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# How we Think About Human Nature: Cognitive Errors and Concrete Remedies

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**Abstract**
Appeals to human nature are ubiquitous, yet historically many have proven ill-founded. Why? How might frequent errors be remedied towards building a more robust and reliable scientific study of human nature? Our aim is neither to advance specific scientific or philosophical claims about human nature, nor to proscribe or eliminate such claims. Rather, we articulate through examples the types of errors that frequently arise in this field, towards improving the rigor of the scientific and social studies. We seek to analyze such claims rhetorically, cognitively, and epistemically. Namely, *how do we think about* human nature? Claims about human nature, we show, are susceptible to widely exhibited deficits in cognitive tendencies such as framing, confirmation bias, satisficing, and teleological perspectives, as well as motivated reasoning. Such missteps foster methodological, empirical, and psychological mistakes and biases. Specifically, they promote the naturalizing error, whereby cultural ideology and values are projected onto an apparently objective description of nature. Concrete remedies are offered to aid scientists in conducting and reporting their research goals and findings more responsibly and effectively (relevant also to educators and other communicators who convey these findings publicly). Recommendations include acknowledging that human nature claims are often context-dependent, seeking multiple critical perspectives, and explicitly labeling uncertainties.

**Keywords** Cognitive heuristics · Error types · Misconceptions · Teleology · Essentialism · Universalism · Public understanding of science

*Us and them is perhaps the simplest explanation of human nature. —Wayne Bennett (2014).*

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## 1 Introduction

Claims about human nature are so pervasive that we seldom notice their ubiquity. "Ah well, it's only human nature. That's just how people are." Such comments appear in casual conversation, as well as, dressed in suitable academic language, scholarly arguments of anthropologists, evolutionary biologists, philosophers, psychologists, and economists. Human nature claims appear in advertisements, museum exhibits, and popular magazines. Advocates frequently deploy claims to justify or excuse behaviors, or to condemn others, in legal, political, social, and commercial contexts. They often appeal to science as having established a decisive benchmark. But is the scientific foundation sound?

Non-scientific or pseudoscientific claims about human nature by laypeople are easily set aside as instances of the fallacy of the appeal to nature (Jackson and Rees 2007). However, our primary concern is the scientific legitimacy on which such pronouncements draw. To be sure, there are many examples of trustworthy, empirically-based analyses of human nature in scholarly discourse (e.g., Katz 2002, Heinrich and Heinrich 2007, Barrett 2015, Sapolsky 2017) as well as popular contexts (Ridley 1996, Pinker 2002, Walter 2006, Shubin 2008, Ridley 2010, Pinker 2011, Lieberman 2013, Zuk 2013). Professional societies foster scholarly study of human nature, including the Human Behavior and Evolution Society (HBES) and International Society for Human Ethology (ISHE). Nonetheless, the way pronouncements about human nature are sometimes presented by scientists, or by those who cite them, make it difficult to distinguish well-founded from unreliable, sensationalist assertions.

Human nature claims often offer vapid platitudes or bromides that go unchallenged. Sometimes claims prove contradictory. Is human life "solitary, poor, nasty, brutish, and short," as Thomas Hobbes contended, or are people "really good at heart," as Anne Frank believed? Unfortunately, proponents of such claims often wield absolutist language that fosters stark and problematic either/or thinking, as in the misleading dichotomy presented in the previous sentence, rather than more nuanced and contextualized descriptions of human behavior (e.g., Sapolsky 2017). Humans may indeed be violent or peaceful and loving, depending on circumstances. Regrettably, human nature claims are often declared in unqualified terms. When statements are intended to shape social policy or actions, how should ordinary citizens or decision-makers respond? Which claims should one believe? Can a suitably rigorous science of human nature resolve such contentious questions?

We are not concerned here with questioning the very concept of human nature, as amply addressed by philosophers from Hull (1986) to Kronfeldner (2018a, b) and Hannon and Lewens (2018). We do not wish to engage whether human nature should be construed as universal, fixed, essential or nomological (Machery 2008), cultural or biological (or developmental), innate or environmental (or interactionist), adaptive or historically contingent (Allchin and Werth 2020), and so on. We are not concerned with the misinterpretation or misapplication of claims by philosophers or other non-scientists in scholarly or public discourse, which has been amply critiqued by Hull (1986), Samuels (2012), Kronfeldner et al. (2014), and Machery (2018). Nor do we comment on normative views of human nature, or the proposed ideals of human flourishing (Amundson 2000, Ramsey 2013; Austriaco 2015, Cherry 2015, Lewens 2015). Many well-known philosophical critiques of human nature (Hull 1986, Hannon and Lewens 2018) allege generalized or theoretical weaknesses in the human nature enterprise or how it is

conceptualized, but are not concerned with the epistemic status of specific claims. Such scholars contribute fruitfully to the concept of human nature, yet largely accept its scientific conclusions. We focus instead on the foundations of the science itself.

Our chief concern, then, is the *science* of human nature (construed descriptively) and the epistemic legitimacy of particular claims. At the same time, we consider the public discourse that follows this science, and which lays bare problems in the scholarly literature from which it draws. Specifically, we address a pattern of unfounded and unsupported claims that perpetually haunts this topic. Because popularizers and advocates regularly rely on science to promote erroneous claims in political or ideological contexts, scientific errors have substantive consequences beyond the academic realm (Schiebinger 1993, Gould 1996). Many core errors, we argue, are fundamentally scientific, not merely a result of improperly "applying" science. Thus we seek to clarify sources of error that typify mistaken conclusions in this field. That is, our concerns are primarily epistemic rather than ontological, ideological, or moral. The foundation of our argument is that whatever one purports to say about human behavior or the natural history of our species, it should be scientifically sound. As H. Clark Barrett (2015) aptly noted, "What does matter is getting the biology right" (p. 326). Assuming as we do that science can justify claims about humans—their behaviors, history, potentials, limits, dispositions—we ask, at heart, which claims can be regarded as trustworthy, and which not?

Our strategy is to explore how we think about human nature (using *we* not in the sense of the authors, but scientists and other scholars in general).How do contexts shape thought processes? How do native cognitive tendencies and dispositions foster errors? Towards this end, we examine a diverse sample of historical claims about human nature (some emerging in cultural discourse) and analyze their scientific flaws. How do erroneous claims arise and seem justified? How might these cases strengthen scientific practices?

