**Anthropomorphism & Anthropectomy**

**as Friendly Competitors**

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**Abstract**

Principles help comparative psychologists select from among multiple hypotheses that account for the data. Anthropomorphic principles select hypotheses that have the most human–animal similarities while anthropectic principles select hypotheses that have the most human–animal differences. I argue that there is no way for the comparative psychologist on their own to justify their selection of one principle over the other. However, the comparative psychologist can justify their selection of one principle over the other in virtue of being members of comparative psychology as a community. As it turns out, though, this justifies both competing principles: the community benefits most from competition between the two principles so comparative psychologists are justified in implementing the principles by which they can best contribute to the competition. Thus, I argue that common arguments to unify principle implementation in comparative psychology are defeated by the conservative arguments to preserve and foster competition.

**Introduction**

According to Sober (1998), comparative psychology consists in making “black-box inferences”. We begin by observing the stimuli that act upon an animal as inputs and the behavior that the animal causes in response to the stimuli as outputs. When we create theories, we are searching for patterns in these input-to-output data. Sometimes, we can find patterns in this raw data: e.g. when a predator becomes visible to the animal (the stimulus input), the animal flees (the behavior output). Other times, we create patterns in the raw data by building theoretical models in which cognitive variables intervene in the unobservable “black box” between the stimulus input and the behavior output: e.g. when a predator becomes visible to the animal (the stimulus input), the animal experiences fear (the intervening cognitive variable), and the animal flees (the behavior output). To give cognitive explanations without being able to directly observe which cognitive variables actually occur in the animal, we need a source of cognitive variables, which we have in human psychology, as a result of human introspection and communication. Thus, cognitive explanations of behavior draw on human psychology, which is why animal psychology is “comparative”.

Often, comparative psychologists find that there are multiple explanations of stimulus-behavior data, both behavioral and cognitive. Within the large set of empirically adequate explanations of the data, we often want to choose specific explanations, beyond what we have empirical reason to choose. For example, when we observe that young male primates avoid the gaze of dominant male primates when mating with female primates, we can explain this data in at least two ways: (1) they avoid the gaze of dominant males because they associate it with beatings by dominant males (in which case they are said to be “behavior-reading”), and (2) they avoid the gaze because they know that would cause dominant males to *see* them and *act* by beating them (in which case they are said to be “mindreading”). As it turns out, it is very difficult to empirically discern between behavior-reading and mindreading explanations, both explanations tend to explain the data (Lurz 2011). In response to this empirical under-determination, some comparative psychologists choose the first explanation in accordance with what Andrews & Huss (2014) “anthropectic” principles that maximize human-animal differences and others choose the second explanation in accordance with anthropomorphic principles that maximizes human-animal similarities.

There has been a lot of lively discussion about whether anthropomorphic (hereafter, “AM”) and anthropectic (hereafter, “AE”) principles are better and even some discussion about whether either of these principles have a legitimate role to play in comparative psychology at all. A common theme in all of these discussions is the revisionary and unifying recommendation that something needs to change, that comparative psychologists have to conduct their research in a unified way: (1) that everyone should implement AM principles instead of AE principles, (2) that everyone should implement AE principles instead of AM principles, (3) that everyone should implement a new principle, or (4) that everyone should stop implementing principles altogether. In this essay, I make a conservative recommendation: that comparative psychology, in its disunified way, is functioning as it ought to.

In order to support this recommendation, I begin by exploring what principles are and what they are meant to do in §1. In §2, I argue that comparative psychologists on their own have no reason to implement one principle rather than another (and no reason to implement any principle at all). In §3, I argue that comparative psychologists only have reason to implement one principle rather than another when we consider their membership to the broader community of comparative psychologists. I also argue that the community benefits most from competition between biased principles, such as AM and AE principles, so that individual comparative psychologists have reason to pursue whichever principles are consistent with their personal hunches about the outcomes of the debate. Finally, in §4, I consider three objections and defend my recommendation against them.

**§1. Anthropomorphism & Anthropectomy as Principles**

In this section, I aim to accomplish three preliminary tasks. In §1.1, I define ‘AM’ and ‘AE’. In §1.2, I argue that Morgan’s Canon, the *modus operandi* of experimental cognitive psychology, is an AE principle. In §1.3, I argue that “heuristic anthropomorphism”, the *modus operandi* of cognitive ethology, is an AM principle.

**§1.1. Defining ‘Anthropomorphism’ & ‘Anthropectomy’**

There are many uses of ‘AM’ and ‘AE’ in the literature. Some use ‘AM’ to refer to the “attribution of human qualities to other animals, usually with the implication it is done without sound justification,” (Shettleworth 2010, p. 477). The parallel use of ‘AE’ would be to refer to the withholding of human qualities from other animals, typically without sound justification. Others use ‘AM’ to refer to a cognitive bias in humans to project human qualities onto other animals (Kennedy 1992; Wynne 2004, 2007). The parallel use of ‘AE’ would be to refer to cognitive biases in humans, which include human exceptionalism (Sober 2005, de Waal 2009) and anthropo-fabulation (Buckner 2016), to withhold human qualities from other animals. Still others use ‘AM’ (and ‘AE’) to refer to the statistical methods whose null hypotheses attribute (and withhold) human qualities to (and from) other animals (Andrews & Huss 2014). Finally, ‘AM’ can be used to refer to investigative methods in cognitive ethology that project human qualities onto other animals in order to generate hypotheses (Burghardt 2007).

One way to deal with the equivocality of ‘AM’ and ‘AE’ is to stipulate that one use of the terms is correct, presumably in the context of one’s essay or research project. This is the simplest solution but I worry that it is too particularistic and may lead to confusion in conversation between researchers who use the terms differently. Instead, I prefer to deal with the equivocality of ‘AM’ and ‘AE’ by (1) distinguishing between the various things that we call “anthropomorphic” and “anthropectic” and (2) calling those things “anthropomorphic” or “anthropectic”. For example:

1. An AM (AE) **proposition** is one that claims that both humans and some kind of non-human animal K possess some set of qualities Q.
2. An AM (AE) **theory** is one that consists of or entails an AM (AE) proposition.
3. An AM (AE) **error** is one that consists of or entails a false AM (AE) proposition.
4. An AM (AE) **bias** is one that causes the biased entity to make AM (AE) errors more frequently than AE (AM) errors.
5. An AM (AE) **method** is one that has an AM (AE) bias.

