How We Think About Human Nature: The Naturalizing Error
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Abstract
History is littered with scientifically ill-founded claims about human nature. They frequently appear in normative contexts, projecting ideology or values onto nature (what we call the *naturalizing error*). In considering a remedy, we adopt a naturalized epistemology approach to how we think about human nature. The "nature" in "human nature" fosters unproductive essentialist thinking, epitomized in the adage, "a tiger cannot change its stripes." Universalist, fixist, and teleological perspectives each erode epistemic reasoning and blur the distinction between normative and descriptive justification. We articulate strategies to guide more responsible claims about human nature in science and science communication.

1. Introduction

We are concerned here not with any particular claim about human nature, or the very possibility of objectively characterizing a human nature, but with *how we think about* human nature. What is the structure and epistemic status of such claims? How are they justified? What justification should be considered adequate? Appeals to human nature often appear in normative arguments as inescapable descriptive claims, ostensibly validated by science. "That's just how people are. You can't expect a tiger to change its stripes," so the familiar adage goes.[1] The role of such purportedly scientific claims in normative or policy contexts should be reassessed, we contend.

In particular, we explore the implications of inscribing normative views or values into scientific views of human nature, what we have elsewhere called the *naturalizing error* (Allchin & Werth 2017). Adopting a naturalized epistemology posture, we consider how people actually think about human nature, the scientific flaws in such thinking, and what strategies may help remedy such tendencies. We describe, in particular, how essentialist-style and teleological thinking, as well as the ambiguity in the very term "nature," contribute to the problem. One rarely encounters appeals in quite the same way to human *dispositions*, human *potentials*, human *limitations*, probabilistic human *tendencies*, frequently found human *traits*, or the spectrum of observed human *behavior*, even when such expressions might suffice. Why not? The very term "nature," we claim, functions (with its implicit teleology) to help inappropriately disguise an illicit slide between descriptive and normative modes of justification.

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[1]This common phrase is a variant of "a leopard cannot change its spots," which, as an indication of its deep cultural roots, can be traced back at least to Jeremiah 13.23. Equivalent expressions are found in many cultures.

In what follows, we first briefly review the argumentative contexts in which appeals to human nature appear and which foster motivated reasoning and several cognitive errors. We note how unjustified appeals to science often go unchallenged in these contexts. We articulate, too, the problematic ambiguity in the term "nature" and the role of essentialist conceptions in straddling descriptive and normative contexts (§2). We then comment in more detail on the various dimensions of essentialism—universality (§3), fixity (§4) and, most importantly, teleology (§5)—and on efforts by various philosophers to conceptualize human nature in non-essentialist ways. We summarize how each dimension of essentialism contributes to the naturalizing error (§6) and what remedies might be available (§7). Our ultimate aim is to highlight the frequency and significance of the naturalizing error in human nature claims (in both academic and non-academic settings), towards informing scientists, educators, and others who communicate science and its sociocultural implications to the general public (Griffiths 2017), as well as the researchers, philosophers, and others whose work they draw on and quote.

2. From "Nature" to Naturalizing

Elsewhere we survey in some detail the discursive contexts of appeals to human nature, from everyday discourse to academic tracts. They vary from explaining (and apparently thereby justifying) government shutdowns, carnivorous tastes, pornography and infidelity, sexual orientation and family structure, gender identities, and the ethics of stem cell and genetic technologies, to name a few (Werth & Allchin, forthcoming). Namely, they are primarily ideological and partial. This sets an important context for assessing what may be presented as neutral descriptive claims.

Such contexts may shape scientific reasoning. That is, scientists are susceptible to projecting their particular perspectives onto "objective" nature. In such cases, a value-laden normative view thence passes for a neutral descriptive view. Elsewhere, we have characterized the subtle shift from "ought" to "is"—an ironic reversal of G. E. Moore's familiar naturalistic fallacy—as a discrete error-type, which we have called the *naturalizing error* (Allchin 2001, 2008b; Allchin and Werth 2017). This becomes problematic, of course, from an epistemic perspective, if such views are then presented as "justifying" the very ideologies from which they were derived. Ironically, however, the ultimate source of the error is scientific.

Rather than address some vague notion of the "social construction" of science (or some generalized relation between the "social" and the "rational"), we focus on the particular epistemic flaws in such reasoning. We trace the source of the error to many types of now well-documented cognitive patterns. Context can foster selective framing, confirmation bias, premature satisficing, and misleading simplifications, such as unwarranted universal generalizations; strict either-or dichotomies; unqualified all-or-none effects; and absolutes (Gilovich 1991; Hallinan 2009; Lehrer 2009; Nickerson 1998; Sutherland 1992). Further the aim to justify ideology sets the scene for *motivated reasoning* (Kahan 2013; Kunda 1990; Mercier & Sperber 2017). All have led to incomplete consideration of the evidence and to scientific errors about human nature (Werth & Allchin, forthcoming). The science of human nature (with its pervasive ideological contexts) seems especially susceptible to the naturalizing error, as exemplified in a history littered with faulty claims: about tool use, language, sexual dichotomy, developmental "monsters," biophilia, rape, diet, self-awareness, gendered attributes, deception, and other features (Allchin 2008b, 2012). Not a praiseworthy track record. We are concerned, therefore, with how scientists can prejudice a presumptively descriptive characterization of nature with

normative views and how potentially honest efforts at critical reasoning can be (repeatedly) transformed into exercises in rationalization.

Epistemically, a major problem with human nature pronouncements, we contend, is the word "nature" itself, a basic term with multiple meanings and used in varied contexts (Kronfeldner 2018). To what does "nature" refer, and does it do so consistently? Commentators sometimes refer to nature as relating to the physical, material world. In this sense, human nature is a fundamentally scientific notion about who we are and how we came to be that way. Claims can be empirically investigated and verified independently by all. At the same time, the "nature" of something defines its essence, an abstract characterization that distills and delineates its unique make-up (Gelman 2003; Medin and Ortony 1989). It is a metaphysical notion and, like a Platonic essence, a transcendental ideal. It need not correspond directly and in all details to every real case. Or it may be conceived normatively. Thus, a reference to human nature embodies an inherent ambiguity between the idealized and the real. As we detail more fully below, the teleology (intent or purpose) commonly attributed to nature adds further potential confusion to the basic meaning of the term.

