Continuity as Crisis: Two Traditions of Theorizing about Animal Minds

Adam See

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CONTINUITY AS CRISIS
Two Traditions of Theorizing about Animal Minds

by

ADAM SEE

A dissertation submitted to the Graduate Faculty in Philosophy in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

The City University of New York

2020
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THE CITY UNIVERSITY OF NEW YORK
ABSTRACT

Continuity as Crisis: Two Traditions of Theorizing about Animal Minds

by

Adam See

Advisor: John Greenwood

Contemporary philosophers and scientists remain largely resistant to attributing humanlike capacities to non-human animals, particularly great apes, for reasons that are not based on compelling empirical or theoretical grounds. Mental faculties such as reason, agency, and theory of mind are widely seen as differing in kind from functionally analogous abilities in other extant species. This dissertation appraises the current state of the animal minds literature by means of a critical genealogy charting the development of skepticism about animal cognition throughout the history of philosophy. In doing so, this project addresses the sedimentation of epistemic, linguistic, ontological, and methodological impasses that continue to shape debates over human uniqueness and limit comparative discussions of human and animal cognition.

Since antiquity, discourse about animal minds has broadly followed two traditions, both of which are representative of positions in the recent philosophical and scientific literature. The dominant path has been to defend fundamental discontinuities between the human mind and the rest of the animal kingdom. I show how this tradition is bound up with common patterns of argumentation and evasive rhetoric that prejudge debates in comparative cognition in favor of discontinuity. Representative figures range from Aristotle, Descartes, and Wallace to modern primatologists such as Daniel Povinelli and Michael Tomasello. This tradition, I argue, is largely defined by the tenacity and
adaptability of “exceptionalism claims,” i.e., claims evoking a cognitive hierarchy in the animal kingdom. It has also been historically preoccupied with so-called “logical problems” suggesting, for example, that decades of experimental research on mindreading in chimpanzees cannot provide evidence for this ability even in principle. Revealing this problem’s underlying ontological, epistemic, and procedural assumptions explains why this tradition repeatedly fails to solve the problems it poses for itself, e.g., does the chimpanzee have a theory of mind?

In addition to this unhealthy skepticism, I show how the dominant tradition relies on a problematic form of rhetoric whereby animals are said to act “as if” possessing X (a presumably uniquely human faculty) but lack “genuine,” “true,” or “real” X, where X is defined at the highest level of human ability. This has long been, and remains, a common strategy used by discontinuity theorists in reaction to evidence of boundary-threatening abilities in animals. This rhetoric has tacitly encouraged antiquated “all or nothing” accounts of human mental faculties that have no place in the contemporary literature.

The critical genealogy this dissertation develops is dialectical — the claims of the dominant tradition are continuously challenged by voices from within a marginalized tradition that take seriously the possibility of cognitive explanations of animal behavior. In illuminating this alternative tradition, my project brings together thinkers as diverse as Plutarch, Lucretius, Montaigne, La Mettrie, Hume, Darwin, Margaret Washburn and Kristin Andrews, who articulate and defend naturalistic approaches to cognition that do not presuppose a cognitive hierarchy with human abilities situated at the top. This tradition has been particularly sensitive to anthropocentric double standards in denying mental capacities to animals, and is home to the original defenders of “minimal” accounts
of rationality. This project selectively draws from this marginalized tradition to promote a healthy skepticism toward animal cognition, culminating in a chapter undercutting the force of modern discontinuity arguments regarding the socio-cognitive capacities of humans and chimpanzees.
Acknowledgements

My deepest appreciation is owed to the efforts of John Greenwood. John encouraged this project from the beginning and was very helpful in narrowing its content. His immense knowledge of the history of psychology was an invaluable resource at every step. John’s presence at the helm was a constant sense of comfort to me. I looked forward to our meetings in the way that one looks forward to seeing a good friend. He was always affable, heartening, and constructive, and I feel privileged to have him as my advisor.

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upon me that teaching can be more significant and rewarding than research. Philip also
inspires me a public intellectual. The last time I saw him he was giving a speech on
climate change at the Brooklyn Public Library. That’s my kind of philosopher.

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Macfarlane. She’s heard me struggle to explain this project hundreds of times, in various
states of sobriety, over many years. Most importantly, Caroline was strong enough to
provide encouragement and emotional support to me during the darkest year of her life,
and I am forever grateful. Thank you Chilla.

Mom and Dad, you should be at the top but if you knew John you’d understand.
My parents, Myra and George See, have worked as hard or harder than anyone I’ve
personally known. The stress they selflessly endure has been difficult for my family. My
parents worked themselves up from nothing in rural Ontario, and they put me through
three college degrees debt free, studying philosophy of all damn things, in New York
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at every step, having a beer with me, talking about David Berman (RIP) lyrics, helping
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Finally, no one spent more time with me during this project than Hannah. When you spend nearly every day thinking about animal minds, you inevitably consider the cat you share the apartment with. You’re writing about phantasia, for instance. You pause. Does Hannah have phantasia? Does that squawk-things she does carry anything akin to
propositional content? Hannah, having finished the project, I say with humility that I know no more about the workings of your damned alien mind than I did at the start. We even tried our own versions of the chimpanzee “folk physics” experiments (adjusted and controlled for cat and laser pointer). Mostly we just hang out, and it’s the best.

Lake Clear, Ontario

August 2019
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Chapter One
Animal Minds: A History of Crisis

1. General Introduction

This dissertation is motivated by the question as to why contemporary philosophers and scientists remain widely resistant to attributing human-like cognitive capacities to non-human animals, particularly great apes, for reasons that do not appear to be based on compelling empirical or theoretical grounds. In recent years, the field of comparative cognition has seen a “virtual epidemic of new theories of human cognitive uniqueness,” in the form of “sweeping characterizations of the differences between humans and other species” (Shettleworth 2012: 2794). With respect to the current state of this literature, Rollin (2013: 15) questions the tendency of “empirically-oriented philosophers and biological and psychological scientists to be agnostic if not downright atheistic about animal mind.” Indeed, decades worth of experimental and ethological research has failed to mitigate widespread skepticism under the guise of the so-called “logical problem” (pages 4-8 below) the proponents of which state that all approaches—past and present—that have been used to evaluate cognitive capacities in animals such as the presence of a theory of mind “cannot provide evidence for this ability even in principle” (Halina 2015: 474).

What’s more, a problematic form of rhetoric (pages 9-11 below) has long been a fixture in arguments for human uniqueness wherein it is claimed that apes and other “higher” taxa behave as if they possessed X, (where X is a cognitive capacity long thought to be exclusive to our species), but only humans exhibit behavior that is “truly”
indicative of “genuine” or “real” X. In the philosophy of animal minds, rhetoric of this nature historically comes part and parcel with what Cameron Buckner (2013: 861) calls “semantic anthropocentrism,” namely, “precisifying vaguely-defined psychological terms to the highest human-level ability,” thereby influencing perspectives on human uniqueness in this literature. My contention is that both these skeptical and rhetorical means of reinforcing traditional boundaries between the cognitive capacities of humans and other species owe less to naturalistically-minded approaches to inquiry, and more to underlying normative assumptions that have deep, appreciable histories prejudging the grounds for a rigid human-animal division in comparative cognition research and the philosophy of mind.

In any scientific, philosophical, or cultural context, unwavering skepticism about specific claims in spite of increased evidential support in their favor is a phenomenon worthy of investigation. My project appraises the current state of the animal minds literature by way of a critical genealogy charting the development, accretion, and sedimentation of these contemporary attitudes in order to understand why it is that hypotheses suggesting cognitive continuity have been marginalized and met with skepticism for centuries despite vast improvements in the available evidence—especially, I argue, in a post-Darwinian intellectual climate where we would expect less opposition to continuity-hypotheses, rather than increased opposition.1 While Rollin (2013) and Boakes (1984) attribute current “agnostic” and “atheistic” trends to the sedimentation of positivistic values propagated by behaviorism, the following chapters demonstrate that there is a great deal more to this story, casting new light on historic and philosophical

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1 This has been widely commented on, e.g., Thorpe 1979; Dewsbury 1985; Wasserman 1981; Boakes 1984; Burghardt 1985; Richards 1987; Singer 1994; Griffin 1976, 2001; Rollin 1989, 2013.
bases for (1) enduring skepticism about continuities between human and animal cognitive capacities, and (2) the tenacity and adaptability of what I call “exceptionalism claims,” i.e., claims evoking a cognitive hierarchy in the animal kingdom wherein certain human capacities are seen as not merely unique, but also more advanced, complex, or otherwise superior to those of other extant species.

Exceptionalism claims have long been—and remain—a dominant fixture of animal minds philosophy. A critical genealogy of the origins and historical developments of exceptionalism claims in the face of steady empirical and philosophical challenges reveals a trajectory of questionable epistemic, ontological, and linguistic assumptions and argumentative strategies employed in their defense. The aim of this project is to explore the evolution of dominant conceptual frameworks that have dictated the terms for debates over human uniqueness and exceptionalism in cognitive ability; specifically, why contemporary scholars such as Penn, Povinelli, Heyes, Vonk, and Lurz place a great deal of emphasis on the so-called logical problem, which, I argue has existed in various forms since antiquity. I also trace the history of how problematic forms of rhetoric—prominent today in the writings of Tomasello’s Leipzig group—have been traditionally used to undergird discontinuity arguments wherein the most complex of human faculties are used as the “gold standard” (Bekoff and Peirce 2009) to define the “true” or “real” meanings of core cognitive concepts, thereby denying their application to the behavior of non-human species. For instance, an argument repeatedly touted by the Tomasello group is that humans are the only species that “truly” cooperates (e.g., Tomasello 2006, 2008, 2009), or that engages in “truly joint joint attention” (Carpenter and Call 2013) because

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2 E.g., Heyes 1998; Povinelli and Vonk 2003; Penn and Povinelli 2007, 2013; Penn et al., 2008; Lurz 2011.
all acts of joint attention are defined exclusively in terms of recursive mindreading.\(^3\) In Chapter Eight, I argue that this approach to joint attention is guilty of semantic anthropocentrism, \textit{i.e.}, “cooperation often involves various kinds of feedback mechanisms, but recursive mind reading, higher-order intentions, and mutual belief are only relevant concepts in very special cases” (Skyrms 2009: 145). The presence of a healthy, responsible skepticism about animal minds is necessary, but modern debates over chimpanzee social cognition expose the prevailing approaches to defending uniqueness and exceptionalism claims about the human mind as neither healthy nor responsible.

The critical genealogy that comprises the body of this project shows that, since antiquity, discourse over animal minds has broadly followed two paths, both of which are representative of positions in the recent philosophical and scientific literature. By far the more dominant path has been to defend a fundamental discontinuity between features of the human mind and the rest of the animal kingdom. I argue that this dominant tradition is bound up with certain kinds of arguments, rhetoric, and values that prejudge debates in comparative cognition in favor of discontinuity, and that we seem to be in this position at the moment—particularly with respect to debates over mindreading in chimpanzees, which reveal degenerative characteristics at work, \textit{i.e.}, the tradition’s (in)ability to effectively solve the problems it poses (Laudan 1977), \textit{e.g.}, does the chimpanzee have a theory of mind? (Premack and Woodruff 1978).

I also present a genealogical account of an alternative, marginalized tradition that takes the possibility of cognitive explanations of animal behavior very seriously. These

\(^3\) \textit{E.g.}, Tomasello and Rakoczy 2003; Tomasello \textit{et al.} 2005; Moll and Tomasello 2007; Tomasello and Carpenter 2007; Schmidt and Rakoczy 2016.
figures articulate and defend conceptions of a fundamental continuity between human cognitive capacities and those of other species, embracing—I argue—a more open-minded and empirically grounded approach to evaluating evidence from a wide variety of sources and toward a wide variety of taxa. Unlike the trajectory of views embodied in the dominant tradition, then, the writings from this alternative history of ideas are indicative of a naturalistic approach to cognition (or, as Frans de Waal [2016] stresses, cognitions) that does not presuppose a cognitive hierarchy with human abilities situated at the top. This project explores potential explanations for why this tradition has not received due attention in the current literature, and, again by means of a critical genealogy, I utilize attitudes and arguments from these figures to outline and promote a healthy skepticism toward animal cognition. The project culminates in a chapter undercutting the force of contemporary discontinuity arguments regarding—and generalized skepticism about—the socio-cognitive capacities of chimpanzees (theory of mind and joint attention).

This reconstructive project is a timely one. Cecilia Heyes (2015: 313) claims that while the animal minds literature from 1978 to 2000 showed “considerable promise,” more recent debates have been mired with theoretical and methodological problems indicative of a “declining research program” that now “seems to be in trouble.” By way of setting the stage for grasping the main issues stalemating the current literature, and thus the impetus for digging into to the origins of these issues in the first place, some introductory remarks on contemporary animal minds skepticism are necessary.

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2. The Logical Problem, Historically Considered

Discussions amongst philosophers and primatologists have long taken place under the influence of what has, in recent years, been referred to as the logical problem (Hurley and Nudds 2006) or Povinelli’s problem (Lurz 2011). In its basic form, the logical problem states that since all we can observe is an animal’s behavior, it is difficult (if not impossible) to determine whether an animal is predicting the behavior of others by means of mental state attribution, e.g., of their underlying intentions and beliefs, or by means of associative or conditioned response-mechanisms. As Andrews (2012) describes this impasse, “given that mindreaders use observable cues to infer the existence of mental states, how can we experimentally distinguish a predictor who uses only those observable cues from a predictor who also attributes mental states?” In the chimpanzee mindreading literature, the logical problem rests upon the demanding task of designing experiments that can convincingly distinguish between “two very general and opposing theories” (Lurz et al. 2014) of the mechanisms underlying social cognition: behavior-reading hypotheses and mindreading hypotheses. With respect to the former, agents make predictions about others’ behavior solely on the basis of non-mentalistic representations formed by past experience with various societal cues...

Some of these cues and relations can be rather specific (realized by a restricted range of bodily movements and gestures) such as ‘torso facing forward’ or ‘hair bristling’. Others can be more abstract (realized by a wide variety of bodily movements and gestures) such as ‘threat display’, ‘orienting toward an object’, or ‘manipulating an object in the most efficient way within the constraints of the setting.’ (Lurz et al. 2014: 428)

According to the behavior-reading hypothesis, animals navigate their environments without representing these social cues being caused by—or in any way associated with—underlying mental states in themselves or others (this is what makes them “non-mentalistic”). For instance, it is well documented that subordinate chimpanzees engage in
a wide variety of deceptive tactics in order to mate when dominants are nearby,\textsuperscript{5} \textit{e.g.}, subordinate males (and willing females, \textit{e.g.}, Matsumoto-Oda [1999]), are far more likely to engage in mating behaviors when the gaze of dominant chimps is obstructed. For mindreading skeptics, the question is whether apes perform these deceptive behaviors on the basis of their prior successes and failures based the \textit{bodily-orientation} of the dominants (what Lurz [2011] calls \textit{direct line of gaze}), or, whether they are attributing perceptual mental states such as \textit{seeing} or \textit{attention} to the dominants. A closely related question recurring throughout the history of the dominant tradition—from Aristotle and Seneca to Tomasello and Povinelli—is to challenge whether certain “rational faculties” (such as mental-state attribution) are required for a given behavior to be called “truly” deceptive, collaborative, and so forth.

Behavior-reading hypotheses do not necessarily amount to a stimulus-bound conception of the causes of animal behavior. Penn and Povinelli (2013: 63), for instance, argue that while chimpanzees are “fully cognitive creatures with a rich suite of representations at their disposal,” nonetheless, the “comparative evidence strongly suggests that nonhuman animals possess a variety of top-down heuristics, ploys, and biases for picking out the causal features of other agents’ occurent behaviors and for reasoning about other agents’ future behavior in terms of their goal-directed relation to the world.” Having set up the debate on these terms, a fair challenge is to demand clarification as to precisely what “causal features” and “reasoning” are meant to refer to in this context (Fletcher and Carruthers 2013). Nonetheless, there exist a number of distinct behavior-reading hypotheses,\textsuperscript{6} and there is no reason to assume these accounts

\textsuperscript{5} See Roberts and Roberts (2015) for a review.
\textsuperscript{6} \textit{E.g.}, Povinelli and Vonk 2003; Perner 2008; Gergely and Csibra 2003.
are mutually exclusive; it is evident that chimpanzees and other species may utilize a variety of non-mentalistic strategies when interacting with others (Lurz et al. 2014: 429).

In contrast to explanations of this nature, mindreading hypotheses state that certain animals are capable of predicting behavior on the basis of a theory of mind. According to Premack and Woodruff (1978: 515), “An individual has a theory of mind if he imputes mental states to himself and others. A system of inferences of this kind is properly viewed as a theory because such states are not directly observable, and the system can be used to make predictions about the behavior of others.” To infer another’s mental states means that one is interpreting that individual’s behavior in terms of their underlying intentions, beliefs, doubts, knowledge, as well as perceptual states such as hearing and seeing. Mindreading hypotheses likewise come in various forms and, as with alternative conceptions of the behavior-reading hypothesis, it entirely possible that mindreading animals—including, of course, humans—utilize multiple mechanisms, e.g., mental simulation, to predict the behavior of others (Mitchell 2009: 1309).

With this distinction in mind, consider a specific example of the logical problem. Liebal et al. (2004) found that, when gesturing to both humans and conspecifics, chimpanzees will reliably act as follows: Attempt one gesture, monitor the receiver’s response, and if no reaction, walk around the receiver and repeat the gesture or try a different one. The fact that chimpanzees appear to employ “practical reasoning” in gestural communication strongly suggests that they possess a theory of mind, i.e., that they attribute mental states such as attention and inattention to others (Tomasello 2008). The skeptic would then respond that there is no need to posit a mindreading hypothesis in the form of the chimpanzee attributing these mental states to humans and conspecifics.

\footnote{See Lurz et al. (2014) and Spaulding (2011) for reviews.}
Their behavior can just as well be explained in terms of conditioned learning from previous experiences in like-situations where they formed “behavioral rules” based on the success and failure of certain gestures to achieve their goals. Whether attention-getting behavior can be adequately explained primarily in terms of identifying and acting upon observable regularities is a hotly debated topic. Nevertheless, it is widely assumed that these two explanations, *i.e.*, theory of mind and behavioral rules, are “functionally equivalent” (Cheney and Seyfarth 2005: 138). In other words, both interpretations provide equally plausible means by which an actor can achieve the same goal, which, in Liebal’s study, is receiving food.

Andrews (2011) claims that, “The logical problem is a descendent of Skinner’s worry about intervening variables: if we can predict future behavior based on environmental stimuli, there is no need to postulate a mental state in order to predict that behavior.” While there is some truth to this, I contend that the *epistemic* framework for the logical problem first came into vogue in 16th and 17th centuries, first, with the influential revival of Pyrrhonian skepticism as applied by Montaigne, Charron, and Gassendi (among others) to the then-novel question what can actually be known about animal minds, and second, with the contemporaneous propagation of the *bête machine* doctrine, including its applications to human cognition, thereby offering an empirical backbone to animal minds skepticism.

The history goes deeper still. While the logical problem is fundamentally epistemic, its central, often dualistic, framework derives from (1) ancient ontological assumptions about carving up the respective capacities of human and animal minds into severe rational and perceptual domains (Chs. 2-4); (2) 16th and 17th century arguments to
the effect that “other minds” skepticism should be categorically stronger when applied to non-human animals (Chs. 5-6); (3) perennial disagreement—beginning with Plutarch and Porphyry—over the extent to which anthropomorphic language is justifiable (Chs. 4-7); (4) disagreement over what qualifies as a parsimonious explanation, e.g., how Wundt’s Law of Parsimony (1863) and Morgan’s Canon (1903) should be interpreted and applied (Ch. 7-8); and finally, (5) methodological constraints about the type of evidence and research capable of discerning disparate behavioral causes (Chs. 6-8). Throughout this genealogy, I contend that all of these factors have influenced the logical problem as it is understood and evoked today.

This problem is widely considered the most formidable impasse in not only comparative social cognition, but also—as first seen in Montaigne (1580) and Descartes (1641)—for questions regarding the appropriateness of applying cognitive explanations to animal behavior more generally. It has only been in recent years that some have seriously engaged the question as to whether the logical problem needs to be “solved” at all (Buckner 2013; Andrews 2015; Halina 2015). In my estimation, the key reasons for this general lack of discussion are as follows: (1) the import of overcoming the logical problem is emphasized in most—if not all—primers and readers on animal minds,\(^8\) marginalizing deflationary accounts as to the very question as to whether it can and/or should be dismissed; (2) the logical problem is representative of long-standing concerns over anthropomorphism in the history of discussions over animal minds and is therefore deeply engrained in the discourse; (3) since the logical problem is commonly conceived as unique to comparative cognition research, rarely has the question arisen as to whether it may be indicative of more general issues in the natural sciences wherein progress has

\(^8\) Kristin Andrew’s (2015) *The Animal Mind* is an admirable exception.
arguably been made; (4) the two alternatives offered by the logical problem are widely conceived as integral to the structure of mindreading debates, thereby raising the (perhaps legitimate) concern that evading this epistemic and methodological problem will make the very notion of animal mindreading empirically intractable. Finally, (5) the challenge of solving the logical problem has generated—and continues to generate—a robust literature of its own, not only among philosophic and scientific commentators, but also amongst the myriad of laboratory researchers whose careers have been built upon the challenge of crafting ingenious experiments to overcome it.

That said, the dominance of this problem has generated certain benefits. Productive dialogue has emerged about the precise meaning(s) of core concepts, and several creative experiments have been devised that attempt to resolve this epistemic gridlock. On the 30th anniversary of Premack and Woodruff’s (1978) landmark paper, “Does the chimpanzee have a theory of mind?,” Call and Tomasello (2008) published an oft-cited companion-piece summing up much of the experimental research to that date. They note that though there is still strong disagreement over whether the logical problem will be overcome, “In a broad construal of the phrase ‘theory of mind’ […] the answer to Premack and Woodruff’s pregnant question of 30 years ago is a definite yes.” By this they mean that, despite the fact that chimpanzees have consistently failed non-linguistic false belief tests, there is now overwhelming evidence that they understand others’ goals, intentions, and perceptual states. Fletcher and Carruthers (2013) call this “stage 1 mindreading,” which they contrast with “stage 2 mindreading,” namely, the ability to attribute “reality incongruent mental states” such as false beliefs to others.

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Heyes 2015: See 2017b. As discussed in Chapter Eight, Krupenye et al. (2016) and Buttlemann et al. (2017) designed false belief tasks that apes have passed.
A natural question arises: given that we now know much more about chimpanzee social cognition than researchers in the 1970s, why is it that widespread skepticism about stage 1 mindreading not only still persists, but persists at such an extraordinary level of intensity? Against the wealth of positive support for these abilities, Penn and Povinelli (2013: 68), argue that there is a “lack of evidence for anything even remotely resembling a theory of mind among nonhuman animals.” Oddly enough, they argue both that the past twenty-five years of evidence suggestive of chimpanzee mindreading is insufficient, while at the same time ostensibly denying that any evidence would likely suffice to solve the logical problem. What is going on here? Crucial to this project is my contention that the logical problem is not—as it is commonly conceived—a problem that emerged in the late 20th century, e.g., from responses to Premack and Woodruff’s iconic paper, but rather from a multi-faceted intellectual milieu, or research tradition (Laudan 1977), dedicated to the study of exceptionalism claims that has long placed conservative constraints on what qualifies as acceptable theories about the animal mind.

3. Cognitive Hierarchies, As If Rhetoric, and Semantic Anthropocentrism

In defending their claim that the logical problem must be “solved” in order to satisfy hypotheses about social cognition in chimpanzees, Penn and Povinelli (2009: 17) write, “there has never been any dispute about the fact that chimpanzees act as if they understand that others can see things.” Povinelli (2000: 39) likewise dedicates a section of an earlier book to drawing distinctions between “‘as if’ understanding” and “‘genuine’

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10 Also see Povinelli and Vonk 2003; Vonk and Povinelli 2006; Penn and Povinelli 2007; Penn, Holyoak, and Povinelli 2008; Lurz 2011; Lurz et al. 2014.
11 Penn and Povinelli (2013: 10-11). While early Povinelli (e.g., Povinelli and Vonk 2004) seems to leave open the door for new experimental paradigms to overcome the logical problem, later Povinelli (e.g., Penn and Povinelli 2013) is very skeptical of this possibility.
understanding” in chimpanzees, *i.e.*, “our apes were behaving exactly *as if* they understood…” This rhetoric is by no means isolated to the New Iberia researchers. Eileen Crist (1999: 40) describes a common “‘as if’ trope” throughout the history of intellectual discussions of animal minds, noting that a relatively clear line can be drawn between those researchers who make concerted efforts to manipulate naturalistic language “under the auspices of achieving ostensibly greater objectivity” and those concerned that such descriptions of animal behavior inadvertently “validate the skeptical stance in their careful avoidance or qualification of mental language” (96). Ingvild Gilhus (2006: 46, 62) identifies the same rhetorical strategy in ancient defenses of human exceptionalism, *e.g.*, the Stoics “had few problems in justifying their use of animals for humans purposes, but they were not always able to maintain a sharp distinction between animals and humans without introducing an ‘as it were’ [‘as if’] principle to explain how animals, who seemed to act according to principles similar to those of humans, do not really do so.”

Use of terms like “real” and “true” to reinforce distinctions between human and animal behavior is historically tied to *semantic anthropocentrism*, *i.e.*, although species Y behave *as if* they possess X, they do not possess “true” or “real” X, where X is exclusively defined in terms of the highest-level human ability, *e.g.*, apes do not engage in “true cooperation” because they (presumably) lack the capacity for recursive mindreading (Tomasello 2008). These “real”/“true”/“genuine” prefixes are regular features in the writings of figures in the dominant tradition. Clearly, the tacit assumption is of a cognitive hierarchy with humans at the top. In comparison, consider the following statement from Peter Godfrey-Smith (2016: 50), which reflects a token perspective of the marginalized tradition: “When we try to compare one animal’s brainpower with
another’s, we also run into the fact that there is no single scale on which intelligence can be sensibly measured. Different animals are good at different things, as makes sense given the different lives they live.” An historic relationship exists between the tenacity of this *rhetoric of the “true”* (i.e., human) in the philosophy and science of animal minds, and the tenacity of *scala natura* language (i.e., “higher” and “lower”) more generally.

Despite the fact that Darwin’s account of common decent from an irregularly branching tree of life heralded a rejection of Linnaean and Lamarckian rank-based classifications of nature (thus problematizing the very idea of ‘higher’ and ‘lower’ capacities, since each organism evolves in adaptation to its particular environment), the language associated with this research tradition persists and is still common today. In a relatively recent paper, Rigato and Minelli (2013) survey the publications of 16 top scientific journals between 2005 and 2010, totaling 67,413 papers, and discovered that “the unexpectedly high figure of 1,267 returned positive hits from our search for *scala naturae* language,” meaning reference to “higher” and “lower” taxa that were “generally expressed by contrasting lower with higher representatives of a larger or smaller branch of the tree of life: for example, lower vs. higher vertebrates, lower vs. higher plants, and so on.” The journals surveyed were both generalist publications and specialized journals in evolutionary biology.\(^\text{13}\) With respect to degenerative characteristics of the contemporary animal minds literature, de Waal and Ferrari (2010: 201) observe that,

\(^{13}\) These findings are mirrored in the philosophical literature. A search of the SpringerLink databases for publications in philosophical journals in Epistemology, Philosophy of Science, and Philosophy of Biology between 2005-2018 yielded 7,152 chapters and articles that contain the phrase “lower animals” and 9,966 chapters and articles that contain the phrase “higher animals.” Among the journals included in this search were highly competitive publications such as *Synthese, Nous, Biology and Philosophy, Mind and Language,* and *Philosophical Studies.* Given my rough search criteria there is evidently room for a significant margin of error, if, for instance, the phrases were used in historical context one would expect them to appear this frequently. To correct for this oversight I searched for these phrases alongside “scala naturae” (which received only 56 results) and Aristotle (which received only 35 results). It seems fair to assume that scala natura language is more pronounced in philosophical literature than scientific literature.
“Scala Naturae assumptions remain prevalent enough that cognitive similarities between distant taxa, such as birds and primates, are sometimes viewed as antithetical to evolutionary theory.”

4. Exceptionalism Claims and Uniqueness Claims

In the animal studies literature it is typical for the phrase “human uniqueness” to be reserved for debates in animal minds, while the “exceptionalism” modifier is reserved for ethics debates. According to Lori Gruen (2011: 4), “There are two distinguishable claims implicit in human exceptionalism. The first is that humans are unique, humans are the only beings that do or have X (where X is some activity or capacity); and the second is that humans, by doing or having X, are [morally and/or cognitively] superior to those that don’t do or have X.” It may seem intuitive that debates about the gap between human and animal minds (regardless of whether the term “uniqueness” or “exceptionalism” is used) are reflected solely in the first claim, leaving the second claim entirely to the ethicists. This intuition is misleading, as the disciplinary divide does capture something right about this distinction as it bears on the animal minds literature: there is a normative connotation to “exceptional” that is not present in the word “unique,” and that connotation is not restricted to ethical inquiry. Uniqueness claims are solely descriptive, e.g., humans have X and bats do not (or conversely, bats have X and humans do not). On my account, exceptionalism claims involve descriptive statements of this nature, but they also include an additional valuation, i.e., and X is a more advanced, more complex, or more morally relevant capacity than those possessed by other species. In comparative discussions about human and animal cognition, uniqueness implies an absence of X in other species, whereas exceptionalism often implies a lack or deficiency,
i.e., in relation to a particular (and perhaps functionally analogous) “higher” capacity that humans alone possess. While the kinds of assumptions, rhetoric, and modes of inquiry associated with the latter are more commonly at home in the ethics literature, they are also indicative of dominant historic trends in the science and philosophy of animal minds.

I define “human uniqueness” as the first claim in Gruen’s two-point definition of human exceptionalism: “Humans are the only beings that do or have X (where X is some activity or capacity).” Taking this definition at face value, it is clear that it is not indicative of the sort of claims that “human uniqueness” is typically attached to in the animal minds literature. When philosophers and scientists use this phrase, they are typically arguing for a much stronger conclusion than the claim that only humans have X; it is, after all, “a veritable truism of modern biology” that “every species is unique” (Povinelli 2000: 338). X in humans would be no more special or worthy of consideration than the unique capacities possessed by other species, e.g., elephants communicate over hundreds of miles by means of their unique ability to detect low frequencies with the soles of their feet (Poole and Granli 2011). The dominant research tradition, which again runs from Aristotle to contemporary figures such as Povinelli and Tomasello, is concerned with the peculiarities of elephant communication only insofar as they somehow challenge the exceptionalism of human communication, i.e., if the long-range elephant rumbles also demonstrated syntax, they would be subject to rigorous debate within this tradition. Compare this uncontroversial uniqueness claim about elephant communication (presumably, elephants are unique in this ability) to the extremely

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14 For example, Tomasello (2008: 17, 294, 249) argues that chimpanzees have a “lack of flexibility in vocal production” and “lack most of the structuring devices of modern language,” as evinced by the “lack” of grammatical structure in their signed gestures; this is due, he says, to a uniquely human “socio-cognitive infrastructure” for shared intentionality.
controversial claims that bonobos, parrots, and squid employ elements of syntax and grammar (e.g., Kirby 2000: 191-2; Pepperberg 1999, 2012; Moynihan and Rodaniche 1982) or the “compelling evidence” that dolphins comprehend the act of naming (King et al. 2013). If true, this is not just communication, but language. There is undoubtedly something more advanced or complex or otherwise impressive about understanding and utilizing syntax and names than there is about signaling by means of low frequencies over extreme distances. The issue at stake is not, then, the uniqueness of human communication; it is the challenge posed to the long-standing exceptionalism claim that any form of communication deemed “language” must be uniquely human. Consider Chomsky’s (1966: 78) influential “defense” of the “Cartesian assumption that human language is based on an entirely different principle” than non-human communication; his proposed distinction in kind carries with it the additional normative assumption of more advanced features of human communication. It is an exceptionalism claim.

The history of animal minds has not, by and large, been concerned with how human minds and human societies are unique in the animal kingdom. Rather, in what are often called “defenses of human uniqueness”—but which are actually, under my terminology, defenses of human exceptionalism—X is seen as having special significance or prestige in the animal kingdom because of X’s presumed role in the age-old tradition of defining “the gap” between humans and all other extant species on the planet; X is what makes human abilities and societies special, extraordinary, exceptional in the natural world; X explains why our species alone has invented electricity, explosives, religion, jazz, the internet, and socio-cultural environments like New York City. To describe our pronounced interest in X-like capacities merely as what makes
humans “unique” is to misrepresent the assumptions and motivations underlying one of the oldest research traditions in human history, *i.e.*, in a number of ways, humans are more cognitively advanced and *do* engage in more complex forms of social interaction than other species; philosophers, scientists, and the general public alike want to know how and why this is the case. The dominant view has been, and remains, that there are qualitative differences to be uncovered here. It is exceptionalism claims, rather than uniqueness claims, that have thus influenced the majority of null hypotheses within this tradition, *i.e.*, we begin with the assumption that humans alone have special capacity X, and it is then an empirical question as to whether this exceptionalism claim is warranted.

Like uniqueness claims, exceptionalism claims need not be anthropocentric, but when evoked in the dominant tradition they always are. I am using the word “anthropocentric” in two senses: (1) inquiry instigated by capacities assumed to be unique and exceptional in human beings (in the post-Darwinian world, such capacities are often the proposed result of a “special” or distinctive adaptation granting humans unique abilities) and (2) interest in defending and/or redrawing categorical boundaries between humans and other animals. My use of the term anthropocentric is by no means pejorative; it is as an accurate description of the values that have historically dominated discussions of other minds. Though philosophers and scientists could in principle posit and defend claims that a *non*-human species is uniquely in possession of a superior or “higher” cognitive capacity—absent even in humans—the dominant tradition discusses animal minds in the context of the human mind. As Frans de Waal (2016: 157) describes long-running trends in the literature, “What a bizarre animal we are that the only question

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15 E.g., Tomasello (2008) argues that a “socio-cognitive infrastructure” for shared intentionality is responsible for uniquely human feats of language and cooperation.
we can ask in relation to our place in nature is ‘Mirror, mirror on the wall, who is the smartest of them all?’” Of course, de Waal is exaggerating about these being the only sorts of questions raised, but he is correct that, traditionally, this has been the dominant attitude from which to approach and evaluate the cognitive capacities of other species.

5. Human Exceptionalism as a Degenerating Research Tradition

Although some have referred to human exceptionalism as a “paradigm” (Klausner 1971; Catton and Dunlap 1979; Radner and Radner 1996), this not a productive lens through which to understand and critically evaluate dominant trends in the animal minds literature. By merging Imre Lakatos’s (1970) notion of progressive and degenerative research programs with Larry Laudan’s (1977) broader idea of progressive and regressive research traditions (discussed in Chapter Eight), I defend the thesis that modern research programs such as those fueling the chimpanzee mindreading and joint attention debates belong to a long-running research tradition concerned with inquiry into human cognitive exceptionalism, including historic debates over the presumed uniqueness of human language, reason, metacognition, morality, and “higher” emotions such as shame. This is a tradition laden with obstructive empirical and conceptual (i.e., second order) problems, such as the logical problem, which are absent from the often-progressive problem-solving abilities of the marginalized tradition. Marginalized figures, for instance, tend to consider a diversity of non-anthropocentric ecological contexts where other species may use a theory of mind,16 and make concerted efforts to avoid

16 *E.g.*, “If some of these tests did not demonstrate a theory of mind in captive chimpanzees, we should not be surprised but rather ask ourselves ‘What kind of a theory of mind is adaptive for chimpanzees to acquire?’ and ‘When do they use it?’” (Boesch and Boesch-Achermann 2000: 243).
epistemic double standards between human and animal psychology when investigating this question.¹⁷

Unlike Kuhn (1962), both Lakatos (1970) and Laudan (1977) maintained that (1) there are always multiple paradigm-like entities at a given time, (2) these larger units of historical analysis evolve over time, (3) that the progressive and/or degenerative features of related traditions could only be comparatively evaluated within the context of each other’s successes and failures at problem-solving, thereby weighing in on the state of current research as well as the promise of particular avenues for future research in a given field of inquiry. In making use of both Lakatosian and Laudian terminology, I follow Godfrey-Smith (2003: 106) in recognizing that the conceptual tools crafted by these philosophers admit of “mixtures,” e.g., “of Kuhn-like and Lakatos-like stories,” as they uniquely accommodate particular disciplines as “tools for describing a range of different large-scale processes in science” and philosophy (ibid.). That said, while I make use of terms and ideas from historiographic philosophers of science in this chapter and (especially) the final chapter, my six genealogical chapters are not wedded to their accounts and do not provide a Lakatosian or Laudanian analysis of the history of the animal minds literature.