In this essay, I am primarily interested in principles that are AM and AE and, in particular, how the use of AM and AE principles is justified. In this section, then, I consider (1) what a principle is (in this context) and (2) what makes a principle AM or AE.

First, in this context, a principle is a formal procedure for generating explanations that ranks possible *explanans*. The principle requires that a scientist select the first *explanans* in the ranking that successfully explains the given *explanandum*. Principles acquire their normative force by promising their implementers important scientific advantages. Strategically designed principles are supposed to minimize the influence of cognitive bias, reduce the need for theoretical effort and creativity, and increase intelligibility within research communities.

Second, a principle is AM iff it has an AM (methodological) bias (as defined in #4 above). In practice, this usually occurs when the principles involve ranking human-to-animal black box inferences (which count as possible *explanans*) in decreasing order of similarity (explicitly or implicitly), so that the first *explanans* to successfully explain the given *explanandum* will be the *explanans* that postulates the *greatest* possible human-to-animal similarity. Thus, AM principles are disposed to AM errors more strongly than they are disposed to AE errors. Similarly, a principle is AE iff it has an AE (methodological) bias (as defined in #4 above). In practice, this usually occurs when the principles involve ranking human-to-animal black box inferences (or altogether different inferences) in increasing order of similarity (explicitly or implicitly), so that the first *explanans* to successfully explain the given *explanandum* will be the *explanans* that postulates the *least* possible human-to-animal similarity. Thus, AE principles are disposed to AE errors more strongly than they are disposed to AM errors.

**§1.2. Morgan’s Canon**

The first and most influential (Dewsbury 1984) principle in comparative psychology is Morgan’s Canon: “in no case may we interpret an action as the outcome of the exercise of higher psychological processes, if it can be fairly interpreted in terms of processes which stand lower in the scale of psychological evolution and development,” (Morgan 1903, p. 57). Strictly speaking, Morgan’s Canon can be implemented when theorizing about both human and non-human animals. Even so, typically, it has only been implemented in theorizing about non-human animals. Indeed, many comparative psychologists (e.g. Griffith 1943, Harriman 1947, Epstein 1984) have mistakenly claimed that Morgan’s Canon *only* concerns theories of non-human animals (Radick 2000, Thomas 2006).

Often, though, the implementation of Morgan’s Canon with non-human animals is accompanied by generous interpretations of human actions “as the outcome of the exercise of higher psychological processes”, even when they “can be fairly interpreted in terms of processes which stand lower in the scale of psychological evolution and development” (Morgan 1903, p. 57). Buckner (2013) calls this tendency “anthropofabulation”. This discriminatory implementation of Morgan’s Canon (which I will just call “Morgan’s Canon” for simplicity, unless otherwise noted) exposes researchers to AE bias. After all, when a comparative psychologist is trying to explain an *explanandum* that regards observable variables in animals, Morgan’s Canon ranks relevant *explanans* according to the increasing “sophistication”[[1]](#footnote-1) of the described intervening cognitive variables. The scientists who apply Morgan’s Canon will select the first and least “sophisticated” *explanans* that sufficiently explains the *explanandum*. However, these same scientists are often disposed to select the most sophisticated *explanans* to explain the analogous *explananda* for human behavior. Thus, this implementation of Morgan’s Canon tends to select *explanans* with greater human-to-animal dissimilarities.

All this means is that discriminatory implementations of Morgan’s Canon make many more AE propositions than necessary while making only a few more or no more AM propositions than necessary. Note, though, that we do not have any reason to prefer AE propositions that are unnecessary for explaining our *explananda*.[[2]](#footnote-2) Thus, each unnecessary *explanans* introduces significant epistemic risk. Since there are more unnecessary AE *explanans* than unnecessary AM *explanans*, there is greater risk of AE error than of AM error. This means that Morgan’s Canon has AE bias.[[3]](#footnote-3)

**§1.3. Heuristic Anthropomorphism**

Cognitive ethologists have developed a more recent principle for comparative psychology that ranks *explanans* for *explananda* that concern non-humananimals on the basis of decreasing similarity with *explanans* for analogous *explananda* that concern humans. Burghardt (1985), a cognitive ethologist, was among the first to explicitly advocate this method, which he called “critical anthropomorphism”. It was de Waal (1999), though, who developed it into a more rigorous method. He advised that we engage in “perspective-taking, where one realizes both how different and how similar another species is, and look at its behavior as much as possible from the animal’s perspective, i.e., animal centric anthropomorphism,” (p. 262). This, de Waal argues, “allows scientists to develop testable ideas, i.e., heuristic anthropomorphism,” (p. 262).

I think we can increase its rigour even further, though. When a comparative psychologist is trying to explain an *explanandum* that regards observable variables in animals, Heuristic AM ranks relevant *explanans* according to what we might call the “degree of abstraction”. What I mean by the “degree of abstraction” of an *explanans* is the number of constants in the corresponding *explanans* for analogous human behavior that are replaced by different constants so that they explain the relevant non-human animal’s behavior. The comparative psychologist chooses the *explanans* with the lowest degree of abstraction that is sufficient to explain the *explanandum*.

For example, consider a primatologist who observes a rhesus monkey smiling at another rhesus monkey. The primatologist realizes that they would explain the analogous phenomenon in humans using the sentence, “A human smiles at another human in order to communicate that they are happy,” (following Fridlund 1994). Accordingly, the primatologist considers the first *explanans*, which replaces ‘human’ with ‘rhesus monkey’, thereby achieving one degree of abstraction: “A rhesus monkey smiles at another rhesus monkey in order to communicate that they are happy.” Then the primatologist notices that the smiling rhesus monkey immediately terminates further social interaction by retreating (de Waal & Luttrell 1985). Assuming that happy rhesus monkeys do not immediately terminate further social interaction (another analogy with one degree of abstraction), the primatologist realizes that the rhesus monkey as probably not happy and, therefore, that the first *explanans* was false. Thus, the primatologist realizes that the *explanans* with two degrees of abstraction (which involves the replacement of two constants with two variables) is probably better: “An *X* smiles at another *X* in order to communicate to that they are *Y*.” When the primatologist specifies ‘*X*’ and ‘*Y*’ (i.e. “A rhesus monkey smiles at another rhesus monkey in order to communicate that they are submissive.”) in order to explain the *explanandum*, they arrive upon the currently accepted explanation of smiling in rhesus monkeys by cognitive ethologists (van Hoof 1976, de Waal & Luttrell 1985).