We take seriously the claim that words and their metaphors strongly shape thinking (Haraway 1989; Lakoff & Johnson 1980). In our view, the metaphor of nature contributes significantly to *naturalizing* cultural norms or values. The double meaning of "nature" fosters ambiguity and can lead to linguistic sleight of hand. Most significantly, normative and descriptive claims may be confused or conflated. A flat-out *normative* claim about human "nature" (embodying an ideological, ethical, political, or other value-based perspective) may easily be presented in the guise of a secure *descriptive* fact about human "nature," presumably fully justified by science. In some cases, the ambiguity allows a conscious bait-and-switch. For example, an argument about sexual orientation may contend that homosexual behavior is commonly observed in numerous species (in a descriptive sense) and *thus* is *natural* (in an idealized, normative sense of ethically warranted). Alternatively, it may be characterized as a "disease," or abnormality that contradicts the species' manifest necessity for reproduction, and *hence* is an *unnatural*, morally reprehensible perversion. In *both* instances, descriptive and normative senses are inappropriately conflated by switching between different meanings of "nature."

For example, as we have noted elsewhere (Allchin & Werth 2017), Herbert Spencer and other historical Social Darwinists, as well as laissez-faire capitalists today, did not succumb to the naturalistic fallacy so much as the naturalizing error. They primed their arguments with descriptions of "natural" selection as placeholders for "natural" norms in the economy. Wealth, competitive ambition, and conspicuous consumption in today's global economy are treated as descriptive substitutes for "natural" processes found among other species, from which well-informed policy supposedly directly follows (Ridley 2010; Saad 2011). The ability to toggle unannounced (and often undetected) between descriptive and normative modes based on two meanings of the same term, "human nature," is a pervasive challenge when assessing the many arguments that draw on human nature claims.

Our concerns about the connotative meaning and implications of appeals to "nature" run far deeper, however. The very term "nature," we claim, carries much more than mere summative description. It is simultaneously an appeal to *essentialism*. That is, the unregulated intuitive view is that human *nature* is not arbitrary, fleeting, subject to qualification, or contingent upon any particular precondition. It seems inevitable and inviolable. A tiger is a tiger, after all, and *thus* apparently cannot change its stripes. Recent psychological studies have identified three

significant features of essentialism, as embodied in vernacular conceptions of animal nature or innateness (Atran 1995; Griffiths 2002; Griffiths, Machery & Linquist 2009; Heine 2017; Linquist et al. 2011):

      (1) *universality*, or frequency or "normality";

      (2) *fixity*, or various forms of genetic determinism; and

      (3) *teleology,* or inherent purpose or intentional design.

Namely, in an unmediated view: (a) *all* tigers have stripes; (b) the stripes are *genetically determined*; and (c) they exist *for a reason* (and this explains *why* they cannot change). Each of the three features of essentialism is a factor in how ostensive descriptions acquire implicit normative weight, and/or how the flaws in scientifically weak claims about human nature escape notice. All are important. Thus, even while many philosophers have proposed concepts of human nature that avoid some of these features, they may still embody another. We also give special attention to teleology, which we regard as central—and underappreciated in most earlier analyses. Again, our aim is not to advocate for or against essentialist claims of human nature, so much as to show how they contribute to epistemic problems in the relation between descriptive (ostensibly scientific) and normative claims.

3. Universality

Perhaps the most intuitive feature of essentialism in how we think about human nature is universality, the idea that "all humans (and, sometimes, only humans) are X." There have been numerous academic debates about whether there are any genuine human universals (Antweiler 2016; Brown 1991, 2000), and whether they would even be meaningful in interpreting human nature (Brown 2004; Hull 1986; Laland & Brown 2018; Lewens 2012, 2018; Machery 2008, 2018; Ramsey 2013). However, our focus here is different. We want to highlight universality as part of a common rhetorical strategy, and to analyze its functional role in those arguments.

    At the most basic level, universality is a tool to facilitate sorting and discrete logical reasoning. That is, human nature claims are rarely framed as statements about the specific habits of Juan or Juanita. Rather, they are constructed as general claims, involving features presumably shared by all. Thinking in terms of clearly delineated and uniform categories is simpler, easier, smoother, faster. In this sense, essentialism helps streamline or economize reasoning. As a powerful heuristic, it shapes how we tend to think about human nature.

    More importantly, in rhetorical contexts essentialism helps cement the argument. With stable categories exhibiting consistent properties, there is no need for qualifications, conditionals, or probabilities. It discourages or forestalls wondering about special cases or unusual contexts. The traits are universal, after all. No exceptions. The conclusion seems less ambiguous, more certain, and more secure. That way of thinking about human nature is an advantage in a social, persuasive context (Mercier & Sperber 2017).

    In our view, an essentialist view of universalism fosters substituting an abstract nature for the material, physical nature. That will seem fine if you want to promote or defend the ideal (Morton et al. 2006, 2009). But it depends on being able to defend the universalist claim, which is often assumed rather than rigorously examined. A notable consequence of universalist claims about human nature is that they should be extremely vulnerable to falsification. One exception should be enough to puncture the bold claims that "all humans are X." Yet this seldom happens. When exceptions were found to the contention that human tool-use was unique, excuses were found, one after another (Allchin 2012). When E.O. Wilson introduced his concept of biophilia,

counterexamples were easy at hand—fear of spiders, sharks and snakes, anxiety with bared exposure to wilderness, technophilia, "urbanophilia," towering hardware aisles of household pesticides and herbicides, and disdain for "tree-huggers"—yet Wilson brushed them all aside. One need only switch from the material-universal to the conceptual-universal to escape exceptions. One appeals, as Wilson did, to deeper intuitions about "essential" properties to discount the exceptions as no more than mere exceptions that can be acknowledged without threatening the original claim (Allchin 2018). Ultimately, when universal claims are shuttled surreptitiously into an essentialist mode of "nature," they become immune to falsification. That is both their rhetorical strength and their epistemic Achilles heel. Essentialism helps illegitimate claims seem like "good science."

One of the greatest ironies here is that universal assertions are often projections of an individual's limited experience and perspective, confirmed only partially via selective use of evidence. A commitment to an idealized "nature" in an essentialist perspective further blinds the thinker to the limitations of the claim when measured against physical reality. Rather than revealing insights of vast scope, human nature claims about universals just as often reveal the blind spots of an essentialist reasoner (Haslam et al. 2005; Bastian & Haslam 2007).

Philosophers now, following Hull (1986), generally concur that speaking in terms of species universals runs afoul of biological and evolutionary thinking (Barrett 2015; Buller 2005; Cashdan 2008; Downes 2016; Kronfeldner et al. 2014; Ramsey 2013). By this they seem to mean, more specifically (and narrowly), that variation within the population of a species (both synchronically and diachronically) precludes a *universalist* human nature. However, this does not guarantee that their approaches remain purely descriptive, nor that they escape implicit normative overtones. Namely, many still exhibit other key features of essentialism (fixity, teleology).

