folk biology: "Membership in a generic species is associated with…the belief that members of a species share a causal essence…which *causes* them to share the typical properties of that kind."[592] Yet, the truth of the matter may actually be the reverse; that is, it could just as easily occur that humans apprehend the *structure* (the external patterns or features) of the entities around them, or the structure of their own subjective experience, and *after* infer essences. Basically, from the organism's experience of its own internal states (such as desire, or fear) and certain external patterns (like motion, or certain smells), the organism projects aspects of its own 'inner world' on to things similar to it in the outer world.[593] This

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587 See, e.g., Griffiths et al (2009, 607).
588 Ibid.
589 The word 'derive' is used specifically in Griffiths (2002, 77).
590 Griffiths (2002, 72; my emphasis).
591 Griffiths et al (2009, 609).
592 Linquist et al (2011, 446; my emphasis).
593 See, for example, Bloom (2004, e.g., 17, 54 – 63). An expert on the subject is Kelemen (e.g., 1999)—who Griffiths et al acknowledge (2009, 608). This idea is key for understanding why essentialism is not simply a quaint folk belief. Humans certainly attribute things like agency to entities that have none—clouds for example. But we get it right when it comes to other living things (even if we are overzealous). The experience of our own inner states dominates our life, is central to our identity, and is *hidden* from others. So it is no surprise we attribute some underlying hidden

interpretation reflects the data in the sense that humans are essentialists in different ways relative to whether an entity is actually animate or inanimate—in other words, registering the patterns for this more basic distinction necessarily precedes what essence is assigned to what.[594] If this is so, then two further points follow. One is that the present hypothesis coincides with why we seem to apply the construct 'innate' to physical features outside of those usually associated with an organism's 'nature'—namely, what we narrowly identify as the 'soul,' or the psychology of an organism. The other is that, if we start at the ground—at external and internal patterns imposed on us, as much as *by us*—then *common experience* is ultimately what links vernacular and scientific forms of the construct. In other words, what science may import is descriptions that are not too far from the truth, even if we find this 'truth' hard to circumscribe in any decisive fashion. As it stands, Griffiths et al (2009) and Linquist et al (2011) are important contributions to the literature, but their approach remains 'free-floating' as they focus on unreliable self-reports about what we *think* is the case, versus *metaphysics*—or whether or not the phenomenon is, so to speak, out there!

4.3) Line-drawing, Language, and Ambiguity

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essence to other organisms. A great analogous case might allow developmentalists to connect. Experiments by Gilbert Gottlieb showed that newborn mallard or wood ducklings had an immediate preference for the calls of their own species. However, Gottlieb's interventions revealed something surprising. When he operated on the vocal cords of the duckling, to mute their voices while they were still in the egg, they no longer showed a preference for their own species when they hatched. Gottlieb concluded it was the sound of their own voice that facilitated the skill of knowing their own kind (Ridley 2003, 154). Attributions of essentialism may work in the same manner, except it is our own inner experience, in part, that helps us to see the nature of other organisms.

[594] Bloom (2004, e.g., 55). But see also Gazzaniga (2008, 249 – 258), or Boyer (2001).

One of the stranger features of the debate in the innate/acquired distinction is the tendency for critics to frame the constructs innate or acquired as absolute (as opposed to treating the distinction as one of gradations). For instance, Mameli and Bateson claim "Any satisfactory account of innateness should at least entail that innateness and the consequences of learning are incompatible: if a trait is innate then it is not learned and if it is learned then it is not innate."[595] Following Richard Samuels, Mameli and Bateson call this the minimal condition and assert that nativists *and* anti-nativists agree to this.[596] However, this framing is highly questionable. As I argued in section (2.7) no one in these debates denies the interactionist consensus. In other words, no one argues that any trait develops in complete absence of experience—in fact, it is doubtful we can even imagine this eventuality (with any ounce of realism). So whatever any 17th or 18th century philosopher may have said, we can immediately rule out the idea that evolutionary psychologists or sociobiologists speak of human traits as if they are entirely

[595] Mameli and Bateson (2011, 437). In both these select (2006) and (2011) papers, Mameli and Bateson do not define what learning is *to them*. One aspect they list as a possibility is: "any change in a brain network…due to the interaction between the external environment and the sensory organs" (2006, 166). They also question the idea that learning needs to be identified with a 'psychological process' (some rational-causal process) as opposed to mere 'triggering' (a brute-causal process) (2006, 167). In particular, they object to Samuel's view that identifies learning with the former saying: "this restriction is unsatisfactory" (2006, 167). This is simply an instance where the critics of nativism are 'moving the goal-posts:' they insist the construct 'innate' be clear but they, *themselves*, are not especially precise on what 'learning,' or 'acquired' is. If innate is contrasted with learning as mere 'triggering,' no one denies this. Yet if learning *is* something 'psychological' then surely there are 'non-psychological' developmental outcomes worth broad distinguishing labels—for example, the human sucking reflex. Wimsatt brought up a similar charge against Lehrman. He argued that because Lehrman had a permissive definition of 'experience,' basically nothing could count as innate (other than the genotype). See Wimsatt (Bechtel, 1986).
[596] Ibid.

'innate.'[597] When we argue about innateness, we are arguing about *degrees* or amounts of experience (or learning) relative to trait formation.[598] An exemplar of evolutionary psychology is useful here. In this instance, I cite Tooby, Cosmides, and Barrett partly because their understanding of innate also undermines the dogmatic charge that, for evolutionary psychologists, innateness is only about adaptations. They write:

> When we call something *innate*, we do not mean that it is 'encoded entirely in the genes,' that it is genetically determined, that it does not develop, that the environment played no role or a lesser role in its development, and so on—nothing real has those properties: not eyes, not eye color, nor aortas, nor otoliths. What we mean is that it reliably develops across the species' normal range of environments. Reliable development (innateness) is caused by the interaction of the ancestrally coordinated set of environmental regularities and genetic regularities. We do not mean *present at birth* if by that one means *expressed at birth*. An innate feature could be the product of selection, a by-product of selection, or a property fixed by a stochastic process. In each of these cases, it is a regular part of the architecture of the organism.[599]

A critic might reply to this by arguing that Tooby, Cosmides, and Barrett are scientists, and we need to direct our discussion more at the level of folk biology. But even some of the folksier interpretations of the innate construct are still not far off what is passably scientific. For instance, one presumably scientific way of thinking about innateness is in terms of features that are developmentally precocious.[600] Early in Mameli and Bateson (2006), they introduce the idea that "A trait is innate if and only if it is present at birth."[601] They go on to rule this out as a good candidate

[597] Beyond some of the examples I go on to provide, see, e.g., Daly and Wilson (1978/1983, 248 -249).
[598] See Wimsatt (Bechtel, 1986).
[599] See Tooby, Cosmides, and Barrett in Carruthers et al (2005, 323).
[600] See Wimsatt (Bechtel, 1986), or Tooby, Cosmides and Barrett in Carruthers et al (2005, 312).
[601] Mameli and Bateson (2006, 158).

for a scientific version of innateness, in part, because “Prenatal learning occurs…and learned traits are paradigmatic examples of lack of innateness according to the folk view.”[602] However, we can see that even if ‘present at birth’ is not scientifically adequate, it still aligns with the idea of precocious development—or, the idea that features appear reliably with specific environmental input, or in absence of the quantity or quality of stimuli we might expect necessary.[603] And this may get at the heart of the issue. I will make four points.

First, it is no improvement to simply say that a trait emerges via some multi-directional, interactive, developmental process. This is because every trait ‘develops.’ The fundamental distinction we are trying to capture with the word innate (judging by the academic literature) is what develops and is sustained primarily by causes that are *a)* ‘biological,’ *b)* prehistoric or prenatal (versus those that are postnatal),[604] and *c)* those that are not significantly determined via opportunities for imitation, or associative learning, made available by other humans (either currently or cumulatively acquired from past humans). This, of course, is a claim that is subject to ongoing empirical testing, but it is notable the 26 singular definitions of innate provided by Mameli and Bateson, and the discussions of

[602] Ibid.

[603] This matches, for instance, Chomsky’s ‘poverty of the stimulus’ argument.

[604] I could use the word ‘distal,’ or ‘ultimate,’ instead of prehistoric. But I feel prehistoric is a term that is not as vague in this context. By pre-historic I mean, roughly, the time period prior to the existence of tribal societies, chiefdoms, or states. Other proxies might be the time period prior to agriculture, sophisticated human technology or art (e.g. hand-axes).

Griffiths at al (2009) and Linquist et al (2011), also reflect this.[605] However, if this is true, then statements about canalization, or what have you, will capture innateness only if they combine with an emphasis on causes prior to the present life-cycle of the organism, and that are distant from 'culture.' To put this colloquially: it is evident the vast multitude of traits we apprehend are not phenomenologically the same! For instance, we do not need to be an academic to see that the species-typical human feature of being able to breath, having a tail bone, or a desire to protect ourself from harm, is somehow substantively different than, say, the feature of committing an entire phone book to memory and retaining that memory. So, at the very least, whatever we say about the developmental process, it is *orienting* to have some roughly appropriate words indicating the difference between these two types of phenomenon: causal sources of the past, and those that are largely biological, versus those of the present that are mostly cultural. This may help us understand why, even if the words change, the innate/acquired distinction is unlikely to go away.[606]

Second, to return to a phrase like 'present at birth,' even accepting the fact we can improve what we mean by the construct innate, it is puzzling why there is so much concern about normative danger—especially given human diversity and the fact that scientific, or not, many people will find a way to misapply a phrase, or

[605] What I mean here is: no one makes a claim that a good candidate for innate is one that defines the trait as socially constructed, or radically developmentally unstable.
[606] "The problem for those would issue an outright and total denial of nativism and abolish the innate-acquired distinction, leaving nothing in its place, is that it serves a real function: *If the innate-acquired distinction did not exist, it or something like it would have to be invented by evolutionary biologists to talk about the evolution of the adaptive design of the phenotype in response to the structure of the information in the environment*" (Wimsatt in Bechtel; 1986, 203).

interpret a phrase in some idiosyncratic manner. What is eminently important is what scientists themselves decide so as to effectively carry out their research. For example, as one of the folk I might claim my daughter is shy by nature, that her shyness is innate, or that she was born shy, and it is not implausible that expert investigation might confirm my statement.[607] But, true or false, there do not appear to be any outright good or bad consequences that follow from this. It might happen that, even if I am scientifically correct, my daughter protests the label, takes a public speaking course, and with some diligence becomes a sought after speaker. Or, I am scientifically wrong, the label becomes self-fulfilling, and yet my daughter still becomes a happy librarian instead of a public speaker. The scenarios are endless. Good science (or scientific terminology), may offer better *control* over specific outcomes, they may valence our prudential and moral choices in the 'right' direction, but good science, itself, does not lead us straight to prudential or moral wisdom.

Third, the issues brought up in this section highlight two problems likely to plague *any* scientist studying systems that are complex or changing. One problem has to do with what philosophers would call line-drawing.[608] Scholars desire conceptual precision, and yet some phenomena simply do not allow it. For instance, where is the exact point at which we can claim someone is bald, tall, intelligent, and so on? When is it that summer becomes fall? And when is it, exactly, that we can say we have mastery of a foreign language? Scholars define and operationalize these

[607] See, e.g., the work of Jerome Kagan (1994).
[608] See, for example, Sober (1980, 356 – 357).

kinds of *real* phenomena, but it does not mean they objectively or accurately do so. The other problem is simply the fact that language is ill-suited to capturing phenomena that are multifaceted. We can take some of the most common constructs of academic interest and, from a perspective of scientific precision, all remain ambiguous despite our best efforts. For instance: life,[609] causality,[610] self-awareness, free-will, happiness, meaning, altruism,[611] aggression, species,[612] genes,[613] learning,[614] culture, religion, beauty,[615] art,[616] normal,[617] political left[618]—and this is to ignore even simpler words, such as chair, vehicle, tree, and so on.[619] This is not to deny that many constructs should be abandoned—and there are good historical examples in constructs such as Freud's Oedipus complex, phlogiston, the four humors (such as yellow bile), luminiferous aether, or the 19th century medical condition known as female hysteria. However, even based on just popularity alone,

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[609] Machery (2009)
[610] Corry (2006, 61).
[611] Sober and Wilson (1998, 17).
[612] Griffiths himself claims there are "twenty or so current species concepts" (Wilson, 1999, 210). But see also Hey (2006).
[613] Griffiths and Neumann-Held (1999).
[614] As noted Mameli and Bateson, themselves, call the construct 'learning' into question (2006, 166).
[615] Dutton (2009).
[616] Dutton (2009, 47 – 63).
[617] The issue of what is species-normal and abnormal is a charged one. See, for example, Lloyd in Hull and Ruse (1998, 552 – 556), or Glover (2006).
[618] Bobbio (1997).
[619] For example, Bloom writes: "there are categories that are artifacts because human goals and interests determine their boundaries. This is the case for dogs. What counts as a dog is partially determined by our own interests, by what we say is a dog…This is true as well for categories such as flowers, grass, herbs, weeds, and trees. These do not correspond to objects that share some common microstructure. They are instead groupings of organisms that share certain humanly relevant properties, such as size and taste. The English word for 'tree,' for instance, refers to a biologically diverse set of plants. From a botanical point of view there is no such thing as a tree" (Bloom, 2003, 54). I use Bloom to make the point that even simple objects require multi-faceted description. I do not agree with him there is no common microstructure to these objects.

innate and acquired have a linguistic tenacity that places them squarely within the first list as opposed to the second.[620]

Finally, if the innate construct is as inadequate as critics claim, it would be helpful to have model examples of biological constructs that are meant to have approximately the same scope of description, or explanation, yet still maintain ideal scientific precision. This at least gives proponents of innateness a chance to understand the standard they must shoot for, and to see that not every construct that might be multi-faceted must face reductionism to one or two of its constituent elements each time the construct is presented (rather than opting for the imprecise short-hand). Moreover, we would expect consistency among critics: if the construct 'innate' is not allowed multiple and/or overlapping facets, then we would assume the critic is not likely to tolerate, say, the species construct—which also has many facets—or any other such construct.

4.4) Framing Amendments

So far, my primary aim in the last two subsections has been to make a case for science co-existing, not just with ambiguity, but with aspects of common experience that are not likely to ever enjoy precise demarcation. However, with respect to the innate/acquired distinction, there *are* ways to still add clarity. Earlier I noted that Mameli and Bateson suggest that one way to salvage innateness is to treat it as a cluster construct. In other words, innateness can be understood as

[620] Wimsatt writes "The innate-acquired distinction is one of the oldest in our conceptual armamentarium, dating back at least to the time of Plato" (1986, 185); and Mameli and Bateson say recent empirical work by cognitive anthropologists suggests the innate-acquired distinction is pan-cultural (2011, 441).

representing, not a single property, but many distinct co-occurring properties where no one property in a cluster need be present in all cases. Mameli and Bateson express doubt that such a cluster exists—at least in the case of human cognitive traits.[621] However, I suspect Mameli and Bateson, and like-minded others, are incorrect on their estimation of innateness as a cluster construct. I agree confidence in this conclusion will involve further empirical work. But we also have not yet come to the end of what traditional philosophical analysis can offer. I offer three amendments to the debate which, themselves, are best seen in a cluster rather than individually. As a single unit, these amendments weaken many of the counter-examples against innateness.

One important refinement for the debate would involve a very simple change in framing. All the scholars in question take up their analysis of innateness without recognizing the construct has a slightly different meaning when applied to a species, a local population, or an individual. For instance, if we are trying to isolate what is innate for a species, then we will look for what is universal, or species-typical, and we may emphasize prehistoric elements.[622] However, this would not be the same for a local population. In the case of lactose intolerance, Tay-Sachs, sickle-cell anemia, or blood type, we may want to use the term innate to describe these

[621] Mameli and Bateson write: “good evidence must be provided for the claim that a cluster [of co-occurring innate properties] actually exists and is not an illusion…Our current opinion is that no clear and well-defined cluster exists, at least not for the case of human cognitive traits. We also recognize this is an empirical matter and therefore an open issue” (2011, 441).
[622] This is not to say that what is universal is necessarily an adaptation. For instance, it could be that pentadactylly is universal, but this may be due primarily to developmental constraints rather than selective pressure.

conditions, as they reflect evolutionary history, and are developmentally robust, but universal is not a description that is appropriate here. Likewise, when we speak of a condition such as Huntington's disorder, this condition is developmentally robust, but the condition reflects relatively local causes—and is certainly not a species-universal. The value of applying the innate construct to tighter frames of analysis will also hold true for my eventual discussion of what is natural. This framework also coincides with our sense of humans, human groups, and individuals as having natures. For instance, human nature, or male nature, will be slightly different from each other, and different from individual temperament.

Another refinement would involve retaining the constructs innate and (socially) acquired, but would also add the construct 'ecological.' This would honor the interactionist consensus, but also make it less of a platitude. Ecological features, would reflect trait stability that is a confluence of proximate and distal, genetic and epigenetic, as well as endogenous and exogenous causes. As a mostly theoretical construct it is, of course, an almost empty statement—as interactionism is. However, as a practical construct, it could be used to refer to at least two phenomena. One would be for invariance that is strongly epiphenomenal, or a by-product of causal variables and processes that are manifold, diverse, and layered, but are themselves constant.[623] For example, one of the claims repeatedly used to challenge the value of the innate construct, is some version of the fact that humans

[623] A very simple example of a by-product would be additive color: yellow can be a constant by-product of an overlay of the constants red and green—or we might even call yellow 'emergent.'

believe water is wet, quenches our thirst, or exists in liquid form. With respect to the latter, Mameli and Bateson suggest that, stated as such, the folk do not think this belief is innate.[624] I suspect this is true. However, the stability of the belief that water is liquid likely derives from two broad sources. One is a variety of organic constants such that human skin and the human nervous system have stable form, and may arguably be considered innate. The other is that water as H20 is also a constant—or a chemical or environmental constant. In turn, the interface of each of these constants leads to an epiphenomenal constant: the belief water is a liquid.[625] As well, what is important to stress, is this belief is not one that is acquired or lost via extensive associative learning. In other words, our culture could instruct an entire generation that water does *not* exist in any liquid form, and it is unlikely this instruction would ever 'take' despite our best efforts.[626] The second phenomenon that falls within the construct 'ecological,' would be with respect to where there is a

[624] Mameli and Bateson (2006, 164).

[625] What is important to realize is that almost everything in the universe is, in some sense, epiphenomenal—for instance, not just 'water as wet,' but the components hydrogen or oxygen. (We also say something similar when stating all biological phenomena are the result of interactionism). But this may get at the heart of the matter. It is impossible to make significant progress investigating a complex phenomenon without holding some aspect of the phenomenon, or the 'context,' steady while focusing on other aspects. This requires creating what are, strictly speaking, *artificial* (and sometimes temporary) boundaries. For instance, we may want to understand the impact of a certain style of teaching math to children—the impact of the so-called 'environment.' In doing so we hold constant and ignore many complicating variables. We might start by assuming that all subjects have many things in common—perhaps, more or less, the same motivation, attention span, the same capacity to learn, and so on. We may eventually find out this is technically too artificial. And yet, *we can still make reasonable scientific progress partitioning the world this way*. The critics often lose sight of the forest through the trees, insisting on the narrowest (or most expansive) scientific frame when, in truth, we need only categories expedient to generating scientific discovery.

[626] This is of course, assuming that we can survive only if water exists in some drinkable form. We can imagine an arid or ice planet whose inhabitants survive on juice that is mixed with water in secret, or pills or popsicles that dissolve into water, or something like that. But the idea is, once exposed to water in the form of rain, rivers, lakes, or oceans, and once we are capable of articulating it, that singular experience will be as liquid, as wet, or as quenching thirst—despite that water can also be in frozen form, or will support other adjectives as well.

seemingly one-to-one correspondence between a developmental resource and an organismic feature.[627] This may exist where the developmental stimuli is species-typical, or morph-specific (such as genital licking by a rat mother and the development of penile reflexes in a male rat pup) or where exogenous stimuli is more idiosyncratic, but also one-to-one, as with the impact of a human mother ingesting alcohol or thalidomide and the known impact on the fetus. In this schema, what we would call 'acquired' or 'environmental,' as opposed to ecological, would encompass features that develop *a)* only when exposed to apparently *simultaneous* conglomerations of exogenous stimuli (such as in a drug overdose due to the ingestion of multiple drugs, while in settings, or with people, that are also stressful or activating), or *b)* when a trait exists only via repeated and fairly prolonged exposure to external stimuli, prolonged associative learning (such as in the case of becoming an expert in a capacity such as in school, arts, sports, career, and so on), or when the trait disappears soon after these stimuli are removed.