Since Heuristic AM selects *explanans* with the greatest possible human-to-animal dissimilarities, it makes as many AM propositions as possible while making no more AE propositions than necessary. As in §1.2, we do not have any *prima facie* reason to prefer AM propositions that are unnecessary for explaining our *explananda*, so each unnecessary *explanans* introduces significant epistemic risk. Since there are more unnecessary AM *explanans* than unnecessary AE *explanans*, there is greater risk of AM error than of AE error. This means that Heuristic AM has AM bias.

**§2. Individualist Justifications of Biased Principles**

I have argued that the prevailing principle in experimental psychology has an (escapable) AE bias and that the prevailing principle in cognitive ethology has an (inescapable) AM bias. Despite the negative connotations of ‘bias’, this does not mean that we should reject these principles, though. For example, a principle may be biased to one kind of error over another and yet still minimize total error, even when compared to principles that are not biased to any specific kind of error. Insofar as comparative psychologists are primarily aimed at minimizing their errors, they would be justified in implementing such a principle. In §§2.1–2.2, I survey some of the reasons that comparative psychologists have used and could have used to justify Morgan’s Canon and Heuristic AM.

**§2.1. Arguments for Morgan’s Canon**

There are two ways for a scientist to justify Morgan’s Canon: (1) that its AE bias neutralizes AM bias and/or (2) that it reduces the overall likelihood of error despite its AE bias.

For the first argument, we might appeal to the well-documented fact that humans have deep-rooted dispositions to project their qualities onto others. These dispositions are responsible for many biases: strange biases like pareidolia (perceiving familiar patterns in objects) and more routine biases like egocentrism and, yes, anthropomorphism. In other words, our cognition is vulnerable to AM errors and hence we have an AM cognitive bias (Kennedy 1992; Wynne 2004, 2007). In the mainstream history of comparative psychology, Romanes’ (1882, 1883) research often serves as the cautionary tale for AM bias (perhaps unfairly). In this same history, Morgan (1903) develops his Canon in order to neutralize the AM bias that he witnesses in Romanes.[[4]](#footnote-4) As a matter of fact, the Canon does neutralize AM bias, by controlling the hypothesis generation procedure with its AE (methodological) bias, which is counteracts and cancels out the AM (cognitive) bias. The unstated assumption is that no residual AE bias remains after neutralization or that if there is residual AE bias, that it is less than or better than the AM bias that it replaced.[[5]](#footnote-5)

There are two problems with this argument. First, although the layperson may have AM cognitive bias, many have argued that trained psychologists actually have the opposite problem: they have AE cognitive bias that is often rooted in human exceptionalism (e.g. de Waal 1999, Sober 2005, Fitzpatrick 2008, Andrews & Huss 2014). I am inclined to agree with these arguments. Second, I worry that the AE bias of Morgan’s Canon not only neutralizes any AM cognitive biases the researchers may have (assuming that they do) but also results in significant overall AE bias. After all, as principles do, Morgan’s Canon reduces the dependence of the theoretical process on the implementer’s cognition. This leaves four main activities to the discretion of the scientist: (1) choose which non-human animal behaviors to observe, (2) observe those behaviors, (3) articulate the *explananda* that describes those behaviors, and (4) determine the first *explanans* in the pre-given ranking that is sufficient to explain the *explananda*. Even in these four activities, psychological training significantly reduces the influence AM bias could have over the process. It seems to me that the most room for bias in this process occurs during the selection the ranking and it is here that Morgan’s Canon’s AE bias has overwhelming and unmitigated influence. Thus, if AM bias were a problem of itself in the first place, then Morgan’s Canon only changes that problem by replacing AM bias with AE bias.

The second argument is much more nuanced, much more popular in contemporary discussions, and often takes on an issue-specific character. Generally speaking, the second argument begins by admitting that Morgan’s Canon (or methods similar to it) have a tendency to make more AE propositions than AM proposition but that this disposition does not count as an AE *bias* because we do have some reason to prefer AE propositions to AM propositions. The reason will depend on the issue at hand, which is why this kind of argument often takes on an issue-specific character.

Nevertheless, Povinelli & Bering (2002) manage to suggest an argument that captures an issue-general reason for preferring AE propositions: “if the dramatic resculpting of the human body and brain that occurred over the past 4 million years or so involved the evolution of some qualitatively new cognitive systems, then this insistence on focusing on similarities will leave comparative psychologists unable to investigate hallmarks of their own species—or chimpanzees, for that matter. It is an agenda that does justice to no one,” (p. 116). This suggests that even if we do not have reason to prefer any *particular* AE proposition (since such propositions would already have been packed into the *explanandum* as I explained in footnote 2), we still have reason to prefer any empirically adequate AE proposition over any empirically adequate AM proposition since AE propositions are more likely to withstand new evidence than AM propositions are.

I think the second argument is superior to the first because it is concerned with minimizing error, which is more important than balancing the kinds of errors. However, it is still flawed: the concern with minimizing error is implemented under the guidance of *a priori* hunches. These hunches are not empirically justified and they are vulnerable to cognitive biases. While Povinelli & Bering (2002) speculate that the behavioral differences between humans and non-human animals are mostly the result of many cognitive differences in kind between humans and non-human animals, others speculate that they are mostly the results of non-cognitive (e.g. bodily or environmental) differences and/or cognitive differences in degree. Until there is enough evidence to discern between these hunches, I don’t see how either side has a *reason* to prefer AE (or AM) propositions over AM (or AE) propositions. Furthermore, I suspect that these hunches usually reflect underlying cognitive biases so that the preferences do end up counting as biases.