Machery described human nature as "equivalent to what ornithologists do when they characterize typical properties of birds in field guides" (2008, p. 323). Such description of humans is surely warranted in a natural history context. However, we do not label behavioral or taxonomic characterizations of birds as "avian nature," nor do we treat them with profound respect. Yet the label "human nature" typically becomes construed in ideological and other cultural contexts. The same would apply to interpreting human nature in the context of a human anatomy textbook, an extraterrestrial being's Earth ethnography, or a zookeeper's manual on tending human specimens. Disentangling "human description" from "human nature" is decidedly problematic. Elsewhere, we have detailed how use of the term "nature" in "human nature" taps into implicit notions of teleology and thereby blurs distinctions between descriptive and normative interpretations (Allchin and Werth 2020). We warn that motivated reasoning leads to "naturalizing," wherein prescriptive statements lead to faulty scientific conclusions, in an insidious reversion of Moore's naturalistic fallacy ("is equals ought"; Curry 2006), lending the false imprimatur of science to unfounded claims (Allchin and Werth 2017). We wish to preserve the reliable descriptive science in natural history and anthropological textbook perspectives, yet we remain concerned about shortcomings underlying such science. We point out that theorizing frequently suffers from errors that can be readily identified and remedied. Therefore, the examples we present are drawn primarily from scientists' claims, although we recognize that ostensibly scientific claims are frequently deployed in popular contexts.

Many well-founded claims about human nature exist, although they may be less fruitful when too broad (i.e., applying not only to humans: people are inherently playful, curious, and cooperative). Some claims clearly distinguish *Homo sapiens* from other species: humans blush when embarrassed and copulate and defecate privately. Some distinctions

relate to the human body (e.g., brains, hands, dentition), others to behavior (e.g., use of fire, cooking, clothing, and art). Among other uncontroversial human universals (Brown 1991, 2004), people are inherently spiritual, gossipy, and legislative (desiring ordered rules to govern behavior).

Hence we do not recommend an "eliminativist" position, whereby reference to human nature is removed from discourse about humans and their behavior (Hull 1986, Dupré 2018, Richerson 2018). Truly, we take aim at shaky science because we support stronger claims. We emphasize that the terminology of human tendencies, contingent dispositions, potentialities, and limits are acceptable and worthy (indeed, equivalent) substitutes for human "nature," and we contend that these alternative terms often articulate more precisely the meanings conveyed by the (perhaps deliberately) vague word "nature."

When analyzing the epistemic status of human nature claims, we consider first their rhetorical contexts. How are claims presented, and for what purposes (Lewens 2018)? What motivates them? What seems to count as sufficient justification? Next, we address patterns of reasoning that guide claims, which, as characterizations of nature, are often presented as scientifically justified *a priori*, and thus in no need of evidence or questioning. We draw attention to error types (Allchin 2001), as arguments about human nature frequently exhibit logical fallacies, biases of cognitive heuristics, or other well-documented lapses in actualized reasoning. We trace these patterns to behavioral tendencies documented by cognitive science. Ultimately, our analysis leads to constructive guidelines for assessing the scientific justification for descriptive declarations.

We structure our paper as follows. First, we profile why appeals to human nature seem so argumentatively attractive and widespread (§2). Several features of teleological and essentialist-style thinking emerge as important. Next, we consider the wide spectrum of argumentative contexts where claims appear, allowing us to characterize broadly what motivates them (§3). As hinted in the epigraph, human nature claims frequently function to justify partiality, power, and privilege (see Downes and Machery 2013; Fuentes 2017; Kronfeldner 2018a, b). Aware of the rhetorical contexts, one can more easily recognize and appreciate the numerous flaws of motivated reasoning (§4). Here, we discuss the role of cognitive heuristics and the errors they facilitate, including blind spots, filters, and effects of unchecked confirmation bias. We note the tendency for teleological thinking. While these errors are common, we contend that they are especially pernicious in the science of human nature (Varella et al. 2013, Buss and von Hippel 2018), where they inappropriately justify cultural values as apparently objective features of nature via *naturalizing*. Finally, we compile a list of recommendations for more rigorous and trustworthy thinking about human nature (§5).

## 2 The Argumentative Allure of Human Nature

Appeals to human nature are widespread. Why? We attribute their popularity to two features: their rhetorical power and seemingly easy justification. This reflects claims that reasoning in social contexts tends towards laziness and partiality (Mercier and Sperber 2017), a basis that guides our deeper analysis.

The persuasiveness of claims about human nature may easily be appreciated by focusing on the term "nature." Most scientific pronouncements would be epistemically acceptable if framed as describing human *tendencies*, *dispositions*, *potentials*, *limits*, or widely found *features*. Instead, claims are cast more definitively and powerfully as being embedded

in *nature* (Allchin and Werth 2020). Contingency and probability thereby become elevated to the level of inherent features, resulting in a persuasive essentialist view. There is a longstanding history, dating back to at least Aristotle, of essentialist arguments about human nature (Varella et al. 2013, Solinas 2015). This relates to and likely derives from psychological tendencies toward determinism, reductionism, fixity, and categorical thinking (Gelman and Rhodes 2012, Gould and Heine 2012, Heine et al. 2017). In contexts where appeals to human nature usually arise, essentialism combines three interrelated elements: purpose (Werth and Allchin 2020), inherent and inflexible structure (Solinas 2015), and universality (Griffiths et al. 2009, Linquist et al. 2011). Each is a powerful rhetorical resource.