At least four legitimate concerns arise whenever one sets about the task of using history to evaluate the present: (1) the risks involved in using anachronistic sources as means to critique contemporary positions and debates, (2) the risk of reducing the rationale behind discontinuity arguments to the relativistic “strong program” (Bloor 1976) in the sociology of science, i.e., just because socio-cultural values are

¹⁷ “In designing [mindreading] experiments for non-humans, humans are often anthropocentric in their approach both when framing the question and interpreting the results” (Vonk and Galvin 2013: 31; see also Rivas & Burghardt [2001] and Heyes [2015: 313]).
anthropocentric, and these values influence science, this does not imply that the science of the day is conservatively in line with those values, (3) the risk of committing the genetic fallacy, i.e., that “the origin or historical career of a doctrine has anything whatever to do with its cognitive well-roundedness” (Laudan 1977: 193), and (4) the risk of distorting history (as well as present views) by forcing linearity into ‘the record,’ i.e., on my reading, the as if rhetoric of Aristotle and Tomasello is indicative of semantic anthropocentrism, but this does not imply any particular history of influence.

With respect to the first risk, as Greenwood (2015: 15) writes, “Although it is anachronistic to talk about early science and scientists and early physiology and physiologists, it is justified to the degree that many early thinkers developed theories about the structures and processes that still form part of the subject matter of contemporary sciences…” This is the case in the animal minds literature (Dierauer 1977; Sorabji 1993; Steiner 2005). As for the second criticism regarding the “strong program,” Laudan (1977: 102-3) observes that the zeitgeist of an era does not always (or even often) play the expected conservative role in suppressing theories at odds with traditional science. To argue so would be “bad philosophy and false history” (103). While religious sensibilities undoubtedly influenced early, dogmatic theories of the animal mind, this was not the case for all influential figures in the dominant tradition (Aristotle being a case in point); what’s more, for many figures in this tradition, religious beliefs informing animal ethics can—I argue—be separated from their explanations for the causes of animal behavior (Descartes being a case in point).

Turning to potential criticisms about the genetic fallacy and forcing false linearity into the record, my use of phrases like “traceable to X” should not be mistaken to mean
“because of X.” Laudan (1977: 194) rightly suggests that statements like “logical positivism has run out of steam,” or “the New Criticism is no longer a promising device for literary analysis,” or “psychoanalysis is becoming increasingly ad hoc and doctrinaire,” are part of normal discourse in philosophy and science. Accordingly, these “characterizations already exploit the insight that a tradition’s history is relevant to an appraisal of its current cognitive status” (ibid.). The now-classic question “does the chimpanzee have a theory of mind?” (Premack and Woodruff 1978) is facing a similar problem, with skeptical arguments becoming increasing ad hoc and empirical problems remaining unsolved (or even thought to be unsolvable). I am far from alone in this evaluation of the current state of the literature.18 As Heyes (2015: 317) observes…

…the social structure of research on animal mindreading has changed. In earlier years there were a number of active research groups, each publishing a significant volume of empirical work and voicing their own theoretical perspectives. More recently, […] these researchers now express doubts (Seyfarth & Cheney 2012; Whiten 2013) or outright scepticism (Penn & Povinelli 2007, 2013). […] So, in these respects, research on animal mindreading has declined.

My project should be interpreted as both an attempt to explain this phenomenon, as well as a means to provide avenues for mitigating it.

Mindreading debates are a small part of a much larger story. Theory of mind is only the most recent iteration of a long series of human capacities traditionally subject to skepticism when applied to other species, e.g., culture, language, ethics, reason, consciousness, etc. My overarching claim is that the mindreading research program started out promising but has turned into yet another chapter in a long-running research tradition chiefly concerned with investigating human exceptionalism. This historic claim is no doubt controversial, but as Laudan (1977: 86) writes, “we should not be misled by the fact that a theory, taken abstractly, does not have its ‘parent’ research tradition

stamped all over it.” The aim of my critical genealogy is to uncover and constructively critique this “parent” research tradition to draw attention to, and ameliorate, undue skepticism in the modern literature.

6. Overview of Project: A History of Crisis

With the exception of the present and final chapters, the bulk of this dissertation is structured as a critical genealogy exploring the tangled and retaliatory discourses of the dominant and marginalized traditions. Epistemic, ontological, linguistic, and methodological arguments in defense of exceptionalism claims are shown to develop (for better or worse) through (1) an historic panoply of dissenting voices, in tandem with (2) new empirical discoveries and (3) shifting attitudes toward appropriate levels of philosophical and scientific skepticism. My project concludes by applying the content of the genealogical chapters to critique the current state of debates over mindreading in chimpanzees. I defend two theses: the rhetoric of “real X” or “true X” has no place in comparative psychology, and the logical problem does not need to be solved in order to attribute cognitive capacities such as a theory of mind to non-human animals. I argue that this problem is not unique to discussions of animal minds, and that its tenacity in this literature is indicative of degenerative characteristics of its parent research tradition.

Chapter Two begins the critical genealogy of the dominant tradition. I start by elucidating and expanding upon Sorabji’s (1993) claim that a “crisis” occurred in ancient philosophy, which arose in response to the difficulty of reconciling pre-existing notions of human exceptionalism with empirical evidence and/or reasoned arguments suggestive of species continuity. Animals often behave in ways symptomatic of higher cognition, yet their behavior is rarely explained as such, e.g., active teaching from elder to infant
chimpanzees (Pruetz 2010; Boesch 2012). The “crisis” to which Sorabji refers is the following: if we deny cognitive capacities to animals, we must then find another way to convincingly explain the presence of cognitive-looking behavior without evoking cognition. In the case of Aristotle, for instance, “To compensate for the denial of reason and belief to animals, perceptual content must be expanded” (Sorabji 1993: 17). This was no easy task. Aristotle’s explanations of complex animal behavior in terms of positing as much cognitive continuity with humans as he thought responsible are often in tension with his general claims about human uniqueness.

I retain Sorabji’s use of the word “crisis” throughout this project. Unlike Sorabji, I extend the application of the term beyond antiquity to label a recurring phenomenon in history of the dominant tradition: (1) empirical challenges are posed to exceptionalism claims, to which (2) argumentative patterns emerge showing how cognitive-looking behavior can be explained without evoking cognitive—or otherwise complex or “higher”—faculties. (3) Figures in the marginalized tradition then problematize these strategies, e.g., in order to deny X to animals, X is defined too exclusively to capture all instances of X in humans (infants, the elderly, marginal cases, and “everyday” instances where X operates in the background of conscious experience). Tensions of this sort are indicative of explanatory crises, which are as integral to understanding the history of the dominant tradition as any particular claims of human uniqueness and/or exceptionalism defended therein, e.g., “the problem of conceptualizing animal consciousness in terms that do not require recourse to propositional attitudes” or the “puzzle of […] how animals can engage in acts of discrimination that are sometimes enormously complex, without employing concepts or intentional states” (Steiner 2005: 27-8).
Terms like “problem” or “puzzle” would suffice to identify this historic phenomenon, and “crisis” may sound excessive, but there are two reasons for my decision to retain Sorabji’s language. First, while words like “problem” or “challenge” always demand qualification, “crisis” directly evokes the specific phenomenon that I am referring to without needless re-elaboration each time. Second, there is a useful—though very loose—relationship to be drawn between my use of Sorabji’s term in the history of animal minds and the basic idea behind Thomas Kuhn’s (1962) famous use of the term “crisis” to identify periods of scientific research where empirical anomalies pile up in such a way that long-standing theories, e.g., exceptionalism claims, must be either rejected, defended, or reinforced. In the sense that new, often surprising, discoveries about animal intelligence were common fixtures of the Roman Empire (Gilhus 2006; Toynbee 2013) and the Scientific Revolution (Boas 1966) just as they are today, much of the intellectual history of human exceptionalism can be viewed as a history of crisis, wherein long-standing exceptionalism claims undergo frequent modification as a result of recurrent challenges. Importantly, my use of Kuhnian terminology in tandem with Sorabji’s portrait of a “crisis” in the history of animal cognition should be taken with a grain of salt; my historical project is not wedded to—or influenced by—Kuhn’s approach to the history of ideas.

The critical genealogy that follows is tethered by four interrelated periods of crisis in the philosophy and science of animal minds. (1) The crisis in antiquity was primarily ontological as it arose from challenges associated with explaining complex animal behavior in the absence of categories originally reserved for human minds and souls; epistemic questions were largely sidelined in favor of debates about whether the human-
like appearances of certain animal behaviors warrants the ascription of human mental causes. There are strong parallels between the crisis to which Aristotle, the Stoics, and their intellectual progeny were responding and (2) the primarily *epistemic* crisis in the 16\(^{th}\) and 17\(^{th}\) centuries brought about by the revival of ancient skepticism in tandem with the rise of the *bête machine* hypothesis (which applies to humans and animals alike). Beginning in the Renaissance, *de facto* ontological bases for debate and inquiry about animal minds deteriorate in favor of far-reaching epistemic questions about what can be known (if anything) about animal minds. (3) The birth of modern evolutionary biology brought about another period of crisis, underlying the “controversial milieu” (Murray 1990) from which the scientific discipline of comparative psychology emerged—particularly the reaction of those sympathetic to behaviorism to the attribution of cognition to animals (Amsel 1989). Thorndike, Pavlov, and Watson responded to the anecdotal anthropomorphism of Darwin and Romanes by taking up the “challenge” of Morgan’s Canon “to develop explanations of animal behavior without reference to mentality or consciousness” (Greenwood 2015: 225). This has been the aim of the dominant tradition since its inception. (4) Finally, respect for Thorndike’s (1898) puzzle boxes coupled with widespread criticism of the “anecdotalist school” mark the first *methodological crisis* in the philosophy and science of animal cognition (Boakes 1984: 72). Skepticism following from the Clever Hans debacle helped cement the view that conclusions on animal cognition must only be arrived at from experiments conducted in controlled human environments on captive animals.\(^{19}\) At the same time, figures from the marginalized tradition argue that field studies are as integral to methodologically sound research as laboratories are (Timberlake 2002).

\(^{19}\) Chapter Seven, Section 9
The state of crisis that the discipline is currently struggling with—defined broadly by long-standing epistemic and methodological challenges now referred to as the logical problem—was instigated by the re-emergence of widespread skepticism in response to the founding of cognitive ethology in the 1970s, where cynical responses to the work of Donald Griffin (1976), for instance, bore striking resemblance to the overriding skeptical attitudes that followed from the writings of Darwin and Romanes roughly a century earlier (Burghardt 1985: 906).

With this broad overview in mind, I return to the content of individual chapters. Following my discussion of Aristotle’s attempt to navigate the crisis, Chapter Three shows how his relatively progressive approaches to inquiry (e.g., identifying “traces,” “resemblances,” and “analogies” of human traits in other animals) will not come to define the origins of the dominant tradition. Aristotle had the most progressive ancient strategies for engaging explanatory crises, but not the most influential—a dubious honor that goes to the Stoics and Early Christians. Confronted with human-looking behavior in animals, the Stoics promote a worldview where all non-human behavior is caused by the same cosmic principle, arguing for a singularity of causation in the animal kingdom explained by reflexive interplay of perceptual faculties and the central nervous system. I explore a variety of Stoic strategies to defend uniqueness and exceptionalism claims, such as their reliance on semantic anthropocentrism when defining key terms, their (often legitimate) attacks on arguments from analogy from opponents credulously believing that like-behavior implies like-causes, and their contention that animals possess different kinds of “perception” and “instincts” than those present in humans.

Spanning antiquity to the 17th century, Chapters Four and Five detail the origins
of a second, more naturalistically minded research tradition in the study of animal cognition. Figures in this tradition do not recognize any challenge or “crisis” inherent in the fact that non-human animals behave in ways indicative of cognitively complex human behavior. The worldview promoted by Plutarch, Porphyry, Lucretius, Montaigne, and Charron (among others) marks a return to the most progressive, yet least influential, aspects of Aristotle’s contributions to debates over animal minds. Most significantly, these chapters explain the roots of the epistemic basis for the logical problem, as well as the first debate over theory of mind in the history of philosophy.

Beginning with Chapter Four, the remaining chapters emphasize the curious fact that the figures from these two traditions very often spoke past one another—a point which applies to the contemporary literature as well, e.g., Penn and Povinelli (2013: 62) describe the recent theory of mind debates as “an exercise in shadow-boxing.” Drawing from both Lakatos (1970) and Laudan (1978), I suggest that placing their attitudes and ideas into critical dialogue is imperative for identifying the strengths and weaknesses of both traditions. In this sense, I conceptualize the remaining two-thirds of the critical genealogy as somewhat of a dialectic, wherein each tradition may be understood as keeping the other in check, and from which a more judicious approach to inquiry into animal cognition and human exceptionalism emerges in the process.

**Chapter Six** details clashes between the dominant and marginalized traditions as they enter the Scientific Revolution. Front and center are debates over the *béte machine* doctrine as expressed by Descartes and La Mettrie. Descartes’ empirical arguments that animals are automata, wholly lacking in mental lives (and perhaps consciousness), are explored in context of the rise of comparative anatomy in the 16th century. I offer a more
nuanced portrait of Descartes than is typical in the animal studies literature. On one hand, there is conceptual continuity between Descartes’ argumentative strategies for defending human exceptionalism and those of the Stoics and Christians. On the other hand, there is a lesser-known side of Descartes indicative of what may be the first scientifically informed argument from epistemic parsimony in the history of animal minds. In contrast, despite being the most progressive member of the marginalized tradition to date, La Mettrie fails to effectively address what will become the major problem in 19th, 20th, and 21st centuries: the problem of inferring psychological analogies from behavioral and/or material analogies. While uniqueness and exceptionalism claims are promoted during this time, they are defended by the likes of Hobbes and Locke in the vein of the Aristotelian strategy of first identifying as much mental continuity between humans and other animals as is empirically responsible, rather than the Stoic strategy—adopted, I argue, by Descartes—of providing an “all or nothing” view of mental faculties.

In Chapter Seven, I maintain that the approaches to comparative cognition at the beginning of the 20th century from figures such as Wesley Mills (1898, 1905), Robert Yerkes (1905), and Margaret Washburn (1908) facilitated more productive questions about the similarities and differences between humans and other species, and offered better grounds for a responsible skepticism about animal minds than was the norm during their time.20 Indeed, at the turn of the century, Washburn (1917: 16-7) was concerned with what she described as the “opposite tendency” to the optimistic, open-minded—though, due to anecdotal anthropomorphism, admittedly flawed—approaches of Darwin

20 Animal minds skepticism in the early to mid 20th century generally took three forms: (1) Global skepticism about the total inaccessibility of the contents of animal minds (Boakes 1984; Dewsbury 1984), (2) skepticism pertaining to interpretations of animal behavior made in non-technical language (Crist 1999), and (3) skepticism pertaining to the conclusions of research conducted in environments outside of complete experimental control (Timberlake 2002).
and Romanes to animal cognition, namely, the reactionary “tendency to make purely biological concepts suffice as far as possible for the explanation of animal behavior and to assume the presence even of consciousness in animals only when it is absolutely necessary to do so.” The parallels to the initial “crisis” described by Sorabji are, I suggest, quite clear. The multitude of discontinuity hypotheses presented throughout the late 19th and 20th centuries were defended in the face of rapidly increasing evidence for “higher” or more complex forms of animal cognition.

Washburn, for instance, was troubled by a rise in opposition to non-behavioristic forms of animal psychology at a time when knowledge of other species had “wonderfully advanced within the last twenty-five years” (24). This evidence came from the work of naturalists such as Jean-Henri Fabre (1823—1915) and George and Elizabeth Peckham (1845—1914; 1854—1940), early comparative psychologists such as Washburn herself, Karl Lashley, and Robert Yerkes (e.g., 1905, 1929, 1940), and later comparative psychologists such as Henry Nissen (1933)\textsuperscript{21} and C. R. Carpenter (1942).\textsuperscript{22} As Dewsbury (1984: 24) notes, “Examination of the leading textbooks of comparative psychology written during this period […] reveals a considerable breadth of approach with respect to the range of species and behavioral patterns studied.”\textsuperscript{23} Despite the fact that comparative psychology “was already a successful discipline at the time,” opposition to studying the mental lives of animals remained widespread (Crist 1999: 89). Even a cursory view of this divided history shows that this steady influx of field and laboratory studies suggestive that other species are “thinking and feeling” were no match for the dominant

\begin{footnotesize}
\begin{enumerate}
\item Nissen was amongst the first to study great apes in the field, as well as to run experiments on their problem-solving abilities (Dewsbury 1984: 24).
\item Carpenter studied a wide variety of monkey and ape species around the world (Dewsbury 1984: 24).
\item E.g., Warden, Jenkins, and Warner 1934; Maier and Schneirla 1935
\end{enumerate}
\end{footnotesize}
view that they are merely “existing and reacting” (Griffin 2001: 234).

The overarching aim of Chapter Seven is to consolidate the most attractive features of this critical genealogy into a responsible, multi-faceted attitude toward the study of animal cognition. I discuss, for instance, how Washburn (1917) and Yerkes (1905) professed views indicative of de Waal’s (2016: 158) recent call for “a moratorium on human uniqueness claims” in favor of a “unitary theory that covers all the various cognitions found in nature” (see also Bekoff and Pierce [2009]). Marginalized figures have long emphasized the necessity of drawing from a variety of evidential sources and multiple forms of criteria (including field data and, occasionally, anecdotal evidence), rather than focusing on crucial experiments and single populations as representative of an entire species (a common criticism of the Tomasello and Povinelli groups24). This attitude is suggestive of what Washburn (1917) called the “ideal method” and what Andrews (2015) recently called the “calibration method.”

With this critical genealogy in place, **Chapter Eight** streamlines the foregoing historical content by providing a philosophical framework for conceptualizing human exceptionalism as a degenerating research tradition (Laudan 1977). After defining key terms (*e.g.*, degenerative, progressive), I argue that problems such as those discussed above, *e.g.*, the logical problem, semantic anthropocentrism, and *as if* rhetoric, are not endemic to exceptionalism claims themselves—which *are* worthy of investigation—but rather to long-standing background assumptions, research constraints, and conservative epistemic values that have engendered undue skepticism by informing the means by which researchers have posited and defended claims of this nature.

The final chapter reveals how sedimentations of the dominant tradition are

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currently shaping the structure, skepticism, and prevailing discontinuity hypotheses embodied in debates over mindreading in chimpanzees. In defending the thesis that the rhetoric of “real X” or “true X” it has no place in comparative psychology, I show how this rhetoric has been used to draw important, unbiased, distinctions in human psychology, e.g., there is a reasonable discussion to be had between what constitutes altruism vs. altruistic-looking behaviors. In comparative psychology, however, something markedly different is going on. In this context, when adjectives such as true, real, genuine, etc. are attached to cognitive capacities, it is evident that the intent of the prefix is to be synonymous with the expression of a given behavior as humans perform it. This chapter thus critiques the implicit normativity that has entered the picture when similar rhetoric is used—particularly in the writings of the Tomasello camp—in arguments which draw distinctions in kind between the human-looking behavior of other species and the like-behavior of our own.

Chapter Eight concludes by building upon naturalistic attitudes drawn from figures from the genealogy to stake a claim on the necessity of “solving” the logical problem. As in any field of study, we need not be concerned that “complementary” hypotheses exist to explain a given phenomenon; we should expect it. What we should be concerned with is “which hypothesis best accounts for the overall body of data” (Andrews 2015: 150) such that we might provide reasonable arguments to the best explanation. Rather than focus solely on crucial experiments as the basis for optimism about the future of the mindreading research program (e.g., Lurz et al. 2014), researchers should pull congruous evidence from a wide variety of sources and develop what Whewell (1840) called a “consilience of inductions.”
As Edward Tolman (1938: 41) concluded a famous address to the American Psychological Association, “It is time that animal workers of all persuasions join with developmental, physiological, and cognitive human psychologists to address the entire issue of mentalism in psychology. If the problem is worth all the words spilled, it is worth a concentrated effort to address it correctly.” In a similar vein, my project concludes with the suggestion that there is room for optimism here. The 20th and 21st century literature on animal behavior is comprised of many disciplines and research programs—including field research often-maligned by the dominant tradition—that, in their own ways, weigh in on debates such as those pertaining to mindreading in great apes. Crucially, what side they weigh in on is entirely beside the point, which is that (1) there are worthwhile questions about what makes the human mind exceptional in the animal kingdom, (2) the research tradition dedicated to addressing these questions has proven to be degenerative, and (3) the philosophical tools to revitalize this tradition—though marginalized—are already present in the animal minds literature.
Continuity as Crisis: 
Two Traditions of Theorizing about Animal Minds

Chapter Two
Ancient Origins of the Dominant Tradition

1. Overview

There is disagreement amongst historians of psychology as to whether the origins of their discipline should be traced to the ancients, and few books on the subject tread back that far (Greenwood 2015: 15). The same is largely true of those—far fewer in number—who have written histories of what is now known as comparative psychology, animal psychology, or simply the science and philosophy of animal minds. In the preface to his sourcebook, Animals in Greek and Roman Thought, Stephen Newmyer (2011: xi) notes, correctly, that while there exist a number of anthologies highlighting “historical antecedents of modern debates on animal issues,” the term “classic”—as used in these texts—most often refers to writings from the 19th and 20th centuries, “perhaps with an occasional excerpt from Descartes.” Newmyer continues:

Greek and Roman “classics” are either omitted entirely or drastically underrepresented, despite the fact that virtually every subject encompassed in post-classical thought on human-animal relations was treated already in Greco-Roman authors, and that the Aristotelian and Stoic formulations of these arguments were instrumental in shaping much of subsequent thought. (ibid.)

Though not anthologies, the two most notable exceptions to this gap in the historical literature are Richard Sorabji’s highly regarded Animal Minds and Human Morals: The Origins of the Western Debate (1993) and Urs Dierauer’s Tier und Mensch im Denken der Antike: Studien zur Tierpsychologie, Anthropologie und Ethik (1977). Gary Steiner (2005) has also contributed a valuable book dedicated to tracing the development of philosophical ideas about animals from antiquity to the present. Despite featuring impressive scholarship on ancient debates about animal minds—which I appreciatively
make use of below—what Steiner’s and Dierauer’s texts have in common is an emphasis on historic sedimentations of contemporary debates in the animal ethics literature. Very often it is impossible to bracket or otherwise ignore the fact that exceptionalism claims about human cognition frequently arise as means to support arguments for human exceptionalism in moral status. What I am interested in below are the philosophical and argumentative strategies used by the ancients for denying human cognitive capacities to other species, rather than the (usually moral) impetus for their doing so.

This chapter provides a critical and conceptual history of philosophical arguments in defense of uniqueness and exceptionalism claims from the 8th century BCE to the mid 15th century CE. To varying degrees, both Aristotle and the Stoics deny animals reason, memory, speech, conceptual knowledge, as well as mental states such as beliefs, intention, attention, and anger, while at the same time acknowledging that many animals appear to possess “traces” of these capacities. As defenders of uniqueness claims, this recognition forces figures in the dominant tradition to confront the challenge—what Sorabji (1993) has influentially called a “crisis”—of explaining complex animal behavior without attributing them the requisite features of human cognition. While ancient philosophers often make the same uniqueness and exceptionalism claims, the ways that they defend these claims by way of navigating this crisis differ considerably in both form and quality. For example…

For memory, preparation, and emotion, the Stoics mounted a whole programme to show how these are replaced in animals by counterfeit versions which do not require belief. They saw this as essential to their case, because all these capacities had been cited as proofs of animal reason. Aristotle’s strategy was different. He did not seek to downgrade animal capacities, but rather to argue that even human memory is not a function of reason. […] Whereas Aristotle divorces even human voluntary action from reason, the Stoics downgrade animal behavior, to make it all non-voluntary. (Sorabji 1993: 50)
While Aristotle’s strategy of “downgrading” human abilities to account for animal behavior—thus restricting the total number of uniqueness claims that he ultimately makes—was explanatorily superior to the strategy adopted by the Stoics, the intricacies of Aristotle’s account lead to interpretive issues where it is difficult to tell exactly where his continuity arguments end and his uniqueness claims begin. In what follows, I build upon Sorabji’s idea of a “crisis” arising in ancient philosophy of animal minds—a notion developed in later chapters as a central feature of the dominant tradition to this day.

2. Origins of the Dominant Tradition in Pre-Socratic Thought

Western conversations about human/animal relations can be traced to the 8th century BCE with the epic poetry of Homer and Hesiod. The first exceptionalism claim in Western literature occurs in Hesiod’s *Works and Days* (700 BCE), when Zeus grants justice to humans alone among the animals. Hesiod states—like Aristotle, the Stoics, and Kant after him—that justice is not only uniquely human, but the most exceptional quality that any animal can possess: “Here is the law as Zeus established it for human beings; / as for fish, and wild animals, and the flying birds, / they feed on each other, since there is no idea of justice among them; / but he gave justice to humans, which is proved the best thing of all by far” (*Works and Days* 276-79). This passage arises in the context of Zeus convincing his deceitful brother that he should listen to his innate capacity for justice, lest he act like an animal, *i.e.*, beneath himself. Newmyer (2011: 82) claims that this line of verse constitutes “the earliest extant Greek attempt to differentiate

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human beings from other animals on philosophical grounds, and may be considered to be the first Greek example of the ‘man alone of animals’ commonplace.”

While it is widely recognized that the earliest musings on the philosophy of mind likely occurred in the 5th century BCE, it is less known that these fragments coincided with—and occasionally corresponded to—the first musings on the philosophy of animal minds. In addition to introducing the concept of mind (nous) into philosophy, Anaxagoras (c. 510—428 BCE) makes perhaps the first claims of human cognitive uniqueness and exceptionalism, i.e., we “master animals through our unique experience, memory, expertise (sophia) and technical knowledge (tekhnē).” By far the most historically significant uniqueness claim from this era is attributed to Alcmaeon of Croton (c. 5th century BCE): “For [Alcmaeon] says that man differs from other creatures in that he alone has understanding (xuniēsi), while the other creatures have perception (aisthanetai), but do not have understanding.” This distinction between understanding and perception has arisen in various iterations that, combined, make it the most influential philosophical device for drawing categorical boundaries between humans and animals, including among contemporary philosophers and animal researchers.

Although this second-hand fragment is all that survives of Alcmaeon’s views on human uniqueness, Alcmaeon likely “inaugurated the belief” that human beings are the only rational creatures on earth (Newmyer 2011: 3), meaning the only species capable of self-awareness, deliberation, and reflection—among other cognitive abilities

28 For more on Hesiod’s influence, see Dierauer (1977: 15-18) and Steiner (2005: 43).
29 Burckhardt 2002: 290; Searle 2005: 66
30 Dickerman 1911; Dierauer 1977; Sorabji 1993; Newmyer 2011.
31 Burckhardt 2002: 290
32 Fragment 21B; qtd. Plutarch de Fort. 98F.
33 Theophrastus, On the Senses, “Alcmaeon,” DK 1a
unexplainable by the five senses alone, *i.e.*, perception. Humans are capable of understanding facets of their actions, beliefs, and environments, whereas the behaviors of other species are performed entirely on the basis of their perceptual faculties without any thoughts, beliefs, or awareness of what they are doing.

It is unclear how Alcmaeon would have defined understanding and perception, which is precisely the sort of interpretive obstacle that would form the backbone of the dominant tradition, particularly the explanatory crisis Sorabji attributes to the writings of Aristotle. The basic problem that arises from denying rationality to animals is evident in Alcmaeon’s fragment, though there is no evidence that he recognized it. When the perceptual faculties—however defined—are forced to account for the full gamut of animal behaviors, including those that seemingly demand cognitive explanations, one is stuck with two options: (1) Expand the meaning of term “perception” to allow the perceptual faculties—in animals and humans—to encompass terms such as *belief*, *memory*, *concepts*, and *intention*, thereby creating more overlap between human and animal mentality by downplaying the cognitive nature of everyday functions of the human mind, while still allowing for categorical distinctions at higher levels, *e.g.*, both humans and animals have memory, but only humans possess willful *recollec*tion (this was Aristotle’s strategy); or, (2) bite the bullet and argue—as the Stoics did—that the terms we commonly use to discuss the functioning of human mind have no clear analog in the animal mind; animals may *appear* to possess memories, intentions, and beliefs, but these terms are defined such as to belong strictly within the province of the rational mind, while all animal behavior is explainable by recourse to impulse and appearance.
It is unclear whether Alcmaeon considered the explanatory repercussions of restricting all animal behavior to the perceptual faculties. There is, however, some reason to believe that the categorical distinction Alcmaeon drew between humans and animals had more in common with Aristotle than it did the Stoics. According to a description of Alcmaeon’s philosophy of mind found in Plato’s *Phaedo* (96b), he is said to argue that, “understanding (epistêmê) comes from a stabilization of memory and belief (doxa), while memory and belief come from the hearing, sight and smell provided by the brain” (Sorabji 1993: 9 [emphasis added]). As a scientist, Alcmaeon “established that the brain is the center of perception and cognition” by “tracing the optic nerves from the retina to the brain”—a theory later reinforced by Hippocrates (Greenwood 2015: 27-8 [emphasis added]). Although Alcmaeon maintained that all the faculties of the mind can be divided into two types, and that this distinction reflects the main difference between humans and animals, he nonetheless went against the grain in ancient philosophy by situating the perceptual faculties alongside the rational faculties in the brain, rather than the heart, as was the dominant view (*ibid.*). With this connection in mind, one way to interpret Plato’s description that “memory and belief come from the hearing, sight and smell provided by the brain” is that Alcmaeon—like Plato after him—did attribute memory and belief to animals, and that he did so by situating them within the province of perception. This reading still allows for the denial of cognitive capacities to animals, as it is only with the “stabilization of” (perhaps: *self-awareness of* or *reflection upon*) these perceptual states by the rational faculties unique to humans that they alone have unique kinds of memory (*e.g.*, recollection) and belief (*e.g.*, conceptual knowledge).
While Alcmaeon plays a relatively minor role in Sorabji’s (1993) discussion of the ancients, both Steiner (2005: 54) and Dierauer (1977: 41) tell grander stories of influence. Dierauer goes so far as to suggest that Alcmaeon’s original distinction between perception and understanding as it applies to humans and animals signaled “the emergence of a new scale of values that assigns to the intellectual moment an unequivocal priority over pure physical force” (43). This distinction, he argues, paved the way for the unique rational capacities of humans to be used by later thinkers as tools to justify human superiority over all other creatures. Dierauer (1997: 5-6) also suggests that Alcmaeon’s influence on Aristotle was considerable, going so far as to venture that the very notion of a Great Chain of Being was born in Alcmaeon’s thought that humans alone transcended the level of sense experience to that of understanding.

What all of these theorists have in common is that the origins of comparative cognition can be traced to the dissatisfaction of ancient philosophers with the idea that animals navigate their environments entirely by instinct; “in antiquity, as today, notions such as instinct appear to have struck many in the philosophical community as question begging” (Steiner 2005: 54)—a point addressed later in this chapter. The ancients wanted “more precise answers” for how perception is related to the intellectual faculties, such as whether the former can function as an interpretive faculty in addition to fulfilling its common-sense role collecting data from the five senses (8-9).

3. Plato, Xenophon, and the Man Alone of Animals Commonplace

While the pre-Socratics were more prone to making uniqueness claims than exceptionalism claims, beginning with Socrates’ follower Xenophon (c. 430—354 BCE) and culminating in the membership of the Stoic school founded by Zeno of Citium (c.
which extended well into the Roman Empire, it quickly became rare for uniqueness claims not to be accompanied by claims of human exceptionalism. It is in Xenophon’s *Memorabilia (Recollections of Socrates)*, written during the late 5\(^{th}\) or early 4\(^{th}\) century BCE, that Newmyer (2011: 12, 54) first identifies what he calls the “*man alone of animals* commonplace” that is “repeated in almost endless forms in classical discussions of animals” in ancient Greek, Roman, and Christian thought, and that would remain popular throughout history.

Speaking as Socrates, Xenophon provides a lengthy list of ways in which humans are superior to animals, with no concessions to animal abilities: humans alone stand upright, are sexually active all year round, have excellent hands, uniquely possess the capacities for meaningful speech, happiness, rational thought, exceptional memory, “fighting off illness,” “promoting good health,” “working toward knowledge,” and—most important to Xenophon—possess a superior soul, the presence of which reflects an intimate relationship to the gods, whom humans alone know to worship (*Memorabilia* 1.4. 11-14). This scattershot approach to downplaying the characteristics of the animal mind—essentially arguing that humans are superior in every desirable way—“would in time become standard arguments in the arsenal” of the Stoics (Newmyer 2011: 53). Seneca (c. 4 BCE—65 CE), for instance, notes in one paragraph that animals lack reason, love, hate, friendship, enmity, discord, harmony, wisdom, foresight, diligence, and reflection, all of which “have been granted to no creature but man” (*On Anger* 1.3.4-7). As discussed below, other popular exceptionalism claims to be added to this list by the ancients include humans alone possessing the capacity to feel emotions, form beliefs, use
tools, count, grasp concepts, establish moral codes, and organize into cultured societies—all of which remain relevant in the 21st century.

Unlike Alcmaeon and Xenophon, the precise contributions of Plato (c. 428—347 BCE) to ancient discussions of animal minds are more difficult to pin down. While uniqueness and exceptionalism claims appear occasionally throughout his body of work, nowhere do they arise in the form of the *man alone among the animals* commonplace. Plato claims, for instance, that among animals, “man […] is superior to the rest in understanding, and alone has justice and religion” (*Menexenus* 237d), that only humans possess reason (*Cratylus* 399c; *Laches* 197a-b), while other animals perform like-actions—such as caring for infants—wholly by instinct (*Symposium* 207b-c). Elsewhere, however, Plato offers a very different picture. He has Socrates claim that the souls of all living organisms possess intelligence (*Laws* 961d), that both children and animals can develop rational calculation later in life (*Republic* 441a-b), that “thought, intelligence, memory, and things akin to these, right opinion and true reasoning” are present in “all animate beings” (*Philebus* 11b-c), and that bees, wasps, and ants may rightly be called “political beings” (*Phaedo* 82b). Plato also argues that animals (and slaves) are capable of forming rudimentary beliefs in the non-rational parts of their souls, but this point is followed by the uniqueness claim that maturation in human infants involves replacing irrational beliefs with rational beliefs (*Republic* 430b, 573d). 34 Because Plato’s philosophy of mind does not isolate beliefs to the rational part of the soul, he is able to grant beliefs to animals. That said, animals “are incapable of stepping back from these beliefs and scrutinizing them with an eye toward assessing their suitability to the higher

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34 Sorabji 1993: 10-11.
concerns of the soul. Animals are imprisoned in a life of sheer physicality, and their beliefs are restricted to considerations of material welfare” (Steiner 2005: 57).

It was likely Plato who inspired Aristotle to dedicate intellectual energy to the distinction between understanding and perception in animals. Sorabji (1993: 9) restricts the import of Plato in ancient discussions of animal minds to his role as stepping stone to the crisis he sees breaking out with Aristotle: “Plato’s most important contribution lay in his dramatic narrowing of the content of perception, and his corresponding expansion of the content of belief.” According to Plato’s philosophy of mind, raw sense data is practically useless for getting around the world without the aid of basic beliefs gained through repeated experiences, which is another reason why Plato feels the need to attribute beliefs (doxa) to all animals, though not plants (Timaeus 77a-c). In what has become a familiar picture in the history of philosophy, the abilities to do stuff with raw sense data is attributed to different capacities altogether: reasoning (sullogismos) and belief (doxazein). Aristotle would react strongly against Plato here. Whereas Plato “narrowed” the role of the perceptual faculties to such a degree that animals had to be granted certain cognitive capacities to explain their behavior (inevitably “expanding” the content and scope of what qualifies as a “belief”), Aristotle grants propositional content to perceptual faculties (like phantasia) so they could play the same functional role of beliefs. This way Aristotle can deny beliefs to animals by keeping them in the rational part of the soul, thereby reinforcing Alcmaeon’s original claim that the distinction between humans and animals rests with the distinction between reason and perception.