This leads me to my final framing amendment. When it comes to the construct innate, critics seem to insist that, to be scientifically valuable, the constructs we employ must have an *experimental*, or laboratory level of precision. And yet, what we know of the laboratory is that while scientists' operational definitions are precise, they are often *reductionist* and sacrifice scientific scope. For example, we might want to determine how violent some particular culture is and then identify violence as the relative number of cases of murder over a certain time

[627] Wimsatt (Bechtel, 1986).

period. This may satisfy many scholars as to precision, but we all know there is more to violence than this. Moreover, if we try to broaden what we mean by 'violence,' we will find that we tend to creep more toward the imprecision of folk-biology—or at least precision that is communicatively cumbersome. Much of the debate on the value of the innate construct would abate if critics would allow that many popular terms are scientifically helpful in their *scope*—or at a communicative or descriptive level—rather than at an experimental one. This also means that, as scholars, we may end up constantly juggling to find terms that are not too narrow or too expansive relative to their scientific purpose. But it is important to keep in mind that *either end of the spectrum can be inexpedient or too artificial*.

4.5) Fixity, Teleology, Typicality, and Framing

Griffiths (2002), Griffiths et al (2009), and Linquist et al (2011), argue that fixity, typicality, and teleology are strongly associated with the construct innate and that the latter is associated with having an evolutionary origin.[628] They indicate they are in the process of designing a study to determine what scientists actually think on the matter but, in the meantime, they speak as if the folk belief, and the 'scientific' one, are very similar.[629] In addition to this, they use standard philosophical analysis to provide counter-examples to the mistake that evolution necessarily implies fixity, typicality, and teleology. I suspect, there are some ways their particular perspective is accurate, but it is also questionable in many respects.

[628] Griffiths (2002, 73/74); Griffiths et al (2009, 624).
[629] Griffiths et al (2009, 626); Linquist et al (2011, 450).

First, there is ample evidence that many specialists do not use the term 'innate' in a way that is ill-defined (relative to other constructs) or hides what they really mean.[630] Accuracy on this claim depends, of course, on extensive statistical work about what we find in the literature. But, one way to triangulate on this is with reference to how often different phrases are actually substituted for the word 'innate' (and, one assumes, this occurs to achieve the precision critics demand). For example, psychologists David Bjorklund and Anthony Pellegrini speak of 'information processes biases and constraints,' and the ease of certain kinds of learning;[631] neuroscientist Michael Gazzaniga uses the word 'biological predisposition;'[632] evolutionary psychologist David Geary writes of innate and acquired in terms of 'biologically primary' and 'biologically secondary' abilities;[633] anthropologist Pascal Boyer speaks of innateness as "a series of skeletal principles, initial biases, and specialized skills" that develop given a normal environment;[634] and sociobiologist E. O. Wilson writes of innateness in terms of 'inherited neurobiological traits' that cause us to see the world in a certain way and prepare us to learn certain behaviors more easily than others;[635] and so on.[636] I suspect these

[630] Steven Pinker is a scholar who seems to use the term a fair amount, although he does carefully explain his use.
[631] Bjorklund and Pellegrini (2002).
[632] Gazzaniga (2008).
[633] Geary (1995).
[634] Boyer (2001, 113).
[635] Wilson (1999, 162), but compare to (2012, e.g., 194).
[636] One interesting fact is the word innate does not often turn up in the indices of classic texts where we might assume the word is important. For example, Daly and Wilson (1978/1983), Wilson (1978), Pinker (2002), Dawkins (1982/2008).

substitutes for the term 'innate' might also be unsatisfactory to the critics, but this is a slightly different matter.

Second, there are lots of examples where the meanings of innate that some critics find tolerable, are actually those specified by proponents. For example, one candidate that Mameli and Bateson (2006) identify as having potential scientific value is that of a trait being developmentally canalized relative to environmental input. For this to be the case, Mameli and Bateson say, there must exist "an evolved mechanism adapted to ensure that the development of the trait is robust with respect to some environmental perturbations."[637] Jerome Barkow (1989), one of the progenitors of evolutionary psychology, defines 'innate' in a similar way.

> The term 'gene' is sometimes linked to 'innate,' which has a strong connotation of immutability. An 'innate' behavior is one that will manifest itself *not* regardless of the environment but within a wide range of environmental inputs. This distinction is crucial. All behaviors are the product of immensely complex gene-environment interactions.[638]

Another progenitor, Donald Symons writes much the same, and in a way that certainly clarifies his use of the construct (1979). Symons defines innateness referencing Lehrman. He gives two possible definitions, but of the second he writes, "the behavior of an individual animal is said to be 'innate' if it develops in a relatively uniform or fixed way despite normal environmental variation."[639] Symons then appeals to multiple possible frames on the issue. He says

> Although the concept of innateness is of little use in the study of behavioral development, it can be useful when one's aim is to call attention to the

[637] Mameli and Bateson (2006, 177).
[638] Barkow (1989, 27).
[639] Symons (1979, 15).

> existence of developmental fixity or to explain, in an ultimate sense, why, or in what circumstances, selection favors particular developmental strategies. Thus, in the course of this book when I wish to emphasize the existence of developmental fixity I shall use the word 'innate' and enclose it in apologetic quotation marks.[640]

Second, many of the presumed conflations, by scientists, of evolutionary origin with innateness, and innateness with fixity, teleology, and typicality, exhibit some conflating themselves. For instance, Linquist et al (2011), provide three quotes where scientists are held to be guilty of this, and yet, in each case, their interpretation is certainly not a literal one.[641] In the hands of Linquist et al (2011), the primatologist Sarah Brosnan's statement that people might be "wired" to respond to inequity is translated as "developing independently of the environment".[642] Jonathan Haidt and Craig Joseph's phrase about certain normative ideas developing "even if they are not taught by adults" is translated as "development without environmental input".[643] And Murray Millar's use of the phrase "produced by natural selection" is immediately translated as "being an adaptation".[644] These translations may not seem overwrought, initially. But against the background of just how often it is explained by evolutionary psychologists, and like-minded others, that *nothing* emerges without the environment, or that natural selection produces many features that are *not* adaptations, the depictions of Linquist et al (2011) are puzzling. To take the case of Haidt and Joseph, 'not taught' does not

[640] Symons (1979, 17).
[641] Another example of this kind is found in Griffiths et al in reference to Lorenz (2009, 621).
[642] Linquist et al (2011, 445).
[643] Ibid.
[644] Ibid.

mean 'does not require any experiential (or environmental) element: the passage quoted even specifies "not taught *by adults*."[645] Much the same applies to Brosnan and the word 'wired.' With respect to Miller, and the idea of natural selection equating to adaptations, it may be that 'selected for problem-solving' shares something with the definition of 'teleology' as goal-directed. But framed as 'how the organism is *meant to be*,' the word takes on a pseudo-scientific dimension, and does not align with innate as used by evolutionary psychologists, or as they explain natural selection.[646] Tooby and Cosmides write:

> In addition to adaptations, the evolutionary process commonly produces two other outcomes visible in the design of organisms: (1) concomitants or by-products of adaptations…and (2) random effects….concomitants of adaptations are those properties of the phenotype that do not contribute to functional design per se, but happen to be coupled to properties that are…bones are adaptations, but the fact they are white is an incidental by-product…Finally, of course, entropic effects of many types introduce functional disorder into the design of the organism…Classes of entropic processes include mutation, evolutionarily unprecedented environmental change, individual exposure to unusual circumstances, and developmental accidents.[647]

Finally, Griffiths (1997), and (2002), Griffiths et al (2009), and Linquist et al (2011) are all publications that express a concern to separate our understanding of evolution from automatic inference to species-universality—or what Griffiths (2002) coins typicality.[648] This argument begins with a clarification that two properties are actually conflated in our traditional notion of universality. One is the

[645] Ibid.
[646] For example see Francis for similar misrepresentation (2004, 5 – 6). 'Meant to be' suggests 'pre-ordained,' whereas evolutionary psychologists mean develops reliably even if contingently.
[647] Tooby and Cosmides in Barkow, Tooby, and Cosmides (1992, 62 - 63).
[648] Griffiths (2002, 81).

idea of organismic features as monomorphic. The other is of organismic features as pancultural. Griffiths (2002) explains that a trait is monomorphic "if only one form of that trait is found in a species" and, here, he gives two human examples: "the ability to synthesize vitamin C and the elevation of heart rate in fear."[649] In contrast, Griffiths notes "a trait is pancultural if it is found in all cultures."[650] From this start, Griffiths claims that "Neither being monomorphic nor being pancultural has any very strong connection to being the result of adaptive evolution."[651] Griffiths (2002) and Griffiths et al (2009) *do* defend this claim empirically. For example, with respect to monomorphism, they highlight some of the ways evolved traits can be polymorphic; and with respect to traits as culture-specific, they highlight how different human groups often reflect adaptations to different ecological zones—such as high altitude.[652] However, at least two things can said in response. One is that, as these scholars themselves acknowledge, this is all common knowledge for the specialist—and they actually admit this of evolutionary psychologists.[653] Thus, their argument seems better directed to folk biology than modern science—or at least requires far more work at the stage of justifying their focus on the triumvirate of typicality, fixity, and teleology. My second point is, even when we agree to these qualifications on evolution and universality, there is still something deceptive in this emphasis. For one, as critics admit, natural (and artificial) selection tends to drive

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[649] Griffiths (2002, 74).
[650] Griffiths (2002, 74). See also Griffiths et al (2009, 624, 625).
[651] Griffiths (2002, 74).
[652] Ibid.
[653] Griffiths (2002, 74); Linquist et al (2011, 445).

out variation in a population.[654] For another, if we add a third dimension to species-universality, the dimension of what is phylogenetic, *trans-generational*, or salient in *the life-cycle of the species*, then many polymorphic and plastic features are, in fact, polymorphic and plastic in very evident patterns. For instance, human genitalia is polymorphic yet *universal* to our species, as is a certain range of hair or eye color. Likewise, there are different 'culture-morphs,' and yet they all exist in universal patterns: all viable cultures must adopt some minimum of care for human offspring; they must deal with the problem of provisioning; the problem of free-riding; sanitation; and so on. So the statement that evolution does *not* have any strong connection to (contingent) species-universals (at least in later stages of speciation) is arguable.

4.6) Toward an Appropriate Construct for Innateness

Scientists aim to be exact, and this is essential to the act of discovery as well as description. Yet, this is also a limited frame if we are to respect the dynamism and complexity of living things. In regard to innate as a construct, innateness cannot be accurately captured by a single terse definition. This means we can agree to the admonition of critics to say exactly what we mean, but this can occur at critical moments, such as in an introduction, and from there we can use the short-hand (innate) so as to expedite easy reading. My own version of 'innate' exists at an accurate *descriptive* level, rather than at a purely experimental one. This means it aligns both with science, as well as some of the intuitive wisdom of folk-biology.

[654] See, e.g., Sterelny and Griffiths (1999, 36), or Lewontin in Dawkins (1982/2008, 21).

Some foundational elements to my version of the innateness construct are as follows.

First, innate is a relative construct. In other words, we can enhance our apprehension of it by holding it in relation to exemplar phenomena that it is not. There are many constructs like this. For example, the construct selfish benefits from exemplary phenomena we imagine to represent unselfish. The same can be said of the constructs natural and artificial; happiness and sadness; cultural and biological; female and male; human and non-human animals; and so on. This is not say that these constructs exist as distinct antinomies. The reality is they exist on a continuum with some degrees on the continuum being almost indistinguishable—for example, we can imagine happiness that borders on something close to unhappiness, or sadness. However, despite our inability, at times, to clearly delineate what these constructs represent, they are experientially robust.

Second, if innate is a word that fundamentally conveys information inherited from the past, as opposed to the present, then whatever we take to be the fundamental unit of evolutionary inheritance must be a touchstone for the word innate. Here we may speak of expanded inheritance, cellular resources, and so on. But, to be scientific, this unit of inheritance will prominently include genes. To be clear, this does not preclude inheritance at other levels of biological organization—for example, what might be inherited due to the actions of a group. However, the idea of phenotypic features as correlated to the presence or absence of specific genes and genomes—or as being *encoded* by genes—is as viable as saying that teaching Spanish correlates to speaking Spanish. The development of both outcomes is contingent and complex, and depends on a vast multitude of other variables, yet each is a scientifically reliable way of speaking. Mameli and Bateson deny the notion of genes as encoding phenotypes by claiming that no one has been able to legitimately show how this can be mapped. However, we do not need to be able to map every impinging variable or twist and turn of development. The absence of a Spanish teacher and the accompanying decline in Spanish indicate there is something, here, worthy of investigating relative to the issue of causation—just as mutations in the FOXP2 gene suggest something causally significant in subsequent speech impairment.

Third, if we are going to speak of genes as encoding phenotypes, or even of cultures or sub-cultures as 'responsible' for certain phenotypes, then we also need to employ the notion of evolutionarily normal or abnormal environments. These two constructs are ambiguous. I will eventually try to clarify them when I introduce the construct 'natural,' but to begin to triangulate on these words we can start by considering technology that was not likely to have been a big part of evolutionary history (and is, thus, abnormal) and consider ways its impact has been dramatic—for example, atomic weaponry, birth control, thalidomide, and so on.

Fourth, to properly gain a sense of innateness, we must treat it as a line-drawing judgment. This allows us to remain interactionist while still bracketing phenomena for scientific and communicative possibility. This means, we must concede that all organic traits are partly genetic. Thus, preferring one work of art to another; driving on the right hand side of the road versus left; choosing to be Catholic or atheist; and even phenomena such as rape, or social inequality, all have, *however weak or indirect*, genetic influence. This is not a controversial point. For example, Mameli and Bateson state: “All phenotypes are genetically influenced because genes participate (one way or another) to the development of all phenotypes.”[655] And, we can compare this to scholars usually imagined as opponents. Here, I will conflate evolution to ‘a process involving genes,’ but Thornhill and Palmer write: “When considering any feature of living things, whether evolution applies is never a question. The only legitimate question is how to apply evolutionary principles. This is the case for all human behaviors—even such by-products as cosmetic surgery, the content of movies, legal systems, and fashion trends.”[656]

Fifth, to understand the construct innate, we must contrast it not just with acquired, but with socially acquired, and ecological. I elaborated on this in section 4.3 and 4.4, but Mameli and Bateson make a point that touches on this. They propose a candidate stating in *absolute* terms: “A trait is innate if and only if it is not learned.”[657] They claim this is problematic as follows.

> One problem with this proposal is that learning is itself a theoretically controversial notion, variously regarded as hypothesis testing, conditioning (classical or operant), synaptic pruning or some other kind of selective process that operates on neural structures, any change in a brain network due to stimuli generated in the sensory apparatus by the interaction between

[655] Mameli and Bateson (2006, 159).
[656] Thornhill and Palmer (2000, 12).
[657] Mameli and Bateson (2006, 166).

> the external environment and sensory organs, etc. The relations between these views are far from clear, and often display inconsistencies.[658]

In response, we can say, with utmost confidence, that *learning occurs whether we can scientifically define it or not*. An organism that could not do so, would quickly be a dead one. It is also obvious this can happen as a biological process (say, at a cellular level, as with our immune system); at a psychological level, (say, apprehending that standing in the rain makes us wet); or at a social level, where we learn we cannot sit at the dinner table with our hat on. However, at the point we must avoid a construct such as 'learning,' the vaunted 'science' we hold ourselves to ceases to have relevance.

Finally, to return to the idea of innate as a relative construct, *innateness is not something that exists in opposition to the developmentalist critique*. In fact, the development of the organism absolutely requires something to be innate—that is, unless we are to assume that development is some environmental *program* that cannot be checked. *Development requires interactive elements*, and these elements do not simply invent the 'knowledge' of how to interact with each other every generation. For example, mitochondria must 'know' what can be converted into energy and what cannot; human lungs must 'know' to interact with oxygen as opposed to water; and, likewise, our nervous system must 'know' what stimuli to register as aversive as opposed to not. In each case, the interacting elements somehow *speak the same language*, but this would be impossible without something

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[658] Ibid.

that is 'given' in the system, as a highly open-ended process would be prone to an enormous amount of dysfunction. We can imagine, for example, one person who can speak, and one who is congenitally deaf. No amount of verbal translation will create the reception, in the deaf person, of the speaking person's voice. There needs be a sensory modality with the capacity to register certain sound waves. In the same way, learning is a construct that, itself, requires explaining.[659] In fact, it cannot occur unless some 'extrinsic' element is fairly quickly recognized as relevant or irrelevant, and the process, or organism, has a way of avoiding the latter. At a psychological level, this will usually require a functional memory of some kind. As Steven Pinker writes, "learning is not some surrounding gas or force field, and it does not happen by magic. It is made possible by innate machinery designed to do the learning."[660] In other words, we can artificially partition the developing system at any point in the life-cycle, and wherever we decide to put boundaries on it, some elements in the system must be 'given,' or prepared for interaction. What is 'given,' and what is not, may change as a system emerges, but there is no mere osmosis of whatever resources are required—just as not every key opens every lock, or every lock fits every key.

4.7) Innateness

The elements of what is innate, as a construct, are listed below. These elements are relatively distinct but can be mixed and matched with respect to

[659] Confer et al (2010, 117).
[660] Pinker (1997, 33).

whatever phenomenon we want to account for. These elements produce a gestalt rather than a linear definition, which means each facet is inadequate, in and of itself. The first two facets are primary and can be paired with any number of the remaining facets. Innate is…

1) *At the level of a species* (versus an individual or population), what is universal or species-typical, but produced by natural selection, sexual selection, genetic drift, past ecology, and so on. This can refer to by-products and vestigial organs, as well as adaptations.

2) What can be reliably traced via the most basic unit of organic inheritance to any previous generation or generations. This involves looking for differences in organisms that do not appear due primarily to differences in the environmental variables—as is attempted in studying identical twins. Phenotypes such as skin pigmentation, or schizophrenia, might be good examples.[661]

3) What is *not* experientially or socially acquired, where 'acquired' refers to relatively extensive associative experience or learning. For example, the capacity for language might be innate, where the acquisition of specific language may be acquired.

4) What is developmentally robust, stable, or invariant relative to a wide range of genetic mutations, or environmental perturbations.

5) What is foundational or preparatory in a developmental system. That is, what features primarily stabilize, the developmental process, or as William Wimsatt would say, play a significant generative role.[662]

6) What is developmentally and relatively precocious in the life-cycle of the organism—for example, basic aspects of morphology, reflexes, the ability to recognize our own species, suckling or smiling responses, and so on.

7) What reliably develops at a particular phase of the life-cycle—for example, baby teeth, puberty, menopause, etc.

[661] Lehrman, himself, seems to accept this version of innate. See e.g., Wimsatt (Bechtel, 1986)
[662] Ibid.

8) What resists relatively extensive attempts at conditioning. Classic examples are found in what Breland and Breland called the misbehavior of organisms.[663] We also find these examples in humans.[664]

9) What requires the most relatively abnormal evolutionary environments, or genetic mutations, to alter development.

10) What develops with relatively minimal opportunity for imitation of conspecifics.

4.8) The Constructs Nature and Natural

Like most constructs capable of generating significant scientific interest, the word 'nature,' or 'natural,' as applied to organisms, is best viewed as a cluster construct. To my knowledge, there is presently no statistical work on what modern populations, laypersons or scientists, mean by the term. Thus, for the purpose of my PhD thesis I will reference these terms as modern scholars use them. Given this, I will also present my own explanation in a hypothetical manner, and according to my own prejudice as to what is scientifically appropriate.

The words 'nature,' or 'natural,' are not quite synonymous. The former, as applied to an organism or species, is a noun that has two key aspects. One is that it references something structural—some set of features that are invariant, stable, or persistent about an organism or species.[665] The other aspect is a sense that what is stable is something important, fundamental, essential, vital, or definitive about an

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[663] Breland and Breland (1961).

[664] See, for example, Tooby and Cosmides in Carruthers (2005, 326). See also the research on the collapse of certain communes (Ellis, 1998).

[665] Darwin uses the word 'structure' more with respect to the physical features on an organism. As for mental 'structure,' he refers to instincts or habits. But Mary Midgley captures the idea well. For example she writes: "What is the underlying structure of human nature which culture is designed to complete and express" (1978, xiv). Or, later in the book, she writes "*Each* species has its own peculiarities, its own special kind of structure, and each has to have its own special set of inherited tendencies to maintain them" (1978, 96).

organism or species.[666] Given the evolutionary truism that organisms must be good problem solvers to survive and reproduce, it is not surprising we often associate *adaptations* with what is stable and important about an organism. The word 'natural,' as an adjective, is an extension of the word nature. This construct, as applied to an organism or species, also has at least two key aspects. One is that it refers to a feature, or set of features, that are produced by the 'natural world.' As such, 'natural' features, or traits, represent those that are the least mediated or altered by other humans. I will later speak a bit more of what we mean by the natural world, but it is noteworthy the meaning of the word nature, with respect to an organism is similar to what we mean by the word nature as applied to the surrounding world. With respect to the latter, we *also* use it to capture something structural—that is, the portion of the world outside the organism that, itself, has historical stability or constancy.[667] On this notion, it is not surprising that our tendency is *not* to include in our idea of the natural world, the 'technological world,' the world of human artifice, that has been created over the last few thousand years—and, in particular, the last few hundred. This is, of course, because human recent technological innovation has dramatically changed typical human living conditions: we are, as it were, now notably distanced from many of the constants

[666] This can make the construct confusing. What might be emphasized as most stable and important for some biotic phenomenon is activity or change. For example, the nature of some particular plant might be a stable, but an activity-based trait such as photosynthesis, pollination, or seasonal spikes in growth.
[667] Singular or rare events in our universe might still also qualify here, provided they show some constancy over time, or some resemblance to analogous cases. Perhaps the impact of a meteor is an example.

our ancestors had to face—for example, vulnerability to animals such as tigers, bad weather, female mortality in childbirth, the ravages of pathogens, and so on. A second key aspect of what is natural, as applied to organisms, is that of features or traits which arise spontaneously, automatically, or easily. A startle reflex is an example in humans and many other animals.