First, there is a strong psychological tendency to view nature as reflecting purpose or (intentional) functionality (Guggenmos 2012; Kelemen 1999; Kelemen and Rosset 2009; Kelemen et al. 2013; Rottman et al. 2017; Varella 2018; Werth and Allchin 2020). With little assistance or persuasion, people often adopt teleological perspectives and an intentional stance. Research shows that we seem disposed to seek patterned order and meaning even where none exists (Fyfe et al. 2008, Krupenye et al. 2016). We can easily imagine that people have certain traits or behave in certain ways because it was "meant to be that way," even if we cannot articulate who or what was the intentional agent or how such goals are cognitively inscribed or chosen, then discovered or attributed (Gergely and Csibra 2003). What might otherwise be a neutral description thereby acquires an aura of an *ideal* world, or how it *ought to be*. As a result, a widespread intuitive view is that nature is an appropriate normative benchmark. In his analysis of the naturalistic fallacy's psychological basis, Curry (2006) listed eight justificatory misunderstandings, including the converse conflations that whatever is good is natural and that whatever is natural is good. "Natural" foods, medicine, fibers, cosmetics, or building materials all seem *prima facie* good in popular connotations (Curtis 2018), where "nature" means original, intentional, authentic, and perfect (Levinowitz 2020). Accordingly, one frequently finds human features portrayed not as arbitrary and contingent results of evolution, but rather as planned outcomes of some value-laden and self-justifying process (Gonzalez, Galli, and Meinardi 2010; Reiss 2011; Werth 2012). Further, there is an implied impropriety in questioning nature as the idealized standard. Psychological research (Bain et al. 2006, Buss and von Hippel 2018) shows that underlying biases and beliefs about human nature influence people's responses to value-laden rhetoric. Arguments that build on certain views about human nature, versus equivalent descriptions of human traits or behaviors, leverage teleology into persuasiveness.

Second, and more deeply, the concept of *laws of nature* implies inevitability. Nature (including human nature) seems invariant, fixed, and immutable, even if one might imagine the world elsewise. As the popular adage goes, "You can't expect a tiger to change its stripes." This causal perspective is embodied in intuitions and cultural imagery about blood lines and genetic determinism. Human "nature," compared to an arbitrary set of human qualities, is rendered as something essential that one must accept, regardless of one's personal views (Kronfeldner 2018a, Allchin and Werth 2020). The would-be critic apparently has no grounds for objection.

Third, in the deep teleological perceptions of essentialism, nature seems not only inevitable but also universal, admitting no exceptions. For a purpose to be realized, it is expressed in all relevant cases. All humans are expected to conform to their inner "nature." Research on vernacular notions (folkbiology or other pre-scientific worldviews) documents this normative dimension of an ostensibly descriptive concept (Griffiths 2002, Griffiths et al. 2009). As a result, ideological positions or cultural claims derived from concepts of human nature tend not to be regarded as subject to alternative

interpretations. Instead, contrary views seem to immediately betray a willful disregard of "reality." The image of universality of human nature contributes further to the perceived persuasiveness of arguments based on them. Ultimately, through essentialist overtones, nature (as portrayed) functions not only as an objective and impartial arbiter of how things should be; it functions as an objective and impartial benchmark of *how things are and must be* (Allchin and Werth 2020). In describing this intuitive worldview as deeply Aristotelian, Solinas (2015) explains that it persists in pervasive (and unquestioned) sacred realms. The world *cannot* be otherwise. This, we argue, explains the strong allure of enlisting human nature claims in ideological arguments.

Moreover, and perhaps most insidiously, portraying features as human *nature* appears scientific. Arguments based on nature project an image that only those with relevant scientific expertise and credentials are entitled to challenge (Kronfeldner 2018a). This status is duly warranted *if* claims are ultimately and truly grounded in trustworthy science. As we detail in the following sections, however, this is often not the case. Evidence and reasoning for human nature claims are rarely presented explicitly in normative contexts. Rather, they are offered as self-evident asides or implicit core assumptions that go unexamined. Leveraging a human nature claim effectively is an easy way to bolster authority. Such declarations carry (presumed) epistemic merit without exhibiting corresponding epistemic work. As we explain, this ellipsis of empirical justification opens the door to substantial intellectual mischief. Nevertheless, the easy route to apparent credibility, we contend, frequently encourages appeals to human nature, even where they are unwarranted.

These features—the inevitability of an apparent essentialist "nature" (or unbending natural "purpose") and relative ease of generating scientific respectability—together make human nature claims an attractive argumentative resource. Unfortunately, such claims seem immune to criticism, and may be so presented. If a claim can be established as correct, even as an assumption, apparently there can be no justified counterargument. In popular contexts, human nature claims are heavy weapons that virtually guarantee victory or at least stalemate against disagreement. They function argumentatively like trump cards, to foreclose debate.

Regrettably, these apparent rhetorical "assets" generally prove to be epistemic drawbacks. As we show in detail below (§4), these postures frequently foster blind spots and scientific errors. Strong advocacy limits one's ability to recognize incomplete evidence or weak justification. Worse, "motivated" perspectives support an illusion of having justified the ideological position in question as an ironclad "natural" conclusion (see §4d below). They allow views from particular cultural circumstances or perspectives to seem universal and inevitable (Hull 1978, Roughley 2000). Our primary aim, therefore, is to profile specific pitfalls in reasoning about evidence for human nature claims. Ultimately, we wish to provide concrete tools to keep in check unjustified claims about human nature, despite their profound allure in normative arguments.

We note that the pitfalls in reasoning and rhetoric we expose are not unique to claims about human nature. They can be found in other contexts, particularly in the social and natural sciences, such as in arguments about economics (Ariely and Kreisler 2017) and climate change (Oreskes 2019). However, in these fields the cognitive errors we highlight are usually involved abstractly, or in the context of general decision-making and argumentation, whereas they are instead explicitly tied to claims about human nature. Second, these cognitive errors appear more frequently in human nature claims due to their cultural contexts. Third, these errors can be considered more significant and "costly" in the context of human nature because of their immediate and far-reaching cultural implications.

## 3 The Discursive Contexts of Appeals to Human Nature

What is the discursive role of appeals to human nature? In the Introduction (§1), we briefly sampled diverse occasions where human nature claims are presented or applied. Here, we delve deeper into their argumentative function, as a context for analyzing (next) their epistemic status.

A catalog of vernacular views ("What Does It Mean to Be Human") collected online for the Smithsonian's Hall of Human Origins (http://humanorigins.si.edu/) reveals that personal notions of human nature involve exploration of private goals and aspirations, as well as collective visions of who we are. Human nature claims shape our sense of self-worth. They limit, or render unlimited, what we can realistically achieve. They bound our ambitions and explain our failures. But whether offered via raw emotion or academic jargon, appeals are frequently enlisted to *explain and/or justify* behavioral norms, such as that to be human means to "help others," "torture and kill," or "destroy nature."