Thus, Morgan’s Canon has AE bias, this AE bias probably only replaces AM cognitive bias (if the scientists even had this bias to begin with), and there is no reason to believe that AE bias actually reduces the overall likelihood of error in the context of particular issues. As a result, scientists have no way to justify Morgan’s Canon over other principles, such as Heuristic AM, and especially over unbiased principles (e.g. Morgan’s Canon with Hume’s Dictum; Buckner 2013).

**§2.2. Arguments for Heuristic Anthropomorphism**

Similarly, there are two ways for a scientist to justify their implementation of Heuristic AM: (1) that its AM bias neutralizes AE bias and/or (2) that it reduces the overall likelihood of error despite its AM bias.

The first argument begins with the claim that trained psychologists actually have AE cognitive bias, which may be grounded in human exceptionalism (de Waal 1999) and a “tough-minded” (Sober 2005), “hard-nosed” (Andrews & Huss 2014) conception of the ideal psychologist. Heuristic AM allegedly counteracts and cancels out this AE bias by reducing the dependence of the theoretical process on the implementer’s cognition and by ranking the *explanans* in a way that has AM bias. Of course, this runs into the same problem as in §2.1: there is significant residual AM bias such that AE bias is simply replaced by AM bias. There is no justification here for Heuristic AM, since we have no reason to prefer one kind of bias over the other.

There are two versions of the second argument. The first is the inverse of the one that I presented in §2.1: on the basis of *a priori* hunches, we speculate that AM propositions are more likely to be true than AE propositions. However, as I explained in §2.1, *a priori* hunches do not give us reasons, especially not when peers have different *a priori* hunches. Supporters of Heuristic AM have a novel alternative, though: the second version of this argument. While Morgan’s Canon ranks *explanans* on the basis of the problematic variable “sophistication”, Heuristic AM ranks *explanans* on the basis of a less problematic (at least, as far as I can tell) variable: degrees of abstraction from human experience.

The alleged advantage of this variable is its methodological utility: Lockwood (1985) argues that AM methods are more efficient and easier to use. Garcia (1981, p. 151) agrees: “I always use anthropomorphism and teleology to predict animal behavior because this works better than most learning theories… I cannot think in the cryptic jargon of learning theory.” De Waal (1999) suggests that Heuristic AM acquires these advantages and others (such as the increased ability to make non-human animal behavior intelligible) by exploiting the strengths of human perspective-taking while mitigating its biases.

Note that if supporters of Heuristic AM are to make a novel version of the second argument, then they cannot claim that Heuristic AM successfully implemented is less likely to make errors than discriminatory yet successful implementations of Morgan’s Canon. Otherwise, this collapses into the first version of the second argument, which fails. Rather, they must claim that implementations of Heuristic AM are more likely to be successful than implementations of Morgan’s Canon are due to their pragmatic advantages (and that they are equally likely, from an epistemic perspective, to make errors when the implementations are successful).

I doubt, though, that Heuristic AM actually has significant pragmatic advantages and, thus, that it has the corresponding epistemic advantages. After all, supporters of Heuristic AM insist that it is not mere perspective-taking, which would have the pragmatic advantages of efficiency and ease at the expense of high AM and anthropocentric bias. On the contrary, I have argued in §1.3 that Heuristic AM is just as rigorous as Morgan’s Canon, except that it ranks on the basis of abstraction from human experience rather than cognitive sophistication. Supporters of Heuristic AM cannot have their cake and eat it too: with rigor comes difficulty and a lower likelihood of error. As far as I can tell, Heuristic AM and Morgan’s Canon are on equal standing here.

Thus, Heuristic AM has AM bias, this AM bias probably only replaces AE cognitive bias, there is no reason to believe that AE bias reduces the overall likelihood of error in the context of particular issues, and, finally, AM bias is not accompanied by pragmatic benefits when it is rigorously mitigated by the principle of Heuristic AM. As a result, scientists have no way to justify implementations of Heuristic AM over other principles, especially unbiased principles.

**§3. Collective Justifications of Biased Principles**

Every attempt I made in §2 to justify Morgan’s Canon and Heuristic AM had at least one important feature in common: the overarching purpose of these attempts is to inform each individual comparative psychologist on their own which principle they ought to implement. Since the comparative psychology community consists of comparative psychologists, these attempts, if successful, would also inform the community as a whole which principle it ought to collectively implement. When none of these attempts succeeded in justifying one of the biased principles, though, they fell short of their overarching purposes, leaving us uncertain about which principle comparative psychologists ought to implement.

This leaves us with three remaining possibilities: (1) an “unbiased” principle (e.g. Morgan’s Canon *with* Hume’s Dictum) is justifiable so we ought to implement that (Buckner 2013), (2) no principle is justifiable so we ought to do science without implementing principles (Sober 2005, Fitzpatrick 2008), and (3) multiple biased principles are “collectively justifiable” so we ought to implement multiple biased principles within a collective scheme. In this section, I advocate the third option (I consider the other two options in §4). To do this, I begin in §3.1 by reviewing Kitcher (1990) to define what it means to be “collectively justified”. In §3.2, I argue that there is a shared collective justification for Morgan’s Canon without Hume’s Dictum and Heuristic AM *together*, if there is competition between the two principles reduces total risk of error more than each principle does on its own. In §3, I argue that the antecedent is true—that competition does reduce total risk of error—thereby implying that there is a shared collective justification of the two principles.

**§3.1. What is Collective Justification?**

Kitcher (1990) disagrees with the guiding assumption of §2 that by informing every individual in the community what is rational for them to do, one also informs the community as whole what is rational for it to do. Instead, he argues that there is a “mismatch between the demands of individual rationality and those of collective (or community) rationality,” (p. 6). According to Kitcher, something is collectively rational iff it promotes the “epistemic projects of the community” (p. 6). Likewise, something is individually rational iff it promotes the epistemic projects of the individual. A mismatch occurs when individuals have different epistemic projects than the communities they constitute.