In the next section, I will attend to some of the critical arguments against the position I have just outlined. However, four very general theoretical points are worth mentioning before I proceed.

First, whatever we choose to say about an organism, a brute fact is that its features are varied and, *relative to each other*, some features are more plastic than others. This should have a very compelling intuitive element to it without our needing to dismiss it as 'folksy' or non-scientific. If we take an individual human being, the feature of bipedalism is quite statistically constant relative to other human beings and, say, the time it takes any one person to run a marathon.[668] However, it is also noteworthy that what is stable or plastic changes relative to our point of reference. For instance, if we compare the running speed of humans over the length of time it might take another species to travel marathon distance—say, a beaver—it is likely that human differences in running speed actually cluster into what becomes a notable constant. So, *relative to other species*, features are also stable or plastic.

[668] The example might be too much 'apples versus oranges.' We can certainly imagine instances where humans are born with no legs, one leg, or four legs. However, if we were to compare marathon times in populations, over history, there would appear to be greater range of variation than we find with number of legs.

Second, my notion of ecological imperatives, or organismic constants, is a plausible hypothesis for understanding what is most stable about an organism. However, even without this construct, we can all easily see that what has stability in an organism is not just physical features.[669] With humans, for instance, care for offspring—a behavioral feature or psychological disposition—is as stable a descriptive feature as we can find in our species.[670] It is also useful as a contrast to organisms that do not care for their offspring. So unless we advocate the Blank Slate model of the human mind, any life-scientist interested in human beings should be willing to list what these stable psychological features are. The very same point can be applied to male and female differences. Critics of disciplines such as evolutionary psychology often acknowledge clusters of stable *physical differences* between human males and females—for example, differences in genitalia; the developmental capacity to lactate; facial hair; average fat percentage; height and weight; and so on. It is also apparent why some of these differences might have adaptive value. But despite the fact the human brain is the most metabolically expensive organ in the human body—and, therefore, likely to have been shaped by natural selection—critics repeatedly take the position that female and male psychology is entirely (or mostly) plastic or, if not, that psychological stabilities are inconsequential.[671] Given

[669] This is a point that Darwin worked hard to establish in The Expression of Emotions in Man and Animals (1872/1965) and even in The Descent of Man (1871/2010). But, unfortunately, it is a point that does not appear to have been convincing to many social scientists and humanities scholars.
[670] This feature, of course, applies at a population level of analysis, not at an individual level.
[671] Homicide or risk-taking in extreme sports might be good examples of comparison.

the current investigative resources available to us, if anything, this hints of something unscientific.

Third, if the brunt of my PhD thesis is correct so far, then what we call 'natural' for humans cannot be identified solely with is innate. This is because some features that are epiphenomenal will also fit the basic framework I outlined above. To borrow an example from philosopher Daniel Dennett, it may be a stable fact that all humans throw their spears pointy-end first.[672] This human feature may also be descriptively significant in some way relative to other organisms. However, this is not a feature where, on examination, we would expect to find some area of our body or brain to have evolved specifically for this activity. Nor would we say that it is a product of human culture. A better explanation is the stability of this trait is due to a confluence of intersecting 'constants.' For instance, there is the ecological constant that sharp things puncture skin better than dull things; there is the organismic constant that humans need to eat and are capable of eating things killed by spears; there is the organismic constant that humans must protect themselves; and so on. In which case, whatever historical time period, insofar as the need for a spear exists, the resources to make a spear are available, and human brains and brawn stay more or less the same, throwing a spear pointy-end first, is actually a behavior that may be difficult to avoid. This makes the behavior natural, in a sense, but within the frame I have coined ecological, rather than within the frame of what is innate.

[672] Dennett (1995, 486).

Fourth, discussions of human nature can be confusing when what is stable and descriptively powerful is the human capacity, itself, to change. I will set this discussion aside for now. But, I will say, the ability of humans to represent the world, to 'freeze' information, to engage in vicarious trial and error, to use written language as a platform to construct ever-more abstract systems of perception and reason, all allow human behavior to be incredibly flexible. However, this flexibility is of means to a range of ends, and exists in breaking apparent stalemates in ends. Moreover, in light of the notion of ecological heuristics, even flexible means are likely to show underlying and convergent patterns.

For the remainder of my PhD thesis, when I apply the word 'nature' to humans, I will also intend it to express 'what is natural.'

4.9) Sober and Ereshefsky: Natural and Unnatural as Anti-biology

In the philosophical literature, there are a variety of authors and arguments that oppose the view there are features, states, acts, or environs, that are natural to humans. However, the arguments by Sober and Ereshefsky, in particular, merit some attention. I will begin with an outline and evaluation of Sober's view.

Sober's argument against natural human features, states, environs, or acts is, ultimately, part of a larger argument to show precisely why biological essentialism is discredited by modern evolutionary theory. As explained in chapter three, Sober felt Mayr's argument against biological essentialism (or typology) was not adequate. For Sober, biological essentialists do not deny individual difference, or the reality of variation in a population.[673] So this is not the reason why biological essentialism is mistaken. Nor does the biological essentialist have any more difficulty than anyone else with the 'line-drawing problems' that may be evoked by the gradualism of evolutionary change.[674] Rather, for Sober, the biological essentialist is in error because of how she or he explains variation in a population.

Sober imagines the biological essentialist is committed to something called the Natural State Model.[675] On this view, biological essentialists do not see variation in an organism, or species, as invariant—as something that simply exists generation after generation. For the biological essentialist, variation is best explained as a deviation from type,[676] or as the result of some perturbation or interfering force with respect to a natural tendency.[677] Sober claims Aristotle as a classic exemplar of this view. However, he translates the idea into modern terms as follows.

> According to the natural state model, there is one path of foetal development which counts as the realization of the organism's natural state, while other developmental results are consequences of unnatural interferences. Put slightly differently, for a given genotype, there is a single phenotype which it can have that is the natural one. Or, more modestly, the requirement might be that there is some restricted range of phenotypes which count as natural.[678]

Sober argues against this explanatory model using population biology and the literature on genetic norms of reaction.[679] I have already explained Sober's views on population thinking and his claim we can dispense with any significant focus on

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673 Sober (1980, 363).
674 Ibid. (359).
675 The classic formulation is to be found in Aristotle.
676 Sober (1980, 371).
677 Ibid. (e.g., 360, 377).
678 Ibid. (374).
679 Ibid. (372-373).

individuals and their properties.[680] However, Sober's ideas on norms of reaction require clarification.

Sober begins with the fact the same genotype may correlate to a range of phenotypes, depending on environment. Sober gives the example of a corn plant genotype which may vary in height depending on differences in environmental temperature.[681] He then asks the question as to which phenotype is natural. The answer he gives is "Each of the heights indicated in the norm of reaction is as 'natural' as any other, since each happens in nature."[682] Sober also applies this reasoning to the variations in genotype a population may exhibit. He asserts that, on the Natural State Model, there is a single genotype or a range of genotypes that would count as natural with "all other genotypes being the result of interfering forces."[683] But again, he claims, this does not match the tenets of modern biology: genotypes "differ from each other in frequency; but unusual genotypes are not in any literal sense to be understood as deviations from type."[684]

Sober then targets the idea of a natural environ. For example, he imagines an argument from a selectionist point of view where an essentialist might claim the environment of highest reproductive success is what is natural. Sober gives the example of a stud bull "injected with medications" so its reproductive abilities are

[680] Ibid. (e.g., 370, 379).
[681] Ibid. (374).
[682] Ibid.
[683] Sober (1980, 374).
[684] Sober (1980, 374-375).

boosted.[685] But this is intuitively suspect as it involves *artificially* boosting the bull's fitness. Sober moves to a more plausible possibility: the essentialist may want to consider fitness, not in the best of all possible environments, but in "the best of all environments that have been historically represented."[686] Yet, Sober provides compelling counter examples. For instance, he says, "The natural state of a genotype is often understood to be one which has yet to occur. Perhaps every environment that a species has historically experienced is such that a given genotype in that environment results in a *diseased* phenotype, or one which is developmentally impaired in some way."[687] So this also does not seem to work. Sober continues in this vein running through other clarifications and hypothetical possibilities, but the end point is the same. Sober asserts, "What happens in nature is simply everything that happens. There is no other sense of 'natural.'[688]

In his paper, 'Where the Wild Things Are: Environmental Preservation and Human Nature' (2005), Marc Ereshefsky extends portions of Sober's 'Evolution, Population Thinking, and Essentialism.' In this paper, Ereshefsky takes aim at environmental philosophers who presume that decisions about what to preserve about the environment significantly depend on making some distinction between what human actions, or parts of the environment, are natural and unnatural, *or* depend on distinguishing what is unique about humans relative to the rest of the

[685] Sober (1980, 375).
[686] Sober (1980, 376).
[687] Ibid.
[688] Sober (1980, 379).

world.[689] Ereshefsky's position is layered, but I will focus on just a single argument. Ereshefsky dedicates a section of his paper to challenging the view of two environmentalists: Brennan and Katz. Both these scholars hold that some human acts and environs are natural and some are not. In regard to the latter, Brennan and Katz claim that "those aspects of the environment that are affected by natural human acts remain natural and wild, while those aspects of the environment that are affected by unnatural acts are unnatural and no longer wild."[690] So what makes an act natural or unnatural? According to Brennan and Katz, natural human acts are those produced by natural selection, and that are free of technological intervention; unnatural acts are the opposite: they are acts that have been technologically influenced, or those that go "beyond our biological and evolutionary capacities".[691]

Ereshefsky's response to Brennan and Katz has two parts. First he draws on Sober's paper and the norms of reaction argument (which Sober, himself, references to Richard Lewontin).[692] So the conclusion is, once again, that modern biology "makes no distinction between the natural and unnatural states of organisms", and that "Every human state, including cognitive and behavioral states, is merely the upshot of a human's genetic component, environmental input, and development."[693] In the second part, Ereshefsky also draws on the work of Lewontin (and others), but this time he builds on the concept of niche construction. On this argument,

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[689] Sober (1980, 378).
[690] Ereshefsky (2007, 59).
[691] Katz (1997, 104) quoted in Ereshefsky (2007, 59).
[692] Sober (1980, 374).
[693] Ereshefsky (2007, 60).

Ereshefsky claims that Brennan and Katz's view "assumes there has been a selective environment for humans that has not been tampered with by humans."[694] However, Ereshefsky points out that, according to niche construction, most organisms affect, or partly cause, the state of the environment around them. The classic example is termite mounds, or beaver dams. Ereshefsky feels this point is "particularly apt for humans" as we "pervasively affect our environment, and in doing so…affect the selection pressures that act upon us."[695] In fact, he goes so far as to say there are no environments of evolutionary selection for human actions that were not humanly manipulated.[696] Thus, he reiterates "there are no…'natural' human actions."[697]

4.10) Critique of the Natural State Model Linked to Biological Essentialism

As my overall argument is to defend a viable conception of human nature and, indirectly, essentialism, I will take a moment to challenge Sober's depiction of biological essentialism. Sober's view is revealing to the extent it shows that a rather dogmatic attitude exists that biological essentialism is wrong despite the fact critics cannot even pin down exactly what it is, or *why* it is wrong—which is the very reason Sober writes this paper.[698] So what are we to make of Sober's answer to the issue? This is a convoluted question because it involves both denying the specific link between essentialism and the Natural State Model, while also affirming the reality of a natural state and interfering forces. With respect to the former, there is

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694 Ibid.
695 Ibid.
696 Ereshefsky (2007, 61).
697 Ibid.
698 In fact, in criticizing the view of scholars such as Mayr and Hull, Sober admits essentialism is "a fairly flexible doctrine" (1980, 359).

certainly nothing in essentialism that logically entails a commitment to the Natural State Model *as Sober describes it*. This is really just Sober's idea. The essentialist can accept variation in a population in much the same way any other Darwinist would: insofar as there is genetic mutation; sexual recombination; environmental change; populations that become reproductively isolated; and selective pressure acting on organisms, then diversity is simply a constant. However, variation as a constant does not alter the fact that, for instance, to be human there is something that necessarily makes this the case. So Sober is wrong about essentialism, in part, because he attributes a view of variation to essentialism that is too narrow.

On my own perspective, what links all essentialists (biological or otherwise) is the view that, for any entity we consider a natural kind, there are some properties that make that entity the kind of thing it is.[699] One advantage of this view is that it is more unifying than the definitions usually imposed. For instance, we do not need to insist on the idea that essentialism requires causal essences—that is, we can allow for essences that are empirically descriptive, or even logically explanatory; we can allow for statistical or relational essences;[700] we can avoid the straw-person view that species' essences "require some property which *all and only* the members of that species posses";[701] and so on.

As for the idea that *some* variation is produced by interfering forces in a natural tendency, this is not in opposition to modern biology. I will explain this in

[699] See, e.g., Sober (1980, 359).
[700] This is something that even critic David Hull allows. See Hull and Ruse (1998, 383).
[701] Sober (1980, 353; my emphasis).

four steps, in a very preliminary way, before attending to the details of Sober's norms of reaction argument. My argument against the latter will be more incisive but, at this stage, I am mostly concerned to establish plausibility.

First, Darwin's published works are full of references to the *tendencies* of living things and to *interfering forces*. At an organismic level, this is especially the case in his book, *The Expression of Emotions in Man and Animals*.[702] In this work Darwin attempts to establish the impact of natural selection on emotions and emotional expression, and psychological and behavioral continuity between humans and non-human animals. However, in light of the topic of this chapter, this work can be summarized as a vindication of instinctual or 'innate tendencies.' Darwin goes through example after example of phenomena that seem inherited, that exist precociously, or that are difficult to control, even though the emotional expression or behavior often has no apparent practical value. For example, he speaks of how a dog might paw a carpet, or hard surface, before it lies down, as if it were outside and digging out a hollow in which to settle.[703] Or with humans, he considers why we might bare our teeth when we are angry.[704] And so on. However, at a population level, natural selection, itself, is described in terms of tendencies and interfering forces. For example, in *On the Origin of Species,* Darwin writes:

> In looking at Nature, it is most necessary…never to forget that every single organic being around us may be said to be striving to the utmost to increase in numbers; that each lives by a struggle at some period of its life; that heavy destruction inevitably falls either on the young or old, during each generation

[702] Darwin (1872/1965).
[703] Darwin (1872/1965, 42-43).
[704] Darwin (1872/1965, 251).

> or at recurrent intervals. Lighten any check, mitigate the destruction ever so little, and the number of the species will almost instantaneously increase to any amount. Nature may be compared to a yielding surface, with ten thousand sharp wedges packed close together and driven inwards by incessant blows, sometimes one wedge being struck, and then another with great force.
> What checks the natural tendency of each species to increase in number is most obscure.[705]

This kind of view of organisms and populations continues strongly to this day.[706] This does not make it correct, but it should provide some weight to the intuition that Sober (and Ereshefsky) are missing something in their presentation of the tenets of modern biology.

Second, Sober's view contradicts the regenerative processes we find at the organismic level and at the population level. Starting with the former, organisms seem to auto-correct toward certain states or phenotypes. For example, when humans dye their hair, it tends to eventually grow back to its original color;[707] when we go without sleep, we tend to be unable to prevent its eventual onset; when we cut ourselves, slightly, our cuts tend to heal. All of these processes suggest, *at least at one frame of analysis*, that not only are there natural tendencies, but there also seem to be states that could be said to be 'interfering.' The same reasoning applies at the population level. For example, human sex ratios, at birth, tend to hover at approximately 50:50 female to male. There are, of course, examples in different cultures where humans have, through sexual selective practices like abortion or infanticide, altered these ratios. However, where these practices are absent the

[705] Darwin (1859/2008, 80).
[706] See, e.g., Kenrick et al (2010).
[707] Griffiths (2002, 80).

ratios at birth stay the same. So again, there seem to be natural tendencies at a population level, *and* forces that 'interfere' in stable phenotypic outcomes.

Third, deviation from type, and a correction toward a natural state, seem to exist *within* the organismic system itself. For example, if we consider homeostatic processes, humans exhibit a tendency to both involuntarily and voluntarily balance their experiential states: when we are too hot, we sweat or take our jackets off; when we are to cold, we shiver or fly to the tropics; when light is too bright, our pupils constrict or the blinds come down; when it is too dark, our pupils dilate or we put our sunglasses on; and so on. With this example, not only would this balancing act *not* occur if there were not some 'normal' range we regulate toward, but such tendencies exist *in synchronicity* with variation embedded in the system. At the population level, this homeostasis is also mirrored in frequency dependent selection. Frequency dependent selection is a phenomenon where the fitness of a trait depends on how common or rare it is relative to con-specifics. We can see this with so-called selfish or unselfish behavior. When the frequency of each becomes skewed in a population, each creates a trend that reverses dominance. For instance, high amounts of unselfishness in a population (in some generic ecology), will lend itself to invasion. If most people are nice, the probability of taking advantage of someone increases.[708] Likewise, when most people are selfish, this creates enough strain that unselfish types will have a high premium. People will naturally seek out others they can trust.

[708] See, e.g., Cronin's discussion of bullying (1991; 314/315).

Fourth, there are developmental tendencies both toward and away from certain phenotypes. For instance, we start as a human morph, a zygote, that is significantly different from the human morphs we see at the end of a typical life-cycle. So this is what we witness in the frame of individual organisms. But, of course, we also see this at the level of populations over evolutionary time. Many species evolve from very simple life forms to more complex life forms, and they also exhibit a tendency to ascend in a particular niche, change, and then (for whatever reason) go extinct. So again, tendencies and deviations *can* exist in unison.

4.11) Critique of Genetic Norms of Reaction Used Against Natural States

Sober and Ereshefsky's arguments on genetic norms of reaction follow a pattern that exists throughout most of the criticisms of human nature, or the word 'natural.' The proponent of human nature (or of a robust conception of human nature) will usually specify some human structure—some stable regularity or pattern in human morphology, thought, feelings, or actions. The critic will respond, of course, by challenging this structure, or the distinctions on which it rests. In essence, the default position of the critic is toward frames that offer the possibility of recognizing maximal human idiosyncrasy. This type of focus is important. But it is also one-sided and runs counter to the prosperous scientific practice of searching for the detailed *commonalities* in phenomena.[709] This applies to the species question, the innate/acquired distinction, the preferred time frames for gauging the stability of human features and, not surprisingly, to the Sober and Ereshefsky's stance on

[709] See Gilbert for an interesting discussion on overvaluing human diversity (2006, 223 - 233).

genetic norms of reaction. True: the minimal requirement for saying something is natural is that it happens. But we can credibly say far more than this. I will start with one general point and move to more specific ones.

First, there is a strong irony in Sober's paper. In critiquing the Natural State Model, Sober draws on a classic debate in physics between the notion of absolute simultaneity and relativity theory.[710] When it comes to the Natural State Model, Sober identifies his own position with relativity theory and the Natural State Model with the kinematic concept of absolute simultaneity, which relativity theory discredited.[711] According to Sober, the Natural State Model is frame invariant; where modern population genetics is not. Sober writes, "this frame invariant 'natural tendency'—this property that an organism is supposed to have regardless of what environment it might be in—has been replaced by a frame relative property—namely, the phenotype that a genotype will produce *in a given environment*."[712] A couple things can be said here. With respect to phenotypic development, Sober has actually made his own 'frame-relativity' *invariant* and, if we are to take him seriously, then he is wrong. In other words, what is 'natural' is likely to be more than, simply, whatever happens. Moreover, it is possible to imagine a range of natural tendencies that are, in fact relative, but the frame they are relative to is, itself, stable. If the emerging phenotype depends on the environment, and if that

[710] In answer to the question 'What is the temporal separation between events 'x 'and 'y,'?" Sober writes: "relativity theory revealed that answering this question at all depends on one's choice of a rest frame; given different rest frames, one gets different answers" (1980, 373).
[711] Sober (1980, e.g., 373, 377).
[712] Sober (1980, 377).

environment *does not change significantly*, then some phenotypes might not either. This is, in fact, what I tried to convey in my notion of ecological imperatives. For example, if there where no great cost to being chronically confused, the imperative of 'do what makes sense, if possible' would relax, or disappear. But, if this is an organic feature that *is* a constant, it exists as such, not *regardless* of the environment, *but because of it*.