While one may be tempted to dismiss these views as irrelevant folkbiology (Linquist et al. 2011), one can easily find scholarly arguments in the same vein (Dupré 2003). Neurobiologist Michael Gazzaniga (2008) characterizes human nature ("the science behind what makes our brains unique") as someone's criteria for a good date: conviviality, consciousness, intelligent conversation, empathy, art appreciation, and trust (Chapters 2-7). He chooses Maserati cars as his example for human tools, and for bipedalism, Italian designer shoes. One gets a stronger impression of Gazzaniga's values than general insight into humans. Anthropologist Ian Tattersall exhibited similar partiality in his unguarded praise of technology and the "restless innovative spirit" in his profile of key human features (1998). Matt Ridley (2010) likewise betrayed strong approval of libertarian capitalism in his evolutionary account of the origins of cooperation (1996). Personal views of human nature are often coupled to bolstering ideology, explicitly or implicitly. "To be human" usually means "to be like me/us." This is often a normative rather than descriptive claim.

Appeals to human nature frequently appear in the context of larger arguments, as "natural" justifications. They are enlisted to explain why the U.S. government faces shutdown (allegedly our tribal instinct to form groups—Rettner 2013), why consumers crave juicy burgers, Ferraris, and pornography (Saad 2011), and why women rarely succeed in computer fields (Fuentes 2017, Sadedin 2017). They are used to advocate (or disparage) ideals of marriage (TFP Student Action 2014), sexual orientation (Newsweek 1992), gender identities (Ford 2016; Walker 2017), and family structure (Carlson 2015). Proponents may use human nature claims to build group identity or coherence, or foster in-group loyalty. Alternatively, they may wish to taint (or taunt) out-groups through a strategy of marginalization and/or dehumanization (Haslam et al. 2005, 2008, Bain et al. 2009, Haslam and Loughnan 2014, Kronfeldner 2018a, b). Debates about genetically modified organisms or embryonic stem cells include claims about "playing God," ostensibly aligning "unnatural" with impermissible (Guilhem 2013). Throughout these cases, the core context of human nature is ideological; the focus, sociopolitical justification (Lewens 2012).

How can one distinguish overtly biased versus more balanced claims about human nature? One telltale consequence of the association of human nature with ideology is the prevalence of contradictory claims. We may attest that humans are (by nature) gentle and loving, yet, when occasions of gruesome murder or terrorism arise, refer to them as (by nature) brutally violent. We say people are naturally skeptical, while admitting we inherently trust others. We get along in a cold, cruel world by selfishly protecting our own interests, but we look out for one another and help the less fortunate. We relish powers of

reason, yet fall prey to gossip, superstition and dodgy urban legends. We naturally mate in pairs, yet chafe at pair-bonding limits. Diametrically opposed claims about human nature are striking. Yet what is most notable is that they are frequently put forward with resolute, unconditional certainty, rarely with tentative qualifiers. As noted previously, false dichotomies mislead. Humans readily behave in opposing ways depending on circumstance. A defense of only one side of opposing tendencies is often a telltale indicator of cherry-picked, ideological appeals to human nature (Sadedin 2017). Given the complex, multi-dimensional states of the human condition (for example, one can be angry when alert or angry when tired), simplistic claims tend to reveal underlying biases.

We allow that contrasting views may (indeed, very likely) contain elements of sound science. As such, their assumptions, evidence, and scope need resolving. Although apparent contradictions could indicate the deep and problematic partiality with which human nature claims are often advanced and the ways evidence is filtered, such nuanced, context-dependent views hew closer to the evidence. Unwillingness to admit complex, multifaceted explanations of human nature often reveals a filtered, ideological approach. Such epistemic blindness, we contend, is not incidental but central to understanding what motivates appeals to human nature. The cognitive orientation seems to govern the effectiveness with which we assess their trustworthiness, as we discuss next.

## 4 Errors in the Sciences of Human Nature

With human nature claims' pervasiveness (§1), importance in justifying arguments (§2-3), and plainly contradictory claims (§3), one might presume their use would inspire vigorous scholarly inquiry, with empirical investigation toward establishing evidence to resolve disagreements. A robust science of human nature should flourish. Ironically, this has not traditionally been the case (Hull 1986, Samuels 2012). In their style of presentation, claims are generally not *meant* to be questioned. They often appear in popular contexts as unjustified premises, but with little argument are soon treated as accepted tenets. When examined closely, one-sided declarations ("people are violent" vs. "people are peaceful"; Sapolsky 2017) frequently resemble manifestos, not proposals welcoming critical dialogue. Indeed, in their ideal role as "trump cards" (§2), human nature claims upstage rather than encourage debate or inquiry.

Although claims about human nature are ostensibly about nature, the underlying science is not necessarily relevant. Empirical evidence is not always presented; research citations may be scarce. Moreover, claims are often stated broadly, indicating they have not been framed to encourage scrutiny. Imprecise language compounds the problem. Historical terms once deemed scientifically acceptable (e.g., "degenerate, criminal, feeble-minded"; Gould 1996) have been duly abandoned as inaccurate. Today, we are challenged with terms like "violent" or "peaceful." They are rarely operationalized with clear reference to concrete observable behaviors, resulting in slippery claims (Kronfeldner et al. 2014, Kronfeldner 2018a).

Nevertheless, claims about human nature *are* about nature. Science *is* relevant, and should be welcome. Accordingly, if we wish to engage in responsible discussions, habits and expectations must change. In particular, we consider it appropriate, first, for anyone presented with an appeal to human nature to expect citations to evidence and sound scientific arguments. Our focus here is to articulate what helps ensure that the science provided in such cases is trustworthy, or reliable.

Scientific reasoning about human nature, like any reasoning, is susceptible to cognitive shortcomings, now widely documented and widely acknowledged (Nisbett and Ross 1980, Sunderland 1992; Gilovich 1993, Gilovich et al. 2002, Krueger and Funder 2004, Ariely 2008, Kahneman 2011, Dobeli 2013). Piatelli-Palmarini (1994) catalogued over 200 such lapses, from the Actor-observer bias to the Zeigarnik effect (see also the Cognitive Bias Codex by Heick 2019). We regard these findings as non-controversial outcomes of decades of cognitive research, which may be fruitfully applied to analyze claims. They illustrate the kind of thoroughly descriptive science that can reliably inform how we think about human nature.