There are two main reasons why the crisis that emerges in Aristotle, i.e., that of explaining complex behavior without recourse to rational capacities, does not emerge in

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Plato. First, Plato was not a significant contributor to the philosophy of mind, and as such, he very rarely concerns himself with the cognitive boundary between humans and animals. Although he often writes about battling the “animality” in the soul, occasionally equating irrational humans with animals, he rarely draws sharp lines between the two. Animals arise in Plato’s text as instruments to show why the cultivation of reason is necessary and attractive. Second, Plato’s comparatively liberal views on animal minds stem from his commitments to reincarnation, i.e., the transfer of the rational soul from humans to animals and—in a rare move for the ancients—from animals to humans (Phaedrus 249b). Since Plato believed that some animals literally contain the souls of humans, “the psychic space between them was reduced” (Gilhus 2006: 38); “animals cannot be viewed as essentially inferior to human beings; at best the difference is one of degree” (Steiner 2005: 55). This is one reason why the diet in Plato’s kallipolis from the Republic (372a-c) is vegetarian.

The crisis recognized in Aristotle, then, owes a great deal more to the content of Alcmaeon’s single fragment that denies reason and belief to animals, than it does to Plato’s various comments on the subject. One way to read this history is to view Aristotle as taking up a challenge suggested in different ways by both Alcmaeon and Plato. I conceive of Aristotle as thinking that Alcmaeon was largely right about the basic difference between human and animal minds, but that Alcmaeon did not recognize that this broad distinction left animals with very few resources to execute the complex behaviors Aristotle observed them performing. On the other hand, while Plato could account for complex animal behaviors since he attributes them beliefs, it is almost certain that Aristotle saw his teacher as being far too tender-minded here. Alcmaeon’s distinction

created a serious problem that none of Plato’s discussions of animals dealt with: how can perceptual content alone account for complex behavior in animals? Instead of taking Plato’s cue by narrowing of the role of perception in navigating the world and allowing animals some cognitive capacities, Aristotle took it upon himself to defend Alcmaeon’s distinction, “compensating” animals by allowing them “a rich enough perceptual content to deal with the world” (Steiner 2005: 55).

4.1 Introducing Aristotle

Despite his ideas rarely being featured in contemporary readers on the philosophy and science of animal minds, Aristotle (c. 384—322 BCE) is inarguably amongst the most influential philosophers to write on the subject. In the spirit of Whitehead’s (1979: 39) oft-cited assertion that much of Western philosophy can be read as footnotes to Plato, sedimentations of conceptual distinctions and lines of argumentation introduced by Aristotle in support of now-classic uniqueness and exceptionalism claims remain present not only throughout the Western philosophical tradition, but the philosophy and science of animal cognition in the 20th and 21st centuries.\(^{37}\)

Aristotle was the most knowledgeable of ancient philosophers on topics of animal biology, anatomy, and behavior—a distinction that he continued to hold for over a millennium in contrast to canonized philosophers who touched upon topics in animal minds. The philosophical tradition predating and including Plato held a particular interest in astronomy over the life sciences; Aristotle broke from this tradition with his naturalistic attitude that one can learn more about human nature by keeping one’s intellect bound to the earth, rather than the stars (Newmyer 2011a: 7). Aristotle’s works

on animals featured a “wealth of careful observations of flora and fauna,” which, in many cases, led to early psychological and biological theories with a “strong empirical bent” that remains impressive to this day (Greenwood 2015: 30). Greenwood likewise notes that Aristotle was the first philosopher to dedicate an entire work to psychology (*De Anima*), and “was also the first theorist to reflect critically on the nature of psychological explanation, and the subtlety and sophistication of his account has scarcely been rivaled since” (29-30). I will argue in this multi-part section that a comparable claim can be made for many of Aristotle’s musings on animal psychology.

Aristotle composed four works on animals: *History of Animals* (nine books), *Parts of Animals* (four books), *On the Generation of Animals* (five books), and *Movements of Animals* (one book). Most of Aristotle’s sources of these books stem from his privileged position as friend and mentor of Alexander the Great (c. 356—323 BCE), who consistently had animal specimens sent back to Greece from his military conquests and expeditions. Aristotle seemed to have been aware of the fact that his research on animals was both important and novel, as he noted that other philosophers—and humans generally—should not downplay the import of studying smaller or otherwise “ignoble” creatures, for great intellectual rewards follow from their close study. In a statement reminiscent of the basic tenor of Darwin’s scientific attitude, Aristotle defends his objects of study as follows: “we ought not to hesitate nor to be abashed, but boldly to enter upon our researches concerning animals of every sort and kind, knowing that in not one of them is nature or beauty lacking. […] If, however, there is anyone who holds that the study of animals is an unworthy pursuit, he ought to go further and hold the same opinion

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38 See Preus (1975) for discussion of Aristotle as an observational biologist.
39 *Parts of Animals* 1.5, 644b22-645a23
about the study of himself.” Very few ancient philosophers (from either tradition) held this bold and contemporary attitude. Aristotle was fascinated by the classification of animals, the intellectual capacities of animals, and—most crucial here—the modern question as to how humans are to be understood as animals while at the same time possessing unique and exceptional capacities that distinguish us from other members of the animal kingdom.

4.2 Biological Context for Aristotelian Psychology: Advantages and Disadvantages

The majority of Aristotle’s uniqueness and exceptionalism claims—and claims about animal minds more generally—stem from his more foundational biological theories. In modern science it is often a virtue to ground explanation in biology. Here, I suggest that Aristotle’s progressive approach to addressing crises of human exceptionalism was both aided by, and hampered by, various tenets of Aristotelian biology. First, Aristotle’s mammoth History of Animals popularized what would later be known as the Great Chain of Being (Lovejoy 1936)—a worldview that would inform the ideas of innumerable thinkers, Christian and otherwise, until the late 19th and early 20th centuries. Relatedly, Aristotle’s scientific worldview is also outmoded in being comprehensively teleological, i.e., all development in nature is explained in terms of realizing a pre-determined end state.

Aristotle believed that all things are composed of matter, which develops purposively into different pre-configurations across the natural world. These configurations are predetermined by a universal teleological principle (entelechy), which

40 Ibid. 645a23-28
essentially defines “development” as the actualization of potential over time. Perhaps the most central uniqueness claim in Aristotle’s work is that, unlike all other animals, humans alone have considerable freedom to actualize their potential in a myriad of different ways; humans possess this freedom by virtue of—and in line with—their uniquely rational faculties, which allow for self-determination and self-improvement. Humans alone possess abilities to master skills of their choosing as well as to learn virtues and exercise moderation, which leads to the supreme good: happiness (eudaimonia). On the heels of Alcmaeon’s assertion that humans were uniquely rational animals, Aristotle made uniqueness and exceptionalism claims of understanding, belief, deliberation, recollection, tool use, happiness, and many others—all of which are made possible by the de facto potential of the human soul or psyche.

As the only pre-Aristotelian philosopher “to recognize higher and lower soul parts” with the rational parts situated at the top (Solmsen 1955: 160), it was Plato who first sketched hierarchies of ensouled organisms. The Aristotelian Great Chain of Being is directly attributable to Plato’s project. However, it “fell to Aristotle to ‘naturalize’ the scale of beings” (162, 164). Against Plato, Aristotle rejected metamorphosis as well as the notion of an immortal soul, independent of material instantiation; Aristotle was an anti-dualist through and through. He understood the soul as “substance in the sense of the form of a natural body having life potentiality within it.” Combined, the parts of soul function as an embodied, animating force whose capacities for outward expression are determined by the physical limitations of the body through which it manifests itself.

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41 Metaphysics 9.1, 1046a11–13
42 Timeus 77b; see also 90e—92c; Republic II, 375a—d; IV, 441b; Lovejoy 1937: Ch. 2; 45-66.
44 Ibid. 2.1, 412a20-22 [emphasis added]
The reason why various species (including humans) differ from one another in their perceptual and rational abilities boils down to facts about the complexity of their physical or material constitution.

Though the word “mind” (nous) does not refer to anything metaphysical, it nonetheless holds an awkward place in Aristotle’s animal psychology as an activity of the rational soul, which is argued to be uniquely human. Animals do not lack minds so much as they lack the ability to perform minded or mindful actions. For Aristotle, “knowledge is an action of the body understood as a compound of form and matter: we say that knowledge and understanding comes into existence as an act of the body’s form. Mind is therefore what body does in an epistemic situation” (Mesaros 2014). The technical question as to whether or not Aristotle attributes “mind” to animals probably sounds more important than it actually is. First, the term did not have the same connotations for the ancients as it does today; second, Aristotle himself says nothing explicit about the presence or function of nous in animals, and, most importantly, third, Aristotle did say a lot about the sense in which animals possess specific parts of the human psychological framework, i.e., intentionality, memory, attention, and imagination. All of these faculties are associated with parts of the soul shared with animals, and are contrasted with those capacities denied to animals, i.e., belief (doxa), intellect (nous), and speech and reason (logos).

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45 Aristotle does not mention consciousness in any of his texts (Greenwood 2015: 39), and the ancients likely did not possess a term equivalent to modern notions of consciousness (Hamlyn 1968). There is a wordy passage from Nicomachean Ethics (1170a29-b5) describing processes of self-awareness.

46 On the Soul 3.3, 428a19-24

47 Ibid. 1.2, 404b4-6.

48 On the Soul 3.3, 428a24; Eudaimon Ethics 2.8, 1224a27; Politics 7.13, 1332b5; Nicomachean Ethics 1.7, 1098a3-4; Parts of Animals 3.10, 433a12. I owe these footnotes to the meticulous research of Richard Sorabji (1993: 14).
Aristotle distinguishes three types of souls or psyches,\(^{49}\) which account for different types of behaviors in human and non-human species. The *nutritive* psyche, which is possessed by plants and animals alike, allows for metabolic, self-sustaining functions of the body. Unlike plants, human and non-human animals also possess a *sensitive* psyche, which allows for sentience, memory, desire, locomotion, and imagination. Finally, only humans are said to possess the cognitive, *rational* psyche, which—in addition to all the capacities granted by the lower parts of the soul—also allows for belief, deliberation, understanding, speech, recollection, and so forth. Occasionally, concepts in Aristotelian psychology are scaffolded in terms of this hierarchy, *i.e.*, imagination (*phantasia*) is a necessary condition for memory, but while *phantasia* is very widespread in the animal kingdom,\(^{50}\) memory itself comes in degrees of potency depending on the species in question,\(^{51}\) and is a necessary condition for recollection (mental time travel), which is uniquely human.\(^{52}\)

It is clear, then, that Aristotle’s theories of animal psychology are largely predetermined by his overarching biological claim that humans are the only species to possess the rational soul, which comes pre-packaged with a set of capacities that are *de facto* off limits to all other species, regardless of whether their behavior appears strongly indicative of those capacities. Contrary to Aristotle’s admirable stress on the role of observation and open-mindedness in natural science, the basis of his views—which are in this context closer to the Stoics—arguably begs the question, *i.e.*, mental faculties are determined *a priori* by Aristotle’s big-picture carving of the joints in nature.

\(^{49}\) *On the Soul* 2.3, 414a31-415a12.  
\(^{50}\) Ibid. 3.3  
\(^{51}\) *Anterior Post.* 2.19, 99b32-100b3  
\(^{52}\) *History of Animals* 488a20-26
Aristotle’s commitment to drawing categorical distinctions between humans and animals stems from the place where his psychology overlaps with his biology: his hierarchical theory of the soul or psyche. Aristotle’s writings on animals are replete with “his eagerness to classify states of mind on one side or the other of the perception/reason frontier” (Sorabji 1993: 51). While Aristotle inherited this distinction from Alcmaeon and Plato, its ubiquity within his discussions of animal psychology is attributable—at least in part—to his a priori biological and psychological commitments about human uniqueness in the animal kingdom. In Aristotelian biology, “different species had always been separate from each other: there was no point in prehistory when their lines of development converged” (Gilhus 2006: 39). Such is the case, of course, for human beings in relation to other species. Similar to Plato’s worldview, the Aristotelian hierarchy of souls is the foundation for Aristotle’s hierarchy of living beings, with rational animals situated above non-rational animals and plants by virtue of their potential to achieve happiness and lead a life of the mind.53

In spite of the fact that Aristotelian biology is antithetical to practically every tenet of evolutionary theory (Greenwood 2015: 33), Aristotle’s account of biological gradualism can sometimes come across as admirably contemporary. Aristotle relished in the identification of continuities throughout nature, and he promoted scientific open-mindedness by acknowledging (a) the existence of spaces where presently unseen continuities may yet be found, and (b) that the size of gaps between different organisms can appear differently depending on the point of comparison:

Hence nature passes from inanimate beings to animals little by little, so that, as a result of the continuity (sunecheia), that which constitutes the border between them and the middle of them escapes our notice. After inanimate beings come first the classes of

53 Nicomachean Ethics 10. 8. 1178b22-8
plants. Among these, one differs from another in seeming to have more of a share of life, and the entire class, compared with other bodies, seems almost animate, but compared with animals, it appears inanimate. For the change from them to the animate is, as was stated before, continuous.\textsuperscript{54}

For Aristotle, as for contemporary thinkers, there are complex creatures and there are relatively simple creatures; the physical differences in complexity between different species are often so slight as to be imperceptible, and Aristotle is arguably instructing us to keep an open mind because infinitesimal borders between species can often “escape our notice.” Although this progressive approach to inquiry is in tension with Aristotle’s \textit{a priori} denial of a rational soul to animals, it explains why Aristotle had little interest in positing exceptionalism claims about what other species \textit{lack}, instead focusing on uniqueness claims about how \textit{functionally} similar behaviors in humans and animals can have different causes, \textit{i.e.}, that “the possession of a rational soul does not set us radically apart from animals, but simply reflects a difference in the ways in which our bodies function in the world” (Steiner 2005: 76).

5.1 Aristotle in Crisis

Aristotle’s fascination with feats of animal behavior has rarely been rivaled in intellectual history. In one of the most remarkable passages in \textit{History of Animals}, Aristotle anticipates Cheney and Seyfarth’s (1990) much-discussed studies of the discriminatory alarm calls of vervet macaques—a species that produces distinctive vocal signals to conspecifics in the presence of ground, tree, and aerial predators. Aristotle, likewise, observes that pigeons vocalize differently when hawks attack from the sky and hawks closer to ground, and elsewhere he describes avian communication in terms of

\textsuperscript{54} \textit{History of Animals} 588b4-12; also see \textit{Parts of Animals} (681a10-15).
“conveying information.”

Aristotle also goes into some detail describing inky acts of deception in cuttlefish and octopuses, as well as how cephalopods change color when hunting. It is because of such observations that Aristotle felt it to be a monumental and arduous philosophical exercise to deny rational faculties to animals. Aristotle’s discussions of animal behavior began with a seemingly small, idiosyncratic problem: how to account for the lack of belief and reason in animals capable of intelligent behaviors. This problem snowballed into an issue of epic philosophical proportions, namely, the need to thoroughly refine definitions not only of belief and reason, but also of terms such as memory, concept, thought, intention, attention, perception, and emotion. Sorabji’s (1993:7) claim that Aristotle provoked a “crisis” is apt to describe this phenomenon; all concepts in the philosophy of mind were “subject to shifting.”

Rather than treating animal minds as an eccentric subfield—as it was for much of history, and largely remains so today—Aristotle believed that the philosophy of animal minds needed to play an integral part in defining basic concepts and problems in the philosophy of mind, ‘proper.’ Aristotle maintained that all instances of animal behavior could be explained by means of a philosophical tool kit containing only two intimately related instruments: imagination (phantasia) and sense perception, both belonging to the general domain of the perceptual faculties, which must “compensatingly expanded” to account for the denial of reason (7). Aristotle goes about his task of “expanding perceptual content” by arguing—at times tacitly and other times explicitly—that humans also largely navigate their environments by non-cognitive means, so we should not be

55 History of Animals 8, 620a29-33; Parts of Animals 660a35-660b2.
56 Parts of Animals 4.5, 679a4-7; History of Animals 8, 621b29-622a14.
terribly surprised that other species do as well. Aristotle was thus the first philosopher to focus on the problem of distinguishing behaviors that are cognitively motivated from behaviors motivated by non-cognitive means—the general impetus for what is now referred to as the logical problem in contemporary animal minds research.

In critically evaluating this project, I explore the successes and failures of Aristotle’s denial of belief to animals, the argumentative strategies implicit within his complicated accounts of sense perception and phantasia, and his recognition of “traces” and “resemblances” of rational capacities in some non-human animals.

5.2 Aristotle’s Denial of Belief to Animals

Unlike his account of reason, the discussion of belief in Aristotle’s philosophy of mind uncharacteristically does not admit of any different kinds or types. The resulting effect on his approach to comparative psychology is not positive. Similar to the Stoics, Aristotle defines belief in terms of the highest of human abilities: assent (or persuasion) and deliberation. For Aristotle, all individuals, including adult and infant humans, who are unable to deliberate and consciously assent to propositional attitudes—or, more specifically, consent to one propositional attitude over others—are likewise incapable of forming beliefs. While surely many beliefs are formed this way, it follows that any proposition arrived at without internal deliberation and assent would not rightly be called a “belief” at all. Of the many differences between Aristotle and Plato, their definitions of belief are among the most pronounced. Plato’s merging of perception and belief was so inclusive that practically all animals could satisfy it; Aristotle’s definition, on the other hand, is so exclusive that it is a reasonable critique to suggest that not even all humans

57 E.g., Nicomachean Ethics 1.7, 1098a3-5; 1.13, 1102b30-1103a3
58 On the Soul, 3.3, 428a20-23
can satisfy it,\textsuperscript{59} and even the most reflective of us hardly satisfies it very often. Perhaps it should be the case that every belief that one possesses was originally—or at some point—the subject of deliberation and persuasion, but this does not accurately account for common sense ideas about how people often come to hold the beliefs they do.

Buckner (2013: 5) has dubbed this general criticism \textit{semantic anthropocentrism}, which “involves precisifying vaguely-defined psychological terms to human-level ability.” Sorabji (1993: 6-8) likewise argues that if humans can form beliefs without this deliberative process, then—permitting that some species navigate the world by means of propositional attitudes, which Aristotle allows\textsuperscript{60}—it seems that those animals should be granted some minimal “unreflective” sense of belief, too. Hardly isolated to ancient authors, this remains a relatively common critique of how concepts are too narrowly defined in the contemporary animal minds literature.\textsuperscript{61} Andrews (2002; 2015), for instance, criticizes Donald Davidson’s (1982) popular argument that animals lack beliefs along precisely these lines.

Davidson’s stance bears some resemblance to Aristotle’s own. Davidson argues, first, that “in order to have a belief, it is necessary to have the concept of belief,” and second, “that in order to have the concept of belief one must have language” (324). According to Davidson, it is impossible to hold a single belief without also holding many interrelated beliefs—a belief in X also means that one has beliefs about that belief, and other beliefs about those beliefs, and so forth—which ultimately leads to uniquely human situations in which beliefs clash with one another and must be worked out in deliberation. Davidson contends that to have a concept of belief entails that one has more foundational

\textsuperscript{59} \textit{i.e.}, human “marginal cases,” such as those with severe mental disabilities from age or circumstance.

\textsuperscript{60} Described in the following section.

\textsuperscript{61} Griffin 1978; Buckner 2013; Andrews 2015.
concepts such as truth and falsity, as well as knowledge of the underlying existence of an objective state of affairs that supersedes any false beliefs about the world. The way that rational agents come to understand this state of affairs is through sharing a language. Davidson also notes that when beliefs clash with one another, a sense of “surprise” follows, and that animals also lack this feeling (326).

Like Davidson, Aristotle claims that animals lack language and speech, that language is necessary for deliberation and assent/persuasion, and, although Aristotle does grant a minimal sense of conceptual knowledge to animals, both Davidson and Aristotle deny them the ability to form abstract concepts like belief. But the overlap is not nearly as interesting as their differences, of which one is particularly significant in attempting to explain complex animal behavior without rational faculties. Criticisms to the effect that Davidson’s account of belief is too exclusive and/or guilty of semantic anthropocentrism likewise apply to Aristotle, but Aristotle has another concept waiting in the wings—which he assumes capable of serving the same function—to take its place: phantasia.

5.3 Phantasia: Propositional Perception without Belief

When Aristotle chose to deny belief to animals, he needed to create an account of the perceptual faculties that differed radically from those before him. First, Aristotle understood that when humans and other animals are engaging in the myriad of activities that make up their daily lives, e.g., hunting, playing, fearing, nursing, and so forth, these experiences are not made up a series of isolated, singular perceptions. Unlike Plato, Aristotle writes of perception in multi-modal terms wherein several senses function concurrently to discern salient features of the environment thus making a “unity out of

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63 “What one perceives through one sense, one cannot perceive through others” (Theaetetus 184e-185a).
Second, in Aristotle’s philosophy of mind “perception” does not merely refer to the classic five senses, but also to *memories* of previous experiences and the unconscious ability to discriminate between types and qualities, *e.g.*, different colors, speeds, amounts, weights, distances, and temperatures. Consider, for example, the macaque that uses his four limbs and prehensile tail to rapidly brachiate through the forest, skillfully avoiding unsupportive branches and perilous jumps that exceed his strength. Third, as Sorabji (1993: 12) puts it, for Aristotle, animals do not merely *perceive*; they always *perceive that* such and such in the case; sense data is always “connected” to—or “predicated” by—a given “subject or a direction” in the environment. Whereas Plato and the Stoics ascribe properties such as “likeness” and “difference” to the realm of *reason*, these properties are “consciously treated by Aristotle as yet further objects of perception” (17). Steiner (2005: 64) elaborates: “sensation has the character of intentionality, that is, it does not simply receive pixels of color, discrete bits of sound, and the like, but is directed toward objects of attention, and is directed toward them as such.” The associative nature of perception grants this web of perceptual capacities a propositional component, *i.e.*, animals and humans alike *perceive that* X is larger than Y, and—crucially—they do not require the belief that X is larger than Y in order to experience and navigate the world that way.

Aristotle thus recognizes animals and humans alike as constantly engaging in a form of “propositional perceiving” (Sorabji 1993: 18). This is not a radical or uncommon interpretation. Martha Nussbaum (1978: 42) likewise makes note of Aristotle’s

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64 *On the Soul* 3.11, 434a5-9.
65 Human and non-human animals alike *perceive* “movement, rest, number, figure, magnitude” (*On the Soul*, 2.6 426b12-13). See discussions in Steiner (2005: 64) and Sorabji (1993: Ch. 2).
66 *On the Soul* 3.2, 426b12-427a14
willingness to describe all forms of perception as a fundamental means of “saying” to the perceiver that objects or conspecifics are frightful or desirable, etc.⁶⁷ In the *Nicomachean Ethics*, for instance, Aristotle has no trouble ascribing the proposition “it is near” to a lion that is about to make dinner of an ox: “Nor does the lion delight in the lowing of the ox, but in eating it; but he *perceived* by the lowing that it was near, and therefore appears to delight in the lowing; and similarly he does not delight because he sees a stag or a wild goat, but because he is going to make a meal of it.”⁶⁸ Propositional perceiving, then, appears to involve some functionally analogous capacity for *anticipation*, allowing certain species a marginal ability to expect future events—not quite by foresight (which Aristotle waffles on but ultimately denies to animals⁶⁹) but perhaps by feeling hungry and associating the mental image (*phantasma*) of an “absent perceptible” (Moss 2012), such as the taste of flesh, with the image of live prey in their field of vision. This “anticipatory” process need not be as complicated as it sounds, *e.g.*, consider the “psychic secretions” of Ivan Pavlov’s (1849—1936) dogs in his pioneering experiments in classical conditioning (1927), where association is viewed as a basis for anticipation.

The notion of propositional perceiving is controversial.⁷⁰ More important than the details themselves, however, is Aristotle’s rationale for attributing propositional attitudes to animals in the first place. Why does Aristotle not take the simpler, Davidsonian position—shared by the Stoics—that propositional content requires belief? Presumably because he felt that doing so would exacerbate rather than ameliorate explanatory crises

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⁶⁷ *Movement of Animals* 7, 701a32-33.
⁶⁸ *Nicomachean Ethics* 7.6, 1149a35 [emphasis added]
⁶⁹ Despite denying that animals have expectation for the future (*Parts of Animals* 3.6, 669a19-21), Aristotle describes movements of a crane that seeks out cover when a storm approaches and signals to conspecifics at potential threats of danger (*History of Animals* 9.10, 614b18).
⁷⁰ See Steiner (2005: 65) for a discussion of how “this account places a great burden on sensation.”
of human exceptionalism. Aristotle’s robust account of perception does, after all, avoid the gap in Davidson’s paper: if animals do not have the ability to form beliefs, then what comparable (or, as Aristotle prefers, analogous) capacity do they possess? On this point, I share the sentiment behind Victor Caston’s (2011: 34) rhetorical question in support of Aristotle: “If animals perceive particulars without perceiving them as anything, how are we to explain how animals pursue or avoid the sorts of things they should?”

Having sketched the basics of Aristotle’s notion of propositional perceiving, I turn now to the key perceptual capacity granted to animals: phantasia.71 Phantasia is amongst the most debated terms in Aristotle’s works, so needless to say the intent of the following discussion is narrow. My focus is restricted to critically discussing one interpretation of why Aristotle introduced the notion of phantasia to begin with, which is to deal with the explanatory crisis evoked by denying belief to animals. Despite Aristotle’s outmoded insistence that all capacities must be neatly divided into the perceptual and the rational (with phantasia belonging in the former), on my view, phantasia is nonetheless intended to fill the gap between perception and reason by stretching the limits of the former as far as possible, not only for animals, but for humans as well. Much of the nuance in Aristotle’s animal psychology absent in later philosophers ultimately boils down to the immense burden that Aristotle places on this term—instead of instinct—to account for intelligent-looking behaviors in the animal kingdom.

Aristotle introduces the term phantasia to explain how propositional perceiving is possible, not only in humans, but in other species. Phantasia should be thought of as the capacity responsible for transforming raw sense data into a “noncomposite sense of

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71 With respect to the following discussion of Aristotle’s views on phantasia, I owe a great deal of gratitude to my friend and colleague Mateo Duque, in whose excellent, currently unpublished paper, “Aristotle’s Phantasia: the faculty of (mis)-recognizing,” some of these ideas originally appear.
something as something” (Steiner 2005: 67). The notion of phantasia thus carries with it a pronounced phenomenological quality, which gives perception an intentional dimension that is subjective and/or relative to the biology and prior experiences of the species or individual in question. Aristotle sometimes writes that phantasia is a capacity that all animals possess\(^\text{72}\) (though he sometimes wavers on this point\(^\text{73}\)), that capacities directly associated with phantasia such as memory and concept formation arise in degrees (Lorenz 2007: 175), and that—as a phenomenological concept—phantasia manifests itself differently across the animal kingdom due to the subjective character that it grants to experience (Duque 2013:16). I propose that one of the most frustrating and natural questions about phantasia: what are its precise roles in (animal) cognition? may be indicative of Aristotle’s progressive attitude that there is much that remains obscure and mysterious about the content of animal minds.\(^\text{74}\) While phantasia is without doubt a puzzling and problematic concept, it was not the brainchild of a dogmatist.

It is common to translate phantasia as “imagination” or “impression,” though Sorabji (1993: 15, 18) prefers “perceptual appearance,” which is “a sort of thinking (noësis, noein)” that “covers both […] perceptual and post-perceptual appearance”—with the latter entailing both memories and dreams. In my estimation, none of these translations are particularly helpful. The best way to introduce the idea is that, like Plato before him,\(^\text{75}\) Aristotle associates phantasia with the verb “to appear” or “to bring to light,”\(^\text{76}\) as in, the perceptual appearance that the sun is extremely small.\(^\text{77}\) Arguably the

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\(^\text{72}\) On the Soul 3.3, 433b28, 434a1-5
\(^\text{73}\) Ibid. 3.3, 415a11, 428a10
\(^\text{74}\) Parts of Animals 1.5, 645a23-28
\(^\text{75}\) Sophist 264a-b.
\(^\text{76}\) On the Soul 3.3, 428a13-14; Sorabji 1993: 18
\(^\text{77}\) Ibid. 428b26
main reason that Aristotle introduces the concept is to account for how errors in perception such as this are possible (Caston 1996: 21), but in addition, *phantasia* likewise purports to explain how animals successfully navigate the world without beliefs. Simply put, when a human or animal perceives a given object *P* that has been the subject of previous experience, the qualities originally associated with *P* (e.g., tasty, slow, docile) automatically become part and parcel of future perceptions of *P*, *i.e.*, rather than the predator holding beliefs about these things, the ox *appears as* tasty, slow, and docile to the predator. That is, unless this perception comes to be challenged by a fast and powerful ox, whereby the appearance is deceptive.

Aristotle thus attempts to draw a functional equivalence between (a) the role played by *phantasia* in perception and (b) the role of true and false beliefs in practice—the main difference being that “every belief implies conviction, conviction implies being persuaded, and persuasion implies reason; some beasts have imagination (*phantasia*), but none reason.” 78 According to Aristotle, “imagination [*phantasia*] is different from assertion and denial” because “truth and falsity involve a combination of thoughts,” 79 of which animals are incapable. Aristotle is thus in agreement with Davidson that belief requires an interrelated network of propositional attitudes whose veracity can be confirmed. By attempting to provide a *tertium quid* between perception and reason, Aristotle’s notion of *phantasia* offers somewhat of a compromise between the Stoic/Davidsonian view and Plato’s proposal for merging perception and belief.

It is evident that *phantasia* can ameliorate some the concerns raised above with respect to Aristotle’s uncharacteristically parochial definition of belief. Sorabji (1993: 68)

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perhaps has a point that, “ideally,” Aristotle “should have identified a lower class of unreflective beliefs” in dealing with animal minds—surely such a distinction would have been natural for him. Aristotle does, after all, distinguish *calculative phantasia* from *sensitive phantasia*, the point being “that rationality has downward effects on how the faculty of *phantasia* functions” (Duque 2013). Both forms play the central role of creating propositional content out of sense perception, but only in its uniquely human calculative variety is this content subject to truth conditions and deliberation. Humans and animals both navigate the world and make perceptual mistakes by virtue of *phantasia*, but only humans possess the additional cognitive equipment to reflect upon these appearances, consciously compare them with past appearances, and form beliefs as to whether they are properly true or false representations of the world, uniquely understood as a space of objectivity.

Another crisis or challenge to be addressed in denying belief to animals is that, like many philosophers, Aristotle claims that beliefs play a significant role in motivating (human) behavior. Since Aristotle never claims that, in the absence of belief, all motivations for animal behavior stem from a single “general principle” such as instinct (the Stoic view), what motivates the behavior of animals? *Phantasia* is made to fill this role as well, for it is the source of all desires and mental images (*phantasmata*) in sentient beings. In addition to describing the biological functions of *phantasia* as distinguishing beneficial features of the environment from threatening ones, or, pleasurable things from painful things, Moss (2012: 62) notes how it also makes possible the ability by which, with the aid of mental images, animals are motivated to go out in search of desirable

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81 *Ibid.* 3.3, 427b22
82 *On the Soul* 3.8, 432a11-13
objects not presently in view. Despite the fact that animals cannot form or recognize false beliefs, they very often learn from errors in perception and then use that information to modify latter behavior by means of memory (which also fall under the domain of *phantasia*). Think of the learning curve mastered by brachiating monkeys or, for an even better example, consider learned tool use in wild chimpanzees (Goodall 1971). The chimpanzee may not have beliefs about hammers, anvils, or nuts, but she can learn that not all rocks make desirable tools, discern the rocks that *will* fulfill this function, and then seek out these objects beyond her immediate perception to satisfy her desires to eat and feed her young.

According to Aristotle, practically all animals possess memory to a basic degree, “some” animals have better capacities for memory than others, and in the smaller number of species for whom memories “remain” over long periods, the rudiments of concept formation arise, which are also not unique to humans.\(^{83}\) Aristotle is able to argue this because, recalling his general strategy for dealing with the crisis, Aristotle “downgrades” several human abilities to the realm of perception in order to grant them to animals, while still supporting the many uniqueness claims that follow from the idea that only humans are rational beings. This is especially evident when Aristotle argues that memory is not part of the rational psyche:

> Hence not only human beings and the beings which possess opinion or intelligence, but also certain other animals, possess memory. If memory were a function of the thinking parts, it would not have been an attribute of many of the other animals, but probably, in that case, no mortal beings would have had memory; since, even as the case stands, it is not an attribute of them all, just because all have not the faculty of perceiving time.\(^{84}\)

This is an example of Aristotle at his most nuanced when distinguishing human and animal minds. Note how carefully Aristotle considers the line between whether memory

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\(^{83}\) Anterior Post. 2.19, 99b32-100b3

\(^{84}\) On the Soul 450a14-450a18
is a rational faculty or not. It seems intuitive to him that memory *appears* to be a rational faculty belonging only to humans, but if this were the case—Aristotle reasons—and *every single* use of memory involved sophisticated recollection, then such a theory would falsely grant humans cognitive powers beyond what he thinks capable of them, as well as overlook the fact that memory seems to function in relatively unsophisticated ways in humans and animals alike, *e.g.*, in distinguishing healthy from poisonous fruits from past experience. Because animals cannot “perceive time” and recall memories at will, all of their memories appear as *phantasma* triggered by one’s present experience, and thus constitute the sorts of mental states that stimulate behavior and make learning by experience possible. There is a *mentalistic* difference between Aristotle’s account of experiential learning and, for instance, stimulus-response views of trial-and-error learning held by the Stoics and popularized in later centuries (Boakes 1984: 71).

Although recollection is uniquely human due to the physical constitution of our species, Aristotle does seem to be suggesting that, just as humans use *phantasia* more often than beliefs in their daily lives, so too do humans use the *phantasma* of “simple memory” more often than they do active recollection; neither *phantasia* (as a stand-in for belief) nor *phantasma* (as a basic component of recollection) are categorically different from their expression in other species. To the contrary, the various functions of *phantasia* exist on a spectrum with most other species on earth. Aristotle claims, for instance, that the intelligence of animals varies in relation to their differing capacities for memory, \(^{85}\) *i.e.*, that the better an animal’s memory, the “more intelligent and apt at learning” they are,\(^ {86}\) not only because it aids discriminatory abilities, but also because memory comes

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\(^{85}\) *Metaphysics* 1.1, 980b22. Aristotle uses the word *phronimotera*, which translates to “more intelligent.”

\(^{86}\) *Ibid.* 1.1, 980a28-30; 981a15.
part and parcel with “the faculty of perceiving time.” Elsewhere, Aristotle comments on degrees of vivacity of memories between humans and other species, making the first uniqueness claim for episodic memory in the history of philosophy, i.e., only humans possess memories akin to “a single experience.” This seems to imply a deep reflective ability to recall vivid experiences (i.e., “autonoetic consciousness” [Tulving 2005: 5]) involving multiple senses in specific life-contexts. This point further attests to the subjective experiences granted by _phantasma_.

_Phantasia_ is therefore not just another capacity functioning alongside reason; _phantasia_ is an essential prerequisite for the “development” of the rational faculties such as technical skill and understanding, which are described as only possible at the peak of perceptual scaffolding. Aristotle is not a continuity theorist; this development only takes place in human beings because, by virtue of _entelechy_, we are the only species in possession of the requisite physical potential. Nonetheless, it is obvious that many of the building blocks of the rational faculties are found within _phantasia_ (memory and concept formation being the most prominent). While this does not entail cognitive continuity, Aristotle finds genuine continuity between humans and animals in perceptual and physical capacities, and almost certainly viewed some non-human species as possessing “higher” capacities than others, i.e., cognitive variation in nature.