Second, for someone who imagines himself a champion of professional biology, Sober's position is notably strained. If all genotypes, phenotypes, and environments are on par, we completely lose the thread of what evolution is about. Take, for example, the study of species-typical adaptations. Adaptations are extant records of the regular, unique challenges of a niche at some earlier time. They represent an amicable match, or fit, between 'normal past form' and 'normal past ecology.' Such niches exist outside and inside an organism and are revealed in much of the organism's macro- and micro- structure. From the perspective of the organism, adaptations denote that involuntary suffering and non-existence are, in a sense, *unnatural*.[713] Conversely, adaptations denote that what is 'natural,' for an organism, has something to do with survival, some modicum of functional features, and health—*and* that extreme deviation from this is abnormal. Thus, Sober (and many

[713] The construct 'natural' is multi-faceted. Death, of course, is natural in the sense of being an inevitable (or stable) occurrence. It is arguable whether it counts as a phenotype. Sober says something similar of illness. He writes: "It is no more a part of human nature to be healthy than to be diseased" (1980, 379). All Sober has done, here, is privilege one facet of what is natural, over the rest. But the construct 'natural' is not exhausted by the definition 'what happens,' or 'commonly happens.' In this instance, I am using the construct 'natural' to refer to what is easily preferential, or of interest, and the construct 'unnatural' to refer to what is *not* easily of interest.

others) overstate their point on reaction norms; it cannot possibly be the case *all* phenotypes are on par or that there is no quasi-restricted *range* of species-specific genotypes, phenotypes, or environments. This argument allows us to make sense of the fact that humans do not live, unaided, underwater for very long; that a zygote will not develop in formaldehyde; and that we cannot survive by drinking only gasoline. It also allows us to understand why biology exists as a scientific discipline: across the history of life, *genotypes and phenotypes cluster* and these clusters represent a kind of fluctuating order in world.

Third, throughout most of his paper, Sober equates what is natural in the Natural State Model—at least in part—with "maximum fitness."[714] However, it is difficult to see how this depiction represents the majority of those who defend human nature or, even if it did, why the Natural State Model could not be retained with '*minimal fitness*' determining a range of natural species-features. With respect to the latter, evolutionary psychologists have repeatedly denigrated the notion of fitness maximization relative to that of adaptation execution.[715] What they mean by this is organisms do not strive, above all, toward some abstract goal to survive, or to maximize their gene representation in subsequent generations.[716] Instead, survival and reproduction are, in effect, *by-products* of an organism successfully orienting to

[714] Sober (1980, 377).
[715] See, e.g., Buss (1995, 10). See also Symons in Barkow, Cosmides, and Tooby (1992, 139).
[716] Humans seem to be the exception, despite still needing to meet more proximate goals to support this.

a vast array of intermediate needs, goals, and experiential states.[717] There are many benefits to this way thinking. One is that it allows us to appreciate the different levels of evolutionary analysis we must attend to if we are to properly understand organisms. Another is we are better able to appreciate the confounding aspect of *behavior*—for example, why opting not to have children, or committing suicide before passing on your genes, is still Darwinian.[718] Finally, the construct of organisms as 'adaptation executors' also aligns my own hypothesis on ecological imperatives. These two constructs together orient us to the idea of *bare minimums* as to what to expect of life—not maximums. Moreover, they are not arbitrary impositions. These proximate goals tell us exactly why life organizes as it does: any organism that can easily turn away from its own species-specific (though subjective) interpretation of 'well-being,' wise use of energy, the avoidance of unnecessary pain, and so on, is simply not likely to survive for long.

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[717] Donald Symons is lucid here. He writes: "In modern industrial societies, where refined sugar is abundantly available, the human sweet tooth may be dysfunctional, but sugar still tastes sweet, and the goal of experiencing sweetness still motivates behavior. That's how we're made. We can decide to avoid refined sugar, but we can't decide to experience a sensation other than sweetness when sugar is on our tongues. If we decide to forgo the pleasure of sweetness in order to reduce the risk of tooth decay, this conscious decision will be in the service of other specific goals (probably related to material cost, physical attractiveness, and pain).

In summary, although human behavior is uniquely flexible, the goal of this behavior is the achievement of specific experiences—such as sweetness, being warm, and having high status. Our flexibility is of means and inflexible experiential ends are underpinned by an array of psychological mechanisms that is universal among Homo sapiens (sex and age differences excepted) and finite" (Barkow, Cosmides, and Tooby 1992, 139).

[718] Representing evolutionary psychology, Anne Campbell writes: "The distinguishing features of evolutionary psychology are…First, it is ultimately concerned with the mechanisms of the mind and not simply behavior. This distinguishes it from sociobiology where comparisons are made between animal and human behavior and implications drawn about a common evolutionary pathway or about convergent evolution under similar selection pressures (2002, 9).

Fourth, my own view is able to tidy up the mistakes and loose ends in Sober's. For example, given the presumed frame-relativity of population biology, Sober moves to illustrate this with a discussion of our current concepts of disease and health, as well as function and dysfunction. Sober says: "For virtually any trait you please, there can be environments in which that trait is selected for, or selected against. Diseases can be rendered advantageous, and health can be made to represent a reproductive cost."[719] Sober, of course, links the Natural State Model with frame invariance and the idea there is some range of healthy or functional phenotypes that always (or mostly) confer fitness, *or* that there is some diseased or dysfunctional range of phenotypes that is always (or mostly) selectively unfit. But Sober makes a curious admission after. He claims this particular argument of his does not mean the difference between health and disease, or function and dysfunction, are mere illusions. Instead he thinks we may find a way to characterize these states in non-fitness terms.[720] I will make just two points in reply. One is that Sober is strictly speaking wrong in assuming that most phenotypes can be selectively advantageous or disadvantageous. What is more accurate is that most phenotypes can be matched to environs where they are made disadvantageous, but *the opposite does not necessarily apply*. We can think of any number of conditions. For instance, in what environment is Lesch-Nyhan syndrome, anencephaly, severe autism, leprosy, elephantiasis, or being born incapable of reproduction, selectively

[719] Sober (1980, 377).
[720] Sober (1980, 378).

advantageous?[721] We may, of course, be able to imagine a few extreme environs, but the spirit of the matter is, there *are* fitness minimums and these can be used to carve nature at its joints. My other point is that moving away from a focus on an organism's *behavior* leads us to the idea of judging health or disease in terms of ecological imperatives. For instance, any feature or environ that renders an organism incapable of a *desire* to avoid unnecessary suffering can be considered both unnatural and unhealthy; and any feature or environ that allows for some critical measure of this desire can be considered both natural and healthy. So again, what is central is *proximate* orientation, goals, or instincts—not, necessarily, behavioral outcomes. We all face death, but if we are suffering prior to it, it may be natural to *want to act* in a way to cause your own death to avoid this suffering. This is only a partial answer, for now, but the spirit of the point should be clear.[722]

4.12) Critique of Ereshefsky on Natural and Unnatural Environments

In having attended to the genetic norms of reaction argument, what remains is Ereshefsky's argument that because there are no earth environments that humans have not, themselves, had a part in constructing, there are no natural or unnatural earth environments. My response to this is that it is simply a line-drawing problem. In other words, to make a case for a natural environment we do not need to find an environment completely untampered with by humans. Instead, we simply need to

[721] What we must remember is fitness is a *relative* measure; so it is not just about passing on genes, but doing so in a way that is superior to most rivals. See Dawkins (1982/2008, 234) or Sober and Wilson (1998, 58 – 60).
[722] I am leaving room, here, to later discuss how imperatives can act against each other to create paradoxes.

make a case for a convincing *degree* of difference. This is not difficult. For instance, we know there is something qualitatively different between a forest and a shopping mall. The forest, itself, may be impacted by years of human pollution, or may have been subject to logging in some previous century. But the issue is simply a relative one and, as such, will have ambiguous aspects. I will make three points of clarification.

First, one of the most evident ways to distinguish between natural and unnatural environments, is to refer to the idea that we are looking for the greatest patterns of phenomenon stability over time that are also the least mediated by human influence. In Ereshefsky's example of the beaver engaged in niche construction, what makes the act natural, in part, is its ancestry. Beavers are products of natural selection, and not artificially engineered. So a starting point on this issue is that beavers are not, robots. However, we can add to this. For millions of years, beavers have made dam structures that are quite similar. Again, if we go far enough back we eventually encounter something more proto-beaver and dams that are quite 'un-beaver-like.' But what *is* constant is that at some earlier point there have existed beavers, beaver dams, and environs that allow for beavers and beaver dams. This is not the case with human niche construction. Humans *are* produced by natural selection. We can also safely assume humans have always had social groups, or culture of some kind. We may also assume we have always modified our local environment in some way. So this makes humans similar, in important respects, to beavers and beaver dams. What is different, however, is the cumulative technological advancement of the last few thousand or even few hundred years. Unlike beavers, if we go back a few hundred thousand years, and up until the relative present, there were no skyscrapers, DVDs, automobiles, synthetic meats, and so on; whereas beaver dams and beaver niche construction has remained relatively steady. If we were to conjure up an equivalent scenario in beavers, it would be something along the lines of their making dams out of Kevlar, or if they suddenly started creating lodges with glass windows. We separate humans from nature, in recent history, because patterns that have existed for millennia are now qualitatively different—and this is acknowledging, all the same, that *humans are still 'natural' and that, at some level, so are skyscrapers*! However the gestalt—from skyscrapers, to DVDs, to nuclear bombs—is significant, and thus, we consider some of our impact on the world, and on ourselves, 'unnatural.'

Second, it is important to clarify that what is 'unnatural' is not necessarily a matter of the degree of impact. As Ereshefsky points out, there have been mass abiotic caused extinctions that seem equivalent to, or greater than, the impact and extinctions humans may have caused.[723] However, when we are using the word natural we are, in part, referencing invariance or stability over time. So what is interesting, is abiotic mass extinctions themselves have existed for billions of years—even though at intervals that have made them fairly uncommon. The equivalent is if we took something like the human technology of the present and found something similar at various spacing through deep history. If this were so,

[723] Ereshefsky (2007, 63).

then we might be justified in denigrating the whole idea of some human environments, acts, or artifacts, as unnatural. But it seems, in relative terms, it is not unreasonable to do so, and to contrast this with 'natural.

Third, we can also say much the same about human culture. It depends on how we define 'culture,' but if we take a fairly standard definition such as the ability to store or transfer information through non-genetic channels, or if we embellish this with some reference to the development of tools or technology,[724] other organisms certainly have culture. However, as Ereshefsky points out, the relative degree of culture with respect to humans is still unique.[725] So again, there is a sense that when scientists or laypeople contrast the natural world with the artificial human one, it is not a great stretch to see why the labels may fit. This intuition also matches the view of many scholars who see culture as its own causal entity or quasi-independent causal force. In fact, 'culture' is repeatedly used as a construct to oppose the idea that humans are presently subject to strong evolutionary forces. I will return to this topic in my next chapter.

4.13) Dimensions of Naturalness

It is now possible to establish a conceptual framework, or cluster construct, for 'natural' as applied to human beings. Like the construct 'innate,' the word nature has slightly different emphasis when applied to an individual, a local population, or a species. To precisely reference *human* nature, then, we must distinguish it from the

[724] Ereshefsky (2007, 64 -66).
[725] Ereshefsky (2007, 67).

two other levels of application. In regard to most proximate areas of relevant generalization (PARG), what is natural for an individual might be far removed from what is natural at the species level. Here, with respect to areas such as anatomy, physiology, or behavior, the construct 'human nature' has the weakest relevance. At the level of a local population, we find broader application. But again, there are likely to be many customs or behaviors we might consider extenuating (or mostly fortuitous) versus species-universal across time. Cannibalism, matriarchy, polyandry, or incest might be stock examples. Features that reliably occur in easily identifiable local ecologies may also fit here: calluses are an anatomical example; depression due to loss of social status might be a psychological one.[726] But the most appropriate application of the term human nature should be reserved for the most *species-typical* traits across the widest range of ecologies and time periods. Griffiths argues, "human nature is primarily the pattern of similarity and difference amongst human beings."[727] However, on my own conception, if we are to emphasize human differences *within* the population, this will likely have prominence only relative to the differences *within* other species or ancestral human populations and, as such, we still focus on what is most species-typical about these differences. For instance, it may be descriptively valuable to know that chimpanzees show ten times the genetic variation humans do;[728] or we might want to consider morph variations in marine

[726] Calluses are very relevant because they have *salient* genetic and ecological components stabilizing them; they may be absent, or expressed uniquely, in other organisms (consider ostriches) which makes them a feature of classificatory value; and they impact our feelings, choices, behavior.
[727] Griffiths (2009, e.g., 31, 49, 53).
[728] Cann and Wilson (2003, 58).

crustaceans, or canines, relative to humans.[729] However, the more we focus on idiosyncrasies in isolation from comparison species, the less likely we are to capture the 'human' portion of human nature.

The dimensions I believe to be scientifically appropriate are as follows. The first twelve are central. The rest are menu items that may be more colloquial, additive, or phenomenon-specific. Some of these dimensions overlap slightly with others and offer only subtle differences in meaning. There are also a variety of key words/phrases that could be substituted for the ones I have chosen which might minimally alter the meaning of a dimension. However, the point of this list is not to establish each dimension with mathematical precision. Each particular dimension acts only as a rule of thumb guiding our considerations. This means, in effect, each dimension can be charitably interpreted to specify a range: ideal cases to those that are less ideal (or do not easily fit).[730] Moreover, each dimension will work in concert with other dimensions so that any anomalous case (hopefully) can be rescued or excised by matching it against more discriminative dimensions. There may be some candidates that defy the entire framework, but such cases should not nullify this

[729] Presumably, in the marine crustacean species Paracerceis sculpta, there are three distinct male morphs. This research comes from Shuster, but is made use of by critics of human nature such as Lewens (2012) and Buller (2005).

[730] For example, if we take the dimension of organismic 'stability' we might even imagine 'tiers.' The first tier would be cases that are very stable—for instance, organismic 'interest' in orientation has existed for over 3 billion years. At the next level of the tier would be traits that are less stable, but reliably produced in local ecologies: parental care, war, baby teeth, or puberty might be examples. The final tier would be what is most transient and, thus, least apt to fit species' natures. This is the broadest category. In some instances, what we might see here would be organic: perhaps rare injurious or terminal genetic mutations. In other instances, it might be highly idiosyncratic behavior: a penchant for collecting 1972 pennies. In yet other cases, this might be phenomena due primarily to convention: particular fashions, for example, such as punk rock, or jeggings.

framework. It may just mean that refinement is necessary or, at the very worst, that no framework will ever perfectly capture a species' nature.

In the context of the human species, what is natural is…

> 1) What is produced primarily by natural and sexual selection, genetic drift, frequency dependent selection, ecology, and so on.[731]
>
> 2) What appears in its original state, or has been least altered or mediated by humans.
>
> 3) What exists that does not depend (mostly) on human social agreement, or convention.
>
> 4) What exists with relatively little explicit instruction, or opportunity for imitation.
>
> 5) What appears relatively spontaneously, without prompting or conscious effort.
>
> 6) What appears or occurs relatively easily in humans versus what is difficult.
>
> 7) What is most stable, persistent, recurrent, or invariant across time and populations.
>
> 8) What is universal or most widely shared with other organisms (or at least shared with our closest evolutionary relatives, or organisms with similar ecological niches, etc.) versus what is rare.
>
> 9) What is most species-typical or what is *not* shared with other organisms.
>
> 10) What constitutes a species' most unique features: talents or vulnerabilities/handicaps/limits.
>
> 11) What least interferes in global, and local, ecological imperatives.

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[731] For references to literary examples of these dimensions see Appendix 'B'.

> 12) What reliably develops at a particular phase in the species' life cycle.
>
> 13) What is sex-typical within a species.
>
> 14) What is automatically or easily preferential or aversive, pleasurable or painful, of interest or disinterest, is motivating or de-motivating.
>
> 15) What promotes life, survival and reproduction, versus death and sterility.
>
> 16) What is relatively vital to well-being or health, versus ill-being or ill-health (what allows a species flourish).
>
> 17) What is predominantly involuntary (versus what is voluntary or chosen).[732]

4.14) Qualifications on Dimensions of Naturalness

Having established these dimensions, I will add a few closing qualifications.

First, one easy criticism of this list is it is rife with line-drawing problems. For example, what do we mean by 'flourishing,' 'conscious effort,' and so on? I spoke of 'ranges' introducing this section, but perhaps more should be said about how we determine these ranges. I posit we simply begin with exemplar cases. If we want to analyze 'flourishing,' for instance, we can begin at events that appear to be starkly the opposite—say, being water-boarded. On the other end of the spectrum, we start with debate about what constitutes a healthy rate or amount of exposure to some pleasurable stimulus, or activity, at a particular stage in the life-cycle. From here, we simply work toward the thorny cases at the center, and establish patterns or

[732] Sometimes what might qualify as human nature will be embedded. Choice, or what is voluntary, seems definitive of human beings. Yet what tends to be involuntary is the choice to choose itself.

underlying principles. However, we should realize that, simply because this is a difficult area of study, does not mean some reasonable empirical referent does not exist—unlike, say, unicorns. Rather our own subjective experience tells us that, if anything, we are up against linguistic, methodological, and epistemic limits. Most of us have likely experienced something approximating flourishing, and often enough to presume we might generalize to others.

Second, with respect to the key dimension of what is stable or invariant, it is evident that global ecological imperatives fit this best. Again, the critic is likely to advise these are too general. However, what makes global ecological imperatives scientifically compelling is primarily how they are embodied. Despite being the same across species, every particular species will express these imperatives within a bounded and evolved form. For example, echolocation is a mode of orientation we will find in a ghost bat; a mormyrid fish will use electric impulses; a loggerhead sea turtle may use the earth's magnetic field; Indigo Buntings may orient by the stars; Luna moths, by the moon;[733] and so on. In each case, the goal is the same—orientation, if possible—but the means are different. For biologists, what will likely be of most interest is the empirical detail of how evolutionary history, the contingencies of development, and present local ecology *mediate* these imperatives.

Third, a dimension I have said little about, up to this point in my PhD thesis, is that of species-limits, species-constraints, and species-talents. With respect to

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[733] What is noteworthy here is these organisms develop their capacities because of the global ecological constants of magnetic fields, the night sky, the moon, sound waves, and so on. So the external ecological structure allows for internal organismic structure.

'species-limits,' this is a construct that is absolutely crucial to understanding species-natures. Moreover, the logic behind the construct is fairly straightforward. In order for an organism to survive, it must be capable of dramatically reducing its potential experience, thought, feeling, choice, and action.[734] Take, for example, a member of our own species choosing ice-cream. We might imagine a dozen flavors that are difficult to choose from. Perhaps, after a short period of evaluation, we arrive at a favorite. But consider, now, having hundreds or even thousands of near equally appealing options—for example, it is no longer simply a choice between vanilla and chocolate, but between bark-flavor, alkaline, tire rubber, and so on. The burden of this expanded choice, at best, would mire us in stultifying deliberation and, at worst, leave us unable to choose.[735] This puts us at the doorstep of an intriguing paradox:

[734] For an exemplar of this point who is a neuroscientist consider Rodolfo Llinás. He writes: "It must be understood that in theory, the nervous system can design two types of overall strategies. One is to leave the system completely free; the other is to have a built-in mechanism for the reduction of choices. By free I mean that if a gazelle sees a tiger coming, it may decide to run in a hopping fashion or with only three of four legs or have two legs running forwards and two running backwards. The problem with a completely free system, one of almost infinite possibilities, is that if allowed to operate it would be very expensive. We know that the system is vastly overcomplete; so an efficient mechanism for the reduction of its degrees of freedom, its choices, is therefore critical. Taking too much time choosing how to escape the tiger is not only inefficient, but also potentially lethal. A system that permits implementation of an inappropriate way of escaping the tiger, such as attempting to first make swimming motions while on land, is also ill advised and potentially lethal.
And so we see that reduction of choice is the mode of operation for which the system has been naturally selected" (2001, 144-145)

[735] Haidt writes: "when people are actually given a larger array of choices—for example, an assortment of thirty (rather than six) gourmet chocolates from which to choose—they are less likely to make a choice; and if they do, they are less satisfied with it. The more choices there are, the more you expect to find a perfect fit; yet, at the same time, the larger the array, the less likely it becomes that you picked the best item. You leave the store less confident in your choice, more likely to feel regret, and more likely to think about the option you didn't choose. If you can avoid making a choice, you are more likely to do so. The psychologist Barry Schwartz calls this the paradox of choice" (2004/2005, 101-102). For an example of the research see Iyengar and Lepper (2000).

having limited sensory modalities;[736] limited energy; taste buds that incline us toward food high in fat and sugar; a digestive system that can *only* digest certain nutrients; and having finite brain capacity; all act so as to create, not only a fairly decisive and functional organism, but the very *experience* of freedom!   Whereas a scenario of *unlimited* sensory as well as deliberative options would leave us paralyzed. To move away from pure anecdote, this is exactly what the empirical evidence supports and—contrary to the position of many critics—is what neuroscientists and evolutionary psychologists have been arguing for decades.[737] This is also what is so important about PARG. Every single area of generalization limits, or *brackets*, possibility as much as enables it and, each area works in a self-organizing (epiphenomenal) way to create very species-specific confluences of behavior.