In particular, universalism links strongly to teleology. Namely, if all members of a species exhibit a certain property, we tend to assume that it must have a purpose. (Why else would it be there?) This form of reasoning about essences applies equally to frequency-based claims, where "most," "nearly all," or even "a major proportion of" members of a species share a certain property. Appeals to "species-typical," "normal" or "robust" properties (or even a developmental "norm of reaction," or "core," "central," or "average" features) may appear to be descriptive only, but they plainly incorporate normative judgments about "type" and "norm," as a justified selective "model" of the species. They exhibit the "tyranny of normality" (a statistical analog of the political "tyranny of the majority" in democracies; [Allchin 2008a]).[2] They generalize from a subset and hence are still susceptible to the naturalizing error and the normative dangers of attributed essentialism. A frequency-based or cluster-based view of human nature (such as Ramsey 2013) is just as teleological and essentialist as a universal one.

4. Fixity

A second major feature of how we think about human nature through an essentialist lens is fixity—or immutability, permanence, or unchangeability. This is typically attributed to heredity with phrases such as "in the blood," "in the genes," or "in the DNA." The reference to

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[2] For example, based on frequency alone we might conclude that the nature of honeybees is to be a sterile female worker. Queen bees and drones, as exceptions, would not be included. Honeybee nature would, paradoxically, not include any reproduction.

inheritance draws on intuitive notions of stability and continuity through generations and genetic determinism, or rigidly "programmed" developmental pathways (Heine 2017; Lewontin 1993; Lewontin, Rose & Kamin 1984; Rose 1997). Studies indicate that, among the three features of essentialism, fixity is the most heavily weighted psychologically in shaping beliefs (Griffiths et al. 2009). Fixity, like universalism, certainly evokes a persuasive aura of inevitability (Dar-Nimrod & Heine 2011).

The importance and role of fixity in how we think about human nature is evident historically in the concerted efforts to depict human nature in genetic terms. For example, when Wilson speculated on biophilia, he presented it as a "psychological phenomena that rose from deep human history" and (thus) "resident in the genes themselves" (Wilson 1993, 40). The rhetorical implication was that biophilia was an inescapable part of who we are. "Innate" seems to mean intrinsic, or unavoidable. A similar strategy was used to try to justify the (now thoroughly debunked) Paleolithic diet. Our evolutionary history purportedly generated particular digestive enzymes and immunities, which supposedly determined our dietary fate today (Allchin & Werth 2017). In neither case did the scientific claim emerge unexpectedly from an independent exploratory inquiry into human evolution. Rather, the evolutionary history and the genetic basis were pursued to justify current desires (here, conservation of nature and tastes in food). In this, both projects borrowed on the widespread belief that genes, through a deterministic causal structure, guarantee a fixed essence. It should not be surprising that the effort to embed human nature in inflexible genetics has a long history, from Francis Galton's hereditary genius and Charles Davenport's pedigrees of "degeneracy" to chromosomal conditions that lead to criminality, to modern sociobiological and evolutionary psychology speculations about human aggression, altruism and political skills (Fowler & Schreiber 2008; Wilson 1978). And there is an equally long history of science debunking such fixist claims (Allen 2011; Buller 2005; Gaspar 2004; Gotz, Johnstone & Ratcliffe 1999; Gould 1996; Lewontin, Rose & Kamin 1984; Paul 1995; Richardson 2007). The allure of an essentialist argument is so strong that (here again) appeals to scientific claims about human nature persistently seem to run ahead of the science itself. While the scientific deficits of genetic determinism are familiar to philosophers and others, our emphasis on "how we think" leads us to underscore the deep cognitive tendencies that foster the recurring errors.

The psychological theme that biology-is-fixed-destiny has a long heritage, too, from the playful plot twists of Gilbert and Sullivan's operetta *H.M.S. Pinafore* to the notorious U.S. Supreme Court decision on sterilizing mentally handicapped individuals. Or even to the more stately traditions of royal lineages and their inherited privileges, or the now-nightmarish visions of the early 20th-century eugenics movement. The significance of essentialist arguments concerning a fixed human nature is, from our perspective, how *normative* principles seem to be justified by plain reference to *descriptive science*. Assuming that a state of affairs is fixed in nature, it cannot be changed. Or even budged. "Is" begins to looks like "ought." Nature, in being governed by immutable natural laws at least, appears inevitable. One can declare that the status quo cannot be otherwise. So, for example, someone may explain away a perceived negative trait as beyond the reach of free will. Consider the provocative cover of *Time* magazine, picturing a wedding ring cleft in two, with the headline, "Infidelity: It may be in our genes" (Wright 1994). Pronouncements about a "gay gene" (whether to ostensibly legitimize homosexual behavior or to disparage it) follow a similar pattern, also appearing on the front cover of a popular news magazine (*Newsweek* 1992). There is no naturalistic fallacy here. Values or norms are not explicitly taken or derived from nature. Rather, nature is taken at face value. No justification

seems needed. Nature just *is*. "You can't fight nature. A tiger cannot change its stripes." (So don't even try.) As a result of essentialist reasoning about fixed (innate) properties, faulty science can be immensely powerful, whether inadvertently or deliberately.

Of course, contemporary biologists (and philosophers of biology) widely reject associating genes with causal fixity. They acknowledge significant roles for complex interactions between genes and environment and for cultural factors in shaping human behavior, yielding diverse outcomes from similar genomes (e.g., Dupré 2003, 2018; Heine 2017; Laland & Brown 2018; Nettle 2018). Deflationary views of genetic determinism still allow scientists to examine human genetic heritage, commonalities across human populations, and discernible differences between humans and other species. Yet one can easily profile such patterns without reference to human *nature* (see also Laland & Brown 2018). The use of the additional term "nature," we contend, is deeply and indelibly associated with essentialism, which unproductively situates genes in a fixist and deterministic framework (see also the next section on teleology).

Attuned to the biological problems of genetic determinism, many philosophers have proposed how to reconceptualize human nature to accommodate an interactionist, developmental systems or multi-level approach that allows for plasticity or other dynamics (e.g., Cashdan 2013; Dupré 2003, 2018; Stotz & Griffiths 2018). But these analyses and new alternatives only seem to underscore the tension between vernacular views of human nature (as fixed, and generally normative), the findings of the human sciences, and the naturalizing error. As Downes (2016) notes in his cogent critique, while the new perspectives are valuable contributions, they may not contribute to the philosophy or science *of human nature*. Ironically, a non-fixist version of human nature strips science of most of its persuasive leverage or relevance in a normative context, the very reason most people appeal to human nature. Fixist (descriptive) thinking continues to be strongly linked to normative appeals.