**5.4 Phantasia Problematized**

Of _phantasia_, Aristotle writes the following: “We must then have some capacity, but not such as to be superior to [understanding] in accuracy. And it evidently belongs to

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87 On Memory 450a13-18.
88 Metaphysics, 1.1, 980b26-981a1; see Clayton and Dickinson (1998) for a contemporary example.
89 Anterior Post. 2.19, 99b32-100b3
all animals. For they have an innate discriminative capacity which is called perception.”\textsuperscript{90} The explanatory potential of \textit{phantasia} is progressive insofar as Aristotle offers reasonable grounds for complicating the barrier between perceptual and rational faculties; recognition that parts of the former can bear functional relationships with parts of the latter is essential in discussions of uniqueness claims. Yet there is good reason to be skeptical as to how successful Aristotle’s attempt to mitigate explanatory crises of human exceptionalism by these means really is.

Aristotle’s claim that propositional perception is near-ubiquitous in the animal kingdom is difficult to accept. There is good reason to challenge the view that the “ability to represent absent perceptibles” (Moss 2012) is as common among non-human species as Aristotle believes. The same can be said of what Lorenz (2007) argues to be one of the fundamental roles of \textit{phantasia}: “envisaging prospective situations.” Like Moss, Lorenz believes that—according to Aristotle—in order for locomotion to be possible, animals need an imaginative capacity to motivate that behavior. The obvious problems with Lorenz’s view are, first, that locomotion can be readily explained without positing the use of mental imagery to envision a desired future situation,\textsuperscript{91} and second, that it is almost certainly a stretch to attribute this capacity to the vast majority of species in the animal kingdom. As noted above, Aristotle himself claims that having a “perception of time”—which is presumably necessary to envisage prospective situations—is extremely rare in the animal kingdom, likely belonging only to humans.

\textsuperscript{90} \textit{Ibid.}

\textsuperscript{91} To be fair, Lorenz (2007: 131) does acknowledge this criticism: “It should be acknowledged at once that, unfortunately, Aristotle does not say, in the \textit{De Motu Animalium} or anywhere else, that animal locomotion always or typically involves envisaging prospects.”
For all the explanatory virtues of Aristotle’s account, it is ironic that the greater number of species whose behavior can be explained in terms of phantasia, the more nebulous this idea ultimately becomes. Simply put, phantasia is Aristotle’s way for accounting for all (or most) animal behavior in all (or most) animals, however the fact that Aristotle never tells us where to draw the line between those species that possess phantasia and those that do not (e.g., do insects have phantasia?) has great bearing on the meaning of the term itself. If spiders have phantasia, then Aristotle is stuck in a situation where he must use the rudiments of arachnoid cognition to explain the behavior of dolphins and great apes.

In what is arguably the best modern interpretation of phantasia, Victor Caston (1996, 1998, 2011) casts his interpretive net more broadly, emphasizing the subjective nature of phantasia and arguing that it should be conceived in terms of how “echoes” (phantasmata) of prior experiences aid in the formation of what Aristotle calls “primitive universals” thus motivating behavior on the basis of how certain features of an environment stand out as X. According to Caston (1996: 292), phantasia gives Aristotle “a plausible psychology for animals, who are capable of learning from past experience and misrepresentation even without a conceptual apparatus like our own.” This too invites a problem. The idea that phantasia involves the “unification of many images,” both past and present, to identify kinds of things in the world from which to generate propositional attitudes toward, does seem to come close to asserting that animals can

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92 Presumably, since Aristotle argues in the Politics (1. 1253a) that bees have complex social lives (though they cannot be taught), he would grant some insects the discriminatory abilities that come part and parcel with phantasia.

93 Metaphysics 981b.
form concepts (even if they are not aware of them). But the ability to form concepts is a capacity that, at least on one occasion, Aristotle explicitly denies to animals.\(^{94}\)

Aristotle’s struggles to attribute a rudimentary conceptual apparatus to animals is yet another example of the crisis that Sorabji writes of, \textit{i.e.}, how can one come to recognize all $P$s as $Q$s (\textit{e.g.}, rocks as hard) or all $R$s as better than $N$s (grapes taste better than cucumbers) without the seemingly cognitive capacity to form concepts like $P$, $Q$, $R$, and $N$? Caston (1998) believes that it is through \textit{phantasia} that humans and animals like can identify “kinds and types” without possessing concepts of those general categories, but by grasping what he calls \textit{indefinite singular content}:

A phantasma, then, would be about a token of determinate sensible type, without being about any token in particular, in much the same way I can promise you a horse, without there being any horse in particular which I am promising you. (289-290).

Thus, on Caston’s interpretation of \textit{phantasia}, this is how Aristotle can explain the means by which a cat—for instance—can set about hunting rats without the direct experience of any particular rat (290-291). The hungry, hunting cat is experiencing similar mental states as if the rat was right in front of her, but despite the cause of these \textit{phantasma} not being any particular rat, the mental state nonetheless has a comparable effect as if this was actually the case (this is why Aristotle also lumps dream states in with \textit{phantasia}). The phantasmal “echoes” of the rat image do not have to be actively brought to mind (as only humans are capable of doing); instead, \textit{phantasia} functions passively (or unconsciously) on the basis of previous experiences with particular rats. Joel Yurdin (2009: 81) offers a similar account of \textit{phantasia} based on what he calls “non-specific representations.”

A reasonable critique of interpreting \textit{phantasia} in this way is that such accounts are both unnecessary and too vague to perform their explanatory roles.\(^{95}\) The challenge

\(^{94}\) \textit{On the Soul} 3.8, 432a10-12
for evoking “indefinite” or “non-specific” representations to explain animal behavior lies in providing an account of how images can function as proxies when categorizing objects as parts of a common class. As George Berkeley (1685—1753) critiqued John Locke’s (1632—1704) notion of “abstract general ideas,” it is unclear whether a mental image can be anything but a particular; images possess definite content, and it is far from obvious whether (or how) an image of a particular rat can serve as a mental representation of all rats. To explain the cat’s hunting behavior, associative learning might suffice, i.e., the feeling of hunger triggers a specific rat image, without anything approximating abstract classification or conceptualization going on.

Caston’s account of *phantasia* ultimately suffers the same fate as those of Moss and Lorenz: Aristotle wants *phantasia* to apply across the vast majority of the animal kingdom, and there is no reason to believe—in Aristotle’s time as in our own—that all (or most) animal minds are capable of conceiving of the world in terms of primitive universals comprised of indefinite singular content. There is another option. If *phantasia* is simply a form of induction based on association, then mollusks might be said to possess it, as they can be classically conditioned. Yet while defining *phantasia* as a capacity that arises in degrees “all the way down” to relatively simple animals might get us closer to the breadth of application that Aristotle had in mind, doing so might also be to abandon the phenomenological aspect so crucial to his account, i.e., *phantasma* arise as traces or echoes of sensations. Perhaps not, however, as the contemporary literature on

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95 This paragraph arose from conversation with John Greenwood.
97 *Nicomachean Ethics* 7.3 1147b4-5. For a contemporary statement of this critique, Peter Carruthers (1996: 36) comes close.
98 Thanks to John Greenwood for this point.
animal consciousness is becoming open-minded to ascribing subjective experiences to insects and even the ancient sea creatures in possession of the first nervous systems.  

The lesson to be adopted from these critiques of Lorenz, Moss, and Caston, is that whatever the “defining feature” of phantasia is, it cannot be too sophisticated, but in its relative simplicity it must nonetheless be robust enough to account for the presence of sophisticated abilities. Phantasia must at once underlie practically all animal behavior, somewhat like the core of a Russian Doll, however—continuing this metaphor—the definitions offered by Moss and Lorenz seem more at home among the doll’s outer layers. Unlike later philosophers and scientists after him, including the Stoics, Aristotle should be commended for not resorting to some vague notion of instinct to fill this role, choosing instead to work within a conceptual framework—puzzling as it may be—that highlights foundational intersections between human and animal minds.

6. The Crisis Naturalized: Traces, Resemblances, and Analogies

Another strategy that Aristotle uses to deal with explanatory crises arising from denying reason and belief to animals is to grant “traces” (ichnē) of human temperaments to other species and, in a surprising turn, “resemblances of understanding (suneseōs)” which “are in many [animals], just as we spoke of with respect to bodily parts.” Intellectual capacities such as sagacity and understanding are said to have “likenesses” (homoiotētēs) in the animal kingdom in the sense that other species can possess them “by analogy” with human understanding (Sorabji 1995: 12-14). In this section, I defend the following two points, both of which testify to Aristotle’s relatively progressive approach.

99 See Godfrey-Smith (2016) and Klein and Barrow (2016).
100 History of Animals 588a16-18—588b3
101 Ibid. 7, 589a1-2
to defending discontinuity hypotheses. (1) Grasping why Aristotle prefers the phrase “by analogy with” is illuminating with respect to explaining why there are very few exceptionalism claims in Aristotle, despite his many uniqueness claims. (2) “By analogy” is Aristotle’s way of asserting that human and animal intellectual capacities can differ in kind while still being functionally analogous. Combined, these points are indicative of Aristotle’s naturalism: although Aristotle defends a Great Chain of Being among species, his worldview of mental capacities in the animal kingdom is one of great variation and overlap, dictated by the ecological demands of species, rather than natural superiority.

Instead of claiming that—despite appearances to the contrary—animals lack rational capacities, Aristotle claims that, in such cases, human and non-human species “differ by being analogous,” since “just as there are in humans technological skill (technē), wisdom (sophia) and understanding (sunesis), so there is some different (hetera) natural capacity (dunamis) of the kind in some of the animals.”¹⁰² In my estimation, this is one of the most remarkable and telling sentences in History of Animals. The key phrase here is “of the kind,” which I take to refer to unknown capacities that fill analogous functional roles to the uniquely human capacities just listed. Mesaros (2014) shares this interpretation, suggesting that this sentence “means that there could be other capacities that count for animals as mind [...] to the same extent that count as mind to humans.” If this reading is correct, then Aristotle is acknowledging that other animals have their own unique capacities that are appropriate to navigate the problems of their own environments—often in ways analogous to problems that we face in our own, i.e., “as A is to B so some other C is to D” (Sorabji 1993: 14). That other species possess capacities

¹⁰² Ibid. 588a16-18—588b3
functionally analogous to reason is a rare claim for an ancient philosopher, and is clearly provoked by the explanatory crisis motivating this dissertation.

The underlying idea is quite subtle. Aristotle employs the same philosophical attitude present in his discussions of phantasia, namely: the fact that animals lack these human capacities is not as interesting or important as the fact that they possess other capacities that are analogous, i.e., that serve the same general function. As such, I posit that while both “kind” and “by analogy” are similarly used to deny human capacities to animals, the latter allows the important connotation that human capacities are not exceptional in relation to like-abilities of animals; they just serve different purposes.\(^{103}\)

This reading is given additional weight by the fact that Aristotle believed—in contrast to the “all or nothing” account of mental faculties defended by the Stoics, Christians, and Cartesians—that “some characteristics differ in a ‘more or less’ relationship with human beings, as does man in comparison with animals (for some of these characteristics are present in a greater degree in humans, and some in other animals).”\(^{104}\)

Indeed, Aristotle rarely makes claims to the effect that human capacities are superior to those found in other species, and when he does make exceptionalism claims, he most often does so in a spirit far removed from that of his contemporaries. To demonstrate this, consider the following example of an exceptionalism claim in Aristotle:

\begin{quote}
Nature does nothing to no end, and man alone of the animals has speech. Now, the voice is the indicator of the painful and the pleasurable, because of which it exists in the other animals as well, for their nature is advanced to the point that they have the sensation of pain and pleasure and signal these to one another. Speech, however, exists to indicate the advantageous and the harmful, and thus likewise the just and the unjust: this is one special characteristic of human beings, in contrast to the other animals, that they alone
\end{quote}

\(^{103}\) See Steiner (2005: 74) and especially Balme’s footnotes on Book 7 (589a1-2) and Book 8 (610b22) of History of Animals.

\(^{104}\) History of Animals 588a16-18—588b3
Aristotle is drawing a distinction between “signals” and “speech” (or elsewhere, “voice”) the latter being not only unique, but “special” to humans, while the former is nonetheless a fairly advanced insofar as other species can usefully communicate a range of emotions to conspecifics. The basis of this exceptionalism claim is Aristotle’s naturalism, wherein “theories of psychological functions must be constrained by theories of their material instantiation” (Greenwood 2015: 36), rather than an overarching belief in human exceptionalism.

This is clear in Aristotle’s discussions of linguistic abilities across the animal kingdom. Aristotle’s distinctions between those species that only “hear sounds” and those that “distinguish the differences between the signs,” as well as those that are capable of “voice” versus those capable of “speech” (only humans), are matched by descriptions of the physical capacities of the animals in question, e.g., the human tongue “is the freest, the broadest, and the softest of all” thereby granting humans the ability to “articulate the various sounds and to produce speech.” Likewise, whereas birds are capable of “conveying information” to one another—the parrot in particular being “human-tongued”—cows lack this level of articulation. Elsewhere, Aristotle claims that animals do not possess speech because they lack the cognitive ability to understand symbols. The capacity for speech “does not rise, in Aristotle’s view, to the level of language because words are not involved in the process. Words must arise from an

105 Politics 1253a9-18 [emphasis added]
106 Parts of Animals 2.17, 660a35-660b2.
107 History of Animals, 8, 608a20-21.
108 Parts of Animals, 2.17, 660a17-25.
110 Parts of Animals 2.17, 660a35-660b2.
111 On Interpretation 16a1-10; 12a28-29
agreement on the part of those who use them as to their meanings—that is, words are *a matter of convention*, and such agreement lies outside the scope of non-human intellect” (Newmyer 2011: 61 [emphasis added]).

Aristotle sees fit to add an exceptionalism claim to this uniqueness claim because human societies are, in his view, capable of more advanced forms of communication and organization than the social units of other animals (who, lacking language, have no idea of justice). Contrast the tone of this exceptionalism claim with Stoic philosopher Philo the Jew (c. 20 BCE—50 CE) who argues that while various species of birds produce “different kinds of utterances” they are “meaningless and insignificant” and, as such, “are not so much real expressions [...] as they are chirps.”¹¹² For the Stoics, animals lack speech due to “an imperfection identified in the animal soul” (Newmyer 2011: 60). The contrast between this attitude and the passage cited above from *Parts of Animals* where Aristotle attributes “some information conveyed”¹¹³ in bird communication is stark.

Even the exceptionalism claim underlying Aristotle’s appreciation of human social life, *i.e.*, “is a characteristic of man that he alone has any sense of good and evil, of just and unjust, and the like,”¹¹⁴ must be taken in context with the points I’ve been making all along. While Aristotle grants unique capacities to humans, (1) not all humans develop these capacities, (2) many animals have “resemblances” and “traces” of them, and (3) even in their simple forms, these capacities should be understood as *scaffolding* for more developed human abilities, rather than radically different from them. While Aristotle does claim that humans alone possess the moral competence to form just societies, in the same text, he also claims that social instinct comes in gradations across

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¹¹² *On Animals* 98  
¹¹³ *Parts of Animals*, 660a35-660b2  
¹¹⁴ *Politics*, 1253a8-1253a18
the animal kingdom\textsuperscript{115} and that many animals possess degrees of practical wisdom (\textit{phronesis}) and the ability to learn from others.\textsuperscript{116} So while Sorabji is correct that “Aristotle’s gradualism in biology is carefully qualified so that it allows for a sharp intellectual distinction between animal and man,” I am suggesting that there are reasons to complicate—though not deny—Sorabji’s (1993: 13) additional claim that Aristotle “carefully applies his gradualism to temperaments, not to intellect.”\textsuperscript{117}

Unlike what I later describe as the token “singularity of causation” endemic to Stoic and Christian attitudes toward animal behavior, by using the phrase “by analogy,” Aristotle may be suggesting that each animal should be compared with humans individually and in relation to their own unique set of skills, the causes of which not always being evident to human observers. Consider Aristotle’s curiosity about the “calculations” of dolphins in contrast to those of human divers:

[The dolphin] appears to be the fleetest of all animals, marine and terrestrial, and it can leap over the masts of large vessels. This is chiefly manifested when they are pursuing a fish for food; then, if the fish endeavours to escape, they pursue him in their hunter down to deep waters; but, when the return swim is getting too long, they hold in their breathe, \textit{as if} (h\textup{o}sper analogisamenoi) calculating the length of it, and then draw themselves together and shoot up like arrows, trying to make the long ascent rapidly in order to breathe. […] The same phenomenon is observed in divers, when they have plunged into deep water; that is, they pull themselves together and rise with a speed proportional to their strength.\textsuperscript{118}

Why \textit{as if} (h\textup{o}sper analogisamenoi) the dolphins are calculating? Presumably because the relationship between Aristotle’s biological claims (regarding human uniqueness) and his psychological claims (about the parts of the soul) provide unsatisfactory \textit{a priori} answers to intriguing questions such as these. Unfortunately, these \textit{de facto} assumptions are the only grounds Aristotle has to argue that dolphins do not

\textsuperscript{115} \textit{Politics} 1253a
\textsuperscript{116} \textit{Metaphysics}, 80a28-980b27
\textsuperscript{117} \textit{Parts of Animals} 4.5, 681a12-28; \textit{History of Animals} 8.1.
\textsuperscript{118} \textit{History of Animals} 9.48 [emphasis added]
make rudimentary calculations. There is a silver lining to this criticism. Note Aristotle’s claim that the “same phenomenon” is observed in human divers. Although only humans truly make calculations, Aristotle is suggesting that the dolphins are doing something analogous, presumably by means of a combination of *phantasia* and practical wisdom (*phronesis*), and that the behavioral result is essentially identical.

Aristotle thus conceives the Great Chain of Being as consistent with cognitive variation in nature that is *not* neatly hierarchical. Most often, the form taken by Aristotle’s uniqueness and exceptionalism claims is the following: *animals possess X and Y, but only humans have Z (which owes its presence to X and Y); however, animals may possess perceptual faculty Q (typically some function of phantasia) which is functionally analogous to Z*. Rational capacities are not only scaffolded atop perceptual capacities; the latter can occasionally (to use Aristotle’s words) “more or less” perform the functions of the former. The lines he draws between species typically boil down to animals possessing some (or most) of these layers, but not the top one, which is the result of the material constitution of human beings which gives them heightened potential for a wider range of behaviors. As a result of his naturalism, Aristotle “implicitly recognizes that the possession of rational soul in human beings does not distinguish them in a cosmically absolute sense from animals, but distinguishes them only by degree” (Steiner 2005: 76).

Aristotle is not claiming that all humans are superior to all non-humans by virtue of some cosmic privilege they have been granted in the universe. Aristotle thought that some humans are less intelligent than animals, despite their physical potential of the rational part and types of behaviors in the animal kingdom.\(^\text{119}\) Aristotle’s views on ontogeny can

\(^{119}\) See Aristotle’s discussion of the “active intellect” (*On the Soul* 3.5)
thus hardly be called speciesist. Not only each species—but also each member of each species—has its own physical potential that can either live up to or fail to do so.

Aristotle’s theories are not always scientifically motivated; nor are they free of dogmatic assertions and problematic forms of argumentation that, ironically, close off empirical solutions to questions about potential continuities between animal and human capacities that Aristotle himself was in a privileged position to investigate. Returning to the dolphin example, this criticism is most applicable to Aristotle’s consistent use of as if rhetoric to deny cognitive capacities to animals whose behavior suggests either that (a) they do possess the capacity in question, or, (b) that in the absence of explanations to the contrary, the claim that they possess the capacity to some degree may be a reasonable hypothesis for empirical and/or philosophical investigation.

As if rhetoric can be found throughout much of Book 6 of History of Animals. Of course, there is nothing inherently wrong with as if claims of this sort; it is clear that it can be useful, for instance, to guard against hasty anthropomorphic attributions. The problems only start arising when the rhetoric itself does all the heavy lifting and closes off open-minded attitudes towards the possibility that a given capacity may not be uniquely human after all. For instance, in an evocative discussion of emotional expression in animals, Aristotle describes a scene of adult dolphins behaving “as if” they are mourning a dead infant—a passage that bears resemblance to observations in recent books on animal emotions. My point is not that Aristotle is wrong to be skeptical, but that it is difficult to tell whether he is skeptical or if he is dogmatically rejecting the very

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120 According to Aristotle, “that a given body has this psyche (the human) is contingent if it might have failed to develop beyond the animal stage” (Ackrill 1997: 175).
121 The Generation of Animals (736b13, 32-779a2).
122 History of Animals, 615a, 616a, 620b, 622b, 6612b, 616b and 610b.
idea that dolphins are capable of this human behavior. There is some reason to believe that the latter view is Aristotle’s position here. As with Aristotle’s *de facto* denial of calculation to all animals, he also denies animals some human emotions entirely. For instance, Aristotle claims that, “we call the lower animals neither temperate nor self-indulgent except by a metaphor” due to the fact that “these have no power of choice or calculation.”\(^{124}\) As with the Stoic Seneca after him, Aristotle believed that animals were incapable of fear, which requires belief,\(^{125}\) so when we observe animals that appear to be in fear—like being courageous—we can only say they are “except by a metaphor.”\(^{126}\) Perhaps Aristotle felt the same way about apparent instances of mourning in dolphins. In any event, there is no reason to believe that Aristotle is suspending judgment on the question. The difference between instances where Aristotle uses “by analogy” and those where he uses “by metaphor”\(^{127}\) is that, in the former, Aristotle is granting that the species in question possesses a capacity that fills the same basic function as the one possessed by humans, where in the later, Aristotle seems to be suggesting a strict difference in kind with no “traces” of the human capacity being present.

Taking stock, there are times when Aristotle makes progressive use of rhetorical tropes such as *trace*, *resemblance*, and *by analogy* to deal with the problems of anthropomorphism, but Aristotle’s rhetoric can be problematic in a number of ways. At its most innocent, Aristotle “repeatedly employs phrases such as ‘just as’ and ‘somewhat like’ to compare human and animal capacities, which tends to blur meaning” (Newmyer 2011: 8). At its most detrimental, in spite of his willingness to downplay the cognitive

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\(^{124}\) *Nicomachean Ethics*, 7.7, 1149b31-32.


\(^{126}\) *Nicomachean Ethics*, 7.7, 1149b31-32

\(^{127}\) See also *Nicomachean Ethics* 8.11 1161b2-3
nature of human capacities in order to explain animal behavior, Aristotle was the first of a long line of philosophers to rely upon rhetorical tropes to claim that although some animals act *as if* they possess capacity X, they are *not really* behaving how they *appear* to be behaving, because X is strictly defined in relation to a set of behaviors indicative of X when *humans* do X (Sorabji 1993: 14; Newmyer 2011: 7; Steiner 2005: 72). I critiqued this strategy alongside Aristotle’s rationale for claiming that beliefs are uniquely human on the basis of confabulating the criteria necessary to satisfy the concept “belief” to a level higher than seems necessary.

7. Final Thoughts on Aristotle

At his best, Aristotle remains a model of how to responsibly posit and defend uniqueness claims. This is because he appreciated—and consciously wrestled with—the challenges that arise from doing so, in particular: the more capacities we deny to animals, the harder it becomes to explain complex behaviors in animals that, when performed by humans, might be deemed cognitively motivated. I have paid particular attention to Aristotle’s forward-thinking strategy for dealing with these challenges, *i.e.*, that of downplaying the cognitive nature of *human* capacities such as belief, memory, and conceptual and propositional knowledge, in order to more readily explain how there is considerable overlap between human and non-human behavioral repertoires. *Phantasia* and rhetorical tropes such as *trace, resemblance, and analogy,* are indicative of Aristotle’s “sensitivity to the complexity of animal behavior, the difficulties involved in thinking the boundary [sic] between human and animal, and perhaps even the potential inadequacy of seizing upon rationality as the dividing line between human beings and animals” (Steiner 2015: 75).
Aristotle rarely professes to have concrete answers to what, for instance, is really going on inside the mind of the dolphin who seemingly calculates the timing of her dives, and while he claims that the human diver has the capacity to calculate his remaining breath, Aristotle never claims that the diver always does this. The phrase “by analogy” seems to function as Aristotle’s way of suspending judgment on such matters. While it is unlikely that the dolphin and the human are doing quite the same thing when they perform the complex behaviors necessary for successful deep-sea dives, and while Aristotle does say that calculation is a uniquely human faculty, crucially, Aristotle is also suggesting that just because the human can calculate her behaviors, (1) the “experienced” diver—like the dolphin—may not need to calculate them, (2) the human diver is not the superior diver to the dolphin (quite the contrary, recall, as Aristotle himself claims), and (3) nor is the implication that dolphins do nothing like calculating when they dive. Aristotle never explicitly states that dolphins lack an ability to calculate, he states that dolphins lack the human ability to calculate.

Though often outmoded and flawed, the singular means by which Aristotle grappled with uniqueness claims set a high watermark that very few philosophers until the 19th and 20th centuries were able to match. Due to his naturalistic convictions and general scientific attitude, “Aristotle kept an open mind on most theoretical matters. He emphasized that his own theoretical contributions were provisional and based upon the limited development of the sciences of his day and that the last court of appeal for any theory was observation” (Greenwood 2015: 30). I have argued that Aristotle’s attitudes toward animal minds in his zoological works also generally fit this description. The tragedy of the dominant tradition is that while the Stoics and Christians adopted the worst
qualities of Aristotle’s approach to animal minds, their arguments nonetheless held a far more dominant influence in the centuries that followed (Sorabji 1993: 2; Steiner 2005: 3).
Continuity as Crisis: Two Traditions of Theorizing about Animal Minds

Chapter Three
Stoicism and Christianity: Dominant Voices of the Dominant Tradition

1. Overview

In the opening pages to his classic work *Origins of the Western Debate*, Richard Sorabji (1993: 2) reflects upon his initial surprise when realizing “how bad were the arguments designed to show that animals were very different from us.” Nowhere in ancient philosophy is this more evident than with the Stoics and early Christians. For all the nuance, detail, and ambiguity present in Aristotle’s account of animal cognition, these qualities only rarely describe the argumentation of these groups. To a certain extent, Stoic and Christian thinkers cherry-picked Aristotle’s texts when forging their own dogmatic explanations regarding the causes of animal behavior. For the most part, however, their thoughts on animals have their own discernable line of influence. There are novel, stimulating and even progressive ideas about animal minds in the Stoic canon. The Stoics were arguably the first philosophers with an account of animal consciousness (Toivanen 2013), a well-developed theory of the emotions, and a proto-evolutionary account of the historical and ontogenetic development of ethical decision-making that offers substantive grounds for uniqueness and exceptionalism claims. Such examples add nuance to my greater contention that Stoic philosophy, alongside medieval Christian thought, represents a prolonged low point in the history of animal psychology.

Even before Christianity became the formal religion of the Roman Empire in 380 CE, there was far more overlap between the relevant ideas of Stoics and Christians than either group had with Aristotle. Part of this had to do with the fact that the texts
comprising Aristotelian zoology—known during the Middle Ages as *De animalibus*, which contained *History of Animals, Parts of Animals* and *On the Generation of Animals*—were amongst the last works of Aristotle translated into Latin, which reflects the lowly importance attributed to animals by Christian thinkers (Beullens 2011). Even the exceptionalism claims of the most “Aristotelian” of medieval philosophers, Saint Thomas Aquinas (1225—1275), have more in common with Stoic arguments than anything found in the works of the medieval zoologists who studied Aristotle. For instance, Albert the Great (c. 1200—1280) produced the most widely read commentary on Aristotle’s *De animalibus* (Beullens 2011: 146), and was “the first scholar since Theophrastus [c. 371—287 BC] to show any interest in Aristotelian zoology as a research discipline” (Tkacz 2007: 31). However it is notable that neither Albert nor any of his more scientifically minded contemporaries expresses interest in engaging with the dominant tradition of positing and defending uniqueness and exceptionalism claims. Like Aristotle, Albert understood the entire sensible world as worthy of study (Beullens 2011: 148); unlike Aristotle, the sole reason for Albert’s empirical investigations was to better understand God’s creation. The placement of humanity within that creation is never questioned, nor do Albert’s researches lead him to comment on the causes of animal behavior. My point being: Stoic approaches to the philosophy of animal minds were far more dominant throughout Hellenistic, Roman, and medieval philosophy than those of Aristotle, even once *De animalibus* became widely available.

It is commonplace to refer to the Hellenistic philosophers such as Zeno of Citium (c. 3rd century BCE), Cleantheus of Assos (330—232 BCE) Chrysippus (280—204 BCE), Seneca (c. 4 BC—65 CE), Epictetus (c. 50—135 CE), Marcus Aurelius (121—180 CE), and
others collectively as “the Stoics.” This is a convention that I adopt in this chapter, though Stoic thought spans four centuries across both Greek and Roman civilizations, as well as Christian, Jewish, and pagan systems of thought.\textsuperscript{128} My aim is not to trace the development of Stoic thought about animals.\textsuperscript{129} Rather, following Chapter Two, I reveal and critique influential ontological assumptions and philosophical/rhetorical strategies that Stoic philosophers rely upon to evade explanatory crises arising from defending categorical differences between human and animal minds in the face of evidence to the contrary. The influence of Stoicism on the dominant tradition is supplemented with discussions of animal psychology in the works of Christian philosophers such as Origen of Alexandria (184—253), Augustine of Hippo (354—430), Basil the Great (330—379), Saint John Chrysostom (c. 349—407), and Saint Thomas Aquinas.

\section*{2.1 Stoic Worldviews: Singularity of Causation in the Animal Kingdom}

While it is far from unusual for ancient philosophers to paint the world in terms of rigid distinctions lacking a discernable middle ground (Malina and Neyrey 1996: 102-3), the degree to which this type of thinking informs Stoic philosophy is more pronounced than any of the figures discussed previously. Much of what the Stoics have to say about animals apparently stems from their general “argument of oppositions,” which assumes a \textit{de facto} division between everything “human” and everything “animal” (Newmyer 2011: 46). No friend of the Stoics, Plutarch (46—120 CE) describes this argument as follows: “just as the immortal is opposed to the mortal and the imperishable to the perishable, and, of course, the incorporeal to the corporeal; just so, if there is rationality, the irrational must exist as its opposite and counterpart. This alone, among all these pairings, must not

\textsuperscript{128} Staniforth 2003; Aberbach 2000; Sedley 1984, 2002; Vassányi 2011; Baltzly 2013

be left incomplete and mutilated.” The reason for the heightened significance of the final division is, of course, its presumed authority in reinforcing human uniqueness across the board. Plutarch critiques this “material objection from the Stoa” to all claims in favor of animal intelligence for what it is: an ontological chopping block rather than anything akin to a substantive reply.

It is because of this ontological worldview that Aristotle’s contention that humans are animals is absent in Stoic thought. Like Alcmaeon, Plato and Aristotle, the Stoics summed up all the capacities that animals lack as those that are rational, and all the capacities that animals possess as irrational. Yet unlike Aristotle, for the Stoics there is no question as to whether any capacities overlap between humans and animals; they do not. Even at the level of perception, humans have rational perception while animals have non-rational perception (Steiner 2005: 78-9), where “perception” in animals is often referred to with another word entirely: appearances. The Stoics deny animals beliefs, emotions, attention, primitive universals, and propositional attitudes of any kind, even going so far as to endorse the wholesale denial of memory to animals. These views follow from the shared contention that animal behavior is motivated entirely by impulse and appearances; even at the level of impulse, humans are said to have rational impulses while animals have irrational impulses (Gourinat 2007: 222-3). The aims of this section are to (1) explain the philosophical basis for these distinctions, (2) trace their conceptual history from ancient to medieval thinkers, and (3) argue that the human/animal distinction is axiomatic for the Stoics due to their collective acceptance of an influential principle informing all their discussions of animal behavior.

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130 On the Cleverness of Animals, 960c
In the philosophy of science, this principle is referred to broadly as the *singularity of causation*, whereby, “the same casual explanation applies to each and every instance of a class of events, regularities, or structures” (Greenwood 2015: 9). Variations on this explanatory principle are commonplace in historic and contemporary discussions of animal minds alike. Beginning with the Stoics, the actions of animals boil down to the same causal explanation: an irrational “governing principle” (*hegēmonikon*) utilizing pre-programed impulses to react accordingly to the presence of meaningless (“turbid and confused”\(^{131}\)) appearances in their respective environments. The Stoics never question the fact that their explanandum for animal behavior has one and only one explanation, which is far from obvious in the case of human behavior or physical motion.\(^{132}\) Indeed, the *hegēmonikon* does a lot of explanatory lifting for the Stoics in terms of their refusal to acknowledge variation in cognitive capacities from one species to the next, or that an animal’s environment and developmental history can influence behavioral repertoires.

Following Plato and Aristotle, the Stoics drew categorical distinctions between humans and animals relative to unique parts of the soul. The human soul, accordingly, has eight parts: the five senses, speech, reproduction, and a central “governing principle” (*hegēmonikon*). There is considerable disagreement about the precise function of the *hegēmonikon*, but it is clear that it acts as a sort of central processing unit that is the ultimate cause of organic behavior and—in humans alone—thought. A. A. Long (1996: 243), for instance, describes the *hegēmonikon* as somewhat analogous to the relationship between the brain and the central nervous system. Whereas the *hegēmonikon* serves a wide variety of unique functions in human beings, *i.e.*, reason, language, speech,

\(^{131}\) Seneca, *On Anger* 1.3.7

\(^{132}\) Thanks to John Greenwood for this point.
phantasia, calculation, practical wisdom, thought, and assent (Baltzly 2013), in animals, the hegémonikon consists entirely of self-interested “impulses” (hormē) stimulated by environmental “appearances” (aesthesis).133 This unsophisticated, yet widely applicable, function of the animal hegémonikon readily allows a singularity of causation for non-human behavior. The animal hegémonikon remains forever in its most elemental state: an instinctual instrument for self-preservation.

This idea has been present in Stoic thought since its inception around 300 BCE. Zeno of Citium (c. 334—262) believed that all beings are born self-interested and impulsive, but “when reason has been added to those creatures that are rational, life for them lived in accord with reason becomes the natural life.”134 If Diogenes’ reading is accurate, then for Zeno, reason functions as an “add-on” to the hegémonikon, granting unique abilities in humans. Newmyer, however, paints a different picture of the standard Stoic view, suggesting that the hegémonikon itself “develops into the faculty of reason” (2011: 164 [my emphasis]). In any event, it is clear that the Stoics believed humans have basic impulses for self-preservation too, but unlike animals, they can control and evaluate them by means of unique functions of their hegemonikon—most notably, the capacity for meaningful speech (which disallows moral contracts with animals) and the crucial role of assent in allowing for rational phantasia.

2.2 Stoic Worldviews: Assent and Constitution

For Zeno, in order to exercise even a modicum of freewill, one must possess the ability to assent (sunkatathesis) to certain sense perceptions over others; without this

133 “Every soul possesses a kind of ‘governing principle’ (hegémonikon), but [in animals] it is their life and sensation (aesthesis) and impulse (hormē)” (Stoicorum Veterum Fragmenta 2.821; qtd. Newmyer 2011: 4).
134 Diogenes Laertius, Lives 7.85
power, animals cannot form beliefs or experience community (*oikeiosis*), nor can they make decisions of any kind.\(^{135}\) There are four degrees of understanding in Zeno: perception, assent, grasping, and knowledge,\(^{136}\) and animals are not granted any of these—not even perception. While this sounds bizarre to modern ears, the argument upon which this uniqueness claim rests is that while the Stoics grant animals *appearance*, they choose to define each and every example of perception (*aesthesis*) as “an assent to appearance” (Sorabji 1993: 41). Without the ability to *assent* to appearances, animals are “carried away with their appearances,”\(^{137}\) and this makes the content of animal minds “turbid and confused” (*turbidas et confuses*).\(^{138}\) The notion of assent at play here is vague, but the underlying claim is that to *assent* to X means to *reflect* or *pass judgment* on X. Even though humans themselves are not always reflecting and judging, their ability to do so makes even their most basic perceptual experiences radically different from those of other species. Due to the *ad hoc* nature of this assumption, an important question is how one could tell the difference between *assenting to appearances* and *not rejecting appearances*.\(^{139}\) I provide examples below, for instance, where it is very difficult, if not impossible, to explain certain animal behaviors (e.g., identifying deceptive tactics in predators, or ignoring unreliable signalers) as *not* involving a rejection of appearances, or, as *not assenting* to how the world appears.