Fourth, the idea of species-specific *talents* is also one that is likely to draw fire from critics for being imprecise.   The notion of a species-talent is really one that highlights the necessary comparative dimension of human nature. We cannot know what a species-talent is without some clear sense of what other species can and cannot do. But here are some examples: relative to many other plants, a cactus is

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[736] E.O. Wilson writes beautifully on this point: "Every species, every kind of butterfly, bat, fish, and primate, including *Homo sapiens*, occupies a distinctive niche. It follows that each species lives in its own sensory world. In shaping that world, natural selection is guided solely by the conditions of past history and by events occurring moment to moment then and now. Because moths are too small and indigestible to be energetically efficient food for large primates, *Homo sapiens* never evolved echolocation to catch them. And since we do not live in dark water, an electrical sense was never an option for our species" (1999, 52).
[737] See, for example, Zajonc (1980, 169-170); LeDoux's discussion of amygdala hijack (1996); Damasio's Somatic Marker hypothesis, or the case of 'Elliot' (1994); Ekman's discussion of the auto-appraising aspects of emotions (2003, 17-37) or Barkow, Cosmides, and Tooby (1992; e.g., 100 – 102).

talented at dealing with warm temperatures. Polar bears, on the other hand, have a talent for cold temperatures. They have warm fur; a layer of blubber underneath that can be up to 10cm thick; they thermoregulate through the paws of their feet; their skin is black which happens to attract sunlight; and so on. The female Australian social spider also has an interesting talent. After laying her eggs, she creates a new batch of eggs (that lack genetic instructions) and are actually too oversized to pass through her oviducts. Not long after her spiderlings hatch, the mother liquefies and the spiderlings devour her and her oversized eggs.[738] These kinds of examples are nearly endless. They do not lend themselves to the creation of *exact* species taxonomies, but they *do* lend themselves to understanding the natures of organisms. Moreover, it is important to see that, for all the specialization exhibited in these talents, they still involve limits and constraints. For instance, the problem-solving morphology we find in a polar bear makes it ill-suited for warm temperature. So problem-solving talents, and specialized opportunities, come with trade-offs.

4.15) Natures and Multiple Ecologies

Over the course of my PhD thesis, I provided some history on the issue of human nature (relative to essentialism). I also defended a particular interpretation of the construct 'human,' and the construct 'natural.' I want to now conclude this chapter by defending the thesis that human nature is not something that inheres, but is rather something that is diffuse. One way to conceptualize this is as a *field of being*

[738] Blaffer-Hrdy (1999, 43/44).

that extends beyond the boundary of our skin. Another way to do so is to see the surrounding ecology *infusing* the human body—that is, local and global ecology, and past and present ecology. The best way to start may be to return to the claim that the survival and well-being of the organism depend on restrictions as to what it can think, feel, choose, and do.

Take the example of the polar bear again. It is not simply psychology that prohibits a polar bear from living in the Sahara desert: its *morphology* may curb its psychology as much as the reverse. Humans, in principle, are no different. For instance, the extended parental care of humans is influenced, not by choice alone, but by the fact that human offspring are born relatively immature, which is partly dictated by the relative size of the female pelvic opening. If the baby were to continue much longer in gestation, it would simply grow to a size that would not allow it to emerge from the womb.[739] So human infants are born quite vulnerable, and human parents placed under considerable stress to care for them which, in turn, has likely expedited the evolution of attachment (and hormones such as oxytocin), *and* influenced the likelihood of long-term human pair bonding. So here we have endogenous physical structures creating what I would call *lines of expedience*. By the latter I simply mean that certain thoughts, feelings, and actions become more probable, in part, because endogenous physical structures corral the organism toward relatively energy-expedient solutions. Yet *endogenous structures are not all that bracket the organism's eventual behavior.* Consider, for example, human

[739] Rosenberg and Trevathan (2003).

ancestry and the fact humans are bipedal relative to, say, cheetahs as quadrupedal. If humans and cheetahs—or other such organisms—ever existed in the same niche, there is likely to have been a bi-directional relationship between the two. Humans and cheetahs have both shown certain kinds of anatomical stability over time. This means—at least in this model—that *what humans are* has depended to some extent, on *what cheetahs are,* and visa-versa. In essence, each creates for the other what I would call *action affordances*—in this case, an expedient behavioral possibility (or we could even say disaffordance).[740] For cheetahs, a salient species-talent of humans is they are tasty; and a salient species-limit of humans is they are slow runners. For humans, a salient species-talent of cheetahs is they are fast runners and successful predators. In which case, the fact that a cheetah may choose to hunt humans is not as much an act of cheetah psychology inasmuch as humans present a salient action affordance. Conversely, in an ecological niche with cheetahs, humans are also presented with certain action affordances. Given bipedal humans are not likely to outrun quadrupedal cheetahs, humans might opt to travel across the open savannah only in groups, or by day; they might perfect hiding; or they might invent a spear to protect themselves. In other words, for both cheetahs and humans, the behavior exhibited is *bracketed by exogenous structures in addition to endogenous ones.* So, in effect, our nature is not something isolated from the structures around us (which create action affordances), nor isolated from our own relative physiology and anatomy (which create lines of expedience). What humans are is *stabilized*, first,

[740] See Miller for a related discussion (2007).

by something like an imperative to well-being, or to avoid unnecessary harm; second, is *stabilized* by the fact we are limited in our running capacity by having only two legs; and third, is *stabilized* by the fact that something exists outside us that can harm us and can run faster than we can. However, if we take away cheetahs, and all things with the predatory species-talents of organisms like cheetahs, our behavioral 'nature' might be tipped toward solitary travel.

This is, of course, a radically simplified model. But it should make the point that our nature is not something intrinsic and simply projected out into the world: it is every bit the world projected into us. Richard Dawkins wrote of the extended phenotype.[741] However, a 'distended ecotype' might also be appropriate. Organismic natures exist somewhere at the fluctuating intersections of multiple ecologies.

[741] Dawkins (1982/2008).

(5) Conclusion and Potential Application

> *Education then is the art of doing this very thing, this turning around…it is not the art of putting the capacity of sight into the soul; the soul possess that already but it is not turned the right way or looking where it should.*
>
> *(Plato/Socrates, in Grube 1974, 171).*

An ecological conception of human nature is superior to rival views in many respects. First, it avoids the theoretical and practical inconsistencies that exist for rival views—for example, those we find in an outright denial of human nature. Second, it can reconcile some of the tension between so-called scientific biology and folk-biology. We find this, above all, in a scientific affirmation (versus rejection) of human nature and via the acknowledgment of a qualified and reasonable version of essentialism. Third, an ecological conception of human nature more accurately matches the best knowledge we have of evolution because it does not force narrow descriptive conclusions about entity boundaries, or about diversity and change, where both organisms and biological processes are better left ambiguous. In fact, an ecological view of human nature allows emphasis to be determined largely by human context or purpose. Fourth, in viewing humans as existing according to laws, it is a view that allows for scientific consilience. Fifth, an ecological view of human nature has greater explanatory potential than its rivals. In particular, it helps to illuminate aspects of the nature-nurture debate; the issue of free-will; mental health; and that of morality. And sixth, it offers far more problem solving possibility than is offered through the didacticism, or 'consciousness raising,' that typically attends other conceptions of human nature.

In this final chapter, I will elaborate on some of the points I have just listed. To this end, I will divide this chapter into two parts. 'In Part I,' I will highlight points of general application for an ecological conception of human nature. To clear a space to do so, I will first reiterate the main inconsistency of rival views. As I have already spoken extensively to the second, third, and fourth points above, I will then turn to point five. My aim, at this point, is primarily to be *suggestive* of the general coherence, application, and possibility of an ecological view, rather than offer anything argumentatively definitive. In 'Part II,' I will turn my discussion to point six, and provide examples of the more specific problem-solving offered by an ecological conception of human nature.

Part I) General Application

5.1) The Inconsistency of Rival Conceptions of Human Nature

One the foundational points of my PhD thesis is that we cannot escape a conception of human nature. In other words, if we do not articulate our conception of human nature in a forthright way, then our conception is expressed obliquely. I have argued this point mostly in a theoretical manner, but it may help to give one concrete example. For this purpose, I will refer to John Dupré's essay, 'On Human Nature.'[742]

In this essay, Dupré sets himself two questions: what is human nature, and why do our theories about human nature seem so important? I already mentioned Dupré's main response to these questions in chapter two, but it may be helpful to

[742] Dupré (2003).

recall them. In regard to the first question, framed negatively, he argues that human nature is *not* biological in any 'interesting' sense of the term. Here, he acknowledges that humans *do* share an evolutionary history, but Dupré does not allow much beyond this to be of 'interest.' Framed positively, Dupré claims human nature is diverse, not singular, and is mostly a product of our ever-changing social world. On this front, Dupré does *not* say human nature is completely unbounded, but he certainly places emphasis on diversity.[743] However, like all critics who emphasize human diversity to the exclusion of robust human similarity, Dupré eventually adopts a position that undercuts both his minimization of a singular human nature and his avowal of diversity. I will give two examples.

First, Dupré answers his question of *why* theories of human nature are important very confidently. In fact, Dupré makes one transitional observation and then claims "The" answer to this question is "views about human nature matter because they are almost invariably understood to have *normative force*."[744] What should immediately stand out about this statement is that it is singular, not plural. Dupré says, *"The* answer to this question [is]…"[745] Judging from the academic literature, he may be mostly right. And yet, for a scholar who argues against a singular human nature, it is curious Dupré does not emphasize other possibilities. Moreover, Dupré's exact words are "*almost invariably understood.*"[746] However, if there is no human nature, there should really be nothing that is stable or 'almost

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[743] Dupré (2003, 119).
[744] Dupré (2003, 120; my emphasis).
[745] Ibid.
[746] Dupré (2003, 109).

invariable' with respect to humans, or as to why theories of human nature are important. Humans as diverse and changing implies that, between the fact or fiction of human nature, human interpretation could be non-normative, or indifferent, or there should be a vast range of normative interpretation, positive and negative.

Second, Dupré's essay is not just a critique of a singular view of human nature, but also a critique of evolutionary psychology. However, when Dupré moves to apply his views of normative force to evolutionary psychology, it appears their research claims can only be *interpreted* one way. For example, he mentions a research project in social psychology dedicated to studying the impact of evolutionary psychology on the "production and reinforcement of sexist attitudes."[747] He then claims that the "preliminary results do indeed reveal just such an effect. Male subjects exposed to evolutionary psychological theories of sex-linked differences in behavior were found more likely to consider women generally inferior, less suitable for jobs, and suchlike."[748] More generally, he highlights what he imagines is "an important difference between the human and non-human sciences."[749] Dupré says:

> claims in the human sciences are liable to have effects on their subject matter that may even affect [their] truth…*It's hard to dispute*, for instance, that supposedly scientific claims that black people are less intelligent than white people will encourage racist attitudes, and that racist attitudes may perpetuate the social causes of lower intellectual achievement by black people.[750]

[747] Dupré (2003, 121).
[748] Ibid.
[749] Ibid.
[750] Ibid; my emphasis.

I am not going to assess the truth of Dupré's claims. However, what *is* important to determine is if this presumed nefarious impact is consonant with a view that human nature exists only nominally. Dupré spends a significant portion of his essay arguing for an 'interactionist' thesis, and arguing for the banality of the universals and generalizations we apply to humans. However, he then allows himself—on many occasions—his own 'interesting' generalizations about humans. Moreover, at no point does he say that his generalizations apply only to humans in this temporal frame, in these ecologies, in this kind of culture or subculture, with this level of education, these developmental deficits, or with respect to these kinds of power imbalances or authorities, and so on. So, Dupré *does* operate from a very clear and singular view of human nature, however implicit—and, to boot, one that is as sad as it is cynical. If we unpack Dupré's claim it reveals at least three very definite ideas about the relationship between humans and the identification of groups as less capable. One hidden claim would be that, in such situations, certain groups of *humans tend to be predatory* or competitive—always, or often, pressing their advantage. Another claim would be that humans are both sensitive to, and vulnerable to, certain types of social demarcation. And a final claim might be that humans are *easily swayed* to assume that how things naturally are justifies how things should be.

All critiques of a singular view of human nature exhibit this inconsistency. Yet, if there is no human nature, and humans are so diverse and changing, there will be no shared information (no uniform interpretation) having a *uniform effect* on any wide swath of the population for any great length of time.

On an ecological conception of human nature, it is possible to affirm the existence of human nature while also testifying to the radically diverse interpretive ability of humans. This is because even though our interpretations of the world and ourselves always serve ecological imperatives, the ambiguity of the phenomena around us, the nuances of ecology, sex, stage of development, and idiosyncratic traits, all allow flexibility. In other words, we are diverse and creative in our interpretations *precisely because* imperatives toward hope, self-respect,[751] status, diverting perceived harm, protecting our already existing concentration of time and effort;[752] demonstrating in-group loyalty,[753] and so on, are *absolutely essential* and, thus, provide a strong motive for creative interpretation.[754]

5.2) The Nature-Nurture Debate

An ecological conception of human nature lends clarity to the nature-nurture debate by challenging the now fairly orthodox claim there is no aboriginal human nature that exists independent of culture—or as Fausto-Sterling claims "no

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[751] Pinker is interesting on this point: "most people claim they are above average in any positive trait you name: leadership, sophistication, athletic prowess, managerial ability, even driving skill. They rationalize the boast by searching for any aspect of the trait they might, in fact, be good at. The slow drivers say they are above average in safety, the fast ones that they are above average in reflexes" (1997, 422).
[752] In social psychology this is known as 'the sunken cost bias.'
[753] See the work done in social psychology on 'group think.' See also the work done by Pentland (2010)
[754] "One of the most enduring lessons from social psychology is that…people go to great lengths to view the world in a way that maintains a sense of well-being. We are masterly spin doctors, rationalizers, and justifiers of threatening information" (Timothy D. Wilson, 2002, 38). See for example, the work on cognitive dissonance, the actor-observer bias, etc.

particular human nature, visible when all culture and learning is stripped away."[755] We can agree that cultures (or we might say groups of people that benefit from accumulated wisdom passed on over generations) make human life possible, or provide the means for humans to meet their goals. However, if an ecological conception of human nature is correct, *culture does not set the ultimate goals for any given group of humans* anymore than consciousness sets the ultimate goals for the individual organism. Culture is a *means,* or tool, toward ecological ends (as is consciousness).[756] This should be easy to apprehend. At a global level, if we take, for instance, any of the ecological imperatives I have outlined (but especially the global ones) any culture that attempts to thwart the possibility of meeting those goals would seriously destabilize itself, if not collapse.[757] For instance, imagine the longevity of a society that organizes itself around a single breeding male or female—as we might find in a termite colony. Likewise, at a local level, technology does not alter the primary goals of the organism. For example, airplanes or 'societies that appreciate flying' do not *create* in us our basic desire to be freely mobile; *they merely accentuate that given desire*. Likewise, telephones expedite our desire to communicate; computers expedite our desire to access information and store it; eye-glasses expedite our desire to orient; movies expedite our desire to fantasize, tell

[755] Fausto-Sterling (1985/1992). But see also Linquist et al (2011, 444).
[756] Psychologist Mihaly Csikszentmihalyi is interesting here. He writes " Cultures...are adaptive responses, just as feathers are for birds and fur is for mammals" (1990, 81).
[757] See Ellis (1998).

stories, or be entertained; and so on.[758] To refine arguments I made in chapter two, the only thing we *transcend* via our technology is the existing state of technology, or the initial individual *means* to meet ecological ends. Certainly, new technologies may create new parochial desires—for instance, a desire for a particular brand, a particular enhancement item, or procedure—but they do not change the ultimate ends.

One way to make this clearer is to understand organisms as executing adaptations—or proximate goals that *imperfectly* lead to survival and reproduction. In this scenario, the flexibility we find in the organic system (or free will) is not the result of escaping ecological imperatives. Rather, we simply transcend existing, and often restrictive, emotions, thoughts, and actions *by using one or more imperatives to overcome other imperatives*. In effect, we see-saw (or alternate ascendancy) among balancing imperatives, ratcheting up to increasingly refined problem-solving—and in a way that is not much different than, say, learning our tennis forehand which then frees us up to learn our tennis serve, or backhand. In effect, in the whole process of 'tennis freedom' we might pit our desire for mastery or potency, or our desire for social status, against our desire to conserve our energy, or avoid unnecessary suffering, and this produces something 'emergent.' Many evolutionary psychologists understand this. For example, Geoffrey Miller and Steven Pinker explain this idea, with respect to imperatives, in much the same way.

[758] What is behind these assertions is that we recognize these goals in organisms that are not social, or are relatively simple (cognitively). We might even say that some animals nominally 'tell stories' in alarm calls, or in behavioral or chemical displays that indicate resources—as in the waggle dance of a bee.

> It is not a case of 'us' overriding our genetic predispositions, but of using one set of dispositions to overrule others—just as our evolved desire to preserve our looks can override our taste for fat and sugar.[759]
>
> Peaceful coexistence…does not come from pounding selfish desires out of people. It can come from pitting some desires—a desire for safety, the benefits of cooperation, the ability to formulate and recognize universal codes of behavior—against the desire for immediate gain. These are just a few of the ways in which moral and social behavior can ratchet upwards, not in spite of a fixed human nature but because of it.[760]

The work of someone like Richerson and Boyd has bearing on this last point.[761] I will not debate them at any great length as I am only providing a viable rival schema. But I will make a few key points. One area of agreement between my view and theirs is that each of us claims that culture does not exist in some realm operating beyond biology.[762] However, Richerson and Boyd say that cultures *do* create new ultimate desires or goals.[763] This has yet to be substantiated. All of their examples show that cultures can partly influence *maladaptive* desires or behavior, but they do not show how this is *not* better accounted for by evolved psychology paired with ecology. Furthermore, Richerson and Boyd recognize the most serious rival to their own view is some version of the 'supernormal stimuli hypothesis' I have advanced (or what they call the 'big mistake hypothesis').[764] They discount it for two main reasons. But each of these is rather thin.[765] Take, for example, the

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[759] Miller (2000, 136).
[760] Pinker (2002, 169). For forerunners to this type of view—though not quite as clearly stated—see E. O. Wilson (1979, 76 – 77), or Boehm (1999, 227 – 232).
[761] Richerson and Boyd (2005).
[762] Ibid., 4, 7.
[763] Ibid., e.g., 13, 177.
[764] Ibid., 150, 189.
[765] Ibid., 189. One reason: they assume the 'big mistake hypothesis' does not make systematic predictions the way their own theory does. Even if this was so, it does not need to be the case.

issue of low birth-rate in modern industrial societies.[766] On an ecological view of humans, this is explained primarily by runaway proximate goals and, especially, by runaway sexual or social selection. However, what is strange is that, even though Richerson and Boyd have an accurate (and rare) understanding of the influence of sexual selection on culture, they align it with something *cultural* rather than something psychological or ecological.[767] Also, the argument given for what they call "rogue cultural variants" applies, in principle, for 'rogue psychological ends.'[768] For example, they say that cultural systems can be maladaptive, in part, because a phenomenon such as the imitation of high status individuals, possibly leading to low birth-rates, can be reproductively beneficial *on average*.[769] But, of course, this can be said of ultimate psychological ends. For example, an evolved sensitivity to our social status, might lead us to take risks that often lead to injury or death, *or* it can often lead to high status and reproduction. Boyd and Richerson even provide a good discussion of adaptations having trade-offs.[770] However, in the face of what seems maladaptive, like low birth rate, there is no strong reason to quickly move to an

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Supernormal stimuli can be evoked to systematically predict morality, patterns in fashion, conspicuous consumption, extreme sports, and far more. (See, e.g., Miller, 2009). The second reason: their view predicts that as soon as culture favors non-parental transmission of information, rogue cultural variants will appear (2005, 189). Again, on the 'big mistake hypothesis,' much the same could be said. As soon as an environment quite different from hunter gathering came into existence (e.g., an environment of low mortality, unequal distribution of resources impacting status, birth control, and so on), 'rogue psychological variants' would also appear. In fact, with respect to evolved psychology, runaway goals would exist simply on the fact that evolution imperfectly guarantees survival and reproduction—as we see, for instance, in ducklings imprinting on humans at birth.

[766] Ibid., 173.

[767] Ibid., 163, 274.

[768] Ibid., 174.

[769] Ibid., 162.