5. Teleology

The third dimension of essentialism in how we tend to think about human nature, and the one we think has been least addressed in recent discourse by philosophers, is a notion of intent, purpose, or teleology. The cornerstone of teleological thinking is a belief that humans (collectively and individually) express an intended purpose—a conviction that we exist for a reason, and that everything, including our lives, is part of an ultimate plan. This belief seems to emerge early in life (Keleman 1999, 2004) and persist into adulthood (Guggenmos 2012), even among professional physical scientists (Keleman, Rottman & Seston 2013), and appears in divergent cultures (Rottman et al. 2017). It may result from projecting our own intentional status onto the world around us (Epley, Waytz & Cacioppo 2007). Perhaps through mirror neurons (the causes are still unknown), we easily interpret intent and motive in all aspects of nature—in other humans we relate to socially, in other life forms, as well as in natural phenomena (storms, fires, clouds) and even in inanimate objects (rocks, dolls, teddy bears) (Kelemen & Rosset 2009; Mead & Scott 2010a, 2010b). The effect of envisioning purpose is to transform the notion of inevitability one step further, into one of inviolability. The way things are is the way they were *meant* to be. Human nature acquires an aura of inherent justification and sanctity. Thus, people widely believe that an organism that fully expresses its "inner nature" is somehow better than one which does not, and that interfering with an organism expressing its "true nature" can only yield ill-effects (Griffiths 2002). In argumentative contexts, human nature claims implicitly invoke dire consequences for those who would dare to disagree. Teleology is another layer of

insulation against criticism in promoting a naturalized ideology.

Further, humans tend to believe that because they are meant to be a certain way (whether as products of nature or divine creation), members of a given species are all the same, fulfilling a preordained order. Instead of expecting humans to display variation, we expect they will act in canalized ways, as they were meant to. Thus, a teleological predisposition toward unified order tends to rationalize and reinforce universalist-style thinking. It is a powerful psychological bias (Fyfe et al. 2008; Kelemen and Rosset 2009). Here, we are interested in the implication of these cognitive tendencies in how humans reason about their own nature for a naturalized philosophy of human nature.

The attribution of purpose is integral to how ostensive scientific descriptions of nature acquire normative import in cultural contexts. Consider the details of the now well known case of the naming of mammals in the mid-18th century and its relation to gender politics (Schiebinger 1993). To justify excluding women from political discourse, leaders appealed to breast feeding *as part of maternal human nature*. Edward Long explicitly described maternal breast feeding as "consonant to the laws of nature." Most social debate revolved around wet-nursing, which Jean-Jacques Rousseau framed normatively as endangering the moral order of society. Carl von Linne (Linnaeus) also criticized wet-nursing and inscribed that cultural view into nature by naming animals with hair, internal development and live birth "Mammalia." Namely, mammary glands were an *essential* feature of the group, *embodying a natural purpose* incumbent on all female mammals. It was not just a descriptive explanation. Through inherent teleology, the purpose also justified a normative view. Nature became the descriptive substitute for the cultural norm. Such scientific errors cannot be dismissed as past history and irrelevant now. Similar arguments are echoed today (as noted above) in debates about whether sexual orientation is to be sanctioned culturally depending on its "natural" status. A similar pattern of appeal to nature occurs in arguments for human monogamy, based partly on serial pair-bonding in birds, although both birds and humans appear to have more diverse patterns of mating relationships (Barash 2016; Barash & Lipton 2001; Benshoof & Thornhill 1979; Cézilly et al. 2000; Fisher 1989; Tucker 2014). Teleology still actively haunts claims about human nature.

The language of teleology can be slippery and is often hidden in apparently innocuous metaphors. Consider common appeals to "playing God" as a moral argument against certain human-crafted technologies. Although the phrase would seem to invoke divine law or purpose, it is common in secular contexts. That is, the phrase typically ascribes "natural" boundaries to human behavior and to proper human purpose. It is a normative claim framed through teleology as something essential about objective human nature. Here, humans creating and using certain tools is, ironically, viewed as *illegitimate*. According to such claims, humans were not "meant" to engineer genes, to alter reproductive physiology in test tubes, to support life "artificially" with machines, to harvest embryonic stem cells, to build atomic bombs, and so on. Such appeals are now also found in the discourse on the ethics of human "enhancements," such as steroids in athletics, "uppers" in academics, gene therapy, robotic prosthetics, artificial intelligence, and beyond (Buchanan 2009; Lewens 2018). Namely, critics cast the behaviors as "unnatural"—*and therefore* as impermissible, or without sanctioned purpose. The normative arguments are naturalized, cloaked in the teleological language of essentialist, objective human "nature."

Purportedly scientific conceptions of purpose even appear in conventional evolutionary biology (exemplified in Ayala 1970, 1999; Mayr 1988; critiques by Gonzalez, Galli, & Meinardi 2010; Richerson 2018; Werth 2012)—what may be called *cryptoteleology*. As profiled vividly by Gould and Lewontin (1979), biologists and others tend to adopt a functionalist interpretation

of organic structures. The default assumption is generally adaptation by natural selection—a "natural" purpose of another sort. That is, the tiger has stripes *because they are adaptive*. They are there *to serve a prescribed purpose*. They have an *intended function*—namely, disruptive patterning and camouflage to enhance predation. It is in such a conceptual climate that evolutionary biologists have endeavored to portray rape as adaptive, with the implication that "nature" not only explains the behavior but also implicitly exonerates the perpetrator as no more than an unfortunate victim of natural selection. (Ironically, females too are supposedly subject to their own evolutionary function: a mandate for "mate choice"; Thornhill & Palmer 2001; see thorough debunking by de Waal 2000). The argument is structured such that any organismal feature construed as adaptive is "meant" to be there, even if only because of environmental exigencies. Through teleological perspectives, a conclusion of evolutionary science colored by cultural values can circle back to cultural discourse, supposedly as a norm validated directly by facts. Robert Ardrey (1966) promoted the evolutionary roots of a "territorial imperative," which then implicitly justified capitalist views of property and the notions of geopolitical spheres of influence, prominent just then in the Cold War. In a similar way, perhaps, evolutionary explanations of altruism based on kin selection emerged historically through an ideological prism that privileged familial relationships over other forms of reciprocity that are now more plainly visible. The "purpose" of sacrifice was presumably the promotion of the value of family (Allchin 2011). Similarly, many evolutionary psychology present improvised "just so" stories as fully justified (Buller 2005; Richardson 2007). Adaptive stories in evolutionary science are vulnerable to the naturalizing error. However, as illustrated in these cases, the deeper epistemic danger emerges when the error is coupled with widespread teleological perspectives that imbue human nature with normative overtones.