It was on this foundation that the Stoics deny belief, language, concepts, and rationality to animals—all of which require the capacity to *assent* (Sorabji 1993: 42).

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\(^{135}\) Cicero, *Academia* I. 11; II. 6, 24  
\(^{137}\) Clement of Alexandria, *Stromateis* 2.20, 110-111  
\(^{138}\) Seneca, *On Anger* 1.3.7; qtd. Sorabji 1993: 25; see also Inwood (1993: 73-4)  
\(^{139}\) Thanks to John Greenwood for this point.
Since animals lack memory as well, they exist in an eternal present. These arguments took hold in the 2nd century BCE, when the third head of the Stoic school, Chrysippus, took “particular interest in the intellectual capacities of animals” and, as a result, may be the figure most responsible for the Stoic’s hard-lined denial of reason to animals (Newmyer 2011: 3). While Aristotle said little about animal volition, the Stoics were the first in a long tradition to base the majority of their uniqueness and exceptionalism claims in this area; assent is necessary to exercise the slightest control over one’s actions or make even the simplest of choices. As Steiner (2005: 78) notes, “Animals cannot interrogate or hold back from appearances, but are moved immediately by them, whereas rational beings are capable of scrutinizing appearances and either assenting or withholding assent from them.” It seems to follow from Steiner’s interpretation that the appearances perceived by humans and animals alike are basically the same, but that humans alone can epistemically assent to (or reject) them.

The Stoics, however, offer good reason to believe that their account is more complicated. They also seem committed to the view that the capacity for reason (and thus assent) changes the way the world appears to animals. Unlike Aristotle, the Stoics maintained that humans and animals have different kinds of appearances. In line with their argument from oppositions, the difference between basic human perceptual faculties and basic animal perceptional faculties is categorical: irrational appearances and rational appearances. With respect to the former, the Stoics treat animals as receptacles for sensory impressions; they have no control over how to think or feel about them, or what actions to perform in response to them. Against Aristotle’s view of animal perception,

140 E.g., According to Seneca, “animals perceive only the time which is of greatest moment to them within the limits of their coming and going—the present. Rarely do they recollect the past—and only when they are confronted with present reminders” (Moral Letters 445).
sensory impressions elicit behaviors that are automatic, “pre-conceptual,” and lacking entirely in propositional content.\textsuperscript{141} Humans, on the other hand, are the only animals that have rational or cognitive appearances; namely, appearances that they can choose assent to. Sextus Empiricus (c. 160—210), many of whose works function as interlocutors with Stoic ideas, describes this position as follows: “One who has the \textit{cognitive appearance} fastens on the objective difference of things in a craftsman-like way, since this kind of impression has a peculiarity which differentiates it from other impressions,”\textsuperscript{142} \textit{i.e.}, from the “turbid and confused” perceptions of non-human species. Similarly, the Christian Stoic Origen (184—253 CE) argued that “Ensouled things are moved by themselves when an impression occurs within them which calls forth an impulse. […] A rational animal, however, in addition to its impressionistic nature, has reason which passes judgment on impressions, rejecting some of these and accepting others, in order that the animal may be guided accordingly.”\textsuperscript{143}

Two issues arise. First, rational appearances seem in danger of being infallible;\textsuperscript{144} and second, if humans and animals alike have appearances, but humans alone can assent and reject them, then it would seem—again—that appearances are common to both. If true, then the “irrational appearances” vs. “rational appearances” dichotomy is again put on shaky explanatory ground. These challenges compel the Stoics walk a thin line between granting some continuity between human and animal perception, while at the same time stating that these apparatuses generate appearances that are different in kind.

\textsuperscript{141} Cicero, \textit{Academica} 1.40-1. Also see Shogry (2014).
\textsuperscript{142} \textit{Against the Professors}, 7.51-2 [emphasis added]
\textsuperscript{143} \textit{On Principles} 3.1.2-3
\textsuperscript{144} Thanks to John Greenwood for this point.
Recall that Aristotle’s definition of phantasia readily allows for propositional content in animal perception, and, in doing so, he sees no problem granting perception a cognitive element. The Stoics, however, arguably see phantasia as exclusively human (Sorabji 1993: 22-25). Unlike the function of phantasia in Aristotle (i.e., that which “unifies” multiple impressions into single images and/or primitive universals with which animals navigate their environments\(^{145}\)), for the Stoics, it is only in humans that “the mind’s stock of conceptions is immediately activated when a sense-impression is received, with the result that the impression presents its object in conceptualized form” (Long and Sedley 2002: 1.140). How, then, do the Stoics explain complex animal behavior? Entirely with “appearance and impulse,”\(^{146}\) the latter of which arise part-and-parcel with species-typical constitutions (discussed below). But automaticity of response does not in itself mandate that animals perceive the world solely by means of vague, “turbid and confused” sensory impressions. Unlike Aristotle, the Stoics seem incapable of explaining not only the issue of how objects and events in their environments actually appear to non-human animals, but also how they reappear in the same way to them when triggered by associated impulses and environmental stimuli.

The most common translation for the Stoic use of phantasia is “presentation.” Humans alone have rational phantasia, whereby the world is “presented” in terms of propositional content that takes on meaning due to language—which is also necessary for thought. Following Plato, the Stoics define “thought” as “internal speech,” thereby denying it to animals.\(^{147}\) The capacity for language is hugely important for the Stoics, as it not only “serves to spell out in linguistic form the content of the object perceived”

\(^{145}\) On the Soul 3.8, 432a10-12
\(^{146}\) Philo, Allegories of the Laws 2.22-3
\(^{147}\) Sextus Empiricus, Against the Mathematicians, 8.275; Plato, Sophist 263e.
(Inwood 1985: 57), but—more fundamentally—allows propositional perception in the first place. When humans perceive the world, (1) their _hegēmonikon_ automatically translates perception into propositional content, which (2) the human is then able to evaluate by means of her rational faculties, *i.e.*, one chooses to assent to the presentation, reject it, or suspend judgment. In a radical turn from Aristotle, lions do not perceive oxen _as_ prey or _as_ food; in Stoic nomenclature, animals do not even “perceive,” because perception requires language to have meaning. As Epictetus claims, “the use of external impressions” is adequate for animals “to eat and drink and rest and procreate, and whatever else of the things within their own province the animals severally do.”

When Plutarch argues that this true of humans as well, the Stoics have nothing to say in reply. Another explanatory challenge arises from the fact that surely children perceive before they develop language, and linguistic deficits (*e.g.*, aphasias) do not lead to perceptual defects. Despite showing early interest in the similarities and differences between infant and animal cognition, the Stoics never address this point.

_Phantasia_ is rarely discussed in Stoic animal psychology, and when it is, it is described as _irrational phantasia_, or _phantasia hormetikê_ (“impulse-generating presentation”). According to the Stoics, “Animals can be _activated_ (energein), but cannot _act_ (prattein), evidently because there is no possibility of reason withholding assent” (Sorabji 1993: 53). This pared down _hegēmonikon_ functions as the singular cause of behavior in the animal kingdom. In contrast with Aristotle, there is no evidence

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148 *Discourses* 1.6.13-14
149 *On the Cleverness of Animals*, 3.19
150 Thanks to John Greenwood for this point.
151 Discussed in Section 7, below.
152 Sorabji 1990
153 Alexander _de Fato_ 205, 38; Simplicius _in Cat_. 306, 26.
that the Stoics discriminate between degrees or variations in mental capacities underlying
the behaviors of insects, dogs, or dolphins. “Dumb beasts, sluggish in other respects, are
clever at living,”\footnote{\textit{Moral Letters}, 121.24} writes Seneca, but they can hardly be called “clever” because they
cannot develop skills, think, or exercise the slightest control over their actions.

Central to Stoic animal psychology is the belief that “immediately at birth” all
animals “are born full-trained” with their complete behavioral repertoires, as well as an
innate impulse for self-preservation that quickly becomes manifest in behavior due to an
intuitive sense of their bodily “constitution.”\footnote{\textit{Ibid.}, 121.20-21} The notion of \textit{constitution (constitutionis)}
is vague, but its purpose is clear: it is the singular means by which the Stoics explain how
animals instinctively know how to breath, reproduce, use their limbs, flee from predators,
and find food, “for it is not likely that nature would make an animal alienated from
itself.”\footnote{\textit{Lives of Eminent Philosophers}, 7.85.} All spiders spin perfect webs from their first attempt and “the openings in all
honeycomb cells are identical in shape;” these “arts are born, not taught; and for this
reason no animal is more skilled than any other.”\footnote{\textit{Ibid.}} Note that Seneca does not distinguish
between the constitutions of insects and mammals; individuals of all non-human species
are born not only with their entire behavior repertoire, but also with constitutions that
pre-dispose them to automatically perform appropriate behaviors in appropriate contexts.

The same psychological worldview is present in Augustine’s \textit{Confessions} (c.
397—400), where animals are said to be born, “each in his own province,” with “instant
intelligence.”\footnote{\textit{Confessions} Ch. 7} Nearly a millennium later, it can also be found in Aquinas’ \textit{Quaestiones
disputatae de veritate} (c. 1256—1259). Aquinas’s view is that while “Reason is found
fully and perfectly only in man,” it is nonetheless only through the rational decisions of an *external* being—God—that “Brutes have a certain semblance of reason inasmuch as they share in a certain *natural prudence*.”\(^{159}\) In a similar fashion to Seneca’s contention that animals are “clever at living,” Aquinas writes of “the well-regulated judgment which [animals] have about certain things. But they have this judgment from a *natural estimate*, not from any deliberation, since they are ignorant of the basis of their judgment.”\(^{160}\) My contention is that Aquinas’ vague notion of a “natural prudence” or “natural estimate” lying behind all animal behavior shares a conceptual history with Augustine’s reference to the “natural intelligence” indicative of each animals’ “province;” both clearly originate from the Stoic notion of *constitution*.

Remarkably, it follows that animals are incapable of learning from experience. Seneca claims that the ability for animals to deal with predators is “not reached […] by experience” because “the teachings of experience are slow and irregular, but whatever Nature communicates belongs equally to everyone, and comes immediately.”\(^{161}\) Since the Stoics held this radically counter-intuitive view, it makes no sense to speak of “skills” outside of human beings; animals are no more “skilled” in their movements than are plants. From this it follows that “animals of the same species would always act in a similar way, even if they were isolated from other examples of their species” (Gilhus 2006: 39). Since “nature’s assignments are always uniform,”\(^{162}\) the capacities of “animals” can be discussed without recourse to individual or species (with the exception of species-typical constitutions).

\(^{159}\) *De veritate* q.24, art. 2 [emphasis added]

\(^{160}\) *Ibid.*

\(^{161}\) *Moral Letters* 121.20-21

\(^{162}\) *Ibid.*
Stoic explanations for animal behavior thus assume a singularity of causation in the animal kingdom. Environment and developmental history are wholly unrelated to behavior, which never varies from a species’ innate repertoire, i.e., the behavior of individuals in species and/or environment X are explained by the same principle or mechanism as is used to explain the behavior of individuals in species and/or environment Y.\textsuperscript{163} While it is would not be inconsistent with this account to grant that the same behaviors could have distinct causal explanations given diverse environmental triggers, the Stoics are seemingly uninterested in expanding their explanatory apparatus beyond simply evoking key terms such as constitution, irrational appearances, and irrational impulses—all of which, under the auspices of the irrational hegēmonikon—boil down to one and same explanatory principle for animal behavior.

A strong case can be made that whatever little behavioral variation the Stoics do grant to the animal kingdom is largely a chimera, since the “subjects” of those behaviors are not properly subjects at all. For pagan and Christian Stoics alike, animals are ultimately a class of objects—their collective purpose on earth is to be used by humans, and analogous to the growth of crops, their movements and fates are entirely dictated by the will of God—a long-running panacea to explain away apparently complex animal behaviors that arguably begins with the Stoics. Of course, since everything is presumably the will of God, this is hardly an explanation at all.

This line of thought reached its apex in the late medieval thought of Saint Thomas Aquinas, where it also took a bizarre turn. Like his predecessors, Aquinas evokes as if rhetoric in claiming that while animals act “as if endowed with reason” and often show “certain marks of sagacity,” all appearances of animal intelligence are deceptive; the

\textsuperscript{163} An exception may be the Stoic notion of “imprinting,” discussed below.
movements of animals are comparable to the movements of clocks \([\text{in motibus horologiorum}]\), since God’s creation of irrational animals is analogous to the uniquely human ability to likewise bring irrational things into the world.\(^{164}\) Unlike the Stoics, however, Aquinas held that because animals are the creations of a rational being (God), the behaviors of animals \textit{are} rationally motivated. The claim that animals are “moved by reason” despite being “without reason” is undoubtedly a clever response to the crisis that emerged from Aristotle’s writings on animals; for this reason alone, “certain animals are called prudent or sagacious; and not because they reason or exercise any choice about things. This is clear from the fact that all that share in one nature invariably act in the same way.”\(^{165}\) Contrary to the Stoics, then, animals have “imperfect volition,” which means that while they behave “without making any choice,” there \textit{is} a sense of choice or judgment resting \textit{somewhere behind} animal behavior by virtue of their natural constitution ordained by a rational being.\(^{166}\) Just as there is reason behind the movements of clocks, so too is their reason behind the movements of animals.\(^{167}\)

Several centuries before Aquinas was born, explanations of animal behavior in terms of the will of God were mainstream in the cultural milieu of Roman times. It is not surprising, then, that some Stoic and Christian philosophers worked this idea into a strategy for denying cognition to animals. Throughout the Roman Empire it was commonplace to interpret a wide variety of animal behaviors in terms of “forces that were external to the animals” who were “not conceived of as acting freely” but rather “as little more than vehicles of meaning” and “instruments of superior powers” (Gilhus 2006: 96

\(^{164}\) \textit{Summa Theologica} 1-2, q. 13. art 2
\(^{165}\) \textit{Ibid.}
\(^{166}\) \textit{Ibid.}
\(^{167}\) \textit{De veritate} q. 24, art. 1
When instinct proved to be an unsatisfactory casual explanation, augury was an immensely popular means to interpret anomalous behaviors of animals. For instance, Aquinas cites Syrian monk John of Damascus (c. 675—749) in stating his contention that “animals do not themselves have the mastery over their own inclination. Hence ‘they do not act but are rather acted upon’ [non agunt sed magis aguntur].” Whether or not animals are vehicles for God’s messages is irrelevant here; the point is that it was commonplace for nearly two thousand years to view animals as vehicles of forces external to their bodies. To this end, the early pagans and the late Christians—from Zeno to Aquinas—are in agreement in positing something akin to a singularity of causation throughout the animal kingdom. This overarching worldview undoubtedly influenced the dominant perception for much of recorded history that animals are incapable of exercising control over their own actions.

3. Stoic Strategies: Expanding the Province of Reason

By making assent a necessary condition for perception, and thereby restricting content in animal minds to their vague notion of irrational appearances, the Stoics have left themselves very little room not only for explaining seemingly complex behaviors like deception, but also relatively simple ones. For instance, ancient zoologists knew that alarm calls are important features of the daily lives of most social animals. Very often animals react to these calls by fleeing, of course, but it is also typical for individuals to ignore them, such as when issued from infants, new group members, or unreliable

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168 De veritate. q.22 art. 4
169 History of Animals 8, 620a29-33.
signalers, or when the threat is perceived to be far away and/or marginal. Stoic philosophers may not have known this, but that is irrelevant with respect to their inability to explain these behaviors. At least three critical points can be raised.

First, varied reception of alarm calls makes little sense without granting animals some ability to assent to, and withhold assent from, appearances. Regardless of the degree of control that, say, baboons, vervet monkeys, and mongooses may have over their behaviors, members of these species perceive the alarm calls of conspecifics contextually, selectively responding to some vocalizations while refusing to respond to the identical vocalizations in others. Similarly, the ability to avoid deception requires some capacity to discern misinformation between very similar appearances, e.g., a dead animal and an animal feigning death; this form of deception is very common across the animal kingdom (Miyatake et al. 2004). Another common form of deception as a defense mechanism can be observed in cephalopods. A particularly good example is the Indo-Malayan “mimic octopus” that changes colors to imitate the appearance of more dangerous predators (Norman et al. 2001; Norman and Hochberg 2005). What the alarm call cases and the deception cases have in common is that, to avoid becoming lunch, a great many animals need some capacity to withhold assent to appearances. According to the Stoics, assent is uniquely human because it involves rational judgments, however by defining the requisite conditions for “perception” as such, their theory lacks the explanatory power to explain why the vervet receiver does not act when the unreliable sender elicits the same stock alarm call that a reliable sender does. What’s more, the very notion of an “unreliable sender” makes absolutely no sense without granting animals the

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170 E.g., see Julie Kern and Andrew Radford (2017) on “immigrant” socialization and alarm call credulity among South African mongooses.
171 Cheney and Seyfarth 1990, 2007; Kern and Radford 2017
ability to learn from experience. The ability to withhold assent is presumably also necessary to pass a “delayed gratification” experiment, and many studies in recent years have shown that chimpanzees and capuchin monkeys can learn to resist acting upon their desires for an immediate reward in favor of waiting for a bigger reward (Beran 2013).

Second, our hypothetical Stoic explanation becomes weaker still when we incorporate their claim that the content of alarm calls must be non-propositional, arising in the form of irrational appearances that humans can say nothing about. Sorabji observes that, for the Stoics, “A lekton [proposition] is defined as corresponding to a rational appearance, and rational appearances are apparently confined to rational animals,” implying that the “non-rational appearances” of “non-rational animals” are “not conceptualisable at all, and a fortiori not conceptualisable as propositions” (24-5). In short, it is common to read the Stoics as saying that the content of animal minds is so chaotic and fuzzy that it could not possibly be translated into concepts and propositions. As a result, it is wrong to attribute to animals propositional content of any kind.

Recall Aristotle’s acute observation that the signals of certain birds communicate both the location and/or type of the predator. As Aristotle recognized, animal signals “convey information” and while he agreed with the Stoics in denying language and speech to animals, Aristotle did not then claim that language is necessary to perceive features of one’s environment as X or Y. While Aristotle attributed propositional content to perceptual experience in both humans and animals, the majority opinion among ancient scholars is that none of the long line of Stoics adopted this general strategy. This dominant interpretation is based on two points: (1) the fact that the Stoics denied

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172 Parts of Animals 660a35-660b2
173 Inwood 1985: 73-4; Long and Sedley 1987: 240;
anything akin to primitive universals to animals, which Aristotle saw as necessary to perceive things as $X$ or that $X$, and (2) the Stoic assumption that propositional attitudes and thoughts of any kind must be capable of being put into language in order to have meaning. As a result, not only can humans adduce nothing about what such calls communicate, but the calls themselves are not strictly communicative, i.e., they carry no discernable content. This is obviously extreme, as successful signaling systems of this sort require at least that the receiver attain information about where to flee from. Not only would the Stoics struggle to explain how we can be certain of this fact, they would also struggle to explain why different animals intuit the same call differently, e.g., if they are safe in a tree or unconvinced of the call’s accuracy. Further, even if we grant that alarm calls are inflexible and strictly impulsive, it is surely unreasonable to add that we cannot make informed statements about the content of these calls. The Stoics reject the accuracy of inferences from markedly simple observations, e.g., signal X is used in the presence of predator type Y, and signal P is used in the presence of predator type Q, therefore, in some sense, the receiver interprets the calls as $X \rightarrow Y$ and $P \rightarrow Q$.

One might be tempted to view the Stoic position as a nascent version of contemporary discontinuity theories by Stephen Stich (1978), Donald Davidson (1982), and Daniel Dennett (1996), all of whom—like the Stoics—deny propositional content to animals on the basis of lacking language. Stich, for instance, argues that attributing specific content to animal minds is epistemically irresponsible, i.e., if we cannot access the content of animal minds, to what extent can we call it propositional? This is no doubt an intriguing question, but—unlike Aristotle’s detailed discussion of phantasia—there is no evidence that the Stoics considered it to be worthy of much consideration. The Stoics
were uninterested in epistemic issues about animal minds. To the contrary, it seems clear that they conceived the subject as too simplistic to provoke issues of that nature, thus further attesting to their general close-mindedness.

In contrast, Stich (1978) offers a more flexible position by granting that there may exist explanatory contexts in which animals can be attributed propositional attitudes such as beliefs, namely, if the sole purpose of this attribution is pragmatic, i.e., to help explain how animals navigate their environments. Stich makes this claim despite remaining firm in his personal contention that attributing beliefs requires access to the content of those beliefs and “nothing we could discover would enable us to attribute content to an animal’s belief” (23). Even next to Stich’s global skepticism, the Stoic view is distinctively hard-lined: nothing underlying animal behavior has meaningful content. The same can be said of comparisons between Stoics and the classic ethologists and behaviorists, who agreed that the content of animal minds is inaccessible. Unlike the Stoics, though, “[t]he ethologist does not want to deny the possible existence of subjective phenomena in animals, he claims it is futile to present them as causes, since they cannot be observed by scientific methods” (Tinbergen 1951: 5). The difference, then, is that 20th and 21st century thinkers make this claim on epistemic grounds (i.e., we cannot access the content of animal minds), whereas the Stoics are straight dogmatists: the content of animal minds, gestures, utterances, etc. is actually meaningless.

Taking stock, the Stoics forward an unattractive uniqueness claim about human perception: the capacity to assent to appearances is required to perceive the objects and events in world as token members of previously experienced kinds or as reliable

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174 To be clear: Stich does not grant reality to propositional attitudes assigned for this purpose.
175 For an alternative to Stich’s skepticism, see David Armstrong (1973).
indicators of future events, *e.g.*, certain types of branches *as* stable, and other types of branches *as* unstable, or, the alarm call *as* indicative of an aerial predator and the need to find shelter. Without rational assent functioning somewhere in the background of everyday perception, the world appears as “turbid and confused” bundles of sense data, which function as triggers for pre-conditioned, instinctive responses to, presumably, particular washes of color, sounds, movements, smells, tastes, and tactile sensations. This theory of perception lacks the explanatory power to account for common behaviors in the animal kingdom. What’s more, it is by virtue of defining perception so exclusively that the Stoics find themselves committed to the unnecessarily strong claim that animals do not learn from experience.

4. Stoic Strategies: Semantic Anthropocentrism

Defining perception in terms of rational assent is therefore a gross exaggeration of the requisite cognitive apparatus needed to perceive objects in the world. Unfortunately, determining the definitions and criteria for cognitive capacities at the highest human ability in order to deny them to animals remains a common strategy to defend uniqueness claims. Cameron Buckner (2013) and Kristin Andrews (2015) refer to this issue as *anthropofabulation* in cross-species comparisons, *i.e.* an “overestimation” or “confabulation of our own typical cognitive abilities,” that can preclude the discovery of potential continuities with other species (Andrews 2015: 44). Anthropofabulation is a cognitive bias whereby researchers overestimate facets of human cognition and underestimate facets of non-human cognition; crucially, the former often bears a close relationship with the latter. For instance, by defining “memory” as “recollection” the

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176 Sextus Empiricus, *Against the Logicians* (II. 396-8).
Stoics find themselves in the thorny situation of explaining how what looks like memory in animals is not really memory at all (a situation Aristotle avoided by arguing that memory arises in different kinds and degrees of strength across the animal kingdom). By overestimating facets of human memory (clearly, not all functions of memory involve recollecting past events), the Stoics implicitly underestimate the capacity for memory in other species.

When this is the case, anthropofabulation can lead to semantic anthropocentrism, i.e. “precisifying vaguely-defined psychological terms to the highest human-level ability” (Buckner 2013: 861). This critique is becoming common in the contemporary literature. The intimate relationship between semantic anthropocentrism and anthropofabulation is highlighted by Donald Griffin (1981: 11-2), who identifies a “double standard” in comparative psychology wherein definitions for concepts are often derived from “the most complex levels of understanding known to human thinkers,” however “meeting these requirements would eliminate many members of our own species.” Likewise, Sorabji (1993: 22-3) notes that if the Stoics deny propositional attitudes and primitive universals to animals because they cannot verbalize their thoughts, then they must also be committed to the view that infants and many adult humans likewise lack these rudimentary capacities. I explain below how at least one Stoic was self-critical of their school for precisely this reason, as well as how contemporaries such as Plutarch explicitly denounced the Stoics for confabulating their cognitive terminology to unfairly promote human exceptionalism.

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177 E.g., in theory of mind debates, Hutto et al. (2011: 15) claim—correctly, in my opinion—that, “…mindreading proposals overly intellectualize what is involved in our basic encounters with others.”
Though progressive in being the first to discuss comparative psychology,\textsuperscript{178} the Stoics ironically define the terms “memory” and “emotion” such that human infants cannot satisfy them. Beginning with the former, recall Aristotle’s belief that most everyday acts of memory are the result of perceptual, rather than rational, faculties. This follows from Aristotle’s general strategy of reducing the complexity of common human cognitive abilities as far as possible in order to use them to explain the behavior of other animals. The Stoics, on the other hand, argue that all memory involves both recollection\textsuperscript{179} and assent\textsuperscript{180} effectively defining memory such that it cannot be attributed to non-human animals. The idea that memory always entails acts of recollection is extreme, and it is difficult to think of an impetus for this decision other than the desire to promote human exceptionalism. As with emotions, intention, and preparation, the Stoic approach to memory “consists of redefining what animals can do. They lack genuine memory; what they have is only perceptual recognition,” \textit{i.e.}, \textit{appearances} (Sorabji 1993: 52). Perhaps a better way of putting this is that the Stoics took it upon themselves to redefine what animals cannot do, since granting memory to animals was commonsense to Plato, Aristotle, and even Xenophon, originator of the “man alone among the animals commonplace.”

Seneca explains the Stoic view of memory as follows: “The dumb animal grasps what is present by its senses. It is reminded of the past when it encounters something that alerts its senses. Thus the horse is reminded of the road when it is brought to where it starts. But in its stable it has no memory of it, however often it has been trodden. As for

\textsuperscript{178} \textit{Moral Letters}, 121
\textsuperscript{180} \textit{Academics}. 2.38.
the third time, the future, that does not concern dumb animals.”\textsuperscript{181} Note the ontological invariance in Seneca’s reference to all animals possessing precisely the same cognitive apparatus for memory. In contrast, recall the various degrees (“traces”) and kinds of memory that Aristotle grants throughout the animal kingdom, as well as the varying influence memory-power exerts on other capacities, such as phantasia and phronesis. Also note that Seneca’s claims here are not incompatible with granting animals memory. The fact that animals can be “reminded” of things presumes that those things were stored somewhere within them for use in guiding future behavior, which is all Aristotle meant when he defines basic memory as a perceptual capacity. The difference, ultimately, boils down to a matter of semantics and hardheaded anthropocentrism on behalf of the Stoics.

The Stoic definition of emotion is also counter-intuitive and overly intellectual. According to the “official Stoic view,” “genuine emotion” is a voluntary process by which rational beings “assent” to moral beliefs issued forth by means of a “rational will” (voluntas) (Sorabji 1993: 58-61). There are at least two counter-intuitive claims here: (1) emotions are voluntary phenomena, and (2) only beings capable of moral deliberation can experience emotions. Combined, the implication is that the mere experience of pleasure or fear is not rightly called an emotional experience; the experience only becomes emotional when accompanied by the additional judgment that the pleasure is good or the fear is justified. By defining emotions as “judgments,” Stoic thought anticipates 20\textsuperscript{th} and 21\textsuperscript{st} century views, such as C. D. Broad’s (1954) description of emotions as “affect-laden judgments” as well as cognitivist theories of emotions such as those of Robert Solomon (1980), Jerome Neu (2000) and Martha Nussbaum (2001). But as Aristotle’s follower Aspasius (c. 80—150 CE) rightly critiques the Stoic doctrine, apprehension may not be a

\textsuperscript{181} Moral Letters 124, 16
necessary condition to possess emotions; humans (and presumably animals) can feel that something is “pleasant or distressing, even before there has been assent and apprehension.”\footnote{Aspapasius qtd. Sorabji 1993: 57.} This is a fair point. Chrysippus, for instance, defined “emotions” as “certain judgments about the presence of good or harm,”\footnote{Porphyry, \textit{On Abstinence from Animal Flesh} 3.22} and, interestingly, seems to have later realized that this definition was easy bait for his opponents, not only because it was too broad to account for all \textit{human} emotions, or because mental states can satisfy that definition without necessarily being emotional, but also because animals appear to be emotional beings, so it seems to follow that they might then also be rational. As a result, Chrysippus had to “had to modify his definition” of emotion as a particular \textit{kind} of judgment indicative of a more immediate or urgent manifestation of the rational faculties (Sorabji 1993: 60). As Sorabji tells the history, the Stoics’ opponents…

\ldots seized on the unfortunate consequence of Chrysippus’, and even Zeno’s, view that animals can no longer be assigned emotions. Conversely, Plutarch reports the argument that, since animals obviously \textit{do} have emotions, they might have reason. Once again if the Stoics were to answer the problem, they would have to \textit{redefine} the mental capacities of animals, just as they had done for memory and preparation.\footnote{Sorabji (1993: 60 [emphasis added]).}

Opposition to the Stoic view of emotions can also be found within the extant fragments of one Stoic philosopher: Posidonius, who was no stranger to criticizing Stoic dogma (Newmyer 2011: 166). Adopting a similar line of reasoning as Aspasius, Posidonius critiques Chrysippus on the basis that (1) Stoic criteria for emotions are too high since, on this view, “most Stoics agree that not even children possess emotions since they too are obviously not yet rational,” and (2) it is “in conflict with clear observable fact” to deny emotions to animals and infants; as a result, Posidonius calls his own
school’s doctrine “manifestly false.”\(^{185}\) Posidonius’s reasoning follows from what he takes to be common sense comparative psychology: just as certain behaviors of human children can clearly be motivated by emotions, \(e.g.,\) anger, this is also “clearly observed” in animals. Elsewhere, Posidonius again attacks the Stoic leader directly: “Chrysippus does not think that the emotional aspect of the soul is distinct from the rational, and so deprives irrational animals of emotions, although it is obvious that animals are governed by desire and anger.”\(^{186}\) While I do not agree that it is “obvious” that all human emotions can be attributed to animals, Posidonius’ theory of the emotions is amongst the most progressive of ancient philosophers.

According to Posidonius, “the emotional aspect of soul” slowly changes over the course of ontogeny, from being irrational (in children and animals alike) to rational (only in human adults). He compares the development of the emotional faculty to a “run-away horse carried off its rider by force, but then as it both tires and in addition becomes sated with its desires, the rider regains control”—which, Posidonius writes, “is a common observable practice” as humans grow up, yet “on such matters Chrysippus was stuck, because he was unable to refer their causes to an emotional faculty of mind.”\(^{187}\) Posidonius is right to challenge the explanatory ability of the Stoic doctrine to account for the discernable grey area between the emotional cries of infants and animals and the (often) more reasonable manifestations of emotional behavior in adulthood. Note how the type of explanation Posidonius demands is causal; the closest analog in modern science to an “emotional faculty of mind” is the amygdala of the limbic system, which—though now controversial as the principle source of homologies between human and non-human

\(^{185}\) *The Fragments*, 157  
\(^{186}\) Ibid. Fragment 33  
\(^{187}\) Ibid. Fragment 227
emotional experiences\textsuperscript{188}—is presumably the sort of isolated emotion center that Posidonius found lacking in Stoic dogma. Unlike Aristotle, who identified certain emotions with the perceptual faculties and others with the rational faculties,\textsuperscript{189} and the Stoics, who saw all emotions as rational, Posidonius evidently created a third option. Indeed, Posidonius even performs some early comparative psychology in arriving at his stance about human and animal emotions being continuous due to their sharing “natural affinities” for similar behaviors traceable to this common “emotional faculty of mind.”\textsuperscript{190} Posidonius seems to be the only Stoic whose theory of the emotions was driven by empirical concerns.

The important point is not merely that Posidonius held progressive views for an ancient Stoic, but that he was acutely aware of the same “distinct bias that loads the deck against animal mentality” that Buckner, Andrews (2015), and Boesch (2007, 2008) recognize in the contemporary literature, namely, “our tendency to tie the competence criteria for cognitive capacities to an exaggerated sense of typical human performance” (Buckner 2013: 853). According to Stoic dogma, to experience emotions one must be capable of making rational judgments, and to have memory one must possess the capacity for recollection. Posidonius the Stoic, Aspasius the Aristotelian, and—as I will show in a moment—Plutarch the Neoplatonist, belonged to rival schools, yet all recognized that not even humans satisfy these criteria when having emotional experiences or using memory.

\textsuperscript{188}LeDoux and Brown, 2017

\textsuperscript{189}Fortenbaugh, 1971; Nussbaum, 1996

\textsuperscript{190}E.g., “These facts certainly do not follow logically from Chrysippus’ doctrines […] But all children rush untaught towards pleasures, avert themselves and flee from pains. We see them raging, kicking, biting, wanting to win and boss other children, like some animals, where no other prize is on offer but only victory” (Fragment 230).
This frustration with the Stoics was clearly felt by their contemporaries. Plutarch, for instance, lodges the following critique, which demonstrates that he was well aware of (1) the explanatory crisis of accounting for all animal behavior strictly by means of the perceptual capacities, and (2) that one of the Stoics’ key strategies for dealing with this crisis involved “repeatedly defining” terms related to human cognitive abilities such as memory, emotion, preparation, and conceptual knowledge (among others) in order to reinforce traditional claims of human exceptionalism:

But suppose it true that perception does not need intellect for its work. Still, when perception has finished engendering in the animal the distinction between what is foreign to it and what properly belongs, what is it that then remembers and fears the painful and longs for the beneficial, contriving, if that is not present, to secure its presence among them, preparing lairs and refuges, and again traps for prey and escape routs from attackers? And yet those very authors [the Stoics] rasp our ears by repeatedly defining in their Introductions “purpose” as “an indication of intent to complete,” “design” as “an impulse before an impulse,” “preparation” as “an act before an act,” and “memory” as “an apprehension of a proposition in the past tense of which the present tense has been apprehended by perception.” For there is not one of these terms that does not belong to logic; and the acts are all present in all animals as, of course, are cognitions which, while inactive, they call “notions,” but when they are once put into action, “concepts.” And though they admit that emotions one and all are “false judgments and seeming truths,” it is extraordinary that they obviously fail to note many things that animals do and many of their movements that show anger or fear or, so help me, envy or jealousy. They themselves punish dogs and horses that make mistakes, not idly but to discipline them; they are creating in them through pain a feeling of sorrow, which we call repentance.191

Plutarch’s sensitivity to the power of language to influence theories is impressive. Like Posidonius, Plutarch is critiquing the Stoics not only on the inability of their over-intellectualized approach to animal behavior to provide satisfactory explanations for animal behavior (i.e., if not X, then what?); he is also attacking their strategy of defining terms in such a way that the capacities they represent are de facto denied to animals. Remarkably, Plutarch challenges the Stoics on their refusal to use mentalistic language to discuss animal behavior, e.g., there is no “preparation” in animals, but rather “an act before an act,” and animal behavior lacks “purpose” but displays “an indication of intent

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191 On the Cleverness of Animals 961C [emphasis added]
to complete.” Critiques of this nature would be at home amid the backlash against behaviorist terminology during the cognitive revolution of the mid-20th century.192

Sorabji (1993: 26) focuses on Seneca in particular as a figure that often employs the “method” of “downgrading the mental capacities of animals by a process of redefinition.” Seneca claims that although animals often appear to be angry, they are not really capable of this emotion because they are irrational, and “anger involves rational assent to the appearance of injustice” (ibid.).193 He does recognize that this interpretation is contrary to popular belief about animals,194 but Seneca is adamant that genuine (i.e., human) emotion is not “unintelligible, disorderly and incapable of words,” but rather—in the case of anger—it is “the subsequent striving which not only receives the appearance of injustice but approves it that is anger; [anger is] the incitement of a mind proceeding to vengeance by will and judgment.”195 It is not clear why approval is a necessary condition for anger (and, furthermore, what exactly this means).