[770] Ibid., 158. But see also E. O. Wilson (1975/2000, 575).

explanation that emphasizes culture. On the scheme of someone like Miller or Pinker, decisions (or feelings) against having offspring are not likely to be new. They are simply a by-product of a whole array of proximate ends balanced against one another relative to ascendant opportunity (connected to survival).[771] Fixation with *actual* reproduction repeatedly masks what is operating at a more fundamental biological level.[772]

5.3) Relative Freedom versus Absolute Freedom

One of the more intriguing revelations of Ullicia Segerstråle's twenty-five year documentation of the sociobiology debates was just how prominent the issue of free will was. Equally noteworthy, Segerstråle says "*both* sides in the [historical] controversy paid homage to the idea of free will" and yet, neither side seemed able to fully connect with the other on the issue.[773]

For someone like E.O. Wilson, there is no *absolute* free will, no force of volition that completely extricates itself from biology or surrounding ecology. Instead, there is something to the effect of what I described above: we simply create some measure of intellectual independence from the forces that create us, by turning

[771] Strangely, Richerson and Boyd also seem to recognize this (ibid., 161).
[772] Consider Dennett's example of the 'digger wasp' (1984/1995, 11). Presumably the organism orients to survival and reproduction. But the wasp has an interesting habit that can misfire. The wasp will paralyze a cricket with her sting. She then uses the cricket to feed her offspring. She builds a burrow for this. Her routine is to drag the cricket to the edge of the burrow, inspect the burrow, lay her eggs beside the cricket, close the burrow, and fly away. If we interfere and move the cricket a few inches, she will repeat the inspection process. This can be done repeatedly, and the inspection process will occur repeatedly—seemingly indefinitely. The wasp has an intermediate goal that enables reproduction, *but the proximate goal of an inspection is essential*. Humans are more behaviorally flexible than a digger wasp, but we cannot lose sight of the fact that proximate adaptations, in certain ecologies, *can take on a life of their own*.
[773] Segerstråle (2000, 396; my emphasis).

them back on themselves.[774] The critics did not understand this. For instance, Lewontin, Rose, and Kamin complained that scholars such as Wilson and Richard Dawkins could only invoke this 'rebellion against the dictates of our genes' by, essentially, returning to Cartesian dualism.[775] However, consider Dawkins' reply:

> I *think* Rose and his colleagues are accusing us of eating our cake and having it. Either we must be 'genetic determinists' or we believe in 'free will'; we cannot have it both ways. But—and here I presume to speak for Professor Wilson as well as for myself—it is only in the eyes of Rose and his colleagues that we are 'genetic determinists.' What they don't understand…is that it is perfectly possible to hold that genes exert a statistical influence on human behavior while at the same time believing that this influence can be modified, overridden, and reversed by other influences…Presumably Rose and his colleagues agree that human sexual desire has evolved by natural selection, in the same sense as anything ever evolves by natural selection. They therefore must agree that there have been genes influencing sexual desire—in the same way genes ever influence anything. Yet they presumably have no trouble with curbing their sexual desires when it is socially necessary to do so. What is dualist about that? Obviously nothing. And no more is it dualist for me to rebel 'against the tyranny of the selfish replicators.' We, that is our brains, are separate and independent enough from our genes to rebel against them…we do so in a small way every time we use contraception. There is no reason why we should not rebel in a large way, too.[776]

To this day, scholars such as evolutionary psychologists and their critics agree to the possibility of turning against biology, or against the cultural forces that

[774] For a discussion see Segerstråle (ibid., 398). In his book *Consilience: the Unity of Knowledge*, Wilson writes: "The brain is a product of the very highest levels of biological order, which are constrained by epigenetic rules implicit in the organism's anatomy and physiology. Working in a chaotic flood of environmental stimuli, it sees and listens, and learns, plans its own future. By that means the brain determines the fate of the genes that prescribed it. Across evolutionary time, the aggregate choices of many brains determine the Darwinian fate of everything human—the genes, the epigenetic rules, the communicating minds, and the culture (1998/1999, 179). See also Wilson (1978, 96).

[775] See Lewontin, Rose, and Kamin (1984, 283 – 284), or see Rose in Segerstråle (2000, 181).

[776] Dawkins (1976/1989, 331/332). A valid criticism of Dawkins might be that he has not explicitly explained what 'other influences' are, how these work, or how they connect back to evolution. On an ecological conception of human nature, 'other influences' would translate into 'ecological imperatives, mediated by forces such as history and culture, and these imperatives will have at least *some* loose genetic foundation. Therefore, we are not, strictly speaking rebelling against our genes as Dawkins claims. We are simply combining different PARG against other PARG.

influence us, but we still get a kind of double-speak on the part of the critics. For example, relative to humans, we often find avowals of scientific materialism,[777] and denials of mind-body dualism,[778] nature-nurture dualism,[779] pure indeterminism,[780] an immaterial free will,[781] and so on. And yet, this is usually paired with either a repeated concern about the influence of things like genes or biochemistry on humans, or we find statements to the effect that humans do, in fact, separate themselves from 'biology.' In regard to the former, for instance, we have Steven Rose. In his book *Lifelines: Biology Beyond Determinism*,[782] Rose makes up a construct for the view he opposes: he calls it "neurogenetic determinism."[783] While Rose considers his own vision of biology to be anti-reductionist, he still dedicates parts of his book to denying or minimizing the relevance of genes, or biochemistry for understanding urban violence, poverty, homelessness, and so on, and does not consider the idea that his own view may be reductionist.[784] In regard to separating humans from 'biology,' Dupré is a good example. At various points in his book, *Human Nature and the Limits of Science*, Dupré makes a case for human autonomy.[785] This is a convoluted argument, but two frames are relevant here. First, he says it is "impossible to characterize a human mind without appeal to language"—which, it

[777] Rose (1998, xi).
[778] Dupré (2001, 33).
[779] Lewontin et al (1984, 284), or Rose (1998, 6).
[780] Dupré (2001, 157).
[781] Rose (1998, 7).
[782] Rose (1998).
[783] Rose (1998, ix). This term derives from an earlier paper by Rose (1995 xi).
[784] Ibid., 305.
[785] Dupré (2001). According to Dupré, human autonomy is essential to having hope for a better world (ibid., 180 - 181).

turns out, "is not a property of an individual but of a linguistic community."[786] Second, Dupré argues that humans can act according to principles, which he imagines are "essentially linguistic phenomena."[787] From here, Dupré basically combines the two frames. He writes: "The ability to adopt a principle, and to make it part of one's nature…is, I take it, a *wholly language-dependent* possibility. And language is essentially social."[788] So, aside from the fact that both Dupré's starting frames are open to serious objection, we find phrasing that *is* dualistic.[789] Moreover, like Rose, and many others of this ilk, Dupré worries about psychopharmacological treatment of various human conditions (not that these do not work, but that they hide more patient-centered, or holistic options).[790]

My aim, here, is not to dissect the various eccentric versions of free-will that now exist. Rather, I want to make a foundational point. An ecological conception of human nature—just as that of sociobiology or evolutionary psychology—recognizes human uniqueness. For instance, in a very obvious way humans are special in their ability to represent the world, to 'freeze' information, to engage in vicarious trial and error, to use written language as a platform to construct ever-more abstract systems

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[786] Dupré (2001, 33).
[787] Dupré (2001, 181).
[788] Ibid., 181; my emphasis. We see something very similar in O'Hear (1997).
[789] Dupré, of course, denies this dualism. For instance, he says, "I do not mean to imply that autonomy is wholly a social product of which individuals are merely passive vehicles" (2001, 181). But his argument is rather thin. To avoid a purely social determination of human agency, Dupré mostly appeals to human imagination: humans can simply be imaginative in their application of principles or rules. However, Dupré does not say just where this imagination comes from (2001, 182).
[790] Dupre (2001, 14, 185). Prinz is another scholar that is concerned. Yet, if we are interactionists, we should be no more concerned about pharmacological treatment that is imperfect, or that can be abused, than social inculcation that is imperfect or has potential for abuse (2012, e.g., 3, 272 - 273).

of perception and reason, and so on. And, *all of this* allows for tremendous human flexibility. However, an ecological conception of human nature would deny that it is scientific to speak of psychological, linguistic, or cultural forces as if they themselves are quasi-independent causes. And this is really what is strange about this specific forum on the free will debate. In principle, both sides aim to be consistent with the materialism of science while honoring our cultural and technological capacities, and our subjective experience freedom. In which case, the debate seems to center on emphasis: neither side seems to *explicitly* accept a totally free will,[791] and yet, some scholars still want humans to somehow be their own causal starting points,[792] and to do this, they tend to elevate phenomena such as human sociality and linguistic capacity and demote genetic, developmental, physiological, anatomical, or ecological influence on humans.[793] An ecological conception of human nature does not require this. Humans are every bit as much genetic or chemical organic systems as they may be cultural or linguistic systems, and neither fact has any more, or less, *general* importance in understanding humans. We are far better to simply emphasize different PARG, at an individual or population level, on a very case-by-case basis.

[791] This is in slight contrast to Segerstråle's depiction of the view of the sociobiological critics. She writes: "What the critics of sociobiology seemed to believe in was a 'totally free' free will, not a will in any way influenced by genetic constraints. This, in turn, followed from their belief in a separate realm of culture. Because of culture, there were no constraints on what humans could do, nor on our social and cultural arrangements" (ibid. 391).

[792] For a related discussion see Pinker (2002, 121-124).

[793] Critics of human nature do often emphasize the influence of developmental processes. But this rarely translates into human psychological laws, as a discipline like evolutionary psychology attempts. In fact, developmental processes are usually invoked to undermine the idea there is a singular human nature or that there are psychological laws. See for example Sterelny (2003, e.g., 166).

From an ecological perspective, human freedom has at least six facets (in addition to matching ecological imperatives against each other). First, human freedom is *relative*: humans are free relative to some previous state; relative to other organisms; relative to certain ecologies; relative to a previous generation; and so on.[794] Second, human freedom is not something internal and projected out of the organism—just like human nature is not something internal. Instead, human freedom straddles the *intersections* of past and present, the organism and the world, and so on. If this is so, the *quality* of information we are exposed to is as important as our capacity to engage it. This also means that human freedom has a *fortuitous,* as well as a 'team' dimension: not only will standing in information's path increase the probability of encountering something we can re-direct toward our (or other's) transformation; *we are generally better off if others try to do the same*. Third, an aspect of the latter: the *heuristics* we apply to engaging the world are key. Some heuristics have more power to 'unravel' provisional limits than others. For example, 'lie on the couch if possible, play video games, and avoid interaction with the outside world' is not a heuristic that is likely to increase transformative possibility, relative to the rival of, say, 'expose yourself to varied experience and unusual or opposing ideas.' Fourth, human flexibility will not be found simply in human behavior or psychology. Rather, it can be found *across* PARG: gene therapy, biochemistry, knowing various developmental windows of opportunity, and so on. Fifth, human

[794] This way of thinking can be found repeatedly in the work of sociobiologists and evolutionary psychologists. See appendix 'C'.

freedom is *incremental.* As a bounded organic system, we need a balance between flexibility and constraint. In other words, sudden or radically expanded possibility is likely to disrupt some of the functional integrity of the system. Here, we might consider the case of Shereshevsky.[795] Presumably, as studied by psychologist A. R. Luria for over three decades, Shereshevsky had a perfect memory. The downside to this, however, is the detail he could recall prevented him from understanding the gist, or *essence*, of a particular life-event.[796] Finally, ecological imperatives suggest that human *morality does not hinge on free will*. Rather, as a social species, not only do we need to cooperate for our well-being, but our capacity to empathize, to imagine other states of being, and to act on this capacity, can 'runaway' from us.

5.4) An Ecological Conception of Human Nature and Mental Health

With respect to mental health, human wellness and pathology should reflect the degree to which ecological imperatives are met in some balanced fashion or the degree to which these are frustrated. This would also mean that the *Diagnostic and Statistical Manuel of Mental Disorders* might be more expediently arranged around *explicitly* identifying ecological imperatives and heuristics relative to a specific developmental history, social ecology, and natural ecology.[797] To investigate certain pathologies we might first ascertain which imperatives are ascendant or neglected,

[795] Gigerenzer (2007, 21 – 23, 123 – 124).
[796] Likewise, we can think of Plato's cave analogy: Socrates suggests the prisoners staring at the shadows in the cave will not be helped if they are simply dragged above ground into the mid-day sun. There need to be trials for their eyes to accommodate the sun.
[797] I use the word 'explicitly' to highlight the fact that what I am suggesting is likely carried out already in a kind of parochial or unconscious way. So the difference is mostly one of framing. I do not impute that psychologists have it all wrong.

or which are in conflict and creating maladaptation. From here, we might investigate the ecological or idiosyncratic heuristics used to meet these imperatives to find out how they are misapplied, overused, neglected, or in conflict with one other.[798] This investigation would also involve studying the origin of these heuristics and the confounding layers of past or present local ecology (family, work, culture, etc). Moreover, rather than viewing humans as exhibiting fairly stable functional or dysfunctional personalities, or *intrinsic traits,* it may be better to see much of what we witness as quite labile, though inhibited due largely to past or present ecology.[799]

To give just one example, consider an instance of somatoform disorder.[800] In his book *Flow; the Psychology of Optimal Experience*, Mihaly Csikszentmihalyi, writes of the difficulties of famous pianist Lorin Hollander.[801] Hollander was a child prodigy piano player, who also had a very strict and perfectionist father. Apparently Hollander would be lost in ecstasy playing piano alone, but when playing around his father, and strict mentors, he felt sheer terror. Mihaly relays an event that occurred

[798] Pinker is relevant here. He writes "What about our rational flexible thought? Can it be explained as a set of instincts?...At the lowest level (the information processing steps) have to be as automatic and unanalyzed as the reactions of the most brutish animal. Remember what the tortoise said to Achilles. No rational creature can consult rules all the way down; that way infinite regress lies. At some point the thinker must execute a rule, because he just can't help it: it's the human way, a matter of course, the only appropriate and natural thing to do—in short, an instinct. When all goes well, our reasoning instincts link up into complex programs for rational analysis, but that is not because we somehow commune with a realm of truth and reason. The same instincts can be seduced by sophistry, bump up against paradoxes like Zeno's beguiling demonstrations that motion is impossible, or make us dizzy as they ponder mysteries like sentience and free will (1997, 184)
[799] I am not taking the existing work done by psychologists lightly. Of course there are very intransigent cases; for example, psychopaths do appear to be victims of largely physiological, affective, or biochemical deficits that are difficult to alter by voluntary means. I am speaking mostly toward the middle of the bell curve.
[800] For another example consider Nesse and Lloyd in Barkow, Cosmides, and Tooby (1992, 604).
[801] Hollander was also the subject of the movie 'Shine.'

to Hollander as follows: "When [Hollander] was a teenager, the fingers of his hand froze during a concert recital, and he could not open his clawed hands for many years thereafter. Some subconscious mechanism below the threshold of his awareness had decided to spare him the constant pain of parental criticism."[802]

Hollander eventually recovered and seemed to enjoy a happy life. I submit it is arguable whether Hollander had some 'illness.' Through the lens of ecological imperatives and heuristics, it is likely Hollander primarily had 'acutely taxing circumstances.'[803] Hollander may have been trying to meet two fundamental imperatives. One might have been something to the effect of 'pleasure, or mastery, if possible.' The other might have been some imperative to social intimacy or social approval—and, with a particular bias to paternal approval. Perhaps Hollander could not find a way, via modifying heuristics or his ecology, to disentangle these conflicting imperatives, or prevent their conflict from creating pain, and so Hollanders body 'made a choice' for him.[804]

To be very clear, this example is only to convey a case in principle—not detail. While it may lack nuance, it should explain a phenomenon that is not presently well understood; it is also consistent with an ecological perspective on the issue of free will. That is, if we can see-saw among imperatives toward greater

[802] Csikszentmihaly (1990, 112).
[803] Again, it is important to keep in mind I am communicating in an expedient way. I am not denying biochemical factors and so on.
[804] This also has an interesting application in the opposite direction: the origin of human consciousness.

flexibility, we should also find that opposing imperatives can sometimes be deadlocked leading to dysfunction.

5.5) An Ecological Conception of Human Nature and Morality

Human morality is another area that an ecological view of human nature can refine. Debates have raged for centuries about whether morality is objective or relative. But if morality is understood in the context of *what humans are as organisms*, then we can say it is both. Very generally, academics that specialize in morality tend to create and apply moral rules toward entities that have *interests* and the nature of these rules are designed to serve some interpretation of what these interests are. A significant portion of moral debate is over who should be a member of the moral community, or whose interests count. However, another portion of the debate is over what rules work best to serve those interests. If it turns out that members of the moral community all have an interest in well-being, then moral rules can be evaluated to the extent they bring about this well-being—or, to be precise, appropriately balance personal or kin well-being with that of the well-being of the moral community. In which case, moral rules are not groundless, but they are not entirely objective either as they reflect the interests of particular subjects. Put another way: our assessments of what is objectively moral will best coincide *not* with some absolute principle pulled out of our philosophical or *a priori* hat, but with the real interests most representative of the well-being of real organisms.

On this system, whatever organisms we decide to include in the moral community, all will exhibit global ecological imperatives, for example: orientation if possible; or avoidance of unnecessary pain, if possible. If this is so, we should find that whether you are a deontologist, utilitarian, virtue ethicist, or what have you, *any system* a moralist presents should preserve one or more of the imperatives I have outlined. In the case of human rights, for example, those rights most considered inviolable will be those that enhance or protect opportunities to meet an ecological imperative. As for parochial moral rules such as 'always tell the truth,' or 'act so as to maximize happiness,' these can be seen as equivalent to my ecological heuristics, but are mostly other-regarding as opposed to prudential. Of course, all the interests of the moral community cannot be secured all at once, and parochial interests or fortunes will change. In which case, it becomes important to assess not only what systems or rules best serve these interests, but also how these might be fluid enough to manage the dynamic aspect of interests, and the changing capacities of groups and individuals to secure their interests.

As with moral goals themselves, moral heuristics can be quasi-objective. We may not have any perfect standard by which to measure our rules (because the system is so complex and probabilistic), but *we certainly can determine their success relative to their known rivals and the knowledge we are capable of.* So it is not just that any moral rule is as good as any other, or that all cultures create rules that meet these ecological imperatives equally well.[805]

One final point worth noting on morality: if we can look at a fellow creature and see they are trying to fulfill some of the same ecological imperatives we are,

[805] See, e.g., Sam Harris (2010).

then however alien they may seem—non-human animals, the physically or mentally challenged, the suicidal, murderous, and so on—this invariance may rescue us from our continual judgment and condemnation of others.[806] In other words, if the imperatives are the same, then it is our best resources to meet them that are askew which is something that is not completely in our control.

Part II) Specific Application

Perhaps the best aspect of an ecological conception of human nature is that it offers far more possibility for timely and effective moral and prudential problem-solving. This is made possible in at least two ways. First, an ecological conception of human nature de-centers human agency and contextualizes it. In other words, *human intentions are not seen in isolation from unintentional elements*. This allows us to actually focus on problem-solving as opposed to allocating moral or prudential credit, or blame and shame, or propping up some specific in-group superiority by contrasting ourselves with some particular out-group inferiority. It also allows us to shift away from moralistic language (the language of right and wrong) toward more naturalistic language (the language of mere contributions or deprivations to individual or collective well-being). Second, by seeing humans in a holistic way, as biological as well as cultural beings, and as inseparable from past *and* present ecology, we can engage more *indirect* problem-solving as opposed to relying so heavily on direct didactic methods, or consciousness raising.

[806] See, e.g., Baumeister (1997), or Bazerman and Tenbrunsel (2011).

To make my case, I will first highlight the place of moral blame or credit for many of the critics of biological theories of human nature. I will show some of the problems with this emphasis, and then I will turn to some specific problem solving to highlight an ecological conception of human nature.