The role of "natural" purpose, or cryptoteleology, in evolutionary explanations appears even in recent conceptions of human nature that endeavor to escape metaphysical essentialism. For example, Machery (2008) promotes a nomological view in lieu of essentialism, but by characterizing human "nature" as those traits that result from the evolution of the species, he thereby supports an alternate form of essentialism: through a teleological stance whereby frequency of traits indicates implicitly justified endpoints or "norms" (combined with a touch of genetic determinism). Cashdan (2008) criticizes essentialism, but still adopts adaptive function of human behavior as an explicit default assumption (and absent any further consideration of alternatives). Teleology, here, seems to favor ecological "optimality" as a default target or unquestioned norm.[3] Ramsey (2013) provides an alternative to universalist-essentialism, but remains preoccupied with describing "naturalness" (986, 989-91), by which he seems to mean standards for how humans are "supposed to" behave based on evolution (but ultimately a teleological overlay).[4] In these cases, the cryptoteleology reintroduces a dimension of essentialism and naturalizing that has been formally disavowed. These views still sit on the problematic cusp between descriptive and normative accounts.

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[3] Namely, discounting "the unfit and the maladaptive" as integral part of a species' "nature" is a normative judgment.

[4] Offering "naturalness" as a prime desiderata of a concept of "human nature" (Ramsey, 2013, p.986) seems highly uninformative, if not circular.

6. Essentialism and the Justification of Norms

In the past three sections, we have documented how the essentialist dimensions in the commonly accepted notions of human nature—universality, fixity, and teleology—contribute cognitively to naturalizing normative ideologies and (time and time again) fostering scientific errors. Ironically, the things that make an appeal to human nature rhetorically attractive in normative arguments are also the very things that tend to erode their epistemic justification from a scientific standpoint.

We can now clarify further the ways in which the illegitimate claims move unperceived from science to normative arguments. The various features of essentialism foster this shift by establishing dichotomies, with metaphors and code words that implicitly convey "natural" behaviors as in accord with, and thus justified by, the empirical facts, and "unnatural" ones as unjustified (Table 1).[5] Again, the descriptive, scientific "nature" (along with its errors) is transformed unnoticed into a normative, idealized "nature" (with a supposed equivalence of meaning).

By framing a human feature as a part of "nature," an essentialist claim renders it as inevitable and unchanging. Along the way, the subtle difference between "cannot be otherwise" and "should," is often lost. It seems all too easy to slide across modes of justification from "the way things always are," along with "there is no other way," to "the way things are supposed to be." Thus, the practice of packaging human tendencies or contingent dispositions into an essentialist human *nature* is a key element in naturalized errors going undetected in normative arguments. They cognitively eclipse awareness of a need for rigorous epistemic analysis. As a result, one can easily imagine that claims about nature (as unconditional, inevitable, or indicative of purpose) are adequately justified when they are not. That is the epistemic predicament of the naturalizing error in human nature.

7. Remedies

In summary, as documented above, how we think about human nature seems to be plagued with problems, both in repeatedly biased science and at the interface of descriptive science and normative philosophy. We are not persuaded that the faulty reasoning can be solved by reconfiguring a new conception of human nature at a high level. In our naturalized epistemological perspective, the tendencies towards essentialism in how we think about humans have deep cognitive roots and will merely emerge in other ways. This is the reason for probing and characterizing in detail the patterns of universalist, fixist, and teleological thinking. This is where prospective solutions lie. We need to address directly how our thinking falters, not jerry-rig concepts around the problems.

Based on our analysis, we do see possible remedies. In our view, discussions of human nature and the human sciences need to adopt new standards:

1. *Ideally, avoid the language of human "nature."*

> Meaningful descriptive, empirical generalizations about humans (their behavior, heritable traits, evolutionary history, genetic relationships, and so on) are possible without saddling them with the unfruitful normative overtones of "nature" or "natural." Likewise,

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[5]It may be worth noting that a key element in the normative reasoning about human nature, here, is not any explicit conception of "good" (as per Ramsey 2013), but a sense of *justification* based on "objectively" following nature's own categories, which seem to allow one to conveniently sidestep the need to articulate or justify the value(s) involved.

meaningful normative claims about human flourishing or ideal human behavior are also possible without trying to disguise them as descriptive claims or scientific observations, or even to appeal to "nature" as a benchmark. Any potential ambiguities in use of the term "nature" should be explicitly resolved.

Kronfeldner, et al. (2014; echoing Samuels 2012) have proposed that essentialist "human nature" is a catchall pastiche of diverse and divergent concepts, and advocate a pluralistic posture. We suggest, by contrast, that the various conceptual approaches be fully differentiated, appropriately (re)named, and not conflated under a single problematic label. Abandoning the term human "nature" need not disturb any of the ultimate aims or endeavors currently embraced by that concept, while contributing to stronger epistemics.

2. *Articulate universalist claims.*

Where appropriate, universalist claims should yield to descriptions of tendencies, contingent dispositions, potentialities, limits, and so forth. Context-dependence and qualifications should be explicit, and quantitative statistics and probabilities provided where appropriate. Frequency-based generalizations should be labeled as not implying either universalism or notions of "typicality," "normality," or "core essence." The role of exceptions should be addressed, not dismissed as insignificant or peripheral. Because they can easily evoke implicit essentialism and teleological interpretations, descriptive universalist claims should be explicitly labeled as not implying normative interpretations. Further, the logical and argumentative roles of universalist claims should themselves be re-examined in light of teleological perspectives.

3. *Articulate determinist and fixed-feature claims.*

Mitigate illegitimate essentialist causal thinking by framing claims in qualified, contingent, or probabilistic terms. Avoid the ambiguous and vague term "innate." Historically, a posture of biological (especially genetic) determinism has fostered many errors. Hence, deterministic claims about human behavior should meet higher standards of rigor (see also #5 below). Many efforts to naturalize behavior in genetic and evolutionary terms can be easily debunked by applying some now common themes (an error-repertoire, or list of common domain-specific error types), such as: clarifying levels of causation; challenging untested analogies; not mistaking correlation for causation; denying mere plausibility or hypothesis as concrete proof; disallowing promissory notes on purported "genes for"; exposing adaptationist biases; demanding adequate sample size and experimental robustness; among others (for example, de Waal 2000; Rose 1997). Passing such error-probes in prepublication review should become standard in the human sciences.