For example, in accordance with the epistemic norms of individual rationality, individuals have the epistemic project of updating their beliefs in such a way that they are supported by the most evidence. By contrast, we might say, communities have the epistemic project of discovering more veridical theories. These projects conflict, Kitcher (1990) says (following Kuhn 1962), because the epistemic norms of individual rationality will compel individuals to remain loyal to the prevailing paradigm, which generally has the most evidence (given that it is prevailing), whereas collective rationality will compel individuals to overthrow the prevailing paradigm, in favor of a more veridical paradigm. This leaves individuals in the community with a dilemma about which norms to comply with.

Kitcher (1990) notes that there are two ways that one might try to reconcile this mismatch (and the resulting dilemma). First, one might try to avoid this particular example of a mismatch by saying that individuals can pursue attempts to overthrow the prevailing paradigm while updating their beliefs in such a way that they are supported by the most evidence. However, Kitcher (1990) replies that individual reasons (as I am calling them; he does not use this term) even require “that the person should also pursue the better-supported theory, since pursuing a doctrine that is likely to be false is likely to breed more falsehood (or less of the desired epistemic state),” (p. 8). In other words, Kitcher argues that pursuits are justified by beliefs and beliefs are justified by evidence such that individual reasons compel one to engage in pursuits that are favorable to the prevailing paradigm. Either way we cut it up, we have a dilemma between individual rationality and collective rationality.[[6]](#footnote-6)

Second, one might try to avoid the mismatch by simply stipulating that the individual reasons compel the individual to pursue the epistemic projects of the communities which they partly constitute. Indeed, this is precisely how Kitcher (1990) wants us to respond: by motivating us to accept an “altruistic ideal of rationality”, rather than an egoistic one. Thus, Kitcher accepts this new definition of individual rationality as a solution to the mismatch between individual and collective rationality.

In this essay, I maintain the distinction between individual and collective rationality even though I agree with Kitcher that the individual community members ought to do what collective rationality requires, not what individual rationality requires. My reason for doing this is dialectic: this allows me to easily and clearly compare this collective conception of rationality with the individual conception of rationality that guides the attempts made in §2 and the other two possibilities that I investigate in §3.3.

**§3.2. Collective Rationality in Comparative Psychology**

Since the possibility for a collective rationality approach depends on the existence of a mismatch between the epistemic projects of individuals and the communities they constitute, we need to show that there is a similar mismatch in comparative psychology before we can offer collective justifications as serious alternatives to individual justifications. This is not as straightforward as we might imagine, though: we cannot simply “fill in” the particulars of the mismatch that Kitcher (1990) discussed between individual interest in the current paradigm and collective interest in new paradigms. After all, comparative psychology does not have a single prevailing paradigm.

On the contrary, comparative psychology is a rather motley community, which we can divide in many ways. One relevant way to divide the community is by their principles.[[7]](#footnote-7) This yields at least two paradigms: the AM paradigm, which consists of practices that are guided by principles that have AM bias, and experimental psychology, which consists of practices that are guided by principles that have AE bias. Other paradigms might include those which consist of practices that are guided by unbiased principles or that are not guided by any principles at all. In contemporary debates, though, most practitioners seem to fall into either the AM paradigm or the AE paradigm.

The diversity of comparative psychology relocates the mismatch between individual and collective rationality: rather than having to decide between being a “follower” inside the monolithic paradigm and being a “maverick” outside the monolithic paradigm,[[8]](#footnote-8) the comparative psychologist must decide which paradigm to follow (if any). This difference in the location of the mismatch causes a significant difference in the nature of the mismatch too. After all, in Kitcher’s (1990) case, the mismatch involved contradicting responses towards evidence: individual reasons obligate followers to believe and pursue the theory that has most evidence whereas collective reasons obligate the maverick to believe and pursue a theory that has less evidence. By contrast, there is no such mismatch in comparative psychology: since there is no evidence for or against either paradigm, there can be no obligatory responses at all and, hence, no mismatches thereof.

Instead, I propose that the mismatch occurs with respect to the individual’s choice to follow one of the paradigms and the community’s interest in sustaining the conflict between the paradigms. After all, individual comparative psychologists lack individual reasons to choose one paradigm over the other, since the likelihood of error in both AM and AE principles is the same, *as far as we know*. Comparative psychology as a community, though, has collective reasons to sustain the conflict between paradigms, if the conflict between paradigms reduces the likelihood of error more either paradigm does. If this is so, then comparative psychology as a community could impose its collective reasons on its members by assigning them to the paradigm which they could best contribute to. Therefore, as long as we can show that the conflict between paradigms reduces the likelihood of error more than either paradigm on its own does, then we can settle the decision of which paradigm any comparative psychologist as a member of the community ought to follow.

**§3.3. The Utility of Bias**

An individual researcher is limited in their ability to implement principles: individual comparative psychologists typically only implement one principle on the basis of their personal hunches. However, communities are not limited in this way: since communities consist of many individual comparative psychologists, they can implement many principles simultaneously. At least three epistemic advantages emerge from this ability. First, while individual researchers tend to choose paradigms to follow, a community has enough researchers to follow multiple paradigms. This allows a community to assign researchers to follow both AM and AE paradigms, which allows them to investigate more hypotheses than if the community were to assign researchers to follow just one paradigm. Since the community has no reason to favor AM hypotheses over AE hypotheses and vice versa, it has reason to investigate *both* AM hypotheses and AE hypotheses.

Second, the community acquires the ability to implement division of labor. The community can exploit this by guiding scientists with AM cognitive biases towards the AM paradigm and scientists with AE cognitive biases towards the AE paradigm. After all, if a scientist has an AM (AE) cognitive bias towards an AM (AE) hypothesis, they will be more likely to find confirming evidence of human–animal similarities (dissimilarities) and refute allegedly falsifying evidence of human–animal dissimilarities (similarities). Since the AM (AE) paradigm practices AM (AE) principles, which generate more AM (AE) hypotheses, scientists with AM (AE) biases perform best in AM (AE) paradigms. This generates collective reasons for individual comparative psychologists to follow one paradigm or the other: they ought to use their own cognitive character and affirm their personal hunches in order to best further their community’s epistemic interests (rather than to minimize their own likelihood of error). Thus, the diversification of research projects exploits the motivational utility of cognitive bias.