5.6) Biology, Human Nature, and Moral Credit and Blame

Perhaps the most persistent criticism with respect to biological accounts of human nature, and/or accounts that reference genes, is that they absolve the individual, society, or sub-culture, of moral responsibility, and/or they justify the status quo. Two examples may help to illustrate this. The first is from Joan Roughgarden's book *Evolution's Rainbow; Diversity, Gender, and Sexuality in Nature and People*.[807] In the passage below, Roughgarden is attacking Darwin's theory of sexual selection. The second example is from Dorothy Nelkin writing in an anthology called *Behavioral Genetics: the Clash of Culture and Biology*.[808]

> Please consider that everyone writing on these topics is writing from a perspective and with a vested interest. Some benefit from the biological excuse for male philandering that Darwin's sexual selection theory provides. Others find validation in Darwin's reinforcement of their aggressive worldview. Still others enjoy the genetic elitism of sexual selection theory, confident that their own genes are superior.[809]
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> Theories of genetic causation are welcomed by [some], such as the parents of the mentally ill, as a way to alleviate blame. However, by locating the source of the social problem within the individual, theories of genetic causation also serve political agendas, for they reduce the responsibility of the state… Moreover, they provide the equivalent of moral absolution, exonerating

[807] Roughgarden (2004).
[808] Nelkin in Carson and Rothstein Ed (1999).
[809] Roughgarden (2004, 10)

> individuals by attributing anti-social acts to an independent biological force beyond the influence of volition—the DNA.[810]

With respect to Roughgarden, it is easy to imagine that if the human population is diverse, then there may be some individual or some portion of the population that may match the descriptions given above. And so, we might assume there are people out there who, noticing they are attractive to many members of the opposite or same sex, imagine their genes are superior; or, we can imagine a student reading a biology text and coming across some statement about differential reproductive investment between the sexes and translating this into a conclusion that it is natural for males to be promiscuous—or something along these lines. But the weakness of claims like Roughgarden's is there is simply no absolute connection between a so-called fact, or fiction, and normative utility. For example, if it were true that, say, sexual selection seemed to elicit feelings of genetic elitism, it would not mean that we simply had to live with this. In fact, there are any number of directions that can be taken if a culture did not want this to occur. For instance, we might take this fact and undermine it with another Darwinian fact: perhaps humans are social, altruistic, or appreciate other's esteem, and so acting in a non-elitist, or in a self-restrained way, can be pitted against a supposed tendency to 'elitism.' So, without even contesting Roughgarden's view—for example, the complicating variable that females may also be promiscuous due to sexual selection, or that males are *not* promiscuous in any unqualified way—Roughgarden, at best, simply elevates

[810] Nelkin in Carson and Rothstein (1999, 158)

a partial truth, or her own worldview of humans as competitive and predatory, over a more ambiguous truth, and *all the other possibilities available.*

Nelkin's ideas have the same one-dimensionality as Roughgarden's.[811] Nelkin takes so-called 'genetic causation,' and generalizes that if genes are implicated, not only are there political reasons for this, but it is likely that those who do so want moral absolution. One of the first challenges we can apply to this view is simply that it is a 'just so story:' *how would Nelkin know* (given all the diverse parents of the world) that those who favor genetic explanation want to rid themselves of blame? Nelkin does not reference any replicated studies that isolate this truth with respect to all the other explanatory possibilities. Instead, she references a series of instances of what she believes is abuse of genetic explanation and does so without any detailed reference to 'genetic explanations' that *do* have validity, or to instances where 'non-genetic or social explanations' also have lent themselves to abuse, and she simply fills the gap as to a reason why.[812] In other words, one element of good scholarship is to *seriously* entertain rival hypotheses, and to track empirical hits as well as misses with respect to both one's own hypotheses as well as your rivals, but Nelkin largely provides confirmation bias. Another challenge: Nelkin tells us that 'biological' or genetic explanations serve political agendas, and much of her writing, and this paper especially, indicate that what she means by this is agendas that serve

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[811] In one sense, Nelkin has a broader view. She does allow that biological explanations can be remedial. But this seems mostly a rhetorical feature. Overwhelmingly her view focuses on their presumed ill-effects (Carson and Rothstein, 1999, 158).

[812] For example, in the mid 20th century, some scholars blamed schizophrenia and autism on 'refrigerator mothers.' The mother's coldness was supposedly responsible for the absence of social skills (Ridley, 2003, 113).

the status quo. But Nelkin's framing is strikingly simplistic.[813] There is nothing about biological explanations, or non-biological explanations that makes them any more or less amenable to progressive or regressive politics. Social limits may be as difficult to reverse as biological ones.[814] Ultimately, what science *does* offer—biological, sociological, or otherwise—are refined or difficult to access truths that are accurate enough to give us a good chance of at least *localized control* and problem solving, even if this control is only wisdom enough to redirect our efforts elsewhere. Nelkin seems quite unsettled by the fact that, for example, alcohol producers can blame alcoholism on genes as opposed to blame themselves for the distribution of their product.[815] But who is to blame is mostly beside the point. What we really want to know is what the elements *are* that influence this condition

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[813] Robyn Fox is relevant here. He writes: "I am not convinced that the social and behavioral sciences, at least implicitly… accept the fact value distinction. I argue that they are committed to a utopian program by their history and by the expectations that keep them alive and funded, namely, that they will help to improve the future prospects of mankind. This is so taken for granted that many people will not see there is an issue: of course these disciplines are intended for the future betterment of mankind; why else would we have them? One answer might be to look for the truth about human social nature whether or not the ensuing news be good or bad. In other words, it is certainly a logical possibility that there is no improvable future for mankind, that the news is indeed bad. At least the issue must be faced, not assumed to be settled. It is hard for the social sciences to face however; it is a poor basis for research proposals.

The result is that there is a tremendous bias in the sciences toward the bearing of good news" (1989, pg. 2/3).

[814] Dawkins is lucid here. He writes: "People seem to have little difficulty in accepting the modifiability of 'environmental' effects on human development. If a child has had bad teaching in mathematics, it is accepted that the resulting deficiency can be remedied by extra good teaching the following year. But any suggestion that a child's deficiency might have a genetic origin is likely to be greeted with something approaching despair: if it is in the genes 'it is written,' it is 'determined,' and nothing else can be done about it: you might as well give up attempting to teach a child mathematics. This is pernicious rubbish on an almost astronomical scale. Genetic causes and environmental causes are in principle no different from each other. Some influences of both types may be hard to reverse: others may be easy to reverse. Some may be actually hard to reverse, but easy if the right agent is applied. The important point is that there is no general reason for expecting genetic influences to be any more irreversible than environmental ones" (1982/2008 13).

[815] Nelkin (Carson and Rothstein 1999, 160).

so we can then try to improve it, and this might mean *there are social and well as non-social elements*. So it may be that alcohol companies *can* abuse some 'biological fact,' but if we provisionally presume there is a genetic component to alcoholism, then denying this and insisting the condition is 'social,' is no less abusive because it leads to *wheel spinning* on a problem where wheel spinning is avoidable. In fact, given the extreme scientific specialization that now exists, and the degree to which research findings now change, knowing what research is accurate or politically regressive, or not, is radically difficult. If we take just Nelkin's view of mental illness, Nelkin assumes she is politically progressive, and yet, her view is both ignorant and *insensitive* to a multitude of conditions afflicting people that are (almost) completely impervious to mere cognitive therapy, education, or the power of positive thinking: for example, Lesch-Nyhan syndrome, William's syndrome, certain forms of obesity,[816] autism, and so on. A final challenge: what appears to be the case, for Nelkin, is that if some condition is labeled 'genetic' this equates to 'beyond human intervention or correction.'[817] This is one of the strangest errors of typical debates over genetics.[818] In response: if we say that something like male violence is significantly genetic, or biochemical, this does not mean we cannot change it, or *that the 'solution' to male violence must also be 'genetic' or 'biochemical.'* Reducing the availability of handguns, discovering means to reduce unwanted

[816] Ruppel Shell (2000, 67 – 70).
[817] Nelkin (Carson and Rothstein, 1999, 163-164).
[818] Steven Rose, for instance, is another scholar who writes like this (1997, e.g., 296-298).

pregnancy,[819] or decreasing disparity in access to resources, may all significantly, or in combination, minimize male violence. However, even so, if we are true interactionists then not only would we expect some 'genetic solutions' (or partial solutions) to some of our social problems, but all of the solutions above, including our basic desire to mitigate this problem, will have genetic aspects. So the idea, implied by Nelkin, that we are better off if we hold someone, some group, or social institution, responsible for human problems, or if we divert our explanations away from 'biology,' seems not only narrow, it also appears based on ideas that are almost entirely arbitrary.

On an ecological conception of human nature, almost any fact or fiction comes with trade-offs. In other words, if morality is complex, and there is diversity in the human population, then we cannot expect any one way of looking at the world will prevent every (or most) abuse, or will guarantee lasting moral outcomes. This is not difficult to understand. Consider the science leading to the invention and use of automobiles. Automobiles exist in our world with multiple trade-offs. They may create mobility while reducing possibility for local intimacy; or they may allow us to connect with others around the world, while destroying the ozone layer. Anyone, telling us that certain engineering facts will lead to widespread abuse or benefit, is simply providing a partial truth. Or consider an even more human example: a bully may indirectly make the person they bully stronger, or they may ruin that person's life. We simplify the issue and, generally, insist bullying is wrong. And I suspect,

[819] See, for example, Donohue and Levitt (2001; 2005).

that given there is a human nature, and that we know what the basic global ecology is facing humans, we mostly get this issue correct. In other words, humans are, in a sense, vulnerable to, and bullied, by all sorts of things in life—so we hardly need to tolerate one more bully. But, strictly speaking, we do not know the moral outcome of local events with any certainty, or at any level of atemporal generality, other than what occurs at fairly extreme ends of the spectrum.[820]

5.7) Ecological Problem-Solving

On some rival conceptions of human nature, because human intentions are viewed largely in isolation from their non-intentional aspects and, because social arrangements are viewed mostly in isolation from a variety of biological and ecological variables, change becomes something quite one-dimensional: for the most part, individual and social education or consciousness-raising,[821] or individual and social volition, work ethic, or will-power is the answer.[822] However, it should be easy, at this stage in human history, to see the problem here. All around us we see evident moral aspiration, florid commitments to change, and sincere positive

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[820] The deontological response, here, might be that bullying is absolutely wrong. However, this is to simply stop at some intermediate point of inquiry and make an assertion. Bullying cannot be wrong *simply because it is*. Moreover, we need a way to adjudicate among moral principles that might be in conflict. Deontology may be a way to preserve not only the historical investment of an agent toward particular moral acts—retrospective versus prospective consequences—but also a commitment to the *potential* of a condemnation of bullying to spread.

[821] Peter Singer writes, "education is the great panacea [for the political left] with the potential to mold human beings into perfect citizens" (1999). But this could also be said of the political right. See also Ellis (1998) or Heath and Potter (2004, e.g., 59 - 61) on consciousness-raising.

[822] Nelkin, for example, worries about drugs being used for therapy primarily because they are cost-effective when 'analytic methods' may be more appropriate (Carson and Rothstein1999, 169). Again, knowing what is appropriate, here, is really the issue. Analytic methods, for example, may be better but far less cost-effective, unstable, or may have any number of side-effects. And pharmaceutical treatment may also be appropriate, even if imperfect, given the length of time analytic treatments might require.

intention, and yet any modest act of imagination tells us there has been ample yet missed opportunity. At an individual level we see this in failed new year's resolutions, broken promises to diet, exercise, watch TV less, give more to charity, and so on. And at a social level we still face on-going and significant racism, sexism, ageism, animal cruelty, environmental degradation, nuclear weapons escalation, unequal access to basic human goods, and on and on.

On an ecological conception of human nature, we can emphasize and access change through all PARG—not simply via direct psychological or social means.[823] At present, there is an increasing amount of experimental literature, some of which is making its way into popular science, which verifies this. For instance, we now see a number of books that give due weight to unconscious (or subcortical) information processing, cognitive illusions, affective primacy, biochemical influences on humans, self-serving biases and motivated reasoning, and so on.[824] We also have new types of expertise and even new academic specializations that are emerging due to these findings. For example, 'choice architects' acknowledge typically human decision-making errors and attempt to structure the context toward helping people make better choices.[825] There are neuro-economists who now pay far less attention to what humans verbally report as their consumer preference and more attention to

[823] Consider someone like Eric Parens relative to the rigidity of someone like Nelkin with respect to genes. Parens writes, "[If] it is sometimes appropriate to respond to social inequalities with social forms of affirmative action, then would it be appropriate to respond to those same inequalities with genetic or 'natural' or 'medical' means? ...Indeed, one might conclude that it is senseless to treat social disadvantages without treating natural ones, if both are unchosen and both have the same undesired effects" (2004, 28).
[824] See, e.g., Mercier and Sperber (2011), or Tavris and Aronson (2007).
[825] See, e.g., Thaler and Sunstein (2008).

what neuroscience and brain scans are telling them—and to great, if not alarming, effect.[826] And there are human factor, or human-tech engineers, who explicitly acknowledge human nature, and/or human anatomy and physiology, and who try to create contexts and technology that minimize human error and maximize human opportunity to meet human needs.[827] An ecological conception of human nature aligns with the power of this research rather than denying it—or reflexively judging it as politically regressive.

A primary thesis of an ecological conception of human nature is that humans think, feel, and act as they do *relative* to particular ecologies. Thus, if we change aspects of any level of biological organization, or aspects of internal or external ecology, the thoughts, feelings, and behavior we see can also significantly change. One of the easiest ways to see an ecological perspective at work is in the simple and mundane way that exogenous ecological cues or prompts offset human limits and constraints. For instance, an obnoxious alarm that is built into an automobile may reliably inspire us to do up our seatbelt. In effect, this is an acknowledgement and correction of the fact that humans do not often make a fair assessment of their own risk, or of delayed harm. An ATM machine that does not dispense the money from your withdrawal until you take back your bank card is an ecological safeguard that acknowledges and corrects for the human tendency to distraction. A gas gap with the word 'diesel' printed across it, aids with the impact human habit has in creating

[826] See, e.g., Lindstrom (2008), or Pradeep (2010).
[827] Vicente (2003).

error. Urinals that are designed with built in targets—such as flies or bumblebees—take into account the fact that humans are goal oriented and this has allowed buildings with public washrooms to reduce washroom cleaning duties.[828] The simple select placement of healthy food in school cafeterias (relative to unhealthy food), can help create better food choices for students.[829] Restrictions on human work schedules, and mandatory rest periods, are an acknowledgment of typical human fatigue and this reduces the error rate of people like pilots, doctors, nurses, and truck drivers.[830] Increased exposure to sunlight can reliably influence human moods. And so on. These very mundane tweaks to exogenous ecology create notable and fairly reliable cognitive, affective, and behavioral tweaks. However, increasingly, social scientists are realizing this may also be applicable to more substantial areas of human success and error at an individual as well as population level.

For the next four sections of this part of my chapter, I will give four examples of ecological problem solving and of how human problems can be solved without making any judgment as to the moral or prudential character of the participants involved. This is not because judging humans, negatively or positively, does not have its place.[831] Rather, it is to *balance* our tendency to see human problems as

[828] Vicente (2003, 86).
[829] Thaler and Sunstein (2008, 1).
[830] Vicente (2003, 21 - 24).
[831] Moral didacticism is likely to work best with certain kinds of subjects, in certain kinds of ecologies, and with certain kinds of moral problems. In particular, it should be most effective at the level of one-to-one moral interaction, small groups, or groups who engage in regular face-to-face contact. It might also be effective in ecologies where there is a stable moral majority, or where there is a clear

systematic or willful as opposed to epiphenomenal or unintentional, and to facilitate a shift in focus *toward human problem solving* as opposed to trying to determine blame or shame, or progressive or regressive politics.[832] My first example should illustrate that our tendency to see human actions only, or mostly, in terms of human intentions is not always helpful. My second example is meant to highlight the connection between human decision-making and behavior relative to human anatomy—which is often a PARG that is overlooked in accounts of human nature. My third example, highlights the importance of factoring in human developmental norms into assessments of human decision-making. And my fourth example is an attempt to show the power of *indirect* problem solving as opposed to that of direct didacticism or consciousness-raising. The reader may find fault with the details of the examples themselves, but it is important to keep in mind that they are merely examples in principle.

5.8) Police Brutality

Journalist Malcolm Gladwell, in his book *Blink; the Power of Thinking Without Thinking,* gives a number of examples of ecological problem solving.[833] One that is quite noteworthy is in regard to assumed police brutality. Gladwell relays a relatively recent case in Dade County Florida where there were a high number of

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imbalance of moral authority and, thus, opportunity for moral intimidation. Most of all, we would expect moral didacticism to be effective with moral problems that are quite simple and similar to what humans may have faced in an ancestral environment.

[832] Richard J. Ellis, in his book *The Dark Side of the Left*, makes an interesting comment about the environmental group, Earth First—a comment that could be generalized. He says, "Many Earth First!ers inhabit a conceptual world in which there are no tragedies, only conspiracies; a world where problems are never due to human beings' limitations, frailties, or even perversities but rather are an intended product of systemic malevolence" (1998, 250).

[833] Malcolm Gladwell (2005).

violent incidents reported between police officers and civilians. As is quite common, the parties involved tended to speak past one another. Local community groups accused the police of being insensitive and racist. The police responded defensively and claimed they had to make stressful, split-second decisions and that violence was, as Gladwell puts it, "a tragic and inevitable part of police work."[834] James Fyfe, head of police training for the New York Police Department, was called in to investigate. Fyfe avoided taking sides in the controversy and simply began to study what the police officers in Dade County were doing by placing observers in squad cars. On investigation, it turned out the problem was not that civilians were being unfair, or that police were simply belligerent. Instead, the problem was a gestalt of relatively minor expediting factors. Change was brought about by *a)* understanding how what happened *before* police encountered a suspect really mattered, as it created situational momentum; *b)* understanding how seemingly innocuous behavior conveyed aggression or threat; and then *c)* training police to avoid these types of behaviors and adhere to stricter training protocols. For instance, simple acts like making sure the police officer took appropriate cover (to force the suspect to shoot first); or that his or her gun was kept away from the individual as much as possible; or that she or he held their flashlight to the side, instead of straight on, dramatically reduced the number of complaints and injuries.[835]

[834] Ibid., 235.
[835] Ibid., 236.

The point of this example is not to say that police brutality or racism does not exist, or that civilian bias does not exist. Rather on an ecological view of humans we step back from our immediate assessments of humans only in terms of their intentions and pay attention to how these intentions refract through the prism of various ecologies.

5.9) Aviation Safety

In his book *The Human Factor; Revolutionizing the Way We Live With Technology*, engineer Kim Vicente gives an interesting account of ecological problem solving with respect to aviation safety.[836] Vicente reminds us that flying used to be very dangerous. One example he gives of this is in respect to the U.S. Air Mail service. He notes that when this service began, in 1918, thirty-one of the first forty pilots were killed in service.[837] In World War II, as pressure mounted for advanced aviation technology, the phrase 'pilot error,' began to appear in incident reports. However, this phrase was deceptive. On analysis, one of the leading causes of these aviation accidents was cockpit designs that were simply ill-matched to humans. In particular, there appeared to be a terribly dysfunctional relationship "between the physical shape, size, or location of the cockpit controls and the size, shape, and dexterity of the human body."[838] The link between 'pilot error' and cockpit design was strongly indicated by the fact that the same patterns of error were made by pilots regardless of their level of experience and skill. For example, during World

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[836] Vicente (2003).
[837] Ibid., 71.
[838] Ibid., 73.

War II, the pilots of various kinds of military planes, such as B-17s and B-25s, frequently retracted the landing-gear wheels rather than the flaps, when landing. Not surprisingly, on the accident-prone aircraft, the levers and switches controlling the landing gear and the flaps were right next to each other and almost identical in appearance. Also, on the problematic aircraft at the time, the controls could not be moved farther apart. The solution, it turned out, was simple. A lieutenant in the U.S. army who was designated to clear up the mess, Alphonse Chapanis, attached "a small wedge-shaped disk to the flap control and a small rubberized disc to the wheel control."[839] Vicente writes,

> The differing shapes made it easy for pilots to distinguish between the two controls merely by touch, and they were easy to remember because there was a clear and easy intuitive relationship between the shape of the controls and the functions they controlled—a wedge shaped control for a wedge shaped wing flap and a round, rubber control for the round, rubber airplane wheel.[840]

So, in this example, we can easily see that particular human behaviors and errors were corrected not by didacticism or punitive pilot training, but by understanding how human physical constraints interface with particular ecological constraints.

5.10) Waking Up in the Morning

A connection between human development and ecological problem solving can be found in regard to the issue of poor grades and attendance in high school. Children are typically early birds—or 'larks,' as it is called in sleep research

[839] Ibid., 75.
[840] Ibid.

parlance. However, as children enter their teenage years, their circadian rhythms change and sleep onset can be delayed usually by 2 – 4 hours (they become 'owls'). This, of course, makes it more difficult for teenagers to get up early on school days and often results in conflict between teenagers and their parents and teachers.[841] Moreover, each side of the issue is likely to see the other as unfair or immoral (at some minor level). The solution to this problem, however, does not necessarily rest in improved communication skills, or moral discipline. Rather, after some investigation, a number of schools simply delayed the start of their classes until later in the morning.[842] This coincided with less absenteeism, better grades, better alertness, and less conflict at the schools that implemented the trial.[843]

One reason why this a good example is because it highlights something specific to human beings—*other species do not have our late maturation*. And, while anatomy is not a salient factor, development, physiology, psychology, and behavior can all be implicated. The change in circadian rhythms for teenagers seems to reflect dramatic changes in growth, or physiological demands. In fact, the swing away from 'owlishness' and back to normal rhythms is often used as a biological marker for the end of adolescence. Ecology is also implicated because culture and natural light also factor in. Moreover, a solution was possible, in this case, because moral conflict was not seen as something always resulting from behavior that is systematic or deliberate. As a consequence, researchers circumvented trying to

[841] See Ackerman (2007, 6 – 7, 36), or Blackwell (2007).
[842] The first study was done in 17 school districts in Minneapolis Minnesota, U.SA. (1998), and has since been copied in many places around the world, including Canada.
[843] Carpenter (2001) or Carskadon et al (1998).

solve the problem simply through social conditioning or by enhancing awareness of desired behavior. Best of all, a solution was possible by assuming similarity in humans.