In contrast, Aristotle did not find it necessary to include approval or reflection upon the specific pain, harm, or injustice that triggers an emotional response for that emotion to qualify as “anger;” according to Aristotle, the “appetite for returning pain for pain” is a formal, final, and efficient cause for anger (with boiling blood around the heart as the material cause).196 Furthermore, when Aristotle writes of cases where “faint or feeble stimulations produce these emotions, viz. when the body is already in a state of tension resembling its condition when we are angry,”197 he is conceiving of anger as

192 E.g., in the technical idiom of classic ethology, “to say a goose is ‘alarmed’ only means that it has ‘perceived a flight-eliciting stimulus’” (Crist 2000: 122).
193 On Anger, 1.3.4; 2.3-4; 1.3.7.
194 Ibid. 1.3.3-8
195 Ibid. 1.3.7; 2.3.5
196 De Anima, I, 1, 403a, 26-403b, 4. Thanks to John Greenwood for this reference and point.
197 Ibid. I, 1. 403a, 21-23
arising within a spectrum of distinctive emotional contexts—an interpretation not unlike
his pluralistic definitions of *phantasia* and *phronesis* (Steiner 2005: 74). Perhaps Aristotle
grants that animals experience “states of tension” analogous to human anger, or, perhaps
his final word on the matter excludes animals because they cannot experience injustice.

To Seneca’s point, there is an important distinction to be made between the
feeling of injustice that he is referring to under the name “anger” and the ferociousness
underlying animal behaviors, and perhaps the former is uniquely human.\(^{198}\) The main
problem is not that Seneca denies animals the capacity to experience anger. There is a
legitimate philosophical and scientific discussion to be had there. James Averill (1983,
2012) has, for example, written eloquently of the distinction between anger and
aggression and, indeed, Seneca himself argues that animals do not get *angry*; they
become *aggressive*.\(^{199}\) Seneca’s semantic sensitivity, again, bears resemblance to what
were perceived by behaviorists and cognitive ethologists of the early 20\(^{th}\) century as
scientifically responsible means of avoiding anthropomorphic rhetoric. The problem is
that when it comes to the broader term “emotion” this sensitivity is entirely absent.

Seneca assumes that all emotions should be defined in the same way. Just as
Seneca “redefined animal memory,” he also redefined emotion as a four-stage process
(Sorabji 1993: 60). The first stage involves the perceptual appearance of something *as
good or bad;* the second involves an *impetus* (involuntary reaction) of the mind; the third
involves voluntary and rational assent or judgment of the mind; and the fourth involves
“an uncontrollable surge that carries us away” (*ibid*.). According to Seneca, animals
cannot experience the third stage and therefore cannot experience emotions; their

\(^{198}\) Though note the ingenious experiments on fairness behaviors in rhesus macaques by Brosnan and de

\(^{199}\) *On Anger* 1.3.4-7
experiences are, presumably, resigned to stage four. Animals do not have emotions, but “certain impulses similar to these emotions,” since emotions are “born only where reason dwells.”\textsuperscript{200} Returning to Plutarch’s critique of the Stoics: if not X, then what? Seneca’s reply is clearly lacking. Redefining all instances of what appears to “anger” in animals as “aggression” is one thing, but redefining all instances where animals appear to show “emotion” as \textit{not really} emotions, but “certain impulses similar to emotions,” evokes the same general strategy only to frustratingly vague effect. Sorabji (1993: 61) thus rightly claims that this view is “entirely implausible,” because “it is uneconomical to suppose that human anger always involves the extra act of assent.” The same criticism applies to Seneca’s claim that animals do not experience “fear” because one needs to understand \textit{why} one is afraid in order to feel genuine fear—arguably another case of semantic anthropocentrism.\textsuperscript{201} Like anger, this example highlights a counter-intuitive element of the Stoic view: there is no such thing as irrational emotions (only irrational impulses).

While Aristotle and the Stoics alike argue that the difference between humans and animals can be conceived along the dichotomy between rational and perceptual faculties, their approaches to this end are very distinct. Nowhere does Aristotle employ the Stoic strategy anthropocentrically gerrymandering the definitions of cognitive capacities to create as many discontinuities in nature as possible by \textit{redefining} human capacities to a level unattainable to animals (as well as some humans and infants).

\begin{flushright}
\textsuperscript{200} \textit{Ibid.} 1.3.4-7 [emphasis added].
\textsuperscript{201} \textit{Ibid.} 121.19. However, for entirely different reasons, see LeDoux and Brown (2017) for a neurological defense of how animal fear may be disanalogous with human fear.
\end{flushright}
5. Stoic Strategies: As if Rhetoric and Early Opposition to Arguments from Analogy

In the previous chapter, I noted how the phrase as if (hôsper analogisamenoi) is a common fixture of Aristotle’s discussions of animal minds, and is somewhat indicative of open-mindedness on his part. Here, I show how the Stoics use the same rhetoric to a very different end: to emphasize that appearances can be deceptive, since like-behaviors do not necessarily follow from like-causes. Aristotle, of course, recognized this too, but the Stoic response to their opponents’ uses of “the argument from analogy” (Povinelli 2000) is a model of epistemic extremism. An amusing passage from Plutarch’s On the Cleverness of Animals (c. 100 CE) reveals how frequently the Stoics employed as if rhetoric to do the heavy lifting in their arguments. The book opens in medias res as the main character asks a group of hunters to recall a conversation they had the previous day about whether “all animals partake in some manner of thought and reason” like humans do—the very reason that hunting requires such skill. The text itself is structured as a staged debate between a Platonist and a Stoic. At one point, the judge Autobolus challenges the ubiquity of “as if” thinking in Stoic rhetoric:

As for those who foolishly affirm that animals do not feel pleasure or anger or fear or make preparations or remember, but that the bee ‘as if’ remembers and the swallow ‘as if’ prepares her nest and the lion ‘as if’ grows angry and the deer ‘as if’ is frightened—I don’t know what they will do about those who say that beasts do not see or hear, but ‘as if’ see or hear; that they have no cry but ‘as if’; nor do they live at all but ‘as if’. For these last statements (or so I believe) are no more contrary to plain evidence than those that they have made.

Plutarch’s challenge to the Stoic’s use of as if rhetoric is to make reductio ad absurdum claims out of their arguments, i.e., application of this rhetoric to all instances of animal behavior is unfair because it leads to absurd conclusions that are either obviously true

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202 Sorabji 1993: 14; Newmyer 2011: 7; Steiner 2005: 72
203 John Greenwood comments, “This is rich coming from folks who claim that a single type of explanation [accounts] for all animal behavior.”
204 On the Cleverness of Animals 960a
205 Ibid. 961e-f
(e.g., animals feel pleasure), or, conclusions that are not readily deniable (e.g., animals do not prepare for future events). Since the Stoics are extreme in their denial of practically all human capacities to animals, Plutarch’s response has teeth in this context. I do not, however, think that this is an effective response in general.

The problem with Plutarch’s reply is that he himself comes across as dogmatic in assuming that all arguments from analogy are equally strong in comparative cognition. This hasty assumption gains notoriety in David Hume’s (1711—1776) contentious stance on animal minds, i.e., because we see “other creatures, in millions of instances, perform like actions, and direct them to like ends, all our principles of reason and probability carry us with an invincible force to believe the existence of a like cause.” Continuity theorists like Plutarch and Hume rely upon the assumption that since the behavior of other animals often resembles our own, and behavior is always the effect of some act of mental causation, we are justified in inferring that the mental lives of other animals resemble the mental lives of our species because like-effects regularly follow from like-causes. This line of reasoning was later made infamous by Charles Darwin (1809—1882) and George Romanes (1848—1894), but quickly became anathema to scientists and philosophers alike in the early 20th century, and with good reason.

Right from the beginning of Plutarch’s response he equates the likelihood of the claim that ‘animals appear to feel pleasure therefore, like humans, they feel pleasure’ with the likelihood of claim that ‘animals appear to get angry therefore, like humans, they experience anger.’ Yet as discussed above, the Stoics and Aristotle may well be correct to draw a uniqueness claim at the capacity for anger; there is at least a substantive argument to be made there. What’s more, despite the fact that there is now strong evidence that

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206 A Treatise on Human Nature, I.3.16
some animals prepare for the future, we can lodge a similar critique at Plutarch’s unqualified assumption that animals obviously do this, too—as if analogies between humans and animals feeling pleasure and preparing for the future are on similar or equal evidential footing. So while Plutarch comes off as more open-minded than the Stoics toward the possibility of animal mentality, he is equally dogmatic in his contention that cognitive continuities are prevalent in the animal kingdom. The tenor of Plutarch’s critique is similar to Hume’s claim that “no truth appears to me more evident, than that beastes are endw’d with thought and reason as well as men.” Both the Stoics and Platonists falter in believing that all arguments from analogy are created equal, despite being on opposite sides of the fence.

The proper response to clarifying instances of as if rhetoric is to challenge its author on epistemic grounds, i.e., if the discontinuity proponent claims that animals are not really doing X, despite acting as if they are doing X, her position should be evaluated strictly in terms of the strength of her evidence. Taking two of Plutarch’s examples, the argument from analogy that animals, like humans, “see and hear” is obviously stronger than the analogical argument that animals, like humans, feel anger or fear. Surely, there is nothing irresponsible about making the general observation that while animals appear to possess X, they do not really possess X, so long as one can then provide an explanation for why appearances are likely deceptive in this context. Such an explanation would ideally have three components:

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207 E.g., Great apes (Bourjade et al. 2014) and ravens (Boeckle and Clayton 2017).
208 Treatise I.3.16
209 Despite homologies in brain structure and molecular neurophysiology, due to the subjective experience associated with emotions, falsifiable hypotheses to test for “fear” in animals are difficult to devise (LeDoux and Brown 2017).
(1) a detailed description of the ("lower") mechanism that they propose animals are using,
(2) a detailed description of the ("higher") mechanism that they propose animals are not using, and...
(3) a comparative discussion as to why the evidence (e.g., behavioral, physiological, neurological, philosophical, etc.) for the former is stronger than evidence for the latter.

No analogy involving unobservables will be “perfect,” but positive and negative analogies alike clearly come in varying degrees of strength (Hesse 1966). Far from the dogmatism implicit in Stoic discussions of animals, I propose that Aristotle sometimes tacitly evokes these criteria as a result of his naturalistic view that the potential of an organism’s behavioral repertoire is restricted by the complexity of its physical constitution. For instance, although Aristotle grants that bird songs can appear as if analogous with human speech, he defends his uniqueness claim about “speech” by referencing the physical limitations of various types of tongue in the animal kingdom, as well as the human capacity for symbolic communication. Similar to Lloyd Morgan’s (1894) claim that appeals to neurophysiological similarities and differences can support and undermine analogical arguments, Aristotle is able to evoke convincing disanalogies between human and animal communication by defining speech as distinct from signals or voice not only by philosophical definition, but also by means of citing empirical observations pertaining to differences in communicative flexibility of humans and birds.

The Stoics, on the other hand, use exactly the same argument behind every use of as if rhetoric: regardless of how strong an analogy may appear to be between human and animal behavior, animals lack the capacity to reason (and thus to assent to appearances) and therefore are never doing genuine X. It is on this basis that the Stoics deny emotions

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211 Chapter 2, Section 6.
212 Thanks to John Greenwood for this reference.
to animals because *genuine* emotions involved judgments, a strategy which they also use when denying memory, intention, preparation, and attention to animals. In each case, the Stoics “downgrade preparing in animals to a mere as-if preparing, and likewise as-if intending and as-if (mentally) attending” (Sorabji 1993: 52-4). Sorabji is unimpressed by the epistemic consequences of the Stoic reliance upon this rhetoric, writing, correctly, that “if animals enjoy only ‘as if’ preparation we lose explanation of animal behavior” (54). Gilhus (2007: 62) lodges a similar critique: the Stoics, she writes, “were not always able to maintain a sharp distinction between animals and humans without introducing an “as it were” [i.e., “as if”] principle to explain how animals, who seemed to act according to principles similar to those of humans, do not really do so.”

When Aristotle raises examples of animals acting *as if* possessing a “higher” capacity, his meaning is often that functional homologies exist across species-lines that can explain how different animals confront similar problems in similar ways, so long as we acknowledge that the underlying mechanisms may be different (or the same). This is not always an attractive type of explanation, but it is at least an open-minded one. In contrast, the Stoics were utterly dogmatic: “If animals seem to act *as if* by reason, it must simply be a wrong impression, because animals always act according to nature,” by which they mean impulse and appearance. When confronted with the appearance of mental continuity, the Stoics rely upon stock, *a priori* responses lacking in nuance or contextual subtlety.

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213 This view is also present in Augustine’s *City of God* (8.17), and is critiqued at length in Plutarch’s *Sollertia* (961D) and Porphyry’s *On Abstinence from Animal Flesh* (3.22).  
214 E.g., Aristotle’s comparative discussion of diving in dolphins and humans (Chapter Two, Section 4).  
215 *On Animals* 43
6. Animal Consciousness: Born of Explanatory Crisis

The most nuanced passages on animals in the Stoic canon are found in Seneca’s *Moral Letters* (c. 65 CE), which is significant for two reasons. First, the book features the first textual discussions of comparative psychology with human infants, and second, the first glimmer of “consciousness” in the history of animal psychology, which would be further developed by Saint Augustine (354—430) and Peter of John Olivi (c. 1248—1298) during the Middle Ages (Toivanen 2013). Despite denying to animals faculties for propositional perception and even the ability to learn from experience, Seneca nonetheless attributes animals non-reflective interoceptive (e.g., pain, hunger, thirst), exteroceptive (e.g., visual, olfactory, tactile), and proprioceptive (e.g., posture, movement) awareness, which, on my reading, is manifest in the context of perceiving and engaging with environmental problems, e.g., evading predators or satisfying desires.

Importantly, Seneca’s discussions of constitution suggest that consciousness was first postulated in the history of philosophy to help explain seemingly rational behavior of animals and human infants. Indeed, Steiner (2005: 27) describes Sorabji’s claim of a crisis in the ancient philosophy of animal minds as the “problem of conceptualizing animal consciousness in terms that do not require recourse to concepts and propositional attitudes.” Letter 121 in *Moral Letters* features a lengthy passage where Seneca ascribes to animals *constitutionis suae sensus*—an idea that is never adequately clarified, but that is explained by aid of comparisons with human infants and turtles:

The child who is trying to stand […] falls and rises again and again with tears until through painful effort he has trained himself to the demands of nature. And certain animals with hard shells, when turned on their backs, twist and grope with their feet and make motions side-ways until they are restored to their proper position. […] Thus all

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Steiner’s interpretation is, to some extent, guilty of presentism—the anachronistic attribution of modern ideas to historical figures, i.e., not even Aristotle thinks to mention consciousness in his many discussions of animals (Greenwood 2015: 39; Hamlyn 1968).
creatures are self-aware [conscious] of their own constitution and thus can use their limbs so easily, and we have no greater proof that they come into life armed with knowledge than the fact that no animal is clumsy in the use of its own self. Someone objects, “The constitution, as you would argue, is the governing principle of the soul which has a particular relationship with the body. How does an infant understand this very complex and subtle notion that can scarcely be explained to you? All animals would have to be born capable of understanding logic to be able to comprehend this definition…” […] What you object would be true if I claimed that the definition of the constitution was understood by animals, rather than the constitution itself. Nature is more readily understood than explained. Thus an infant does not understand what a constitution is, but he understands his own constitution. […] Thus both infants and animals possess a consciousness of their primary element which is not too clearly distinct or exact.217

Seneca displays a rare sense of epistemic humility here. Much that is observable does not admit of explanation, Seneca contends, and animal mentality—however little of it there may be—falls into this category. Presumably because Seneca is unsatisfied with explaining animal and infant behavior with impulse and appearance alone, he uses the word “understanding” in two distinct ways: (1) to evoke a uniquely human faculty for meta-cognition, and (2) to evoke a sense of bodily self-awareness that—when viewed in tandem with the innate “knowledge” granted to each species from birth—is functionally analogous with the type of epistemic knowledge that one might think necessary to satisfy particular practical ends (e.g., climbing a tree, eating an apple, swimming). This practical “knowledge” is non-reflective and common to humans and animals. Recall my discussion brachiating monkeys who are capable of using all four limbs and their prehensile tale to jump and swing rapidly through the treetops, adeptly avoiding unsound branches. This behavior requires a certain sort of inferential background “understanding” in the sense that branches that look like X, Y, and Z should be avoided, while branches of the sort P, Q, and R are reliable platforms given both the monkey’s weight and the distance and/or height of her leap. There is a legitimate dispute to be had over whether what I have just called “understanding” really is understanding in an epistemic sense, but that is beside

217 Moral Letters 121 7-13 [emphasis added]
the point. I propose that this is precisely the type of thorny explanatory situation that leads Seneca to opt for epistemic terms in his theory of animal constitution, which is at odds with Stoic animal psychology as strictly perceptual.

If this reading is accurate, then Seneca does recognize a sense of continuity in how humans and animals relate at a basic level to the potential and limitations of their own bodies in everyday situations. The constitution of the monkey is different from the constitution of the elephant, which is different from the constitution of the dog, and so forth. Seneca never says this, but presumably constitution is his way of accounting for behavioral variation in the animal kingdom, while at the same time arguing that all animal behavior stems from the one-and-the-same causal principle. If the role that constitution serves is analogous with thinking, understanding, and skilled behavior in humans, then by allowing overlap between humans and animals here, Seneca—similar to Aristotle before him—gets to have his cake and eat it too. Animals are largely automata, but they also possess a certain kind of “knowledge;” animals are not skilled, but they nonetheless “understand” how to use their bodies in ways that promote their self-interest. Constitution is defined as a perceptual capacity, while at the same time identifying “the special kind of perception” that “cannot easily be classified under any of [the five] sense modalities” (Toivanen 2013: 356).

Seneca is thus wrestling with the traditional dichotomy between “perceptual” and “rational” faculties as insufficient to explain the gamut of animal behaviors. Constitution, like Aristotle’s discussion of phantasia, is neither rational nor perceptual, but somewhere in between, edging toward the latter but not utterly devoid of the former.
8. Concluding Thoughts

The most progressive ancient philosophers of animal minds, whether Stoic (e.g., Posidonius), Aristotelian (e.g., Theophrastus, Aspasius), or Neoplatonist (Plutarch, Porphyry), took observation seriously. All of these figures called out Stoic explanations of animal psychology for being, in Posidonius’ words, “clearly in conflict with observable fact” not only with respect to animal behavior, but also in terms of apparent continuities between the cognitive abilities of animals and human infants. The latter critique predates the emergence of the field of comparative psychology by two millennia, and yet was a common fixture of challenges to Stoic views about animals.

The Stoics deserve credit for being the first to critique the argument from analogy about animal minds. Their responses were dogmatic rather than responsibly skeptical, but their rightly incredulous attitude nonetheless pre-dates critical responses to Hume, Darwin, and Romanes by over a thousand years. In this sense, the Stoics can productively be seen—similar to Descartes’ views of animals today—as important foils representing overly radical, tough-minded positions, and thus as tacit encouragers of dissenting views. The Neoplatonists were practically always responding to the Stoics, so it is fair to postulate that works such as Plutarch’s *On the Cleverness of Animals* would not exist were it not for Philo’s *On Whether Dumb Animals Possess Reason*.

Turning next to the marginalized tradition in the history of animal minds, the key questions going forward are the following. (1) What are the most responsible ways to posit uniqueness claims without underestimating animal cognition and/or overestimating human cognition? (2) Do umbrella terms such as “rational faculties” benefit debates over human uniqueness, or unnecessarily complicate them? (3) Building upon the simple
criteria introduced in Section 5: what are the most responsible ways to posit arguments from analogy with healthy skepticism? (4) What are the most responsible ways to identify and avoid semantic anthropocentrism in comparative cognition and the philosophy of animal minds? Most importantly, (5) when is carving the human/animal dichotomy in nature a productive way of understanding the causes of animal behavior, and when is it obstructive to that goal?
Chapter Four
Enter the Marginalized Tradition: Rejecting the Crisis

1. Overview

As discussed in Chapter One, explanatory crises of human exceptionalism arise in four types: ontological, epistemic, empirical, and methodological. By introducing the original figures from a marginalized tradition in animal minds philosophy, the present chapter concludes my focus on the origins of ontological crises of human exceptionalism, i.e., how complex behavior (animal and human) can be adequately explained within the confines of strict dichotomies between rational/cognitive and perceptual/bodily faculties. For almost as long as this dominant worldview has existed, so has a competing position in favor of a pluralistic account of cognitive faculties tailored to the environmental pressures of disparate species, rather than a hierarchical scale of mental capacities with those of humans at the top. This approach to inquiry led Plutarch, Porphyry, and Lucretius to reject the basis for explanatory crises of human exceptionalism of the sort that dogged most ancient philosophers, making their writings the earliest precursors to methods advocated by contemporary proponents of the marginalized tradition, such as Frans de Waal (2016), Brian Hare (2017), Kristin Andrews (2012, 2015), and Colin Allen and Marc Bekoff (1997), among others.

2. Plutarch Denies the Crisis: Gradations of Rationality

Plutarch was a member of the New Academy under Carneades (c. 189—129 BCE), and “central to the New Academy’s stance was its opposition to doctrinaire Stoicism with its emphasis on the primacy of the human being” (Newmyer 2011: 172).
Next to Porphyry, Plutarch is the best-known Platonist to write on animals, as well as, perhaps, “the most open-minded among the ancient philosophers and moralists” to discuss the subject (Bodson 1983: 314). Plutarch’s massive work, *Moralia* (c. 100 CE) contains three works dedicated to animals. *On the Eating of Flesh* and especially *On the Cleverness of Animals* are direct attacks on the Stoic ideas that animals lack reason and that membership in the moral community extends beyond the human species. The dialogue *Gryllus* is a revisionary telling of the myth of Circe and Odysseus, where—after having been transformed into a pig—one of Odysseus’ men (Gryllus) argues at length that he would like to remain as such instead of being made human again. According to Gryllus, for every capacity thought to be exceptionally human, there exists an equally exceptional analogue in animals—often exercised more proficiently. All of these works take doctrinaire Stoicism as their primary target.

More than any ancient philosopher, Plutarch argued that rationality (along with imagination, learning, and sentience) arises in degrees within and between species. Unlike Aristotle and the Stoics, Plutarch does not begin with an anthropocentric definition of the types of human behaviors indicative of rationality before investigating whether animals lack the ability to “truly” perform these behaviors; rather, he looks for the lowest common denominator of rational behavior in humans with cognitive deficiencies, and then uses these cases to identify continuities and overlaps with seemingly rational behavior in other species, ultimately suggesting that gradations of mental ability present a better model for accounting for cognitive variation in the animal kingdom (including humans) than the standard “all or nothing” view of rationality central

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218 Seneca claims, for example, that the communities of animals “are perfect only in their particular nature, and not truly perfect, since they lack reason” (*Moral Letters* 124.13 [emphasis added]).
to Stoic philosophy. Plutarch reveals tensions in Stoic thought by arguing that so-called “perceptual” capacities alone cannot sufficiently explain animal behavior without some degree of knowledge or understanding also being present.

Plutarch’s first strategy when making this argument is to emphasize that not all humans were created equal with respect to intelligence, and although humans are the most intelligent creatures on earth, there exist non-human species that seem to display capacities for reason, memory, and so forth better than, or equal to, some human beings. Take, for example, the following exchange from *On the Cleverness of Animals*…

SOCRARUS. Yet it is astonishing how greatly man surpasses the animals in his capacity for learning and in sagacity and in the requirements of justice and social life.

AUTOBULUS. There are in fact, my friend, many animals which surpass all men, not only in bulk and swiftness, but also in keen sight and sharp hearing; but for all that man is not blind or crippled or earless. We can run, if less swiftly than deer; and see, if less keenly than hawks; nor has Nature deprived us of strength and bulk even though, by comparison with the elephant and the camel, we amount to nothing in these matters. *In the same way*, then, let us not say of beasts that they are completely lacking in intellect and understanding and do not possess reason even though their understanding is less acute and their intellect inferior to ours; what we should say is that their intellect is feeble and turbid, like a dim and clouded eye.219

The phrase “feeble and turbid” in the final sentence is almost certainly intended as a direct reference to Seneca’s use of a similar phrase (evoked several times in the previous chapter) to discount the idea that rationality can exist in the animal mind. Remarkably, however, Plutarch seems to be meeting his opponent halfway here, *i.e.*, they can agree that animal intellect is generally inferior to human intellect, but for Plutarch, a “dim and clouded” engagement with the world does not necessarily imply that animals are completely irrational, or, that humans surpass animals in all (or even most) capacities. For instance, *On the Cleverness of Animals* contains an inspired discussion of how mad dogs—like madmen—are, at least in part, cognitively impaired (insofar as

219 *On the Cleverness of Animals*, 963b [emphasis added]
“understanding” of the world is affected); their impairment is therefore not solely perceptual. Plutarch is attempting to catch the Stoics in a double standard, to which they could reasonably respond that calling dogs “mad” is just a popular turn of phrase; in reality, rabies is a defect in temperament, not rationality. This would be a fair reply, but Plutarch’s underlying purpose for raising this argument remains a viable critique of Stoic dogma: reason, imagination, memory, phantasia, etc., are not “all or nothing” categories, even among members of our own species. If the Stoics were to accept this basic point, Plutarch would have nudged them closer to accepting the possibility of continuities and overlaps between cognitive faculties across species.

Plutarch is challenging wholesale human exceptionalism, where all humans are viewed as being superior to all non-humans in terms of possessing rational capacity X. With good reason, he believes this to be an untenable position because however one defines X, not all humans will possess it. Those familiar with the contemporary animal ethics literature will recognize this as a nascent version of the “argument from marginal cases,” which states that for any cognitive capacity argued to support human exceptionalism (i.e., all human beings are worthy of an inherent dignity denied to other species by virtue of their possessing X), one can point to human beings (“marginal cases”) who lack capacity (or capacities) X that the exceptionalism claim is based on. The point of the argument from marginal cases is to break down categorical distinctions between all human beings and all other sentient creatures by emphasizing similarities rather than differences. There can be no doubt that this is Plutarch’s strategy. For

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220 Ibid. 963e-f
221 Also see Gryllus (992d-e).
222 Unless X is “being human,” i.e., “unqualified speciesism” (Rachels 1991).
223 For longer treatment, see Gruen (2011: 64-5) and Dombrowski (1997).
example, in response to the Stoic claim (discussed below) that all humans are morally bound together in kinship due to all humans being rational, Plutarch responds as follows: “The followers of Zeno make this kinship the origin of justice” but “is it not irrational, when we see many humans living by perception alone, without intelligence and reason, to think that there is some bond of justice with such persons, and not with our plow animals and with the dog that shares our house and with those beasts that provide us milk?” On my reading, Plutarch is evoking the first use of the argument from marginal cases in the history of philosophy in order to galvanize explanatory crises in the Stoic philosophy of mind. He was not alone in identifying this double standard; Porphyry likewise claims that animals deserve justice because “many of our own species live from sense alone, but do not possess intellect and reason.”

Curiously, one of the more progressive arguments put forth in Plutarch’s *On the Cleverness of Animals* overlaps with a position attributed to Seneca in the previous chapter. Recall that Seneca is arguably responsible for the first mention of consciousness in the history of philosophy. Despite denying mental states to animals, Seneca claims that animals and human infants alike develop non-reflective “knowledge” or “understanding” (contrasted with reflective understanding) about the world. I argued that Seneca’s uncharacteristic reliance on epistemic language is indicative of explanatory crises in his work, e.g., what philosophical or empirical basis is there to argue that a human baby and a dog navigate their environments with fundamentally distinct mental operations? I have shown how Aristotle, the Stoics, and the Neoplatonists alike—indeed, likely all ancient philosophers—found this discontinuity hypothesis unlikely. The marginalized figures,

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224 *On the Cleverness of Animals*, 3.19 [emphasis added]
225 *On Abstinence from Animal Flesh*, 3.19
226 *Moral Letters* 121
however, are the only ones for whom this mutually agreed-upon idea in early comparative psychology does not provoke defensive strategies in their general philosophy of mind. By intentionally blurring the lines between the functions of so-called perceptual and rational faculties, Plutarch is perhaps the first to state that psychology (human or animal) need not be partitioned into (two) simplistic causal domains, *e.g.*, “often, it is true, while we are busy reading, the letters may fall on our eyes, or words may fall on our ears, which escape our attention since our minds are intent on other things; but later the mind recovers, shifts its course, and follows up every detail that had been neglected,” a fact which “proves that it is impossible to have sensation at all without *some* action of the intelligence,” because “the impact on eyes and ears brings no perception if the understanding is not present.”

227 Plutarch then draws the following conclusion: “if we are so constituted that to have sensation we must have understanding, then it must follow that all creatures which have sensation can also understand.”

Plutarch regards as antithetical to common sense the idea that a set of purely perceptual faculties functions as the sole cause of animal behavior. This, recall, is precisely Plato’s reason for attributing belief (*doxa*) to animals, *i.e.*, raw perception alone is insufficient to explain how animals navigate their environments. 229 Whereas Aristotle responded to Plato by expanding the number of capacities that fall under the domain of “perception” (allowing *phantasia*, memory, and so forth), the Stoics provide no such additional

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227 As John Greenwood comments, Plutarch’s example is ill chosen, as focused attention may be necessary for reading, but not, for instance, discriminating poisonous plants. Further, the fact that we can remember content that we had not been paying attention to casts doubt on Plutarch’s claim that understanding must be present in order for perception to occur.

228 *Ibid.* 961b

229 Chapter 2, Section 3
resources and are thus being rightly criticized by the Neoplatonists by means of a classic idea from their namesake.

Presumably, like Seneca, Plutarch is referring to a limited sense of “understanding” akin to associative learning, or, a combination of learning and memory put into action, for he writes that an animal…

…the could not survive for a moment if it had not learned to give [hostile animals] a wide berth while freely mixing with [friendly animals]. It is, to be sure, sensation that enables each creature to recognize both kinds; but the acts of seizing or pursuing that ensue upon the perception of what is beneficial, as well as the eluding or fleeing of what is destructive or painful, could by no means occur in creatures naturally incapable of some sort of reasoning and judging, remembering and attending. Those beings, then, which you [Stoics] deprive of all expectation, memory, design, or preparation, and of all hopes, fears, desires, or griefs — they will have no use for eyes or ears either, even though they have them. Indeed, it would be better to be rid of all sensation and imagination that has nothing to make use of it, rather than to know toil and distress and pain while not possessing any means of averting them. 230

Despite it being far from obvious that “some sort of reasoning and judging” is required for these acts, the key point is that Plutarch’s account intentionally blurs the lines between perceptual and rational faculties, thus closing the door on explanatory crises of human exceptionalism by offering (perhaps) the earliest precursor of what are now referred to as “minimal theories of rationality.”

Christopher Cherniak (1986: 3) opens Minimal Rationality with an accurate historic claim: “Until recently, philosophy has uncritically accepted highly idealized conceptions of rationality.” Fred Dretske (2006) argues that some learned behaviors produced by operant conditioning can be considered “minimally rational,” in short, because select animals are capable of forming “internal representations” of, and acting in accordance with, particular types of objects in the world; in the above passage, Plutarch is perhaps making a similar claim. Animals and humans form representations over time that

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230 On the Cleverness of Animals, 961a
discern types of objects and events in their environment *as* harmful or beneficial to them, and then adjust their behavior accordingly. A radical interpretation of Plutarch would paint him as suggesting, in line with William James, that what we call “intelligence” is a highly advanced form of associative learning. James (1890: 360) was a discontinuity theorist, *i.e.*, humans alone make associations based upon abstract similarities, but he also believed “genius” in humans to be associative learning in animals only to an “extreme degree.” This interpretation might make Plutarch guilty of an over-intellectualized account of instrumental learning. Nonetheless, Plutarch offers a more explanatorily attractive account of functionally adaptive intentional behavior in animals than the purely reflexive account tied to fixed behavioral repertoires that the Stoics advocate.

It is the nature of gradualist ontologies to be comparatively ambiguous next to categorical or otherwise abrupt attempts at carving nature at the joints. In this sense, the lack of details in Neoplatonist continuity-based comparative psychology is perhaps excusable. After all, when considered beside Stoic psychology—where blunt simplicity ultimately proves detrimental to its explanatory value—Plutarch’s approach to the animal mind at least has the advantage of opening up more questions than it closes. The earliest philosophical rustlings of *less idealized, less anthropocentric* conceptions of rationality and mental activity are thus found in the marginalized tradition. Due to challenges associated with explaining complex behavior with perceptual faculties alone, I’ve also suggested that figures in the dominant tradition were—in tension with long-standing exceptionalism claims—occasionally compelled to adopt similar gradualist approaches to expand explanatory detail in comparisons of human and infant cognition. It is for these reasons that the Stoic theory of animal consciousness is somewhat progressive.
In the next section, I turn to another forward-thinking idea in Stoic psychology, *oikeiosis* (“belonging”), which provides the foundation for the only attractive exceptionalism claim in the Stoic canon: that humans alone are capable of transcending self-interested impulses to develop a kind of *impartial moral reasoning* that applies not only to kin, group, and citizenship, but to humanity as a whole. Despite broadly denying uniqueness claims in favor of gradualist accounts, Darwin (1871) also forwarded this exceptionalism claim, which is still defended—with good reason—in the contemporary literature. This argument is the closest the Stoics come to Aristotle’s superior strategy for dealing with explanatory crises of complex animal behavior, *i.e.*, begin by positing simple, widespread, biological capacities that allow organisms to survive and learn; proceed to scaffold capacities allowing increasingly complex forms of behavior, until at some level of comparative analysis, exceptionalism or uniqueness claims may become appropriate. Ideally, such claims are then justifiable by appealing to simpler levels as offering more parsimonious explanations for given animal behaviors than the level in question, presumed to be uniquely or exceptionally human.

3. *Oikeiosis*: Illustration of a Progressive Foundation for Exceptionalism Claims

According to the Stoics, humans are exceptional in being able to understand, appreciate, and act in accordance with *oikeiosis*, which means “belonging” or “community” (Sorabji 1993: 77), “loving devotion” (Dierauer 1977: 199), “recognition and appreciation of something as belonging to one” (Striker 1983: 145), or “an affective disposition relative to the thing which is owned or belongs” (Long and Sedley 1990: 351). The term itself is “notoriously difficult to define” (Newmyer 2011: 28), but it is...
with this concept that the Stoics provide the first (somewhat) naturalistic account of the evolution of morality—an account that appears to overlap in its early stages with other species, and which then proceeds to explain uniquely human moral relationships in terms of a uniquely human faculty: *logos*. According to the Stoics, without the joint capacity for reason and speech, communication is meaningless, thereby making moral deliberation—and thus membership in the moral community—impossible (Newmyer 1999: 99-110).

According to Cicero (106—43 BCE), the Roman politician and Stoic philosopher, the first stage in the development of *oikeiosis* occurs “Immediately at birth” wherein “a living creature feels an attachment for itself, and an impulse to preserve itself and to feel affection for its own constitution and for those things which tend to preserve that constitution; while on the other hand it conceives an antipathy to destruction and to those things which appear to threaten destruction.” It is therefore natural that animals are born with an attachment to their mothers.

In a move perhaps guilty of presentism, Sorabji (1993: 125-6) and Mary Midgley (1983: Chs. 9-10) associate the first stage of *oikeiosis* with modern ideas of bonding and imprinting mechanisms, demonstrated empirically by Douglas Spaulding (1841—1877) in the 19th century. It is doubtful how seriously we should take this association. According to both Zeno and Cleanthes, *rational phantasia* is defined in terms of imprinting (*tupósis*) where the soul is originally a blank slate: “a presentation (or mental impression) is an imprint on the soul: the name having been appropriately borrowed from the imprint made by the seal upon the wax.” This metaphor bears only a tangential

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232 *On Ends* 3.16: 232-33. See also Epictetus (*Discourses* 2.22.15-16).
233 *Lives of Eminent Philosophers*, 7.42; Sextus Empiricus (*Against the Mathematicians* 7.228-231)
relation to modern learning theories of imprinting/bonding. It is also unclear how far this *tabula rasa* notion of the soul should be extended to animals, but presumably not much further than identifying their specific mother. Although the behaviorists and classical ethologists constructed models of imprinting without reference to thought or primitive universals, it is difficult to make any notion of the term consistent with the Stoic notion of constitution, from which it likely follows that animals do not learn from experience. As Louise Barrett (2011: 74) notes, “Far from enabling individuals to arrive in the world with their knowledge preformed […] and impervious to learning effects, imprinting is a mechanism that absolutely requires a young animal to learn from experience, both to trigger the predisposition, and to allow the imprinting onto the specific idiosyncratic features of the mother.” Assuming Barrett is right, Stoic animal psychology fails to clarify how their account of imprinting functions in the big picture.