Third, the community acquires the ability to rationally exploit the cognitive biases of its members, even though none of its members independently have this ability. As the individuals that constitute the community affirm their personal hunches and follow one of the two prevailing paradigms, competition will ensue, generating a strong incentive for followers of both paradigms to (1) corroborate their own hypotheses, (2) defend them against allegedly falsifying evidence, and (3) try to falsify competing hypotheses. The more frequent and vigorous the competition, the higher the likelihood that true hypotheses will be corroborated and false hypotheses will be falsified. Thus, the diversification of and competition between research projects among biased paradigms decreases the total risk of error.

I think there is a case to be made that we have already witnessed these advantages in the comparative psychological literature. For example, consider the debate about whether non-human animals of any given species predict the behaviors of other animals via behavior rules, in which case they are behavior-reading, or via ascribing mental states, in which case they are mindreading. Since humans typically predict behavior via mindreading (at least upon reflection), AM principles are disposed to assign mindreading abilities to non-human animals. Since mindreading involves “sophisticated” cognitive variables, though, AE principles are disposed to assign behavior-reading abilities to non-human animals. As soon as both groups began to debate, both sides realized how difficult it was to develop a test that could empirically discern between the mindreading hypothesis and the behavior-reading hypothesis. Often, one side of the debate will offer evidence that seems to suggest that their hypothesis is correct and, shortly after, the other side will show that they can explain the evidence too, renewing the busy search for a discerning test. The progress of the debate appears to be motivated by (1) a healthy sense of competition between followers of the two paradigms and (2) their commitments to their *a priori* hunches in the outcome of the debate.[[9]](#footnote-9)

Another example is the debate about what cognitive traits are unique to humans. AM principles are disposed to minimize the number of cognitive traits that are unique to humans. In this particular debate, they are also disposed to explain cognitive differences as differences in “degree” rather than differences in “kind”. By contrast, AE principles are disposed to maximize the number of cognitive traits that are unique to humans. In this particular debate, they are also disposed to explain cognitive differences as differences in “kind” rather than differences in “degree”. At first, Darwin (1871) and Romanes (1883, 1892) , the two founders of comparative psychology, claimed that most behavioral differences were due to cognitive differences in degree. Then, after Morgan (1903), it was fashionable to follow the AE paradigm. Today, increased communication between experimental psychologists and cognitive ethologists has led to a more even-handed and productive debate between followers of the AM and AE paradigms. Once again, the progress of the debate appears to be motivated by (1) a sense of competition and (2) personal investment in *a priori* hunches.[[10]](#footnote-10)

Now, one could object that the progress in these debates occurs *regardless* of or even *despite* the competition and personal investment in *a priori* hunches rather than because of it. Of course, the two factors that I have mentioned are not necessary for the kind of progress that we can find in this debate, so there remain alternative explanations. However, these alternative explanations would need to make two unlikely moves. First, they would need to claim that (1) competition between followers of AM and AE paradigms does not create incentive for the followers of one paradigm to outcompete followers of the other paradigm and (2) that having an *a priori* hunch does not create further incentive to corroborate and defend that hunch. Second, they would need to find another source of incentives that explain the pace of the debate between the paradigms. However, I do not think any of these moves are promising: I have already argued against the first move above. Regarding the second move, I cannot see which sources of incentives one could appeal to that would be stronger than the first two that I have suggested.

Therefore, the best explanation of the progress that comparative psychology as a community has enjoyed and continues to enjoy is that the competition has been healthy and incentivizing and that the exploitation of personal investment in the outcome of the debate has been effective in mobilizing followers of both paradigms. This confirms that comparative psychology as a community has a collective interest in sustaining this competition and that this interest gives its constituents reason to follow the paradigm that they have personal interest in due to their cognitive biases. My recommendation, then, is conservative: comparative psychologists should continue to pursue their favorite paradigm even though they do not have individual reason to do so because they have collective reason to do so.

**§4. Three Objections**

In this section, I defend the collective justification of AM and AE principles against three objections. In §4.1, I consider the objection that the community of biased followers who implement biased principles will probably be biased too, depending on whether AM or AE biases are stronger and whether there are more AM or AE followers. In §4.2, I consider the objection that a community that implements unbiased principles (the first alternative I mentioned in §3) could outperform a community that implements biased ones. In §4.3, I consider the objection that a community that does not implement any principles (the second alternative I mentioned in §3) could outperform a community that implements biased ones.

**§4.1. A Mismatch in Bias**

Another way to understand the move from individual rationality to collective rationality is to consider how biases are neutralized. In §§2.1–2.2, I considered the possibility that biased principles could neutralize cognitive biases but concluded that they could not: principles have so much influence over the hypothesis generation process that they would overwhelm any cognitive bias the implementer of the principle might have. In §3, I offered a different way to neutralize bias: individual members of the community would remain biased and so would the paradigms they partly constitute but the two paradigms would cancel each other’s biases out.

One way to object to the collective justification of biased principles is to argue that it is unlikely that both biases are equally strong such that they cancel out. On the contrary, it seems more likely than not that one bias would outweigh the other and the community would have an overall bias. On its own, this is not an urgent objection: sure, the community may have a bias (although I will argue that it probably does not) but it would still be less biased than if the community chose to side with either paradigm on its own. The objection arises when we compare the mildly-biased community to communities that implement unbiased principles, as we will in §4.2. In anticipation of that objection and to mitigate concerns of bias, then, we have reason to push back on the suggestion that AM and AE paradigms are unlikely to neutralize each other’s biases.

Weisberg & Muldoon (2009) tested this suggestion through computer simulation. The simulation consisted of an epistemic landscape and three sets of agents, which were distinguished by their search strategies. The epistemic landscape was a space that consisted of three dimensions: “the *x* and *y* coordinates of points… will correspond to aspects of the approach and the *z* coordinate will correspond to the epistemic significance of the truths yielded by adopting that approach,” (p. 230). The objective for the agents was to find the “maxima” in the space, the points that corresponded to truths with the highest epistemic significance. The first set of agents, the “mavericks”, are disposed to move through the epistemic landscape by exploring the cells that had not been explored before. The second set of agents, the “followers”, are disposed to move through the epistemic landscape by exploring the cells that had been explored before. Finally, the third set of agents, the “controls”, would use a mix of the two strategies.