4. *Probe for and avoid teleology and cryptoteleology.*

Actively monitor for the tendency to transform descriptive statements about human nature into normative ones without proper additional justification. Look for purpose implied (even if not stated) in universalist and determinist claims.. Be alert for uncritical adaptationist bias. Recall that, cognitively, cryptoteleology is still teleology and carries normative overtones and connotations.

5. *Apply higher standards of epistemic rigor for claims about human behavior that may be used in normative contexts.*

Recall, first, that the standards of evidence required for claims about human nature are not met by plausibility, non-systematic evidence (anecdotes or hand-picked cases),

correlation, or theoretical coherence alone. The strength of empirical evidence required should parallel the cultural significance the normative claim. Search for any telltale conflict of interest as a form of bias. Following a now familiar social epistemological principle, assess completeness of evidence in part by engaging complementary interpretive perspectives, especially those that might be adversely affected by the normative views (Harding 1991; Solomon 2001). Namely, expose and neutralize partiality with counter-partiality. History reminds us that epistemic checks and balances are especially needed where motivated reasoning about human "nature" may arise from considerations of gender, race, class, and other social dimensions with political overtones.

6. *Clarify normative contexts*.

Keep descriptive and normative claims distinct and clearly identified. The justification for normative claims should be explicit and detailed. Descriptive claims should inform, not indicate any mandated action. Motivational contexts should be candidly announced. When assessing arguments presented by others, one should examine the context of human nature claims for potential "conflicts of interest" or other forms of ideological, political, economic, or religious bias as potential signals of the naturalizing error.

The epistemic concerns thus apply quite broadly. However, different actors have different roles to play. We see major opportunities for corrective regulation at four points. First, and perhaps most important, science communicators, journalists, teachers and other media "gatekeepers" should use awareness of the naturalizing error to interpret scientific claims about human nature, identify their shortcomings, and report on them in public discourse. Second, scientists and other scholars who are aware of the possible (mis)use of their claims, can be more careful, guarded and circumscribed in their claims. Scientists cannot fully abdicate their professional role as stewards of public knowledge. They need to monitor how their claims are portrayed in public media. Third, more deeply, in generating and originally publishing their claims, researchers can be more mindful of the potential errors, the standards of evidence, and the import of their word choice and arguments in broader non-scientific domains. They can seek complementary perspectives in planning empirical investigations and, later, in interpreting the results, towards incorporating epistemic checks throughout the process. Fourth, potential critics can use the principles to be more thorough and articulate in their criticisms—for example, by identifying particular claims as exhibiting the naturalizing error or faulty essentialism, genetic determinism, or teleological assumptions.

We have not aimed to make any original claim about human nature ourselves. However, we *have* relied on scientific knowledge about human behavior—specifically what we take as reliable understanding about how humans tend to think about teleology, universals and causation. We trust that this knowledge was developed independently from building normative claims about human nature, and outside the shadow of any relevant ideological and political bias. At the very least, we hope that such scientific findings can contribute to a process of noticing and remedying the naturalizing error and improving how we think, individually and collectively, about the human sciences, on the one hand, and our ideals of human flourishing, on the other.

References

Allchin, Douglas. 2001. "Error Types." *Perspectives on Science* 9:38-59.

Allchin, Douglas. 2008a. "Monsters and the Tyranny of Normality." *American Biology Teacher* 70:117-19.

Allchin, Douglas. 2008b. "Naturalizing as an Error-type in Biology." *Filosofia e História da Biologia* 3:95-117.

Allchin, Douglas. 2011. "The Domesticated Gene." *American Biology Teacher* 74:120-23.

Allchin, Douglas. 2012. "To Be Human." *American Biology Teacher* 75:132-35.

Allchin, Douglas. 2018. "The Politics of Biodiversity Speak." *American Biology Teacher* 80:397-400..

Allchin, Douglas, and Alexander Werth. 2017. "The Naturalizing Error." *Journal for the General Philosophy of Science* 48 (1): 3-18.

Allen, Garland. 2011. "Eugenics and Modern Biology: Critiques of Eugenics, 1910-1945." *Annals of Human Genetics* 75 (3): 314-325.

Antweiler, Christoph. 2016. *Our Common Denominator: Human Universals Revisited.* Translated from the German by Diane Kerns. New York: Berghahn.

Ardrey, Robert. 1966. *The Territorial Imperative: A Personal Inquiry into the Animal Origins of Property and Nations*. New York: Athenaeum.

Atran, Scott. 1995. "Causal Constraints on Categories." In *Causal Cognition: A Multi-Disciplinary Debate*, ed. Dan Sperber, David Premack and Ann James Premack, . Oxford: Clarendon Press.

Ayala, Francisco. 1970. "Teleological Explanations in Evolutionary Biology." *Philosophy of Science* 37:1–15.

Ayala, Francisco. J. 1999. "Adaptation and Novelty: Teleological Explanations in Evolutionary Biology." *History and Philosophy of the Life Sciences* 21:3-33.

Barash, David P. 2016. *Out of Eden: The Surprising Consequences of Polygamy.* New York: Oxford University Press.

Barash, David P., and Judith Eve Lipton. 2001. *The Myth of Monogamy: Fidelity and Infidelity in Animals and People*. New York: Macmillan.

Barrett, H. Clark. 2015. *The Shape of Thought: How Mental Adaptations Evolve*. New York: Oxford University Press.

Bastian, Brock, and Nick Haslam. 2007. "Psychological Essentialism and Attention Allocation: Preferences for Stereotype-Consistent Versus Stereotype-Inconsistent Information." *Journal of Social Psychology* 147 (5): 531-541.

Benshoof, Lee, and Randy Thornhill. 1979. "The Evolution of Monogamy and Concealed Ovulation in Humans." *Journal of Social and Biological Structures* 2 (2): 95-106.

Brown, Donald E. 1991. *Human Universals*. New York: McGraw-Hill.

Brown, Donald E. 2000. "Human Universals and Their Implications." In *Being Humans: Anthropological Universality and Particularity in Transdisciplinary Perspectives*, ed. Neil Roughley, 156-174. New York: Walter de Gruyter.

Brown, Donald E. 2004. "Human Universals, Human Nature and Human Culture." *Daedalus* 133 (4): 47-54.

Buller, David J. 2005. *Adapting Minds: Evolutionary Psychology and the Persistent Quest for Human Nature*. Cambridge, MA: MIT Press.

Cashdan, Elizabeth. 2008. "Waist-to-Hip Ratio Across Cultures: Trade-Offs Between Androgen- and Estrogen-Dependent Traits." *Current Anthropology* 49 (6): 1099-1107.