The Stoics could avoid tensions of this sort by simply admitting continuity in learning mechanisms among human infants and animals. Otherwise, Seneca’s view that the development of morality begins with social instincts tailored toward particular kinds of relationships is hardly controversial today. As Steiner (2005: 90) observes, “[t]he initial stages of *oikeiosis* hold up animals as a mirror in which we catch sight of ourselves as part of a larger cosmic whole” which the Stoics conceive of “in terms of a progression through increasingly inclusive circles of belonging.”

Evidence of species continuity is also discernable in the second stage of *oikeiosis*, which involves an expansion of one’s concerns to one’s kin and group-mates. Cicero explains this process in terms of an impulse that “[e]ven in the lower animals nature’s

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234 Chapter Seven, Section 9
operation can be clearly discerned.” This idea resonates with contemporary trends in ethology, primatology, and the philosophy of biology that promote a “survival of the friendliest” model of the evolution of pro-social behaviors and communicative ability.

At this stage, Cicero goes so far as to detail mutually beneficial relations across species, such as interactions between “sea-pens” (mussels) and pinotes—the latter being a species of crab that lives on the sea-pen and warns it of threats. These sorts of observations have become hot topics in recent years. A current example of this sort of relationship is documented by Alex Vail and colleagues in “Referential gestures in fish collaborative hunting” (2013), which provides evidence that groupers and coral trout make use of a “pointing signal” (an “upside down headstand”) to indicate the whereabouts of prey to larger “cooperative hunting partners” such as moray eels, octopuses, and Napoleon wrasses, that reliably share in the bounty. Cicero provides other examples as well, noting that “the ant, the bee, [and] the stork do certain actions for the sake of others besides themselves,” but that “with human beings this bond of mutual aid is far more intimate,” from which “it follows that we are by nature fitted to form unions, societies, and states.” It is unclear whether early Stoics shared Cicero’s sentiments here, since Cicero appears to be inferring that human social arrangements are natural parts of the human constitution because we observe similar arrangements elsewhere in the animal kingdom.

It is only at the third and final stage that the Stoics mark a definitive categorical distinction between humans and animals: it is the exceptional capacity for logos that allows humans to extend the circle further, beyond their friends and family, to larger and

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235 “When we observe the labor that [animals] spend on bearing and rearing their young, we seem to be listening to the actual voice of nature” (Cicero On Ends, 3.62: 281-2).
236 e.g., de Waal 2006, 2010; Hare 2017; Tan and Hare 2017
237 On Ends 3.63: 283-4
238 Ibid. 3.19: 63
larger groups, and ideally, to humanity itself. Interestingly, there is some overlap between this theory and the core argument in Peter Singer’s book *The Expanding Circle* (1981), which was inspired by Darwin’s (1871) evolutionary account of morality. Singer argues that it is precisely our unique capacity for impartial moral reasoning that—combined with social instincts shared with other species—has, since our hominid ancestors, naturally led human societies to extend their “circles of moral consideration” from kin and nearby groups to citizenship, race, sex, gender, and—for some—all sentient beings. The Stoic Hierocles even uses the metaphor of an expanding circle: “The outermost and largest circle of *oikeiosis*, which encompasses all the rest, is that of the whole human race. […] It is the task of a well tempered man, in his proper treatment of each group, to draw the circles together somehow toward the center.” Singer and the Stoics alike offer progressive accounts of moral development; the most significant difference (save for the former being biologically and anthropologically substantive) being that, for Singer, impartial moral reasoning logically takes us further than the global human community to consider the interests of non-human animals (120). The argument from providence central to Stoic philosophy makes this next step impossible. Neoplatonist thinkers, however, encounter no tensions in making it.

The nuanced thesis defended here, namely that *oikeiosis* provides a progressive foundation for exceptionalism claims ultimately restrained by explanatory crises of human exceptionalism, is present in the marginalized tradition. Note that the Stoics do not attach any moral value to the first two stages of *oikeiosis* shared with animals, while at the same time they must allow, by dint of common sense, that *not all humans* achieve

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240 “Justice lies in being restrained and harmless toward those beings that do not harm us” (*On Abstinence*, 3.26).
the final stage of acknowledging cosmopolitan ideals. This critique is found in *On the Cleverness of Animals*, where Plutarch expresses surprise that it does not “seem absurd” to “those very opponents of ours” (the Stoics) that “while they postulate that love of one’s offspring is the very foundation of our social life and administration of justice, and observe that animals possess such love in a very marked degree, yet they assert and hold that animals have no part in justice.”\(^{241}\)

Porphyry also suggests that the levels of *oikeiosis* detailed by the Stoics are susceptible to double standards, because the existence of continuity in the early stages suggests the corollary that “the race of all other animals would thus be akin (*oikeion*) to us and in all things related.”\(^{242}\) Porphyry attributes this view to botanist and successor of Aristotle, Theophrastus (c. 371—287 BC), who wrote a lost book entitled *On the Intellect and Character of Animals*. According to Porphyry…

Theophrastus employs the following reasoning: […] we conceive that those who derive their origin from the same ancestors that we do, are allied to us. […] Thus also we must admit that all men have an affinity, and are allied to each other. […] The principles of the bodies of all animals are naturally the same. […] I mean the seed, the flesh, and the conascent genus of humors which is inherent in animals. […] They have all of them the same food and the same spirit, the same purple streams; and they likewise demonstrate that the common parents of all of them are Heaven and Earth.\(^{243}\)

Unfortunately, not a single original work of Theophrastus’ survived antiquity. This passage, however, suggests a worldview of kinship between humans and other animals far more pronounced than that of Aristotle. Elsewhere there is evidence that Theophrastus argued in favor of cognitive continuity, rather than just hinting at “traces” of it, as his teacher did. In *On Piety*, Porphyry attributes the following views to Theophrastus (as summarized by Theodor Gomperz [1964: 495]):

Differences of degree [between human and animal capacities] no doubt occur on the most extensive level; but there are no really qualitative distinctions with regard either to the intellect or the emotions, and still less with regard to sense-perception. In the mental as in

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\(^{241}\) *On the Cleverness of Animals*, 495c

\(^{242}\) *Ibid.*

\(^{243}\) Qtd. W. M. Rauw (2015: 6; *On Abstinence* III. 25)
the physical sphere the ‘fundamental ingredients’ or elementary facts are the same.244

Before elaborating upon this ontological worldview as it emerged in the context of the marginalized tradition, it is worth noting how strange it is that the Stoics—from Epictetus to Cicero—go to such lengths to offer a fairly naturalistic description of oikeiosis, even suggesting that certain behaviors within animal communities can serve as models for humans,245 only to drive (arguably) the sharpest moral wedge between humans and other species in the history of philosophy, i.e., “it is the Stoic doctrine that there can be no question of right between man and the lower animals, because of their unlikeness.”246 Animals are denied membership in the moral community partially because they do not communicate by means of logos endiathetos, i.e., “inner reason” or “thought” (Newmyer 2011: 164). Unlike contemporary versions of this argument (Clark 1984; Diamond 2004) however, the Stoics deny that humans have any moral obligations to animals whatsoever.

Stoic discussions of oikeiosis nonetheless provide rare windows into what responsibly posited exceptionalism claims can look like in ancient discussions of animal minds. Few ancients realized that one can eschew “all or nothing” accounts of cognitive capacities in favor of recognizing basic overlaps with other species, while at the same time arguing that humans have “special” or “exceptional” or “more advanced” versions of nascent capacities shared with other animals. As the Stoic theory of oikeiosis rightly suggests, one can argue that there are degrees or stages of capacity X throughout the animal kingdom, while still claiming that—perhaps at a certain level of complexity—differences in X between humans and animals are so great as to indicate a difference in

244 Qtd. James Gill (1969: 401).
245 E.g., “A sheep does not abandon its own offspring, nor a wolf, and yet does a man abandon his?” (Discourses 1.23.8).
246 Lives of Eminent Philosophers 7.129
kind, e.g., the development of impartial moral reasoning from instinctive “fairness” responses to social inequities (Brosnan and de Waal 2003), or, the evolution of a “socio-cognitive infrastructure” for shared intentionality which gains explanatory value when posited in the context of a phylogenetic history with the intentional, pro-social, “proto-collaborative” behaviors of great apes (Tomasello 2008).

4. Natural Ontologies of the Early Marginalized Tradition

Unlike the hard-lined categorical distinctions so common to Stoic writings on animals, “Platonists saw more subtly and nuances. According to them, the different species of animals had virtues and intelligence in varying degrees” (Gilhus 2006: 61). Plutarch does not offer anything akin to a positive account of uniquely human mental capacities; he sees animal intelligence (of which “understanding” is an focal part) as constituting a vast spectrum:

For as one capacity for seeing or flying differs from another (hawks and cicadas do not see alike, nor do eagles and partridges fly alike), so also not every reasoning creature has in the same way a mental dexterity or acumen that has attained perfection. For just as there are many examples in animals of social instincts and bravery and ingenuity in ways and means and in domestic arrangements, so, on the other hand, there are many examples of the opposite: injustice, cowardliness, stupidity. [...] Why, moreover, do we not say that one tree is less intelligent than another, as a sheep is by comparison with a dog; or one vegetable more cowardly than another, as a stag is by comparison with a lion? Is the reason not that, just as it is impossible to call one immovable object slower than another, so among all creatures to whom Nature has not given the faculty of understanding, we cannot say that one is more cowardly or more slothful or more intemperate? Whereas it is the presence of understanding, of one kind in one animal, of another kind in another, and in varying degree, that has produced the observable differences.247

The central claims here are (1) there are multiple types of understanding and intelligence found throughout the animal kingdom, specific to different species; (2) there is variation within species as to how effective their degrees of “understanding” are in performing their respective functions (in contrast to the Stoic view that “no animal is more skilled

247 On the Cleverness of Animals, 963a
than any other\textsuperscript{248}); (3) these gradations are clearly observable; and (4) animals and humans belong on a spectrum of intelligence that plants and insentient objects do not.\textsuperscript{249} Plutarch never questions the fact that human beings are generally more rational than individual members of other species. As he suggests in \textit{Gryllus}, “I scarcely believe that there is such a spread between one animal and another as there is between man and man in the matter of judgment and reasoning and memory.”\textsuperscript{250} As discussed in the next chapter, Montaigne and Descartes echo precisely the same sentiment.\textsuperscript{251} This statement is not inconsistent with Plutarch’s challenge to any claim suggesting that animals are wholly irrational beings.\textsuperscript{252} On this Plutarch is clear: the Stoics “mistakenly believe that creatures that were designed by nature to display perfect reason or have no reason at all.”\textsuperscript{253} Plutarch prides himself on what he takes to be empirical basis for his views. Like Aristotle, Porphyry, and Alexander, Plutarch’s \textit{On the Cleverness of Animals} covers a wide range of species for such a short work: “thirty-six different types of mammal, twenty-five birds, five reptiles or amphibians, thirty types of fish, seven molluscs, five crustaceans, four insects/spiders and two echinoderms—and also a swamp” (Gilhus 2006: 48) as well as nearly two dozen examples of animals apparently demonstrating abilities for cooperation, altruism, emotional contagion, memory, and—of course—“cleverness,” \textit{i.e.}, practical wisdom.\textsuperscript{254}

Evoking a wide variety of “clever” animal behaviors is a common strategy for figures in the marginalized tradition—a strategy that stands in stark relief with the

\textsuperscript{248} Liv\textit{es of Eminent Philosophers}, 7.85
\textsuperscript{249} Philo, \textit{On Animals} 78-80
\textsuperscript{250} \textit{Gryllus}, 992d-e
\textsuperscript{251} Apologie, 415; \textit{Philosophical Writings}, 3.302
\textsuperscript{252} \textit{Ibid.}, 960c-d
\textsuperscript{253} \textit{On the Cleverness of Animals}, 962c
\textsuperscript{254} \textit{Ibid.}, 966a-b
writings of the Stoics and Christians, who rarely evoke specific examples or anecdotes to defend exceptionalism claims. Consider the conception of nature promoted by another key figure in the marginalized tradition: the Epicurean poet and philosopher Lucretius. The worldview set forth in *De rerum natura* (c. 1st century BCE) can hardly be more distinct from that offered by the Stoics:

Take a representative of any of these diverse species and you will still find that it differs in from others of its kind. [...] individuals of these species are mutually recognizable [to each other] no less than human beings.\(^{255}\)

Immediately following this passage, Lucretius recounts a poignant story of a cow searching the pasture for her calf, unaware that her infant was sacrificed in the name of human religion.\(^{256}\) The tale is affecting largely due to Lucretius’ stress on how the mother is looking for her *individual* calf, who is the only one of its kind (*quiddam proprium notumque*),\(^{257}\) and for whom the visual presence of other calves is inconsequential to her state of mind.\(^{258}\) As Yamashita (2016) notes, this scene is one of many where “the motif of ‘uniqueness’” is present in *De rerum natura*, as Lucretius “emphasizes the absolute value of the lost calf.”\(^{259}\) Consider also the presence of genuine emotions in animals. Several scenes in *De rerum natura* are indicative of “an idea almost unparalleled otherwise in ancient texts, that is, the belief that animals are capable of emotions like sadness and joy, and that they take simple pleasure in their own lives” (Newmyer 2011: 168).

No ancient text is more left field from Stoic and Christian human exceptionalism than *De rerum natura*. According to Lucretius, humans are foolish for believing that their

\(^{255}\) *De rerum natura*, 2.347-348
\(^{256}\) *Ibid.* 2.352-66
\(^{257}\) *Ibid.* 2.366
\(^{258}\) *Ibid.* 2.364
\(^{259}\) *Ibid.* 2.352-66
species represents the pinnacle of life on earth. Lucretius provides proto-evolutionary accounts of the origin and development of language and rationality from animals to human beings. Lucretius’ story is remarkably prescient and adds weight—in retrospect—to his contention, shared with the Neoplatonists, that intelligence should be seen as a vast tapestry spanning the animal kingdom, while still acknowledging that humans have developed superior capacities for advanced forms of behavior. Lucretius’ worldview stems from adherence to the atomism of Epicurus (341—270 BCE), of whom the former was an ardent disciple.260

In cursory form, ancient atomism is a materialistic and anti-deterministic ontology; its central tenets are diametrically opposed to teleological metaphysics. Aristotle named Epicurus as one of the main competitors to his worldview (Berryman 2016). For the atomists, every tangible object in the universe was born of, and is comprised of, chaotic interactions of atoms, which are indivisible, “strike against one another, rebound and interlock in an infinite void” (ibid.). The abundant variation in the world of organic and inorganic things is thus a result of large-scale variation in arrangements of atoms,261 which Lucretius explicitly links to variation among species—even noting that resemblances among individual members do not reflect absolute similarity in bodies262 and temperaments.263 It is on this basis that Lucretius likewise “countenanced the idea that animals have mind. He observes, for example (2.268), that a racehorse at the starting gate cannot burst forth as quickly as its mind (mens) would like to because the atomic substance of its body must be roused throughout its frame before it

260 See *De rerum natura* (1.817-829) for how Lucretius’ atomism leads him to posit widespread variation in the natural world.
262 *Ibid.* 2.342-48
can follow the ‘urging of the mind’ (*stadium mentis*)” (Newmyer 2011: 168). In the sense of what may be considered a *minded* being, humans are therefore not fundamentally different from other animals. Book V of *De rerum natura* states that humans are not divine creations; they are the products of lengthy temporal, environmental, and non-teleological processes. As Holmes (2003) notes:

Lucretius has an axe to grind in this book with Antiquity’s teleologists—the Platonists, the Aristotelians, and, most of all, the Stoics. His stated aim is to disabuse his reader of the idea that the nature of the universe is owed to any demiurgic blueprint. From the outset, the most visible cost of this disenchantment—which for Lucretius, of course, is its greatest gain—is the uncoupling of the human from any cosmic master plan.

Defenders of atomism oppose the notion of an intelligently designed universe, as well as the idea of a divine being intervening and casting judgment on earthly affairs (Berryman 2016). According to Lucretius’ origin story, the original state of nature was far nastier, brutish, and short for humans than Thomas Hobbes (1588—1679) imagined. Humans are aliens in the natural world, not the masters of it.264 There are passages in *De rerum natura* where Lucretius seems to relish in animals killing humans with their superior strength.265 Lucretius even suggests that the earliest humans almost went extinct due to domination from other species.266 The argument from providence is “idiotic”267 since, as with other all species, humans are no more than “a chance concatenation of atoms, of which our desires are a chance off-shoot” (Holmes 2013).

Lucretius opposed the Stoic view that animals do not belong in the moral community due to their lack of logos. According to both Lucretius and Epicurus, reason and speech are not gifts specially ordained by the gods, discontinuous with other parts of nature. Beginning with the former, Lucretius identifies reason not as something distinct

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264 See Holmes (2013: 155-7)  
265 *De rerum natura*, 5.988-998  
266 *Ibid.*, 5.990-1027  
267 5.156-165; also see: 2.177-181, 5.181-3, 5.195-99, and 5.218-221.
from imprinting (as the Stoics do) but as a type of imprinting; reason is “something that emerges, at the intersection of nature and desire, and is, therefore, an extension and imprinting of the natural world on the human mind” (Holmes 2013). This position is similar to the notion of “minimal rationality” I attributed to Plutarch, who saw associative learning as a type of reason. Likewise, according to the Epicurean and Lucretian worldview, behaviors that follow from reason are not separate from those explainable “by nature” (as the Stoics are fond of saying), to the contrary…

Reasoning is an activity produced in the mind by means of atomic movements. To reason is to arrange images; and this mental power is the result of images continually impinging on the mind and establishing certain patterns within it. [...] This process gradually becomes an ability of the mind to sort out images deliberately, that is, to perform acts of reasoning. (Asmis 1999: 281)

Similar to Plutarch’s insistence that rationality must be discussed as a kind of activity (or, as a background condition for particular activities), Lucretius held that reason is “an instrument, not an end in itself;” it “serves the desire for pleasure” and humans are not unique in this regard (Asmis 1993: 765-6). It follows that the formation of mental concepts is not a uniquely human capacity either, as—similar to Aristotle’s talk of “primitive universals”—Lucretius and Epicurus understood rudimentary concepts to be necessary for perception.268

With respect to the other side of logos (language or speech), the story offered by Lucretius, following Epicurus, is much the same. Meaningful speech is not a capacity ordained by an anthropocentric god, but rather a faculty shared with other animals, which developed over a long period of time. In the fifth book of De rerum natura, Lucretius tells his “culture story” which begins with pre-historical times in the state of nature.

268 “On Epicurus’ view the mind somehow conceptualizes and articulates the informational content of perception as a result of sensory barrage by images and is able to do this because repeated experiences have built up patterns in the mind atoms which amount to the possession of concepts” (Annas 1992: 169).
Lucretius claims that the words that make up human language first appeared as instinctive, meaningless noises, such as grunts, that were no different from the vocalizations of animals, and that humans uttered thoughtlessly in response to environmental stimuli; when humans eventually became aware of these reflexive vocalizations in themselves and others, they attached vague meanings to these sounds, using them as tools to communicate. In a striking resemblance to theories by Wilhelm Wundt (1878) and Michael Tomasello (2008, 2010) about the origins of human communication in animal gestures, Lucretius claims that the natural pointing behaviors of babies are indicative of humanity’s inborn desire to connect and converse—an observation that led Tomasello to designate the intentional pointing gestures of great apes as building blocks of human communication, rather than their vocalizations. Lucretius never states that other species communicate as expertly as humans; his claim is that there is not a qualitative difference between human and animal communication in their formative stages. Perhaps the same holds for developed stages as well. As Holmes (2015: 4) puts it, the aim of “Lucretius’ lengthy comparison of proto-human expression to articulate animal noises” is to show that…

…humans were once animals who made referential, meaningful noises in response to their surroundings. […] It was reason and usefulness that brought us to language. The diversity and contingency of the experiences that gave rise to the varieties of sounds—and therefore to the varieties of words and languages.

One of Holmes’ more intriguing interpretations of Lucretius’ account of language is that the nonsensical words that he makes up to describe the utterances of prehistoric humans are intended to reflect the fact that early human language would appear to us—like

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269 De rerum natura, 5.1028–90
270 Ibid. 5.1028
animal vocalizations—as meaningless. The point being that just because humans cannot understand animals does not mean that animal vocalizations are devoid of meaning.

A similar point is present in Porphyry’s *On Abstinence from Animal Flesh*: “For the Greeks do not understand what is said by the Indians, nor those who are educated in Attica the language of the Scythians, or Thracians, or Syrians; but the sound of the one falls on the ears of the other like the clangor of cranes, though by others their vocal sounds can be written and articulated, in the same manner as ours can by us.”

According to Porphyry, animal sounds are indicative of the externalization of internal wants, desires, and emotions. A parallel view is found in Plutarch, who claims that, “animals themselves have an understanding of the concept of justice and actively seek it from human beings,” as evinced by their “cries for justice,” which, while they appear “inarticulate” to humans, the reason for this is because humans lack the capacity to decipher them. What Porphyry, Plutarch, and Lucretius do not consider, oddly perhaps, is that the fact that humans cannot understand animal language does not entail that it is meaningful either.

This was nonetheless an influential strategy in the marginalized tradition. Pierre Gilles (1490—1555) uses a similar argument in his *Ælian* (1533), claiming he is “convinced that the beasts reason and answers the objection, of which much was made in the seventeenth century, that they cannot speak, by asserting that they can speak, only we do not understand them. But for that matter, we don’t understand foreigners” (Boas 1935: 41). To his credit, Gilles also posits that some do understand animal signals by studying the meaning of their cries and vocalizations (*ibid.*). While still dogmatic, at least Gilles

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271 *On Abstinence from Animal Flesh* 3.3
273 *On the Eating of Flesh*, 994e. See also Newmyer (1997: 85-88).
defers authority to experts. Likewise, the epistemic claims of these two Neoplatonists against Stoic skepticism about the meanings of animal sounds warrant some merit, but their own certainty in this regard is unfounded, and seemingly rests entirely on the view that humans are not alone in having a “silent discourse” running through the soul as they perceive and interact with their environments,\textsuperscript{274} which is doubtful.

Having discussed alternative conceptions of the development of reason and speech, I conclude with marginalized views on the role of animals in the origins of morality. The purpose of Lucretius’ natural history is not merely to show how humans are inconsequential, or how atomism created the world, but how human morality emerged on the scene. Animals play pivotal roles in this story. First, humans are said to have banded together into communities because they were too weak to survive amongst other animals on their own. In contrast to Stoic restrictions on moral community membership, Plutarch, Porphyry, and (arguably) Lucretius believed that humans could form contracts with certain animal species for the purpose of safety and pleasure (Shelton 1995: 115-121). Second, as a result of physical weakness, humans have more ruthless constitutions than is typical of other species. Combined, these points offer a radically different picture of the origins of ethical behavior than the Stoics’ story of the development of oikeiosis among providentially ordained moral beings.

6. Concluding Thoughts

What the marginalized worldviews of Lucretius, Porphyry, and Plutarch demonstrate is that there were ancient philosophers capable of both (1) acknowledging that humans do indeed have exceptional capacities for language and morality, and (2) that

\textsuperscript{274} On Abstinence from Animal Flesh 3.3
one can make claims of this nature while at the same time remaining open-minded that continuities may exist in the domains of communication, community, and reason more generally. Aristotle’s overlaps with the marginalized figures on these points are what make his strategies for defending exceptionalism claims about the human mind the most progressive of the dominant tradition during antiquity.

One encounters fewer explanatory roadblocks accounting for similarities and differences between humans and animals when inquiry is directed from ontological assumptions shared by the marginalized tradition and—to a significant extent—Aristotle, than from the widespread views of the dominant tradition. The repercussions of semantic anthropocentrism, for instance, are felt not just in animal psychology, but in developmental psychology as well. It has been known since antiquity that confabulating the mental abilities of humans in comparison with those of animals never bodes well for explaining the behavior and mental lives of human infants. In contrast, bottom-up models of cognitive development (such as those offered by Lucretius) that begin with species continuity provide firmer foundations for uniqueness and exceptionalism claims down the line. Such is the case with the Stoics’ uncharacteristically nuanced notion of oikeiosis. Nonetheless, explanatory tensions of the sort arising from the final stages of oikeiosis and Seneca’s relatively progressive approach to animal consciousness are indicative of larger explanatory crises in the ancient philosophy of mind tied to how the perceptual/rational dichotomy informs traditional ontologies of mind and species.
Chapter Five
Renaissance Origins of Animal Minds Skepticism

1. Overview

How much, after all, does man amount to? Formally or informally, directly or indirectly, the Renaissance is perpetually preoccupied with this question of scale, of valuation. It tries to survey man methodically, sets him in balance with animals or angels, looks at him from odd and unfamiliar perspectives, reduces, magnifies, inverts, and collapses him—stunting with the nature of man, as with a new-model airplane, to see what extraordinary feats he is capable of. Or, the game can be reversed…

-Robert Adams (1963: xlii-xliii)

After centuries of church sanctioned, Stoic-inspired dogma about the causes of animal behavior, debates over human uniqueness come back into vogue with the revival of ancient texts during the French and Italian Renaissance, culminating in the 17th century with René Descartes’ “monstrous thesis” (Harrison 1992: 221) that animals are automata. For the first time in history, the argument from providence—long central to the dominant tradition in the philosophy of animal minds—begins to lose favor amongst intellectuals, satirists, and those dedicated to fostering a new secular science. For those who found wisdom in Saint Peter’s claim, “for God resisteth the proud, and giveth grace to the humble,” the argument that God bestowed exceptional capacities upon humanity slowly acquired the antediluvian repute of an age far removed from the present. Michel de Montaigne (1533—1592) opens his widely read Apologie for Raymond Sebond (1576) berating the dominant tradition with an attitude already in vogue among poets, humorists, and academics of 15th and 16th century Europe:

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275 1 Peter, 1.55
276 Most prominently, Francesco Petrarch (1304—1374).
277 A rich literary tradition emerges of satires on mankind (White and Tierney 1987: 27).
Let him help me to understand, by the force of his reason, on what foundations he has built these great advantages that he thinks he has over other creatures. […] Is it possible to imagine anything so ridiculous as that this miserable and puny creature, who is not even master of himself […] should call himself master and emperor of the universe, the least part of which it is not in his power to know, much less to command? (399)

Accordingly, true faith in God is achieved only through the critical reevaluation of humanity. Montaigne sets about this project by shifting debate over uniqueness and exceptionalism claims from theological and/or ontological speculations about categorical differences between human and animal minds, to epistemic concerns about how these disparities can be known in the first place. The result is the emergence a new kind of explanatory crisis not only in the philosophy of animal minds, but also in the philosophy of mind generally.

In challenging the intellectual vanity of humans, Montaigne taps the epistemic currents of the “nouveaux Pyrrhonism” present throughout 16th century thought, to which Descartes would later respond in his celebrated quest for certainty and Bacon with his championing of the scientific method. As Richard Popkin (1979: xvi, 1) observes, “skepticism plays a special and different role in the period from the Reformation up to the formulation of the Cartesian philosophy […] due to the fact that the intellectual crisis brought on by the Reformation coincided in time with the rediscovery and revival of the arguments of the ancient Greek skeptics”—arguments which “became part of the philosophical core of the religious struggles then taking place.” The role that animals played in this moment in history was threefold: by tearing down uniqueness claims, animals were cast as (1) foils for human intellectual arrogance, e.g., other creatures also reason; (2) foils for human cosmic vanity, i.e., as living proof of continuities in nature.

278 Consider English polymath Sir Thomas Browne’s (1605–1682) Pseudodoxia Epidemica (1672), where Browne uses the elephant as an example to “dispel each of the principal inhibitions traditionally understood to disqualify animals from the exclusive human domain of language” (Cummings 2004: 164).
and thus the hypothesis that “man” is but one animal of many; and (3) as provocative and often humorous examples to motivate this “new” skepticism—after all, few hypotheses in history have enjoyed as much agreement as exceptionalism claims against “the beasts.”

Sextus Empiricus and the myriad of ancient and early-modern skeptics that he influenced argued that since “our judgments about animals as objects of perception are problematic,” “we must end in suspension of judgment about the way animals really are” (Annas and Barnes 1985: 46). At his best, Montaigne is the first figure in what I have called the marginalized tradition to adopt this epistemic stance, and one can sense the pleasure he takes in his task: “How does he know, by the force of his intelligence, the secret internal sittings of animals? By what comparison between them and us does he infer the stupidity that he attributes to them?” (400)—later adding, “we, who have no dealings with them except obedience?” (416). Montaigne then answers his own question with a passage that embodies the open-mindedness characteristic of the marginalized tradition, and also of the times: “All that seems strange to us, and what we do not understand, we condemn. The same thing happens also in the judgment we make of animals. They have several conditions like to ours; from those we may by comparison draw some conjecture: but of those qualities that are particular to them, how know we what to make of them?” (416) Note how Montaigne is not necessarily advocating conclusions drawn from the argument from analogy here (as David Hume later would). Rather, he is noting how positive analogies based on observation can be suggestive of continuities; as I read this passage, Montaigne is telling his reader that there is too much

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279 Montaigne, for example, was influenced by the literary genre of *paradoxes*—“little essays against the prevailing opinion of mankind” (Boas 1935: 11). For instance, in Theatre du Monde (1558: 27) P. Boaistuau discusses the misery of humanity and allies himself with “many ancient Philosophers, have not been ashamed to dispute, & to stand in doubt whether brute beasts be partakers of reason.”
unknown about the animal mind to warrant uniqueness claims about humans—an attitude present in an oft-quoted passage from the *Apologie*: “When I play with my cat, how do I know that she is not passing time with me rather than I with her? We entertain ourselves with mutual monkey tricks. If I have times when I want to begin or to say no, so does she” (401). One can thus observe in Montaigne the combined influence of Sextus’ Pyrrhonian skepticism and the anti-anthropocentric, pro-continuity perspectives of Plutarch and Lucretius, which, collectively, push the burden of proof of exceptionalism claims onto those who take them for granted.  

2. The Rise of Epistemic Crises of Human Exceptionalism

The ancient philosophy of animal minds stressed what would become the central point of contention for the dominant tradition: all complex animal behavior can be explained in terms of instinct, learned behaviors, and the basic faculties of perception. By the Renaissance, the question emphatically becomes: yes, but why should it? On what epistemic basis is one justified in denying human cognitive capacities to animals? Montaigne’s *Apologie* contains several passages demonstrating this outlook, e.g., “we see […] in our ruder performances that we there employ all our faculties and apply the utmost power of our souls; why do we not conclude the same of [animals]? Why should we attribute to *some sort of natural and servile inclination* these works which surpass all we can do by nature and art?” (404). Again, note the repeated “why.” This attitude is was also present among Renaissance zoologists who, like Pierre Gilles (1490—1555), were “precursors of the empirical method,” who at once wanted to study animals as “they actually are” (*ibid*.), while at the same time eschewing the dogmatic certainty of ancient

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280 Theodore Gaza (1398—1475), the great translator of Aristotle, also translated Plutarch’s theses on animal rationality (Perfetti 2011: 163).
and medieval uniqueness claims. Riding this wave of skepticism, Renaissance philosophers often demand of their peers an unachievable level of certainty, of which uniqueness and exceptionalism claims are hardly exempt.

In tandem with the “theological crisis” (Popkin 1979) described above, the Renaissance brought about a “crisis of knowledge” (ibid.) provoked by “that type of doubt engendered by the rediscovery of the great variety of points of view of ancient thinkers” as well as “coupling the impact of the rediscovery of the ancient world with the discovery of the New World. On the other side of the Atlantic Ocean another cultural universe existed, with different standards and ideals. On what basis could we ever judge whether the outlook of the noble savages was better or worse than our own?” (43) The same can be said for the renewed interest in the variety of organisms that make up the natural world. Indeed, skepticism about human uniqueness in these centuries is not entirely based on epistemic concerns, it also arises from increasing empirical knowledge that the natural world is full of marvels that are unknown, unappreciated, or just plain mysterious. Montaigne (1576: 417) uses this fact to his advantage, writing that while humans are presumably superior in some ways, animals “produce other effects much beyond our capacity, to which we are so far from being able to arrive by imitation, that we cannot so much as by imagination conceive them.”

For example, Montaigne marvels at the capacity of cephalopods to “actively change” their colors “at will” as the occasion permits, which he contrasts with the “passive” color changes that occur in chameleons and humans in various states of passion (418). Montaigne’s conjecture has some contemporary merit. “It’s not easy to re-identify animals that can change their color and shape at will,” observes Peter Godfrey-Smith
Individual cephalopods, distinctive in their palettes and behaviors, are seemingly able to “actively produce the right color” as the situation requires (120). Godfrey-Smith’s choice of language does not commit him to the view that octopuses, cuttlefish, and the like are capable of making conscious choices of their colors. This is an enigmatic, multi-faceted question. But Godfrey-Smith presumably agrees with Montaigne that there is a difference between this capacity as expressed in chameleons—which is easier to explain—and this capacity as manifest in cephalopods, perhaps due to the relative intelligence of the latter. Like Montaigne, he writes, for instance, “I wondered whether this might be a case of the ‘passive’ production of colors, reflecting the mix coming in. But the movement through colors seemed more organized than that, and many of the colors had no analogues outside. […] Perhaps the part of his brain that controls the skin was turning over a sequence of colors of its own accord” (134). Though Godfrey-Smith’s open-mindedness about the mysteries of animal cognition is fairly characteristic of animal scholarship today, Montaigne stands out historically in terms of both epistemic humility and curiosity about non-human species for their own sake (rather than as stepping stones to human cognition). As Montaigne’s cephalopods demonstrate, explanations of the differences between human and animal cognition are not always amenable to a single cognitive hierarchy in nature—nor would this be desirable.

The Renaissance ushered in a “crisis of scientific knowledge” that often arose from squaring Aristotelian philosophy with new methods of empirical science (Popkin 1979). In The Advancement of Learning, Sir Francis Bacon (1605/1963: 228) wrote that “in natural history we see there hath not been that choice and judgment used as ought to have been, […] a great part not only untried but notoriously untrue.” The same was being
said about the knowledge of animals inherited from antiquity. Scientists in the 15th and especially 16th and 17th centuries were forced to come to terms with the fact that they did not know much about animals, that is, beyond the writings of Aristotle, the medieval bestiaries, and lengthy tradition of moralistic *natural histories*. “There is no description here, only legend,” wrote Georges-Louis Leclerc, Comte de Buffon (1707—1788) attacking Ulisse Aldrovandi’s (1522—1605) *Historia serpentum et draconum* (1640) as—in the words of Foucault (1970: 39)—“an inextricable mixture of exact description, reported quotations, fables without commentary.” Not only was Aristotle’s epistemic worldview under attack (*i.e.*, certain truths exist), but many of his specific views were as well, including those on animals. The humanists and zoologists who translated Plato, Aristotle, and Seneca were not interested in crises of continuity between human and animal minds; they turned to Aristotle for foundations to a new, rigorous science of zoology, and were ultimately disappointed. This led to a “drastic decrease” in Aristotelian commentaries on *De animalibus* in the early to mid 16th century (Perfetti 2011: 154).

New Aristotelians such as Pietro Pomponazzi (1462—1525), for instance, seemingly had no interest in the animal mind. Pomponazzi was professor of natural philosophy at the University of Bologna, who in 1521 seemingly taught the first course on Aristotle’s zoology in the Renaissance—yet as Stefano Perfetti describes the class, it “is something of a program of reasoned skepticism, more than an exercise in progressive naturalism” (152). In Pomponazzi’s own words, Aristotle lacked “true science,” instead basing his arguments on “credulity and belief, since Aristotle did not see all these animals (had he lived a thousand years, he would not have seen them); rather he trusted in those who saw things;” Pomponazzi then makes a claim at home in Montaigne: “Aristotle had
about [animals] the same knowledge that we Christians have about Christ: for we did not see Christ, but we believe those who wrote about him.” For the first time, Aristotle was widely critiqued for not being empirically rigorous. His complicated, often progressive views on animal minds were all but overlooked during this era, presumably because animal physiology first needed to be reestablished as a proper science.