When contrasted with idealized reasoning or standard rational norms, actual reasoning can be strongly shaped by inference mechanisms, emotion, prior belief, and numerous other psychological factors. The aim of trying to justify ideology (§3) sets the stage for an even stronger influence—*motivated reasoning*, where desired ends subconsciously bias thinking (Gilovich 1993; Kahan 2013; Kunda 1990; Mercier and Sperber 2017). Crudely, a normative context can transform efforts at thorough critical reasoning into (ironically) exercises in rationalization. Such cognitive tendencies need not be universal to be important. Nevertheless, these phenomena are widespread and, as we outline, can be documented historically for many claims about human nature. Wherever errors are liable to occur, they deserve notice and ultimate correction. Our normative epistemic posture, therefore, is to recognize any observed deficits and remedy them.

Effects can be subtle and can occur almost surely without conscious awareness. As richly documented by cognitive scientists, human brains tend to rely on *heuristics*: streamlined reasoning patterns that guide thinking (Kahneman 2011; Kahneman et al. 1982; Wimsatt 2007). These cognitive mechanisms appear to have evolved for various reasons. They may provide simple strategies for solving complex problems, help manage unwieldy uncertainty, compensate for insufficient background knowledge, or save time and mental effort (Barrett 2015; Wimsatt 2007). They are fruitful short-cuts, much of the time. Nonetheless, they periodically yield errors, usually with characteristic points of failure (Kahneman 2011; Wimsatt 2007). They are a source of scientific error (Allchin 2001). Fortunately, our minds have other long-term mechanisms to correct misleading short-term thinking (Krueger and Funder 2004). Nobel Prize-winning psychologist Daniel Kahneman (2011) called this pairing "thinking, fast and slow." Alas, under circumstances of motivated reasoning, second-order checks are readily eclipsed, allowing mistakes from heuristics—which might otherwise be fixed—to go uncorrected. We contend that the strongly motivated reasoning accompanying many human nature assertions frequently facilitates lapses of this sort.

### 4.1 Framing

In our estimation, efforts at a science of human nature usually adopt a strategy of pattern-matching or pattern-validating, rather than pattern-seeking. Thus, available information is the result of questions that have been asked, which in turn are guided by the conclusions that investigators seek: a *framing effect*. In other cases, relevant information is unavailable simply because no one was motivated to collect it. Information may thus be unrepresentative or incomplete (Kahneman 2011; Sutherland 2013; Stanford 2006). Framing generates *blind spots*. As Kahneman (2011) phrases it, "what you see is all there is," or WYSIATI. The net effect of limited question-posing is working within limited evidential horizons—what psychologists refer to as the *availability heuristic*, or its corresponding *availability error* (Gilovich 1993; Kahneman 2011; Sutherland 2013).

Here, epistemic susceptibility to rationalization and error increases dramatically (e.g., Oreskes 2019 pp. 24-26, 32-39; Zimring 2019 pp. 56-59, 63, 77-81, 91).

Consider an American Museum of Natural History exhibit (Tattersall and DeSalle 2007), with stunning models, fossil replicas, a family tree, and an area on "What Makes Us Human?" The display credits intelligence, creativity, symbolic representation, language, music, art, and tools—all traits widely valued (by humans). As the teacher's guide explains, "Only modern humans create complex culture." The cultural story-telling context frames the ultimate message: we are special and privileged. Ironically, the exhibit acknowledges that bower birds show "individual expression" via colorful mating bowers (art), and that whales and birds have "structured" songs (music). But because of framing, the significance of the contrary cases is peripheralized. The same abilities called "distinctive" in humans are characterized as "limited" in non-humans (Walter 2006). Selective framing haunts a similar exhibit at the Smithsonian (Potts and Sloan 2010a, b), where traits featured as demarcating humans are not outright falsehoods, but reflect choices which bolster museum-goers' self-esteem. Framing based on assumed human superiority and privilege results in biased and misleading (even if not strictly false) views of human nature. This reflects anthropocentric exceptionalism, which has plagued interpretation of human nature since at least Aristotle (Taylor 2013, Varella 2016). These reveal the danger of what has been dubbed the "space shuttle fallacy," in which faulty conclusions are inductively extrapolated from insufficient data (McGrew 2015).

Framing effects may be observed in scientists' responses to counterevidence. Tool use long marked humans as unique (Allchin 2017) until naturalists discovered widespread tool use by other species. Exceptions were acknowledged, but the core belief in tools as special to human nature was preserved. Claims reappeared in modified form: humans are the only animal to *make* tools. With discoveries of chimpanzee tool sets, that distinction also fell by the wayside. But this did not prompt profound reconsideration. Rather, scientists again retreated modestly to new claims about *teaching* tool use. When that distinction failed, scientists shifted to claims about *preparing* and *saving tools for future use*. Research has now discredited that claim, too (Allchin 2017). (Should we now consider comedian Tim Allen's claim that humans are the only animal to *borrow* tools?) In each case, scientists respected available evidence. But their responses illustrate an *error cascade* (Fig. 1; Allchin 2015), a halting, stepwise retreat wherein successive errors betray a framing bias, rather than swift

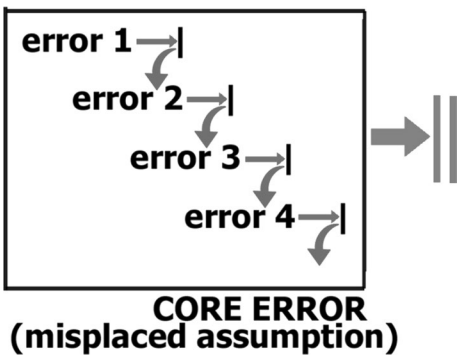


**Fig. 1** An error cascade, exemplified in scientists' reactions to successive counterevidence on the role of tools in human nature.

acknowledgment of the core error: linking tools to human nature (Allchin 2007). The original blind spot (Fig. 1) remains unresolved.