Cashdan, Elizabeth. 2013. "What Is a Human Universal? Human Behavioral Ecology and Human Nature." In *Arguing About Human Nature*, ed. Stephen M. Downes and Eduoard Machery, 71-80. New York: Routledge.

Cézilly, Frank, Marina Préault, Frédérick Dubois, Bruno Faivre, and Bruno Patris. 2000. "Pair-Bonding in Birds and the Active Role of Females: A Critical Review of the Evidence." *Behavioral Processes* 51: 83-92.

Dar-Nimrod, Ilan, and Steven J. Heine. 2011. "Genetic Essentialism: On the Deceptive Determinism of DNA." *Psychological Bulletin* 137 (5): 800-818.

de Waal, Frans B. M. 2000 (April 2). "Survival of the Rapist: Two Scientists Argue that Plain Old Evolution Explains Why Men Rape." *New York Times.* http://www.nytimes.com/books/00/04/02/reviews/000402.002waalt.html

Downes, Stephen M. 2016. "Confronting Variation in the Social and Behavioral Sciences." *Philosophy of Science* 83:909–920.

Dupré, John. 2003. "On Human Nature." *Human Affairs* 13:109-122.

Dupré, John. 2018. "Human Nature: A Process Perspective." In Lewens and Hannon 2018, 92-107.

Epley, Nicholas, Adam Waytz, and John T. Cacioppo. 2007. "On Seeing Human: A Three-Factor Theory of Anthropomorphism." *Psychological Review* 114:864–86.

Fisher, Helen E. 1989. "Evolution of Human Serial Pairbonding." *American Journal of Physical Anthropology* 78:331–54.

Fowler, James H., and Darren Schreiber. 2008. "Biology, Politics, and the Emerging Science of Human Nature." *Science* 322:912-14.

Fyfe, Sophie, Claire Williams, Oliver J. Mason, and Graham J. Pickup. 2008. "Apophenia, Theory of Mind and Schizotypy: Perceiving Meaning and Intentionality in Randomness." *Cortex* 44:1316-25.

Gaspar, Phil. 2004. "Is Biology Destiny?" *International Socialist Review*, 38. https://isreview.org/issues/38/genes.shtml

Gelman, Susan A. 2003. *The Essential Child: Origins of Essentialism in Everyday Thought*. New York: Oxford University Press.

Gilovich, Thomas. 1991. *How We Know What Isn't So*. New York: Free Press.

Gonzalez Galli, Leonardo Martin, and Elsa N. Meinardi. 2010. "The Role of Teleological Thinking in Learning the Darwinian Model of Evolution." *Evolution: Education and Outreach* 4:145–52.

Gotz, M.J., E.C. Johnstone, and S.G. Ratcliffe. 1999. "Criminality and Antisocial Behaviour in Unselected Men with Sex Chromosome Abnormalities." *Psychological Medicine* 29:953-62.

Gould, Stephen J. 1996. *The Mismeasure of Man*, 2d. ed. New York: W. W. Norton.

Gould, Stephen J. and Lewontin, R. C. 1979. "The Spandrels of San Marco and the Panglossian Paradigm: A Critique of the Adaptationist Programme." *Proceedings of the Royal Society, London, Series B (Biological Sciences)* 205 (1161): 581-98.

Griffiths, Paul E. 2002. "What is Innateness?" *The Monist* 85:70–85.

Griffiths, Paul E. 2017. "Communicating Genomic Complexity." *Journal and Proceedings of the Royal Society of New South Wales* 150 (463/464): 93-103.

Griffiths, Paul E., Eduoard Machery, and Stefan Linquist. 2009. "The Vernacular Concept of Innateness." *Mind and Language* 24:605-30.

Guggenmos, Carrie Jeanette. 2012. *Teleological Reasoning in Adults: Believing in the Purpose of Events.* Masters thesis, Western Kentucky University.

Hallinan, Joseph T. 2009. *Why We Make Mistakes*. New York: Broadway Books.

Haraway, Donna. 1989. *Primate Visions: Gender, Race, and Nature in the World of Modern Science.* New York: Routledge.

Harding, Sandra. 1991. *Whose Science? Whose Knowledge?* Ithaca, NY: Cornell University Press.

Haslam, Nick, Paul Bain, Lauren Douge, Max Lee, and Brock Bastian. 2005. "More Human Than You: Attributing Humanness to Self and Others." *Journal of Personality and Social Psychology* 89 (6): 937-50.

Heine, Steven J. 2017. *DNA Is Not Destiny*. New York: W.W. Norton.

Hull, David. 1986. "On Human Nature." In *PSA: Proceedings of the Biennial Meeting of the Philosophy of Science Association*, ed. Peter Machamer, Arthur Fine, and Micky Forbes, Vol. 2, 3-13. Chicago: University of Chicago Press.

Kahan, Dan M. 2013. "Ideology, Motivated Reasoning, and Cognitive Reflection: An Experimental Study." *Judgment and Decision Making* 8:407-24.

Kelemen, Deborah. 1999. "Functions, Goals and Intentions: Children's Teleological Reasoning about Objects." *Trends in Cognitive Sciences* 12:461–68.

Kelemen, Deborah. 2004. "Are Children 'Intuitive Theists'? Reasoning about Purpose and Design in Nature." *Psychological Science* 15:295–301.

Kelemen, Deborah, and Evelyn Rosset. 2009. "The Human Function Compunction: Teleological Explanation in Adults." *Cognition* 11:138–43.

Kelemen, Deborah, Joshua Rottman, and Rebecca Seston. 2013. "Professional Physical Scientists Display Tenacious Teleological Tendencies: Purpose-Based Reasoning as a Cognitive Default**."** *Journal of Experimental Psychology: General* 142 (4): 1074-83.

Kronfeldner, Maria, Neil Roughly, and Georg Toepfer. 2014. "Recent Work on Human Nature: Beyond Traditional Essences." *Philosophy Compass* 9 (9): 642–52.

Kronfeldner, Maria. 2018. "Divide and Conquer: The Authority of Nature and Why We Disagree about Human Nature*."* In Lewens and Hannon 2018, 186-206.

Kunda, Ziva. 1990. "The Case for Motivated Reasoning." *Psychological Bulletin* 108:480-98.

Lakoff, George, and Mark Johnson. 1980. *Metaphors We Live By*. Chicago: University of Chicago Press.

Laland, Kevin N., and Gillian R. Brown. 2018. "The Social Construction of Human Nature." In Lewens and Hannon 2018, 127-44.

Lehrer, Jonas. 2009. *How We Decide*. New York: Houghton Mifflin.