Unsurprisingly, when just one population was deployed on the epistemic landscape, the mavericks required the fewest trials to find the maxima, followed by the controls and, finally, the followers. When *multiple* populations were deployed on the epistemic landscape, though, Weisberg & Muldoon (2009) found that a mixed population of mavericks and followers outperformed every other kind of population. More surprisingly, they also found that adding mavericks or followers to a mixed population had rapidly diminishing marginal returns. Accordingly, most proportions of mavericks-to-followers were equally effective: even extremely unbalanced populations could find the maxima in a similar number of trials as balanced populations.

As I mentioned in §3.2, comparative psychology is not a community that can be divided up into mavericks and followers. However, their results are strongly suggestive: the benefits of any given epistemic strategy for the community seem to require only a minority of the community to deploy the strategy. Thus, in a conflict between two biased paradigms, we have reason to believe that the relative populations of the two paradigms and the relative strengths of the biases do not make a significant difference. Since AM and AE biases are similar in strength, as far as we can tell, and AM and AE paradigms both host active research projects, we have good reason to believe that the biases cancel out at the level of the community.

At this point, one might object that by diminishing the community’s dependence on the individual, I have diminished the individuals’ dependence on the community for collective reasons. After all, if the community can pursue its collective epistemic project regardless of what the individual does, then it is difficult to see how the individual has collective reason to do anything. This would leave them with the need for individual reasons, which, I have argued in §2, they do not have. Thus, the collective justification I have provided in §3 would be a justification for paradigms as a whole to continue their biased projects, not for any individual members of the paradigms.

To answer this objection, I must point out that all of Weisberg & Muldoon’s (2009) models assumed that the “epistemic landscape” is “unified”.[[11]](#footnote-11) Within a unified landscape (of size *x*), their results indicate, there is a diminished responsiveness of epistemic productivity to the activity of individual researchers after a threshold number and diversity of researchers (of size *y*). This effect is due to the diminishing marginal return of mavericks. However, if we consider non-unified epistemic landscapes,[[12]](#footnote-12) which they do not, then we realize that the unified parts of that landscape (*x/n*, where *n* is the number of unified parts) will have increased responsiveness since they will have much fewer mavericks and are more likely to be below the threshold *y*.[[13]](#footnote-13) Thus, the smaller the unified part of the landscape, the more responsive it will be to the error preferences of its members.

This resolves our problem. Comparative psychology is a non-unified field that consists of many semi-independent problems about which there are semi-independent debates (e.g. animal mindreading vs. human uniqueness). It consists of mature problems with larger communities that have diminished responsiveness to individuals and, therefore, have the epistemic advantages that come with that. It also consists of new problems with smaller communities that have high responsiveness to individuals and, therefore, lack the epistemic advantages that come with that. Thus, while individuals do not have collective reason to follow the larger AM and AE communities that address mature problems, individuals do have collective reason to follow or even initiate the smaller AM and AE communities that address new problems. Therefore, once we account for the complexities of the field, we find that individual comparative psychologists do have collective reason to follow the AM or AE paradigm in projects to which they can make an impact.

**§4.2. The Impossibility of Neutrality**

I admit that my proposal to justify our existing operations in comparative psychology via collective reasons is a bit unorthodox and complex, even though I think it does succeed. One might wonder why we should go to all this trouble when we have access to principles that do not have either AM or AE bias, such as Morgan’s Canon with Hume’s Dictum (Buckner 2013). That way, we can neutralize bias at the individual level and not have to worry about mismatches between individual rationality and community rationality. There is a fatal problem with this proposal, though.

While Morgan’s Canon with Hume’s Dictum probably does not have any AM or AE bias, it certainly does have other kinds of bias. Most explicitly, it is biased to cognitive variables that are less “sophisticated”. We could just as easily imagine an inverse of Morgan’s Canon with Hume’s Dictum, which ranks explanations with the most “sophisticated” cognitive variables highest. This inverse principle would have the opposite bias, towards variables that are more “sophisticated”. I think this demonstrates a general problem: any principle must select one hypothesis from a large set of empirically adequate hypotheses on the basis of a ranking rule. Since this is a set of empirically adequate hypotheses, there is no evidence to favor one over the others. Thus, principles inescapably lead to bias. Thus, there are no “unbiased principles” for comparative psychology to implement. Instead, comparative psychology should accept the bias of its principles and mitigate the epistemic risks through preserving and fostering competition between its paradigms.

Of course, one could still argue that comparative psychology would benefit more from developing and fostering a paradigm whose practices implement Morgan’s Canon with Hume’s Dictum and another paradigm whose practices implement the aforementioned inverse of Morgan’s Canon with Hume’s Dictum. I am very open to that suggestion. However, to make a persuasive case for it, we would need to argue that scientists have differing cognitive biases towards and away from sophisticated cognitive variables in a way that is neutral to and independent of species. There are two reasons for this: (1) cognitive biases are important for making *a priori* hunches, which are important for being personally invested in an outcome, which promotes community productivity, and (2) these cognitive biases cannot be dependent on AM and AE biases or else we would be re-affirming the prevailing paradigm, not reforming it into a new paradigm. Furthermore, since AM and AE bias ground the prevailing paradigm, one would have to make a stronger case to change the status quo: that pro- and con- “sophistication” biases further community interests more than AM and AE bias do. None of these arguments seem very promising, so my argument for AM and AE paradigms stands.

**§4.3. The Utility of Principles**

If all principles are biased, one might suggest that we do away with the use of principles altogether. For example, Sober (2005) argues that “the only prophylactic we need is empiricism,” (p. 97) and Fitzpatrick (2008) agrees. There is something apparently sensible about this suggestion: if there is a set of empirically adequate propositions, why must we choose one without evidence? Why not wait agnostically until we have devised experiments to empirically discern among them? The idea is to minimize the total risk of error by making no hypotheses at all, or by making them on a pragmatic basis, rather than an epistemic one.