A similar error cascade can be found in the history of claims that language is an essential and unique feature of human nature—with punctuated retreats from language to symbolic systems, then to grammar, then to linguistic structure, etc... (Allchin 2017). The context of justifying human uniqueness framed a telltale succession of mistaken interpretations.

Ultimately, debate about human nature can be effective only to the degree that initial premises are not unduly prejudiced. To echo Kahneman's adage of "What you see is all there is," perhaps "What you look for is all you will likely ever see." One is unlikely to find counterfactual cases without seeking them. Blind spots are convenient but unjustified "excuses" for avoiding alternate explanations or possible negative evidence when appealing to human nature.

### 4.2 Confirmation Bias

Closely related to framing and resultant blind spots is the effect of prior beliefs, which, once acquired, tend to be reinforced and amplified rather than critically considered—an effect known as *confirmation bias* (Ariely 2008; Gilovich 1993; Kahneman 2011; Mercier and Sperber 2017; Nickerson 1998; Sutherland 2013). Ideas adopted early guide later thinking. *Cognitive filters* appear. Similar instances are readily noticed and accepted as confirming examples. Evidence is cherry-picked. Counter-instances, when perceived, may be creatively recontextualized as confirming instances. Counterclaims are severely scrutinized for flaws or discounted entirely. Generalizations may be "hasty." Original concepts thus become resilient, even if unjustified. Although this pattern applies to all human thought, we argue that it is particularly applicable to conceptions of human nature.

As an example, we note E.O. Wilson's proposed "biophilia" (see Allchin 2018): an "innately emotional affiliation of human beings to other living organisms." Wilson explicitly stated that "Innate means hereditary and hence part of human nature," but also tied this hypothesis to conservation values and "environmental ethics." Wilson's motivated reasoning by itself does not invalidate his science, but it does signal a need for cautious, rigorous critical analysis. Not content to show that *some* people exhibit biophilia, or that it might be a *learned* value arguably worth nurturing, Wilson needed a universal predilection to function rhetorically as an indisputable political norm. He did not fully consider other explanations for why some humans affiliate with nature. He did not consider the aesthetics of spectacular scenery (e.g., waterfalls) unaffiliated with life. His later comment was telling: "If it [biophilia] exists, and I believe that it does…" (1993, pp. 31). "If"-speculation, however deeply felt, hardly constitutes sound science. Yet ethical discussion of biophilia's role in justifying conservation galloped ahead without research first confirming Wilson's original hypothesis.

Another example of confirmation bias, cherry-picking, and motivated reasoning in the study of human nature involves Thornhill and Palmer's book (2000) *A Natural History of Rape*, which argues that rape is a behavioral byproduct of adaptive human traits (sexual desire, aggression, etc.) selected for in our "nature." Critics (e.g., de Waal 2000) decried the premise of adaptive rape as an ill-conceived starting point, even if the tendency to consider behaviors through an evolutionary lens is a worthy, albeit fraught, premise.

### 4.3 Satisficing

Confirmation bias further contributes to prematurely declaring inquiry complete. When a solution matches expectations, standards of proof are low. Human minds do not always seek optimal solutions; they tend to *satisfice* or cease inquiry when solutions are perceived as good enough (Simon 1956; Nisbett and Ross 1980; Kahneman et al. 1982; Wimsatt 2007). People accept as adequate a plausible explanation or modicum of confirmatory evidence, even when empirical support is patchy or flimsy, or alternative explanations easily found.

For example, Charles Davenport (1911) believed some persons "by nature" were born "feeble-minded." He collected pedigrees to show successive generations of the same family deemed to exhibit lower intelligence. He presented that as sufficient proof. So, too, for pedigrees of "pauperism" and "degeneracy." The shortcoming of truncating relevant evidence was nicely articulated by fellow geneticist Thomas Hunt Morgan (1925):

> Family pedigrees in which an unusual number of individuals [mentally] below par are present undoubtedly give the impression that something is inherited, but until all the social conditions surrounding the childhood of the individual are examined and given proper weight, serious doubts will arise as to what form of inheritances is producing the results. It is quite probable that there are extraneous factors involved in such pedigrees. (p. 201)

Davenport's error arose from premature satisficing: here, failing to address alternative explanations. In a similar way, many evolutionary psychologists have proposed "genes for" certain behaviors. Yet the assumptions soon transform into conclusions without further evidence. The problem lies not in speculating about the genetic basis of specific behaviors, but in consistently presenting partial evidence as decisive (Buller 2005, Richardson 2007).

Again, it is not uncommon to find contradictory claims espoused by advocates motivated towards different ends (§3): We like rules and regulations but are free spirits who desire independence. We love to work but also love to play. We are inherently lazy yet conquered the world through ambition and initiative. We crave social interaction but demand privacy. People are violent aggressors, yet inherently peaceful cooperators. Acknowledgment of opposing tendencies, evident in long lists of human "universals" (Brown 1991, 2004), reflects the evidence of complex, multivalent human behavior. By contrast, if one considers a handful of cherry-picked anecdotes as complete, and thus closes discussion as satisfactory, one's conclusions are susceptible to error and can reflect ideological bias premised on a unidimensional and monolithic as well as purposeful view of human nature.

Thomas Henry Huxley, Darwin's stalwart proponent, embodied this paradox. An unwavering supporter of evolution, he nonetheless balked at the notion that morality could result from purely natural processes. Huxley inconsistently argued instead that humans are inherently selfish and aggressive, yet rise above our beastly, amoral nature with foresight, concerted effort, and cooperation (Huxley 1894; de Waal 2001). Darwin claimed that evolution alone fully explained human nature, but Huxley wanted both ways: evolution coupled with superseding culture. Huxley's dilemma reflects the enduring question of whether people are naturally peaceful or war-like (Sapolsky 2017). This quandary stretches back millennia (Foot 2001) yet remains an intensely debated topic in natural and social science (Shermer 2012; Keim 2013). The dispute is neatly epitomized in opposing views widely promulgated by Rousseau, Locke, and Hobbes (Ardrey 1966; Sahlins 2008), with the "noble savage"

pitted against social contract thinkers who described humans' original state as an unfettered free-for-all. Steven Pinker (2002, 2011) argued that people overcame a violent and brutal nature, whereas primatologist Frans de Waal (1996) claimed that pacifism, cooperative alliances, and moral tendencies evolved from deeply-seated empathy, fairness, and reconciliation now richly observed in our primate ancestry.