5.11) Ending Slavery

If the examples given so far seem relatively minor, a more significant historical example can be found in one of the important milestones to ending the slave trade. William Wilberforce tried for almost two decades (1789 – 1806) to pass parliamentary bills to end the slave trade in England. He was unsuccessful, in part, because many parliamentarians made a great deal of profit from human trafficking. Vested interest, it seems, hindered 'educated men' from seeing the atrocity of the slave trade as we do now. The tide changed in these debates when abolitionists resorted to *indirect means* (versus direct moral appeal) to end slavery. A maritime lawyer named James Stephen convinced Wilberforce to try passing a bill that would allow British privateers to board 'neutral ships' suspected of dealing in slaves with the French (who the British were at war with). However, many of these neutral ships, under an American flag, were actually crewed by British sailors. This bill, seen as patriotic in the war against France, actually prohibited 2/3rds of the British slave trade and dramatically cut British revenue from it. In turn, this paved the way for the passing of the 'Slavery Abolition Act' in England, which finally happened in 1833.

The point, here, is not that moral didacticism was ineffective—it was. The point is that significant progress was made on a moral problem because, at some level, people came to understand humans as more than merely 'rational' creatures. Consequently, *this led abolitionists to pay attention to ecology*.

5.12) Chapter Conclusion

With respect to human problem solving, if there are at least three axioms that might be helpful to redirecting the current academic orthodoxy, these might be as follows.

First, research that may suggest human biological limits or constraints should be no more unsettling to us than research that points to social limits and constraints, *or* research that points to biological or social opportunity.[844] This is because knowing what our limits and constraints are allows us to, at times, respect these limits, or at other times, not necessarily to *overcome them*, but to, effectively, *move sideways* around them. In regard to the former, knowing that humans are, for example, vulnerable to certain toxins, pathogens, temperatures, altitudes, animal predators, distractions, pleasures, and so on, helps us to avoid these possible risks and harms. We take account of such limits fairly easily and unconsciously at an individual level, and even in the knowledge that we make repeated mistakes about it. But, it is puzzling how unpopular it is to respect these limits and constraints at a population level—on the part of both the political left or right. I suspect this is to the

[844] What is embedded here, that should be evident from previous argument, is that limits and constraints should be welcomed because they make choices manageable and facilitate clarity and decisiveness. But this is minor relative to the fact that our denial of limits is often delusional and harmful. We are not omnipotent, and while we may achieve something like omnipotence over time, at every intermediate stage on the way there are constraints or provisional impossibility. In addition to this, there is the fact that almost all our opportunities and restrictions come with trade-offs. Chris Hedges, for example, even makes a convincing case for war as strangely creating peak moments of purpose and meaning for humans (2002/2003).

detriment to both individual well-being *and* our future as a species.[845] In regard to moving sideways around limits, we see this especially in human technology. Virtually every technology ever invented is an acknowledgment of human limits. Calculators indicate the challenges of abstract math; microscopes indicate the limits of human eyes; planes reflect the fact that humans cannot fly by flapping their arms; and bullet proof vests indicate the limits of human tissue. However, what is noteworthy is that most of these technologies *do not change what is organically impossible*. They simply allow us to artificially circumvent the limit. Perhaps what is most alarming about the current academic orthodoxy with respect to human problem solving is that our attention seems to be captured by groups who would abuse limits *rather than groups who perpetuate moral and prudential wheel spinning.*[846] This might be a human cognitive blind-spot akin to our tendency to pay attention to salient or natural harms—like shark attacks—as opposed to less salient, but far more probable (and violent) harms, such as car accidents.

[845] Consider Barbera Sher in regard to individual well-being and the problem of not acknowledging limits or constraints. She writes: "Sometimes…I'd convince myself that I should be able to make something of myself, no matter what the odds. After all, we create our own reality don't we? All I had to do was believe in myself and I could do anything, right? At least that is what it said in every self-help book I'd ever read—and I had read them all. Just think positive, tough it out, never quit. If you can't follow through on your dream, the problem is all in your head. Change your thinking. Pardon me, but when I read those words, I just start getting all choked up because they made me feel like a complete failure. If those phrases worked for you, the more power to you, but they never worked for me. I can't tell myself how to think. I can't just do anything I set my mind to" (1996).

[846] See, for example, Kitcher's [1985]). In reaction to the sociobiology of his day, Kitcher argued that, in regard to humans, our scientific standards must be high to due to the potential political abuse of this science (ibid. 9, 435). This view undermines the fact of human interpretive diversity, and presumes a special connection between facts and values. Just one response to Kitcher is that inevitable abuse must be weighed against missed moral opportunity. This evaluation is never likely to be easy, but some care must be taken to do so. As history and hindsight show, no scientific pronouncement is ever the end of story; good science cannot exist without the errors that speed orientation; and one generation's 'good science' is rarely that of future generations. As with any other brand of scientific investigation, human science should be allowed this latitude.

Second, facts alone do not determine values,[847] and, for anyone interested in helping to alleviate some of the suffering of members of the moral community, this should be welcomed. There is, factually, unequal ability among humans and other animals. For instance, we can consider the mental capacities of other primates, or those of someone with down-syndrome or Alzheimer's. But this does not then mandate privileging the interests of those with greater relevant capacity.[848] In other words, the facts of inequality do not then necessitate exploiting this inequality—and there is repeated example of humans exercising moral restraint in such cases. This hardly needs to be said, and yet, when evolutionary psychologists or like-minded thinkers raise the fact-value distinction it is often denied or minimized by critics, even though it absolutely essential to understanding human morality.[849]

Third, *certitude about the value of our moral ideals does not guarantee expertise as to how to best realize these ideals*, or even recognize the more subtle

[847] In regard to the sociobiology debates, Segerstråle's makes an interesting observation that is relevant to gaining perspective on scholars such as Roughgarden or Nelkin. Arguing against the critics, she writes: "logic may be quite beside the point when it comes to people's reasoning on these matters. So let us ask a different question…By what mechanism does a 'mere statement of fact' in the world of science become a seeming prescription for action, although there is no *logical* connection? The answer is: a society where people perceive an intimate connection between a fact and its *utility*. Under such conditions a mere statement of fact is never really a 'mere' statement of fact" (2000, pg. 375).

[848] An example of the minimization of the fact-value distinction can be found in Dupré (2003, 120). For a passage that contradicts what Dupré claims of the fact-value distinction, relative to evolutionary psychology, see Pinker (2002, xi, 139).

[849] A noteworthy critic of 'biological determinism,' Stephen J. Gould shares the same basic idea: "It would be poor logic and worse strategy to hinge a moral or political argument for equal treatment or equal opportunity upon any factual statement about human biology. For if our empirical conclusions need revision—and all facts are tentative in science—then we might be forced to justify prejudice and apartheid (directed perhaps, against ourselves, since who knows who would turn up at the bottom). I am no ethical philosopher, but I can only view equality of opportunity as inalienable, universal, and unrelated to the biological status of individuals. Our races may vary little in average characters, but individuals differ greatly—and I cannot imagine a decent world that does not treat the most profoundly retarded person as a full human being in all respects, despite his evident and pervasive limitations (1985, 196 - 197).

sources of their compromise. Repeatedly, we see arguments in the academic literature that seem to move very quickly from an expressed allegiance toward human well-being, or a particular group which many of us might be sympathetic to, to a dogmatic certainty about how this can be accomplished. For instance, in her book, *Love of Shopping is Not a Gene; Problems With Darwinian Psychology*, Innes Dagg tells us:

> The view that human social behaviors are correlated with our human genes is largely held by people who are right wing politically. Opponents of Darwinian Psychology, by contrast, tend to be liberals or democratic socialists who believe that the enlarged human brain enabled individuals and cultures to adopt these same behaviors not through genetic inheritance, but because they were best suited to their lives… The left-wingers would like to see the world change for the betterment of all, an aspiration more feasible if human behavior is not biologically determined, but plastic enough to adapt to new conditions as they arise. For individuals whose lives are in disarray, blame can then rest with the conditions and cultures that caused this dysfunction.[850]

This passage is full of dubious assumptions. Dagg actually has a PhD in animal behavior, and yet, she makes elementary mistakes about genes; about the empirical knowledge we have about the political allegiances of Darwinian psychologists;[851] about the fact that many critics of evolutionary psychology happen to be from, for example, the religious right; about the difference between a political commitment and actual practice (in the same way going to church might not make a person a Christian); about the radical range of interpretation as to just what the 'betterment of all' might mean; and so on. But, most important to my point, is the

[850] Dagg (2005).
[851] Tybur et al (2007).

assumption that plasticity and not 'determinism,' is what makes 'betterment' likely, and that 'biologically determined' is somehow incompatible with plasticity. To show just one obvious problem with the latter, consider the fact that evolution also 'determined' human reasoning capacity and volition, as well as our involuntary aspects.

At this stage of intellectual history, what is strange about views such as Dagg's is that where we might expect a marked and persistent openness as to how to solve various recalcitrant human problems, we find remarkable self-assurance as to how complex moral possibility can be accomplished, and certitude as to the intentions of rivals whose 'facts' appear to contradict our own. For instance, for many critics of research on sex differences, or the biological basis of aggression, the research seems to have only one possibility, which is usually negative. Currently, there does not appear any evident connection between our moral values and our ability to then solve a complex problem. At best, our zeal might lend itself to persistence. But the proponents of one political group do not, at present, appear to produce more practical solutions to human problems.

5.13) Thesis Conclusion

As a final comment, it is worthwhile to point out that an ecological conception of human nature has at least one thing in common with two other notable intellectual advancements in human history. If we consider the shift from a geocentric to the heliocentric view of our solar system, or the impact of Darwin's theory of evolution, in each case one of the main constraints that needed to be overcome to fully appreciate these discoveries was that of human self-importance. In the case of the former, Copernicus's discovery allowed us to realize that our planet was not the center of the universe; in the case of the latter, Darwin, allowed us to see that the human species was *not* the focal point of the biological world. With respect to an ecological view of human nature, human psychology and consciousness are also displaced from the center of the universe. This means, in effect, we look to how *all PARG bracket choice*. Humans, and human properties, are always embedded in context. With respect to the former, it is generally helpful to see these contexts as either invisible extensions of each human being, or as spreading like tree roots *into* the soil of human beings. On this picture, human nature is diffuse, or like a magnetic field, and is not necessarily something that inheres. This small adjustment in perspective might bring greater compassion toward other humans and increased problem solving power. But, of course, it also comes with trade-offs. In particular, demonizing other humans, or aggrandizing our own moral and prudential effort, can galvanize us toward doing and being our best. However, given the magnitude of the problems facing humanity, watering down these judgments may be a small price to pay to ensure our continued survival.

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Appendix A

Sociobiologists and evolutionary psychologists are repeatedly depicted, by critics, as genetic determinists. This is in stark contrast to what sociobiologists and evolutionary psychologists actually say on the matter, and how they conduct their research. Some of these scholars *do* make claims that some features of human beings are resistant to change. Such claims can be supported, or criticized, case-by-case. But determinism, itself, does not entail inevitability. In fact, the dominant tenor of this literature is that knowledge of human nature provides hope and can help us toward, as Pinker puts it, "a...biologically informed humanism" (2002, xi). Some historical writing on genetic determinism, by sociobiologists and evolutionary psychologists, are as follows.

> [Genes] determine behavior only in a statistical sense…A good analogy is the widely conceded generalization that 'A red sky at night is the shepherd's delight'. It may be a statistical fact that a good red sunset portends a fine day on the morrow, but we would not bet a large sum on it. We know perfectly well that the weather is influenced in very complex ways by many factors. Any weather forecast is subject to error. It is a statistical forecast only. We don't see red sunsets irrevocably determining fine weather the next day, and no more should we see genes as irrevocably determining anything. There is no reason why the influence of genes cannot easily be reversed by other influences (Dawkins, 1976/1989, 267 - 268).

> [We] should accept the likelihood that genes influence our behavior…This is not to say that we necessarily carry genes 'for' competition, say, or altruism, courtship, child care or group identification. But it is similarly true that there are no genes 'for' arms or legs; our limbs develop out of a complex interaction between our genetic make-up and our environment. When embryos are exposed to thalidomide, their genes and their products may function peculiarly or not at all. Under normal circumstances, however, our genes guide our development to produce a recognizably normal human being (Barash, 1979, 37).

> [It] is meaningless to speak of genes without discussing the environment. It is true that all behavior is genetic, but not in a 'super-deterministic' sense, only in the sense that its probability of occurrence is indirectly affected by a host of genes, even when the pathways are extremely complex and the effect of any individual gene relatively slight. Playing the piano is in this sense genetic. After all, one's background will certainly influence the probability that one will have sufficient manual dexterity to play, adequate auditory ability, and so forth. It is also true that, if you were born in the seventeenth century, the probability of your playing the piano was zero, regardless of your genes (Barkow, 1989, 27).

> [Every] feature of every phenotype is fully and equally co-determined by the interaction of the organism's genes…and its ontogenetic environments…by changing either the genes or the environment any outcome can be changed…As with all interactions, the product simply cannot be sensibly analyzed into separate genetically determined and environmentally determined components or degrees of influence. For this reason, *everything*, from the most delicate nuance of Richard Strauss's last performance of Beethoven's Fifth Symphony to the presence of calcium salts in his bones at birth, is totally and to exactly the same extent genetically and environmentally codetermined. 'Biology' cannot be segregated off into some traits and not others (Barkow, Tooby, and Cosmides, 1994, 83 - 84).

> All biologists speak of the interaction between heredity and environment. They do not, except in laboratory shorthand, speak of a gene 'causing' a particular behavior, and they never mean it literally. That would make no more sense than its converse, the idea of behavior arising from culture without the intervention of brain activity. The accepted explanation of genes to culture…is not heredity alone. It is not environment alone. It is the interaction between the two (Wilson, 1998, 149).

> Of course, the 'wonderful diversity of the human species is not hard-wired in our genetic code,' but we didn't need to count genes to figure that out—we already know from the fact that a child growing up in Japan speaks Japanese but the same child growing up in England would speak English (Pinker 2002, 78).

> [If] one is shy because of something that happened to one as a child, this is no less a deterministic event than if one's shyness had a genetic basis. We are all the product of the many determinants that have shaped us to be the persons we are now. The real mistake is to equate determinism—be it environmental, genetic, or some other kind—with inevitability. Determinism

> is about the causes of a particular situation, not about the consequences (Vandermassen, 2005, 100).

Appendix B

The dimensions of naturalness I have presented are those I presume best capture the construct. However, there is historical precedent for each dimension—despite the fact that terminology is sometimes quite different. I will, of course, provide *only a sample* of this precedent. In each case, I will start by listing the most salient dimensions a particular statement covers (re: page 248). These select dimensions act as a magnifying glass by which we might isolate and delineate certain empirical phenomena. What should be made clear (as with the other appendices) is that I am only drawing attention to instances of academic framing. *I am not claiming exact agreement with these views.* The view of each scholar presented is, of course, only a small (and perhaps distorting) aspect of his or her more developed view. Moreover, the connection to a 'nature' or 'what is natural' might not, in one or two selections, be directly apparent without comparison to the main body of text these selections are extracted from.

Dimension 4, 5, 6, 9, 10, 17:

> Cats…tend naturally to hunt; they will do so even if deprived of all example. They do it as kittens when they do not need food, and they will go on doing it even if they are kept fully fed; it is not just a means to an end. But their hunting is not a single stereotyped pattern, it covers a wide repertory of movements. A cat will improve greatly in its choice of these during its life; it can invent new ones and pick up tips from other cats. In this sense, hunting is learned. The antithesis between nature and nurture is quite false and unhelpful; hunting, like most activities of higher animals, is both innate *and* learned. The creature is born with certain powers and a strong wish to use them, but it will need time, practice, and (often) some example before it can develop them properly. Other powers and wishes it does *not* have and will find hard to acquire. For instance, swimming is outside the usual range of both cats and apes; in spite of their great agility it does not suit them as it

suits men and hippopotami; example will not usually bring them into the water, and they may starve if their food lies beyond it (Midgley, 1978, 53 - 54).

Dimension 1, 7, 9, 15:

To me, 'man is a social animal' who struggles to reconcile the partially warring parts of his universally occurring nature—the desire for survival and sustenance with the desire for companionship and approval…And not a social animal by accident, but a social animal by nature—that is, as a consequence of biological predispositions selected over eons of evolutionary history (Wilson, 1993, 123).

Dimension 2, 4, 9, 12:

We say the nature of something is its original or innate condition, what it is if nothing is done to it. Yet we also say the nature of something is its characteristic normal state when it has developed its mature form. Understanding nature as original potential may require a sharp distinction between nature and art; understanding nature as developed potential may require conceiving of art as sometimes the completion or imitation of nature. A body healing itself on its own is natural in the first sense. A body healing itself with the aid of the medical art is natural in the second sense.

According to the first sense, our nature is what we are at birth—our original potentialities or inclinations—before habituation or learning (Arnhart, 1998, 37).

Dimensions 1, 5, 9, 14:

Having a normal human brain does not imply that you have religion. All it implies is that you can acquire it, which is very different. The reason why psychologists and anthropologists are so concerned with *acquisition* and *transmission* is that evolution by natural selection gave us a particular kind of mind so that only particular kinds of religious notions can be acquired. Not all possible concepts are equally good. The ones we acquire easily are the ones we find widespread the world over; indeed, that is why we find them widespread the world over (Boyer, 2001, 4).

Dimension 3, 4, 5, 9, 15, 17:

We do not have conscious access to the vast majority of our psychological processes. They work as automatically and unobtrusively as do digestion and blood pressure regulation (when functioning normally). For example the incredibly complex and sophisticated machinery that underlies our ability to see is not accessible to introspection; not is there any adaptive reason why it should be. Our ancestors would have derived no adaptive benefit from being able to access the underlying machinery of vision consciously. Neither we nor any other animal with eyes needs to know how this machinery works, even if it exists, in order to see. All we need to do is open our eyes (Salmon and Symons, 2001/2003, 24).

Dimension 1, 3, 7, 8:

By human nature I mean the set of features that are reliably observed in any human group and presumably based on an evolved neurophysiological substrate. Put differently, human nature is the normal repertoire of human behaviors resulting in a large part from phylogentic inertia. We should expect most components of human nature, so defined, to emerge smoothly across the primate series (Mazur, 2005, 57).

Dimension 5, 6, 7, 9, 14:

An innate human nature applied cross-culturally in turn points to a naturalistic cross-cultural definition of the concept of art…The arts must be understood in terms of a cluster of features—skill display, pleasure, imagination, emotion, and so forth—that normally allow us to identify art objects and artistic performances through history and across cultures. These features are persistent in human life and arise spontaneously wherever artistic forms are adapted for or invented, whether for instruction or amusement (Dutton, 2009, 4).

Appendix C

The notion of relative freedom is, ultimately, one that implies the power of acknowledging human limits and constraints so we are better able to circumvent them. With the construct 'human nature,' and its semantic connection to what is most stable in human beings, the emphasis of scholars from sociobiology and evolutionary psychology tends to be on *biological* limits and constraints. The following is a selection from a few classic historical texts and a few notable recent ones.

> Socrates' frightening demand 'know thyself' still stands as the beginning and the end of a reasonable course of personal study. Perhaps the same rule can be applied to the species: 'know ourselves.' And here a paradox stares us in the eyes. In order to change how we act, we have to know what we are. Only by knowing what has changed a precious little can we set about changing things a little more (Tiger, 1969/1971, 217).

> Pure knowledge is the ultimate emancipator…But I do not believe it can change the ground rules of human behavior or alter the main course of history's predictable trajectory. Self-knowledge will reveal the elements of biological human nature from which modern social life proliferated in all its strange forms. It will help to distinguish safe from dangerous future courses of action with greater precision. We can hope to decide more judiciously which of the elements of human nature to cultivate and which to subvert, which to take open pleasure with and which to handle with care (Wilson, 1978, 96 - 97).

> [In] the effort to solve humanity's most profound problems, including those with moral and ethical implications, there is potentially great value in continuing to develop a perspective from modern evolutionary biology to be added to those deriving from philosophy, social sciences, religion, history, and the humanities. This biological perspective is appropriately added, not as an argument for determinism, but, precisely to the contrary, as a possible way to greater freedom, deriving from greater knowledge of the cause-effect patterns that underlie our history and our nature (Alexander, 1987, 255).

> A Darwinian [political] left would…[accept] that there is such a thing as human nature, and seek to find out more about it, so that policies can be grounded on the best available evidence of what human beings are like (Singer, 1998, 61).
>
> The existence of human nature is not a reactionary doctrine that dooms us to eternal oppression, violence, and greed. *Of course*, we should try to reduce harmful behavior, just as we try to reduce afflictions like hunger, disease, and the elements. But we fight those afflictions not by denying the pesky facts of nature but by turning some of them against others. For efforts at social change to be effective, they must identify the cognitive and moral resources that make some change possible. And for the efforts to be humane, they must acknowledge the universal pleasures and pains that make some kinds of change desirable (Pinker, 2002, 172 - 173).