Lewens, Tim. 2012. "Human Nature: The Very Idea." *Philosophy & Technology* 25 (4): 459-74.

Lewens, Tim. 2018. "Introduction: The Faces of Human Nature." In Lewens and Hannon 2018, 1-17.

Lewens, Tim, and Elizabeth Hannon, eds. 2018. *Why We Disagree About Human Nature*. New York: Oxford University Press.

Lewontin, Richard C. 1993. *Biology as Ideology: The Doctrine of DNA*: New York: Harper Collins,

Lewontin, Richard C., Steven Rose, and Leon J. Kamin. 1984. *Not in Our Genes*. New York: Pantheon Books.

Linquist, Stefan, Eduoard Machery, Paul E. Griffiths, and Karola Stotz. 2011. "Exploring the Folkbiological Conception of Human Nature." *Philosophical Transactions of the Royal Society B* 366:444-53.

Machery, Eduoard. 2008. "A Plea for Human Nature." *Philosophical Psychology* 21 (3): 321–29.

Machery, Edouard. 2018. "A Plea for Human Nature, Redux." In Lewens and Hannon 2018, 18-39.

Mayr, Ernst. 1988. "The Multiple Meanings of Teleological." In *Towards a New Philosophy of Biology*, 38-66. Cambridge, MA: Harvard University Press.

Mead Louise, & Eugenie Scott. 2010a. "Problem Concepts in Evolution Part I: Purpose and Design." *Evolution: Education and Outreach* 3:78–81.

Mead Louise, & Eugenie Scott. 2010b. "Problem Concepts in Evolution Part II: Cause and Chance." *Evolution: Education and Outreach* 3:261–64.

Medin, Douglas, and Andrew Ortony. 1989. "Psychological Essentialism." In *Similarity and Analogical Reasoning*, ed. Stella Vosniadou and Andrew Ortony, 179-95. Cambridge, UK: Cambridge University Press.

Mercier, Hugo, and Dan Sperber. 2017. *The Enigma of Reason.* Cambridge, MA: Harvard University Press.

Morton, Thomas A., S. Alexander Haslam, Tom Postmes, and Michelle K. Ryan. 2006. "We Value What Values Us: The Appeal of Identity-Affirming Science." *Political Psychology* 27 (6): 823-38.

Morton, Thomas A., Tom Postmes, S. Alexander Haslam, and Matthew J. Hornsey. 2009. "Theorizing Gender in the Face of Social Change: Is There Anything Essential about Essentialism?" *Journal of Personality and Social Psychology* 96 (3): 653-64.

Nettle, Daniel. 2018. "What We Talk about When We Talk about Biology." In *Hanging on the Edges: Essays on Science, Society and the Academic Life*, 25-42. Cambridge, UK: Open Book Publishers.

Newsweek. 1992 (February 24). "Is This Child Gay?: Born or Bred: The Origins of Homosexuality."

Nickerson, Raymond S. 1998. "Confirmation Bias: A Ubiquitous Phenomenon in Many Guises." *Review of General Psychology* 2:175-220.

Paul, Diane B. 1995. *Controlling Human Heredity: 1865 To the Present*. Amherst, NY: Humanities Books.

Ramsey, Grant. 2013. "Human Nature in a Post-Essentialist World." *Philosophy of Science* 80:983-93.

Richardson, Robert C. 2007. *Evolutionary Psychology as Maladapted Psychology*. Cambridge, UK: Cambridge University Press.

Richerson, Peter J. 2018. "The Use and Non-Use of the Human Nature Concept by Evolutionary Biologists." In Lewens and Hannon 2018, 145-69.

Ridley, Mark. 2010. *The Rational Optimist: How Prosperity Evolves*. New York: Harper.

Rose, Steven P. 1997. *Lifelines: Life Beyond the Gene*. Oxford: Oxford University Press.

Rottman, Joshua, Lizu Zhu, Wen Wang, Rebecca Steston Schillaci, Kelly J. Clark, and Deborah Kelemen. 2017. "Cultural Influences on the Teleological Stance: Evidence from China." *Religion, Brain & Behavior* 7:17-26.

Saad, Gad. 2011. *The Consuming Instinct: What Juicy Burgers, Ferraris, Pornography, and Gift Giving Reveal About Human Nature*. Amherst, NY: Prometheus.

Samuels, Richard. 2012. "Science and Human Nature." *Royal Institute of Philosophy Supplement* 70:1-28.

Schiebinger, Londa. 1993. "Why Mammals Are Called Mammals: Gender Politics in Eighteenth-Century Natural History." *The American Historical Review* 98:382-411.

Solomon, Miriam. 2001. *Social Empiricism*. Cambridge, MA: MIT Press.

Stotz, Karola, and Paul E. Griffiths. 2018. "A Developmental Systems Account of Human Nature." In Lewens and Hannon 2018, 58-75.

Sutherland, Stuart. 1992. *Irrationality: Why We Don't Think Straight*. New Brunswick, NJ: Rutgers University Press.

Thornhill, Randy, and Craig T. Palmer. 2001. *A Natural History of Rape: Biological Bases of Sexual Coercion* (rev. ed.). Cambridge, MA: MIT Press.

Tucker, William. 2014. *Marriage and Civilization: How Monogamy Made Us Human*. Washington, DC: Regnery.

Werth, Alexander. 2012. "Avoiding the Pitfall of Progress and Associated Perils of Evolutionary Education." *Evolution: Education and Outreach* 5:249-65.

Wilson, Edward O. 1978. *On Human Nature*. Cambridge, MA: Harvard University Press.

Wilson, Edward O. 1993. "Biophilia and the Conservation Ethic." In *The Biophilia Hypothesis*, ed. Stephen R. Kellert, and Edward O. Wilson, 31-41. Washington, DC: Island Press.

Wright, Robert. 1994 (August 15).. "Infidelity: It May Be in Our Genes. Our Cheating Hearts—Devotion and Betrayal, Marriage and Divorce: How Evolution Shaped Human Love." *Time*.

Feature of Essentialism	Normative Dichotomy	
	NATURAL (as a surrogate for justified)	**UNNATURAL** (as a surrogate for unjustified)
universalism	universal	accidental, heterogeneous
	species-typical	exceptional, anomalous
	normal	abnormal
fixity	genetic (nature)	environmental, social (nurture)
	biological, evolutionary	cultural
	physiological	psychological
teleology	adaptive	accidental, random
	"given"	man-made, artifactual
	organic	synthetic, artificial, technological
	normal, healthy	pathological

Table 1. Various ways features of essentialism contribute cognitively to bridging descriptive and normative forms of justification.