With disagreement enduring three and a half centuries after Hobbes' *Leviathan*, one may be tempted to conclude that the jury is still out (Foot 2001; Wrangham 2019). We maintain, however, that each claim works from certain assumptions and fruitfully highlights certain evidence, while failing to entertain other evidence (Devitt 2008; Boulter 2012). Excluding or discounting relevant contrary evidence leads to misleading overstatements. Yes, empirical evidence supports each view—in part. Neither argument can best the other. But both views are also flawed insofar as they reflect one-sided, motivated reasoning (Eiser and Pligt 1988).

The noted debate between anthropologists Margaret Mead (1928) and Derek Freeman (1983), about whether human nature is mostly genetic or culturally contingent, further illuminates satisficing's predicament (Shankman 2009, 2013). Both scholars amassed reams of data to support their views without openly entertaining alternative explanations. Given that both views appeal to nature, the tendency may be to assume that only one account can be correct. Yet each claim reflects one-sided, motivated reasoning. Each position *errs* by satisficing with incomplete arguments; each is thus *partially* warranted, in both senses of the word "partial." We argue that both views and their apparently inconsistent evidence must be reconciled scientifically (Levins 1966). The limited scope of each claim must be delineated and multiple lines of evidence accommodated.

Cynics might contend that competing claims weaken the case for any genuine human nature. However, we view juxtaposed claims as demonstrating the need to better understand premature satisficing and judgments based on incomplete evidence guided by confirmation bias. Our epistemic standards should be sufficiently rigorous to resolve apparent contradictions among different findings (Schmitt and Pilcher 2004). We must acknowledge and address cognitive dispositions that can promote fruitless either-or debates, strict dichotomies, universalism, and a propensity for teleology, which encourages us to presume that things exist "for a reason."

### 4.4 Teleology and the Naturalizing Error

Earlier, we noted the prevalence of teleological perspectives (§2). These views support illegitimate appeals to nature, treating facts about humans as if they were self-justified mandates. However, descriptive views, apparently justified scientifically, may themselves be tainted. Through the errors noted above, scientists unwittingly project personal or cultural values onto nature, whereby they seem embodied objectively. Normative claims reappear as descriptive. "Ought" subtly becomes "is" in an ironic reversal of G. E. Moore's naturalistic fallacy (Curry 2006, Varella et al. 2013). We call this problem the *naturalizing error* (Allchin and Werth 2017, 2020, Allchin 2008, Roberts 1910). For example, museum curators might unconsciously portray wild animals in a diorama as adhering to a human ideal of a two-parent, two-child "nuclear family" (Haraway 1989), or one might imagine that one's preferred diet reflects "natural" adaptations by our Paleolithic ancestors, without actually studying those diets (Zuk 2013).

Teleology further compounds the problem because it construes human nature as purposeful. Purpose implies essential, universal features and conflates normative and

descriptive perspectives (Allchin and Werth 2020). For example, if one accepts parenthood as a teleological ("natural") goal, then homosexuality or abstention by sexually mature individuals each "unnaturally" violate an implicit purpose. Cultural views of purpose may thereby become inscribed into ostensibly descriptive scientific accounts of human nature. Other examples include the Paleo diet (Zuk 2013) and the naming of mammals (Allchin and Werth 2017). Teleology's allure naturalizes ideological views. Accordingly, heightened epistemic vigilance is warranted.

As another example, Linnaeus's views of wet-nursing and women's roles were reflected in his chosen label "mammals," based on mammary glands, rather than on hair, homeothermic metabolism, or four-chambered hearts (Schiebinger 1993). For Linnaeus, human "nature" involved nursing one's own child. In another case based on ideology of purposeful gender roles, scientific evidence was selectively cited to conclude that women are not "naturally" fit for creative jobs or leadership roles in the software tech industry, as exhibited in the notorious Google memo (Fuentes 2017; Sadedin 2017).

## 5 How to Think More Fruitfully about Human Nature

The flaws we have documented in historical scientific claims about human nature—essentialism, universalism, absolutism, teleology, framing, confirmation bias, satisficing, and naturalizing (among others)—are not unique to anthropology, psychology, or other human sciences. However, we maintain that these problems are particularly acute in these fields, and that cultural consequences of such scientific errors can be substantial, both morally and politically. Further, non-scientists readily seize on and amplify scientific error or misstatement. The effect of cultural views imbued with teleology and others forms of ideology-laden reasoning on human science are thus especially pernicious. Accordingly, we contend that human nature claims should reflect an exceptional level of epistemic caution, and that scientists in the field should insist on higher standards for evidence and clarity of argument.

We have noted deficits in historical and contemporary cases of ill-informed claims about human nature. We nonetheless believe that awareness of past errors can productively guide future science. Thematic cognitive deficits we profiled can be addressed through simple, basic, and familiar means applied consistently. Prospective remedies function at multiple levels. First, we hope that responsible scholars can be more mindful, rigorous, and careful in presenting their claims, which are often later echoed uncritically by others and promoted in popular contexts. Second, we provide a checklist for critiquing claims presented by others. We trust that by noticing and exposing epistemic flaws, subsequent discourse will foster more rigorous arguments and evidence. Third, we consider these epistemic guides important topics in promoting scientific literacy, by informing citizens how to interpret scientific claims in normative arguments. Our remarks are aimed not only at scholars, but also at a broad audience for whom a conception of human nature might be relevant: scientists, educators, and researchers who communicate scientific complexities and their sociocultural implications to the public (Stotz and Griffiths 2018).