Part of this I accept and part of this I reject. I agree that we ought not take our *a priori* hunches too seriously and that we should entertain agnosticism among empirically adequate hypotheses in certain reflective contexts. However, to be effective scientists, we must choose hypotheses to test and we must find the motivation to vigorously support and defend them. This is when *a priori* hunches become so useful: they provide the motivation and lead to competition, which provides even more motivation. Thus, despite the fact that agnosticism is an epistemic virtue in certain context; it is a pragmatic vice in others. Insofar as the individual puts the community’s epistemic projects before their own epistemic projects (as part of their pragmatic projects) and insofar as the community’s epistemic projects benefit from the motivation of their constituents, the individual also has collective epistemic reason to avoid agnosticism and throw themselves behind their cognitive biases and *a priori* hunches.

**§5. Conclusion**

Scientists and philosophers usually have a deep-seated disposition to resolve conflict. Generally, this disposition serves us well. I have argued that it does not serve us well, though, if the conflict concerns whether we should implement AM principles or AE principles. The conflict between principles promotes the epistemic projects of the community, so resolving that conflict—whatever that would mean—is not in the interests of the community. Being good members of the comparative psychology community, therefore, involves sustaining the conflict, which, in turn, involves exploiting that deep-seated disposition. Thus, we ought to direct disposition at resolving conflicts over the particular hypotheses that the AM and AE principles generate in particular contexts, not over the principles that generate those particular kinds of hypotheses in the first place.

In many ways, the system that I am advocating for comparative psychology as a community is similar to the adversarial system of justice. The prosecution always selects the hypothesis that maximizes the guilt of the defendant(s) that is empirically adequate (since that maximizes their payoff) while the defense always selects the hypothesis that maximizes the innocence of the defendant(s) that is empirically adequate (since that maximizes their payoff). The prosecution and the defense do not debate the principles by which the other functions: instead, they debate about the hypotheses that these principles yield in response to the evidence. Despite the cognitive and methodological biases, though, the system is designed to exploit these biases and cancel them out in order to get at the truth. If I have argued successfully, then the competition between the AM and AE paradigms ought to work the same way.[[14]](#footnote-14)

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1. Note that, unsurprisingly, many comparative psychologists have criticized this concept of “sophistication” (e.g. Allen-Hermanson 2005; Fiztpatrick 2008, 2009; Sober 1998, 2005; de Waal 1999). [↑](#footnote-ref-1)
2. Otherwise, if we did have a reason to prefer an AE proposition, then that reason must involve empirical content and that empirical content must constitute a new *explanandum*, which would *necessitate* the AE proposition (thereby narrowing the gap of what is explanatorily adequate). [↑](#footnote-ref-2)
3. Obviously, though, AE bias can easily be mitigated if we implement Morgan’s Canon when we explain both human and non-human animal behavior. Buckner (2013) makes this a formal requirement, which he calls “Hume’s Dictum”. [↑](#footnote-ref-3)
4. Note that I qualify these claims by relativizing them to the “mainstream history of comparative psychology”. My reason for doing this is that there have been different versions of this history in the literature. The reason for this is due to the fact that the people who tell the history often fail to read the original texts. For example, behaviorists misinterpreted Morgan’s Canon as a behaviorist principle for decades (e.g. Griffith 1943, Harriman 1947, Epstein 1984), until psychologists revisited the original texts and carefully interpreted them (e.g. Radick 2000, Thomas 2006). Since I have not read the original texts, I will carefully avoid making this same mistake. [↑](#footnote-ref-4)
5. One could also say that Morgan’s Canon replaces AM bias with AE bias and this somehow improves things because AE bias is better than AM bias. For example, Andrews & Huss (2014) suggest that AE bias is soften more acceptable to scientists than AM bias because it “demonstrates a kind of hard-nosed conservatism that has long been taken to be a virtue of the serious scientist,” (p. 717). Although I agree with this claim, I do not think that hard-nosed conservatism can provide a serious defense of Morgan’s Canon, so I do not address it any further. [↑](#footnote-ref-5)
6. Even though Kitcher (1990) talks about the “norms of individual rationality”, I think he means to say the “*epistemic* norms of individual rationality”, since the pragmatic norms of individual rationality would certainly justify the pursuit of paradigm overthrow if there were personal reward for doing so—indeed, both Kitcher and, later, Strevens (2003) argue that there are. [↑](#footnote-ref-6)
7. Another way to divide the community is by their observational practices: cognitive ethology, whose *modus operandi* is field observation, and experimental psychology, whose *modus operandi* is laboratory observation. Yet another way to divide the community is by the variables they consider to be acceptable for theoretical explanation: behaviorists, who only permit behavioral rules, and cognitive psychologists, who permit cognitive variables. [↑](#footnote-ref-7)
8. Weisberg & Muldoon (2009) introduce these terms. [↑](#footnote-ref-8)
9. See Lurz (2011) for a detailed discussion of the mindreading debate. [↑](#footnote-ref-9)
10. See Shettleworth (2012) for an overview of the human uniqueness debate. [↑](#footnote-ref-10)
11. By “unified”, I just mean that any follower in the landscape can follow any maverick in the landscape if the maverick were to find something interesting. For example, the sub-field of animal mindreading is unified under this definition because the interesting findings of any research member would bear on the research of all other members. [↑](#footnote-ref-11)
12. By “non-unified”, I just mean that some followers in the landscape cannot follow some mavericks in the landscape if the maverick were to find something interesting. For example, the union of the sub-fields of animal mindreading and human uniqueness are not unified under this definition because some (but not all) interesting findings in the one sub-field (e.g. a researcher discovers that corvids are indeed capable of mindreading) do not bear on the research of all other members (e.g. this would not be relevant to research on human uniqueness if researchers had already discovered that non-human great apes were capable of mindreading). [↑](#footnote-ref-12)
13. That is, if *p(f<y)* is the probability that *f* is less than *y*, then *p(x/n<y)>p(x<y)*. [↑](#footnote-ref-13)
14. I must thank Reviewer 2 for this excellent analogy! [↑](#footnote-ref-14)