Most important, we underscore the central role of epistemic checks and balances in addressing biases introduced by motivated reasoning (Funder and Krueger 2004). Historians, philosophers, and sociologists of science have documented errors arising from gender, race, class, and other social dimensions with political overtones. They have also discerned solutions. Through historical casework and philosophical analysis, social epistemology has affirmed the value of dialectic among multiple perspectives (Harding

1991; Longino 1990, 2001; Solomon 2001). Partiality is best exposed by counter-partiality. Standards of evidence are best enforced by critics. Engaging complementary perspectives and motivations helps to counterbalance respective biases. Evidence and arguments must thus survive the filters and critical scrutiny of multiple perspectives. Mutual criticism can thereby lead to deeper, more robust and stable interpretations of human nature. In public discourse, individual views, no matter how expert, will not suffice. Thus, for trustworthy claims about human nature, the consumer-citizen should seek no less than a stable consensus among an appropriately diverse scientific community (Oreskes 2019; Solomon 2001; Ziman 1968). Diversely sourced and independent evidentiary support is key. Consensus is no guarantee of strength, as evidenced by the initial unwillingness of scientists to embrace evolution, continental drift, and a heliocentric model of our solar system. Elimination of scientific error is unrealistic, but a system of checks and balances to expose partiality can show where "me" is generalized to "all humans."

Here, then, are epistemic standards (Schmitt and Pilcher 2004) we propose should be systematically applied to scientific claims about human nature, with the support and participation of all stakeholders.

### 5.1 Motivational Contexts Should be Stated Explicitly

Readers should by now be fully aware of how appeals to human nature are frequently linked to justifying ideology (§§2-3) and motivated reasoning (§4). Motives are not always publically acknowledged. When assessing arguments presented by others, one should probe the context of claims to expose hidden biases or potential conflicts of interest, whether ideological, political, economic, religious, or other. We should bring hidden assumptions to the foreground and address their epistemic implications. For example, recent studies fruitfully assessed the evidence for whether political motivation or bias guides evolutionary biologists working on human nature (Tybur et al. 2007, Lyle and Smith 2012, Buss and von Hippel 2018). We note that it is easy not only to invent stories about human nature, but also to "throw stones" at these stories. Criticism of human nature arguments often misses the mark, but we feel some criticism is justified (Lewontin 1993, Gaspar 2004, Buller 2005, Richardson 2007, Allen 2011). Still, an asymmetry may exist wherein criticism of bias comes so easily that "good" (justified) human nature claims, such as those we outline early in this paper, are unfairly targeted. Given recent cultural movements, often politically motivated (such as a trend to emphasize human difference and eschew universals), skepticism and awareness of motivated reasoning is all the more important.

### 5.2 Descriptive and Normative Claims Must Be Disentangled

Cognitively, ideological and teleological contexts may be ineliminable (§2). A romanticized version of individual rationality and accountability may be an unattainable ideal in practice. The goal must instead be to regulate potential bias at the community level, through critical discourse. Stakeholders should monitor proposed claims for unstated but implicit teleological perspectives or other assumptions about "naturalness," "purpose," or "essential" features (§2, 4). Normative contexts may be "called out" to inform interpretation of descriptive claims, which remain subject to "ordinary" standards of evidential

appraisal. Individuals may endeavor to contextualize claims at the outset. Still, communities should foster an epistemic humility, encouraging individuals to recognize peer criticism's value and the collective aim of identifying and resolving contrary perspectives. Healthy skepticism is warranted even as denial or harassment of scientists (Bailey 2019) must be avoided.

### 5.3 Descriptive Human Nature Claims Should be Circumscribed by Available Empirical Evidence, with Citations to Research. Speculative Claims Should be Conspicuously Labeled as such and Stated Clearly, in Testable Terms

Evidence cited to support particular claims about human nature may be incomplete or narrowly framed by satisficing (§4). Accordingly, limits and contextual qualifications of conclusions should be explicitly and prominently articulated. Peer reviewers, editors, and critics should expect authors to responsibly acknowledge and address relevant evidence. Arguments based merely on plausibility, isolated anecdotes, non-systematic data, correlation, or coherence may be informative or suggestive (e.g., Sacks 2008), but should not be accepted as conclusive—and should be labeled as speculative. Correlational studies are useful where experiments are ethically prohibited, and can focus future research efforts. Vague terms (e.g., "natural," "violent," "altruistic") should be defined operationally, by reference to concrete observable behaviors. Non-scientists should be entitled to expect appeals to scientific claims about human nature to be accompanied by a summary of empirical evidence, with contexts and limits clearly articulated.

### 5.4 One Should Expect Explicit Epistemic Efforts to Check for Major Cognitive Biases

Using awareness of argumentative context in particular (§3), one should probe for indications of the naturalizing error (§4d). Mindful of the potential adverse effects of motivated reasoning, one should look for evidence of framing, confirmation bias, satisficing, and such (§4a-c). One should search critically for essentialism, often manifested by reifying group averages to group properties that purportedly reflect all individuals of a group equally. Partiality is best exposed and balanced by counter-partiality. Professional communities should support diverse perspectives (Oreskes 2019) and foster respect for minority or dissenting views to promote interpretive balance.

### 5.5 Ontext-dependence and Qualifications Should be Articulated. Quantitative Statistics and Probabilities Should be Provided Where Appropriate

Universal claims provide strong rhetoric (§2), but are often contingent assertions whose context is seldom properly specified. They should yield to descriptions of human tendencies, dispositions, potentialities, and limits (a more "deflationary" version of human nature; Allchin and Werth 2020). Non-universal claims may still inform about potentialities or limits. Numerical frequencies should be reported where possible. Absolute, all-or-none, and either-or essentialist claims (§2) should yield to contextualized claims identifying probabilities, contingencies, conditions, and qualifications. Efforts to address and resolve contradictory claims (§3) through context-dependence and qualifications should be expected.

In summary, we contend that fuller exercise of these standards at individual and community levels will yield more reliable claims about human behavior. We anticipate that such claims will likely be more nuanced, qualified, and contextualized as a bulwark against efforts to naturalize ideology through science (Allchin and Werth 2017).Our intent here has been to analyze the cognitive and rhetorical dimensions of claims about human nature and to strip bare the thinking used to justify them. We hope awareness of widespread psychological processes, philosophical and ideological biases, and rhetorical tendencies can contribute at a deeper level to remedying flawed claims about human nature in scholarly and public discourse (Varella et al. 2013, Varella 2018, Buss and von Hippel 2018). How we think about human nature is susceptible to cognitive errors, but we believe it can be greatly improved with concrete remedies.

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