Prior to the Cartesian turn in animal psychology, then, one must consider how the lack of reliable knowledge about animals, combined with skepticism toward pretensions of knowledge about anything, engendered a state of explanatory crisis in the Renaissance quite distinct from the ontological questions about human exceptionalism that pervaded antiquity. In terms of popular readership, these newfound epistemic and empirical challenges were instigated by Montaigne, his protégé Pierre Charron (1541—1603), and other marginalized figures discussed below. This is not to say that the principle basis of ancient crises of human exceptionalism fades away. Like Plutarch, Montaigne targets the utility of dichotomizing rational and perceptual faculties in humans and animals, i.e., “when we compare man with animals, we find he has no wonderful faculties that they lack, and that his so-called rationality is just a form of animal behavior” (Popkin 1979: 45). It is to say, however, that due to prevailing epistemic currents in search of reliable criteria for knowledge, the Renaissance allowed space for progressive philosophical positions on the similarities and differences between human and animal minds. Inspired primarily by Montaigne and Gilles, continuity hypotheses earned fresh champions, including Estienne Pasquier (1529—1615), La Mothe le Vayer (1588—1672), Cureau de la Chambre (1594—1669), and most famously, Charron, who like Montaigne adopted

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282 E.g., Love and Hate of the Beasts (1667)
the Lucretian stance of not being “interested in man’s place in relation to other creatures, but only in the particular endowments of each” (Boas 1935: 50).

From his readings of ancient texts Montaigne lends much-needed credence to a progressive, naturalistic worldview predating modern biological inquiry by at least three centuries. As Montaigne sums up his influential attack on human exceptionalism, he quotes Lucretius—who is cited seventy-six times in the Apologie (Hendrick 1979: 457)—making explicit their most significant shared contribution to this critical genealogy:

All this I have said [about animal life and intelligence] to prove the resemblance there is in human things, and to bring us back and join us to the majority: we are neither above nor below the rest. All that is under heaven, says the wise man [Lucretius], runs one law and one fortune: “All things are bound in the same fatal chains.” There is indeed some difference [between species]; there are orders and degrees; but ’tis under the aspect of one same nature.

Akin the Neoplatonic conception of the place of humans in the animal kingdom, all creatures are said to have traits unique and fit to their species; humans excel non-humans in some traits, while some non-human species excel humans in others; despite immense variation, there is continuity throughout nature (Montaigne even writes of homosexuality in other species); there are discontinuities to be found, but uniqueness claims about humans hold no additional weight than uniqueness claims made about any species (as one can infer from Montaigne’s discussion of “active change” in cephalopods).

The aims of these works are ultimately contrary: “Lucretius stresses the distance between man and the gods in order to emphasize the dignity and independence of rational man. Montaigne creates as wide a gulf as possible between God and man in order to abase human pride and presumption” (Hendrick 1975: 460).

Apologie, 408

Ibid. 406

Ibid. 421.
3. Semantic Anthropocentrism in the Renaissance

In stark contrast to the worldview just described, the dominant tradition in the philosophy of animal minds assumes an orthogenetic perspective about cognition in nature, i.e., as a trajectory of “lower” to “higher” capacities culminating in the mental faculties of Homo sapiens, sequestered by divisions in kind along the way. As with Plutarch, Porphyry, and Lucretius, Montaigne was highly critical of systematic attempts by any philosopher to “pick himself out” and “separate himself from the hoard of other creatures” by “carving out” the best “shares for his fellows and companions,” thus “distributing among them such portions of faculties and powers as he sees fit.” Montaigne was aware of the argumentative strategies commonly used by adversaries in defense of uniqueness claims. For example, skeptical of the claim that birds lack speech, Montaigne accuses his opponents as “playing with words to go and attribute this great effect to some natural ordinance, without the intelligence, consent, and reason of the creature that produces it” (418). Montaigne likely borrowed this critique from Plutarch’s challenge to the Stoics’ repeated use of “as if” rhetoric in the Gryllus.

Plutarch’s clever dialogue is, I suspect, largely responsible for Renaissance acknowledgment of the dangers of semantic anthropocentrism. Two direct literary riffs on Plutarch’s fable went through multiple printings and editions during this period: Niccolò Machiavelli’s (1469—1527) The Golden Ass (1517) and Giovanni Battista Gelli’s (1498—1563) Circe (1549)—both of which portray a baffled Odysseus struggling to convince his fellow Greeks to accept Circe’s offer to relieve them of their animal forms in favor of becoming human again. The arguments in the latter are often clever, but

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287 Chapter Eight, Section 5
288 Apologie, 401 [emphasis added]
it is a mistake to represent Gelli as simply reiterating Plutarch’s arguments with characteristic Renaissance flourish, as Boas (1935: 27) and Robert Adams (1963: xxiv) tend to do. Rather, Circe is a superior text to Gryllus insofar as the key strategies of dominant tradition are accurately and fiercely represented. Throughout its ten dialogues (over 170 pages), Gelli’s Ulysses is a character who repeatedly employs the most common strategy of the dominant tradition to date: when a species is suggestively argued or shown to possess what is widely believed to be a uniquely human capacity, that capacity undergoes constant semantic refinement and redefinition in order to defend and reinforce the original uniqueness claim, often by adding the “true” prefix.

For example, Ulysses argues that animals lack “true friendship” because, “among you beasts ‘friendship’ is nothing but instinct and natural inclinations” (Gelli 1963: 77). Animals also lack “true judgment,” “true habits,” “true bravery,” and “true fortitude”—all of which, despite being observed in animals, are uniquely human because they require “right reason.” For my present purposes, what is important is not what Gelli’s Ulysses means by “right reason,” or whether he is correct that animals lack these capacities; what is significant are the incisive responses of Ulysses’ antagonists, the animals. Representatives of several species accuse Ulysses of semantic anthropocentrism. In defense of the argument that animals have no sense of morality, the Bullock, for instance, accuses Ulysses of drawing upon “fantastic subtleties and hairline distinctions devised by yourselves in order to maintain your superiority over us” (150). Similarly, the Lion accuses Ulysses of repeatedly ‘moving the goalposts’ throughout their debate on these subjects, even to a point where humans can very rarely be said to possess these virtues:

Ulysses, let me speak a plain word. As you describe the matter, so many circumstances and considerations are required to make an action valiant, and so many rare ingredients are necessary in the composition of a brave man, that I very much doubt if either can
occur very frequently. Especially since they cannot be achieved till they have gained a universal applause, which is supposed always to have due regard for truth and merit. But you must not hope to make these sophistries prevail… (107-8 [emphasis added])

Elsewhere, in his discourse with the Dog, Ulysses attempts to defend the uniqueness claim regarding prudence. This discussion is notable due to the Dog’s skepticism, which proves to be more incisive than Montaigne’s. After providing a lengthy list of examples of animals planning ahead, the following exchange ensues:

Dog: Why, will you deny that prudence is knowing how to govern our operations rightly and how to employ them carefully about things which are good or useful for us? Surely you will not contradict me in this.

Ulysses: No; but this is not sufficient. […] Prudence is a virtue of the practical understanding, and its business is to know the general rules of the active life. These first principles she learns from the understanding, and afterwards, by the help of reason, applies them to particulars. But this whole process you can have nothing to do with because you have no understanding.

Dog: How will you make it appear that prudence is in the understanding and not in the sense? (130-1)

This final question is key, as the Dog is adopting somewhat of a proto-behaviorist response—the same sort of skeptical attitude fueling the logical problem in contemporary philosophy. Namely, how can one tell the difference between cases where an animal or human is guided by a rational faculty, or, by instincts and/or operant conditioning? Ulysses’ response is unconvincing. He cites Stoic dogma that animals lack capacities for assent and judgment, both necessary for “true prudence” regarding the future, to which the Dog immediately employs the same strategy again in order to back up his skepticism: but do not animals also possess memory and phantasie, which serve the same function in perceiving things that are not immediately present? (131). Again, how can one tell the difference between prudent-looking behavior caused by reason, versus that caused by memory and imagination? Ulysses dodges this question as well. Instead of providing grounds for distinguishing analogous behaviors caused by two functionally equivalent
capacities, in Stoic fashion Ulysses denies that animals possess both memory, “because you are incapable of conceiving universals,” and learning, “because you have not the gift of memory which treasures up particulars so that reason may afterwards consult and examine them” (132) which means that animals “cannot possibly receive any new intelligence” apart from what they are born with (172). The Dog replies: “Why do pretend that we have no memory?” to which Ulysses falls again into the same linguistic strategy, and consequently, the same earnest request for further clarification:

Ulysses: I deny that you have it, for yours is imagination, not memory.

Dog: And what real difference is there between them, if we remember things as well by our imagination as you do by your memory? (132)

In response, Ulysses tightens up his definition even more: true “intellective” memory, he says, requires the ability to understand time (173). As such, prudence is “nothing else but a habit of acting reasonably upon those things that are either good or evil for us.” When the Dog replies that animals also have habits based on practical understanding, Ulysses replies that they are not “true habits” informed by reason. To this, the Dog gets fed up:

Dog: All these plausible reasons you have produced, Ulysses, seem to me nothing but verbal distinctions, which you have been pleased to create to gratify your own self esteem. Thus the very same thing which is called prudence or art in you, when it occurs in us is called instinct and direction of nature. (173 [emphasis added])

Again the Dog is strategically donning his proto-behaviorist hat to contest the epistemic basis for uniqueness claims about cognitive abilities. Interestingly, whereas in the 20th and 21st centuries this mode of skepticism will be evoked primarily by the dominant tradition to refute the epistemic legitimacy of continuity hypotheses (e.g., that animals possess a theory of mind), here it is evoked to support the marginalized tradition. The point is: regardless of perspective, the logical problem can be, and has been, used to challenge any pretense of knowledge that animals do or do not possess a given capacity.
This strategy appears once more in the text, which eventually leads Ulysses to make what appears to be the first uniqueness claim pertaining to *theory of mind* in the history of philosophy. Responding to Ulysses’ claim that animals lack judgment/assent, the Elephant asks, “Could not sense and appetite perform the same function without setting up this additional faculty in man?” (168) To which Ulysses replies, “yes, but imperfectly,” as “true judgment” requires “separating or abstracting forms from matter, considering their proper essence, and dividing it into its several parts, or composing their predicates, substantials, and accidentals, along with their subjects, comes to have a most certain knowledge of nature” (*ibid.*). To this, Ulysses and the Elephant get into an argument about instances where animals appear to make judgments in their social lives. Ulysses then essentially claims that animals lack a theory of mind, as they interact with one another entirely by means of…

…a certain instinct of nature, by which means a sheep, seeing a wolf, without thinking at all, takes immediately to his heels; whereas [humans] gather the like *intentions* of things, not by natural instinct, but by a train of argument, guided by reason, which compares one thing with another; hence this faculty in us is called *cogitation* […] for it considers the *intentions* and properties of particular things, as the understanding does universals. And therefore when a man happens to see a wolf, even though he takes him to be an enemy, he does not forthwith run away on a natural principle [unless the wolf is] making furiously toward him, howling and openmouthed, like one dying of hunger, then, comparing all these things together, he is likely to conclude that the wolf approaches with *no friendly intentions*, and so he beats a retreat. By this single instance you may perceive how much more perfect these faculties are in us than in you. (167 [emphasis added])

As it turns out, theory of mind is the exceptionalism claim that wins the day. The book ends with the Elephant conceding to Ulysses that humans are superior in this way, leading him to be the only animal to implore Circe to change him back into a Greek.

Gelli’s *Circe* “had a great vogue and was often imitated,” being translated into multiple languages through several pressings; it was even put into dramatic form a number of times (Boas 1935: 35-6). Montaigne himself owned a copy (27). Most
importantly, *Circe* embodies the open-mindedness of the times. The best example of this is perhaps Ulysses’ discourse with the Doe, who offers a progressive defense of feminist principles as her reason to remain an animal, rather than returning to her human form.\(^{289}\)

Robert Adams (1963) aptly notes that *Circe* is the product of an age encountering a “sense of crisis” pertaining to stature of humanity in nature (xlvii). Gelli’s work, Adams continues, represents a marginalized approach to animals, for “[i]n the history of formal philosophy, there is of course no place at all for the Florentine shoemaker; [except] among the disciples of Democritus,\(^{290}\) who have thought that crises might as well be encountered with levity and mental agility as with somber desperation” (*ibid.*). Indeed, amongst the “disciples of Democritus” is Plutarch, who, unlike Gelli’s final dialogue with the Elephant, ends his *Gryllus* ends on a different note: “beasts are not entirely deprived of rational discourse nor understanding, though of course their abilities vary. But the same lack of uniform ability is found in men” (Boas 1935: 27). Ultimately, Gelli’s primary concern is no different than that of Aristotle and the Stoics: addressing explanatory crises wherein animal capacities appear equal to, or greater than, those of humans. In this sense, Gelli is an example of the sort of open-minded figure who does not fit neatly into either the marginalized or dominant tradition. He acknowledges that while there are discontinuities between human and animal minds, it is also true that the types of semantic strategies often employed to reinforce uniqueness claims tend to arise from anthropocentric incentives.

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\(^{289}\) Doe: “Alas! It is not being a reasonable creature that makes me so unwilling to return to my former condition, but because I must be a woman again. We are so scorned that some of your wise men have asserted that we are not of the same species” (84-5).

\(^{290}\) Democritus (*c.* 460—370 BC) belongs in the marginalized tradition. As Montaigne describes his influence: “Democritus held and proved, that most of the arts we have were taught us by other animals, as the spider has taught us to weave and sew, the swallow to build, the swan and nightingale music, and several animals, in imitating them, to make medicines” (413).
4. Animal Language: A Case Study in Healthy Skepticism

Satirists and philosophers have long evoked exceptionalism claims pertaining to language as targets for attack. This topic likewise sets the scene for some of the most progressive arguments in Montaigne’s *Apologie*. To begin, Montaigne evokes skepticism to convincing effect by citing what is inferable from animal signals: “Even in the very beasts that have no voice at all, we easily conclude, from the social offices we observe amongst them, *some other sort of communication*; their very motions converse and consult” (402 [emphasis added]). Montaigne’s approach recalls Aristotle’s frequent claim that animals can be said to possess some human capacities “by analogy.” Indeed, there is a relationship to be drawn between the biological functionalism that leads Aristotle to largely eschew exceptionalism claims in favor of uniqueness claims, and Montaigne’s perspective that “each species and each individual must have its own standards” for comparison, entailing that “the worth of an individual consists not in riding high, but *fittingly*” (Arbel 2017: 51). Montaigne, continues Arbel…

...was a solid believer in the plenitude of nature and the great chain of being—not a vertical chain of being with links from low to high as in Ficino, but rather a horizontal chain with links stretching across all creation. [...] There is no question of one being superior to another [...] They are merely *different*, and in large measure the key to man’s worth, as well as to the worth of other creatures, is to be found in variety itself.

Returning to accusations of semantic anthropocentrism, the mistake of philosophers, argues Montaigne, is to define “language” strictly in terms of vocalizations, whereas, in fact, there are “grammars in gestures” and “finger alphabets” that fulfill the same roles (403). As noted in the previous chapter, this claim also appears in *De rerum

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291 For an example of the times, consider Desiderius Erasmus’s (1466—1536) *Praise of Folly* (1509), which includes “reflections on the classical (and modern) claim that animals are inferior beings because they lack the ability to speak and are ignorant of grammar. [...] ‘The grammar of even one language is more than enough to make life a perpetual agony.’ Thus the very characteristic singled out by philosophers as an exclusive capacity of human beings is here presented as a source of misery” (Arbel 2017: 72).
natura, and indeed, Montaigne quotes Lucretius four times in this section. In doing so, he evokes human marginal cases—“mutes” who “dispute, contest, and tell stories by signs,” children who cannot yet speak,\textsuperscript{292} as well as the case of “lovers” who, whether “angry” or “reconciled,” are able to “entreat, thank, appoint, and, in short, speak all things by their eyes.” Indeed, Montaigne describes in great detail and with dozens of adjectives the multitude of meanings conveyable in human and animal communication with eyes alone, hands alone, head alone, eyebrows alone, shoulders alone. There is, says Montaigne, “no movement that does not speak both a language intelligible without instruction, and a public language” (\textit{ibid.}). He chastises humans for not relating animal communication to “the variety and particular use of other languages,” and instead assuming that human language “must rather be judged the one proper” (\textit{ibid.}). This perspective is straight out of Sextus Empiricus: “even if we do not understand the sounds of the so-called irrational animals, it is nevertheless not unlikely that they do converse and we do not understand them.”\textsuperscript{293}

Montaigne then takes this opportunity to promote another key idea: we should not be surprised that we do not understand other species, since there is immense variation in cognitive capacities both throughout the animal kingdom, as well as within individual species. He refers on the same page to Aristotle\textsuperscript{294} and Lucretius\textsuperscript{295} for examples of how “the difference of language which is manifest amongst us, according to the variety of

\textsuperscript{292} Montaigne is borrowing from Lucretius: “From no far different reason the want of language in children seems to induce them to have recourse to gestures” (\textit{De rerum natura} 5.1028).

\textsuperscript{293} \textit{Outlines of Pyrrhonism}, 22.

\textsuperscript{294} “Aristotle, in proof of this, instances the various calls of partridges, according to the situation of places” (\textit{Apologie} 402).

\textsuperscript{295} “Various birds make quite different notes; some their hoarse songs change with the seasons.” (\textit{Ibid.})
countries, is also observed in animals of the same species” (*ibid*). Montaigne’s discussion of this topic is refreshing in historic context:

The defect that hinders communication between them and us, why may it not be just as much ours as theirs? It is a matter of guesswork to determine where the fault lies that we understand not one another—for we understand them no more than they do us; and by the same reason they may think us to be beasts as we think them. [...] We have some mediocre understanding of their meaning; so do they of ours, in about the same degree. They flatter us, threaten us, and implore us, and we them. As to the rest, we manifestly discover that they have a full and absolute communication amongst themselves, and that they perfectly understand one another, not only those of the same, but of divers kinds. (402)

Despite ambiguities over what “full and absolute communication” is supposed to entail, Montaigne’s key points are clear: *(1)* there are various means through which animals appear to communicate with one another, *(2)* humans do not understand these means, however *(3)* we can sometimes decipher “some mediocre understanding” of what is communicated to conspecifics and, occasionally, to humans as well. In Pyrrhonian fashion, Montaigne is imploring his readers to suspend judgment. As discussed in the following chapter, such claims about the proper attitude to adopt toward animal language are amongst those of which Descartes critically responds.

Having detailed the progressive features of Montaigne’s approach to animal minds, I turn now to the regressive qualities. Despite the progressive anti-hierarchical perspective, the celebrations of continuity and variation in the animal kingdom, and the newfound skeptical attitudes toward token defenses of uniqueness claims, in the Renaissance these positions often come part-and-parcel with anti-intellectualist and “primitivist” trends of the day, for which Montaigne was very much a ring-leader. Indeed, equally symptomatic of this epoch was not only that traditional exceptionalism claims were dethroned, but that, often enough, they were re-directed and heaped upon animals as *our* superiors. Unfortunately, this perspective was intimately related to
progressive views of the place of humanity in the animal kingdom. What’s more, both attitudes were often present in the same works (such as Montaigne’s *Apologie*), which is surely one reason why figures like Montaigne and Charron are overlooked in histories of the philosophy of animal minds. Most importantly for my purposes, Montaigne’s “theriophily” leads him to make the most egregious, utterly credulous abuses of the argument from analogy in the history of debates over animal minds.

5. Poisoning the Well: Theriophily and the Argument from Analogy

George Boas (1891—1980) refers to Renaissance figures in what I have called the marginalized tradition as “theriophiles” (1933, 1935). Theriophily (etymologically: “animal lover”\(^{296}\)) signifies a Golden Age mentality. Its proponents typically—though not always—critique human exceptionalism from the perspective of the superior lives and virtues of early and/or indigenous humans (“primitivism”), and/or non-human animals. In the latter case, A.O. Lovejoy (1873—1962) calls this related tradition “animalitarianism” (1935: 32). Primitivism is an outmoded and fallacious worldview, forever condemned to that tenuous realm between tawdry satire and earnest critiques of early capitalism (White and Tierney 1987: 34). Jean Jacques Rousseau (1712—1778) remains arguably the most read proponent of this worldview, yet it never had so many adherents as it did during the Renaissance, including of course, Montaigne. At times, theriophily even worked its way into science. Early zoologist Girolamo Rorario (1485—1556), for instance, authored a book, apparently in earnest, entitled *Animals Often Use Reason Better than Men*

\(^{296}\) Representing the combining form of the word *thērion*, diminutive of *thēr* (“wild beast”). As Boas notes, “the first root must not be interpreted as denoting merely ‘wild animals.’ We shall use it to denote domestic animals and insects as well” (1933: 1).
Despite its provocative title, this text is of interest only as a clear example of the anti-intellectualist, primitivistic trends of the time. Rorario’s basic argument is, first, that reason is not uniquely human (defended credulously with examples from Plutarch and Aristotle), and second, that animals reason better than humans because their actions—though predictable—are always in accordance with “nature.” In humans, Rorario opines, reason inevitably leads to misery.

Just as I presented an “alternative Seneca” at the end of Chapter Three, it is appropriate to highlight an “alternative Montaigne.” The Montaigne I have focused on so far “was not interested in man’s place in relation to other creatures, but only in the particular endowments of each. The idea of man’s being ‘above’ or ‘below’ other creatures is one which Montaigne steadfastly refuses to discuss” (Arbel 2017: 50). While Arbel’s first claim is true, his second is patently false: the Apologie is chock full of exceptionalism claims heaped upon other species. Most of these serve a common purpose: to demonstrate how humans can learn from nature to improve their condition. Montaigne quotes Pliny the Elder’s (23—79 CE) Natural History (c. 77 CE) in calling nature “a merciless stepmother” to humanity, i.e., humans, unlike other species, are not given innate knowledge on how to live well, and must “seek out by art the things necessary for our preservation” (404). This theriophilic perspective is the source of many of Montaigne’s most epistemically irresponsible uses of the argument from analogy.

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297 Published posthumously by Gabriel Naudé (1600—1653).
298 Given that Montaigne was more a theriophile than a responsible proponent of animal minds skepticism, it would perhaps be more appropriate to dub the Montaigne that I started with as the “alternative” version.
299 See 419-432 for 11 examples, e.g., “some [animals] have some ability to judge their young which is different and keener than ours” (419).
300 Book VII, Ch. 1, 117-118; Apologie, 404
I have argued that Montaigne often evokes the argument from analogy to promote open-minded, yet skeptical, hypotheses about animal minds, *e.g.*, in *On Cruelty* Montaigne discusses “with how much *probability* [animals] are likened to us” (434-5). There are, however, many examples in the *Apologie* where Montaigne reveals himself to be as dogmatic as his opponents and as credulous with his sources as any figure in the history of marginalized tradition in yielding to analogical reasoning: “Hence we try—because of pride—to explain their talents as operations of blind instinct, but we ought to conclude that, since the same effects have the same causes, such deeds as are the effects of reason in beasts” (175). *Conclude?* This passage is highly reminiscent of Hume’s problematic thinking about animal minds.\(^{301}\) Despite Montaigne’s good intentions in rooting out anthropocentric bias, his stance here is unambiguous: positive analogies based on anecdotal observations of animal behavior used to infer similarities between human and animal minds *hold true*.

Montaigne employs this argument constantly—far more often than the instances where he uses analogical reasoning (as with animal language) to forward empirical and epistemic challenges to claims of supposed human uniqueness. The *Apologie* contains a lengthy spree arguing against potential answers to the following question: “what sort of faculty of ours do we not recognize in the actions of the animals?” (403). By my count, he takes aim at *thirty-one* uniqueness claims about humans (403-430). Montaigne is as gullible with his sources as any philosopher discussed so far, *e.g.*, he tells of a dog following a thief through town to his home and then returning to lead the police there—unbelievable perhaps, yet “Plutarch testifies to this story as a thing well confirmed and

\(^{301}\) “other creatures, in millions of instances, perform like actions, and direct them to like ends, all our principles of reason and probability carry us with an invincible force to believe the existence of a like cause” (*A Treatise on Human Nature*, I.3.16).
happening in his time” (425). Whereas Pomponazzi, for instance, is highly critical of his ancient sources, Montaigne presents most of them as fact.302

In Montaigne’s writings, then, the most progressive features of the marginalized tradition to date are observable alongside its most regressive features—among them, belief that “The tone of their voices or their bodily movements suffice to show us their minds” (Boas 1935: 5). The best one can say about arguments arising from Montaigne’s theriophily is that they collectively serve to forward a provocative philosophical statement that Descartes also maintains (albeit for much different reasons303). Namely, “that there is more difference between a given man and a given man, than between a given man and a given animal” (415)—a claim also present in the writings of Charron.304

For the marginalized tradition during the Renaissance, the point is threefold: (1) those species that “in several features come so near to human capacity” (ibid.), serve to demonstrate (or at least suggest) that the cognitive variation observable throughout humanity is only part of a vast spectrum of more basic capacities that, very often, are not uniquely human after all. (2) While animals possess an “inferior” capacity for reasoning than most humans do, according to Charron and Montaigne, this inferiority “is nothing compared to some humans’ inferiority to other humans; and this serves to upset the notion of animal inferiority” (Fudge 2006: 96-7). This is yet another instance of figures in the marginalized tradition employing a nascent, mind-oriented version of the argument

302 Montaigne also believes a ridiculous story from Cleanthes (c. 330—230 BCE) about an ant colony paying the “ransom” of a dead worm to another ant colony in exchange for their group-mate’s corpse, which they carry back to their colony after deliberation with the enemy (417).

303 “Montaigne and Charron may have said that there is a greater difference between one human being and another than between a human being and an animal; yet there has never been known an animal so perfect as to use a sign to make other animals understand something which bore no relation to its passions” (Philosophical Writings, 3.302).

304 I.e., “beasts do reason, have the use of discourse and judgment, but more weakly than man; […] yet there is a […] greater distance between a man and a man, than a man and a beast” (1607: 108).
from marginal cases to challenge the human/animal dichotomy. On the other hand, the diverse and multifaceted skillsets of humans are sometimes unique in the natural world—Montaigne and Charron grant this much—but this fact does not justify the standard view that humans are somehow distinct from nature. Instead, the numerous capacities that humans share with animals only validate the great potential for cognitive variation that philosophers—biased by hubris—are presently unaware of and may never fully grasp, even among those species they claim to know intimately. This general attitude is, again, reminiscent of Aristotle’s (and Darwin’s) progressive stance toward zoological inquiry. Montaigne asserts: “We more admire and value things that are unusual and strange than those of ordinary observation; I had not else so long insisted upon these examples [of small and/or ordinary animals], for I believe, whoever shall strictly observe what we ordinarily see in those animals that live amongst us, may there find as wonderful effects as those we fetch from remote countries and ages” (416).

6. Doorway to Descartes

In the two centuries preceding Descartes’ Meditations (which opens with a quote from Montaigne), the dominant tradition was under attack; due in large part to the “historical accident” (Popkin 1979) of renewed interest in ancient skepticism, the marginalized tradition was—for the first time in history—not so marginalized. Indeed, the concluding pages of Montaigne’s Apologie function as a giant carrot on a stick to figures like Descartes, straight from Sextus: knowledge of our senses is unreliable, the idea of first principles is dubious, and there are no reliable criteria for rationality. In the next chapter, I discuss how the pendulum is soon forced back in favor of the dominant

305 Chapter 4, Section 2.
306 “Good sense is the best-shared thing in the world” (Of Presumption, 499).
tradition. This occurs largely on the back of Descartes’ vendetta as “conqueror of skepticism” (Popkin 1979: 172), in tandem with new developments in anatomical science in 17th century France. Throughout Part Five of the Meditations, “Descartes’s arguments and examples cite without acknowledgment Montaigne’s famous demonstration of the resemblance between humans and animals which aimed to bring humans down to join the ranks of all living creatures” (Lampert 1993: 254). In brief, for Descartes there are continuities between the “automatous” functions of human and animal bodies, but within the “human machine” there is uniquely a mind and a soul. Despite downplaying the historic importance of the theriophiles, Boas (1935: 4) nonetheless notes of the bête machine doctrine, “this famous tenet of Descartes and the Cartesians […] historically grew out of the attack on Montaigne’s disciple, Charron, who in the early XVIIth century was the most prominent Theriophilist.” Indeed, the influence that Montaigne and his followers had on Descartes has been widely commented on (Foglia 2014).

At their best, Montaigne and Charron bring about a decidedly “new” crisis that should be understood as a progressive shift from the ontological parameters of the original. In antiquity, the crisis revolved around whether the causes of animal behavior should be classified under the banner of the “rational faculties,” or, under that of instinct and the “perceptual faculties.” The fresh pairing of Sextus and Plutarch advanced this debate by asking not only how one can tell the difference? but also, whether these archaic dividing lines are actually helpful in the first place. For instance, when Charron (1607: 107) attacks those who “maliciously” reduce animal behavior to “servile and forced inclination; as if beasts did perform their actions by a natural necessity, like things

307 Discussed in following chapter. The relevant citation is Philosophical Writings (Vol. 3: 304). Clarke (2006: 334) agrees, noting that Descartes “had been given a copy of Charron’s Three Books of Wisdom in 1619, and, perhaps contrary to his usual practice, he had read some of it on his travels.”
inanimate, as the stone falleth downward, the fire mounteth upward,” he provokes empirically grounded responses from representatives of the dominant tradition in 17th century France; most notably, Descartes. Montaigne and Charron treat the age-old idea of animals being guided by “servile inclinations” with disdain—not because they believe it to be false—but because there exists empirical (albeit anecdotal) evidence that it may be false. As René Ferchault de Réaumur (1683—1757) claims in the 18th century, “These two opinions […] are equally sound since there can be no way of finding out which is true” by observation alone. In this chapter I have suggested that the logical problem, as expressed here by Réaumur, first begins to take form in the Renaissance.

Pyrrhonian skepticism is undoubtedly the most extreme way to pose this dilemma, but in historic context it is largely responsible for the emergence of epistemic challenges to anthropocentric bias in philosophy. Fudge (2006: 115-6), for example, emphasizes “the importance of skepticism to both Montaigne’s and Charron’s thinking about animals,” referring to them as “skeptical Plutarchians” for whom “that thing labeled ‘instinct’ is not the natural, truthful way of being in the world; it is an epistemological category worthy of some detailed—and destructive—scrutiny.” Throughout both the present and the previous chapters, I have argued that this willingness to challenge long-standing categories and divisions is par for course in the marginalized tradition. The writings of Giovanni Battista Gelli, for instance, offer the most engaging critical dialogue about semantic anthropocentrism to this point, as well as what appears to be the first debate over theory of mind in the history of philosophy—a dialogue that recognizes the crux of this debate as it stands today: the logical problem.

308 1734: I, 22; qtd. Boas 1935: 51
The writings of these philosophers combine the strengths and weaknesses of the marginalized tradition into a digestible package that was controversial, widely read, and practically begging for rebuttals from intellectuals in the 17th century: a far less credulous age from when those ideas originated. While the theriophiles marveled at the unknowns of the natural world, Descartes sought to eliminate them. Montaigne’s mountain of examples of animal intelligence leads him to ask, rhetorically yet in earnest, “Can all this be understood without reasoning and intelligence?”  

Descartes’ response will reestablish the dominant tradition’s seat at the head of the table.

309 Apologie, 409
Continuity as Crisis: 
Two Traditions of Theorizing about Animal Minds

Chapter Six 
Crisis and Comparative Anatomy: 
Animal Minds and the Scientific Revolution

1. Overview

The shapes of human exceptionalism vary over time, and thus we can distinguish pre-Cartesian instances from later developments [...] Early dispensations invoke and police a very active border between man and beast, to be sure. 

- Laurie Shannon (2013: 129)

Despite being arguably the most famous figure from the history of philosophy to discuss the animal mind—or lack thereof—the influence of René Descartes was not a boon to the dominant tradition. To the contrary, though extensively known by his contemporaries, Descartes’ infamous bête machine hypothesis was not widely revered during the Enlightenment; it was rarely, if ever, cited by scientists to justify animal experimentation, and far more philosophers challenged the idea than accepted it, including those who corresponded with Descartes directly. This chapter demonstrates how the emerging discipline of comparative anatomy exacerbated philosophical crises of human exceptionalism, particularly as Empiricists and self-styled “philosopher-physicians” like Julian Offray de La Mettrie (1709—1751) saw little reason not to extend mechanistic forms of efficient causal explanation to the human animal. La Mettrie was at the center of much controversy during this period, but his general claims that “Animals certainly deserve to be compared with man” and that “Descartes did them wrong” (1747/1994: 90-1) were not considered extreme.

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310 See Anita Guerrini (2011: 124-133) and Erica Fudge (2006: 167-8) for elaboration. Robert Hooke (1635—1703) for instance, was vocally uncomfortable with his now-infamous “vacuum pump” experiments, expressing preference for the newly invented microscope’s “nonviolent exploration of nature” (Guerrini 2011: 124-6).
This is partially because of all the ancient texts that enjoyed resurgence during the Renaissance, those of the Pyrrhonian skeptics were arguably the most influential on the Enlightenment thinkers that followed (Popkin 1979). Literary and philosophic trends leaned broadly toward epistemic and existential humility in the face of the unknown. The result was an unexpected boon to the marginalized tradition, where human exceptionalism became a popular subject of satire (e.g., Giovanni Battista Gelli, Michel de Montaigne, La Mothe le Vayer), scientific scrutiny (e.g., Pierre Gilles, Cureau de la Chambre), and skeptical theology (e.g., Pierre Charron, Estienne Pasquier). Despite heavyweights like Francis Bacon (1561—1626) and Descartes opposing the resurgence of Pyrrhonian skepticism on the basis that “it could be overcome by the employment of a proper method,” i.e., the scientific method (Greenwood 2015: 74), the rise of comparative anatomy during the Scientific Revolution was conducive to growing skepticism about the uniqueness of the human mind. Throughout this chapter, I discuss the influence of Oxford neurobiologist Thomas Willis (1621—1675), Abraham Trembley’s (1710—1784) observations on the bizarre, category-stretching plant-animal: the freshwater polyp, Albrecht Haller’s (1708—1777) work on pain perception and muscular irritability in animals, among several other figures.311

The major explanatory crisis of the Scientific Revolution as it related to animals was the problem of how the causes of human behavior could be responsibly distinguished as different in kind from those of animal behavior. When Galileo Galilei (1564—1642) abandoned the Aristotelian theory of final causation, where the movement of bodies was

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311 F. J. Cole’s *A History of Comparative Anatomy* (1949) traces the origins of the discipline to Pierre Belon’s (1517—1564) appraisal of the skeletons of human beings alongside cetacean (1551) and avian (1955) species. Also central was the London Society for Improving Natural Knowledge in 1662 with its journal *Philosophical Transactions.*
long understood as teleological, \textit{i.e.}, as a motive principle guiding the object toward an ultimate destination, a classic basis for human uniqueness claims was abandoned too. The Stoic idea of animals as perceiving “turbid and confused” world but guided by a singular cosmic \textit{hegēmonikon} is one such example,\footnote{Chapter 3, Part 2.} as is Aquinas’ theory of a “natural prudence” or “natural estimate” lying behind all animal behavior.\footnote{“Brutes […] follow the judgment implanted in them by God.” (De veritate q. 24, art. 1)} In its place was a mode of explanation relatively conducive to continuity hypotheses: \textit{efficient causal explanation}, which “came to be characterized as mechanistic explanation and became associated with the popular seventeenth-century conception of the universe as a giant (usually clockwork) mechanism governed by fixed laws of nature” (Greenwood 2015: 72). The scope of William Harvey’s (1578—1657) mechanistic account of the circulation of blood (1628) ranged over practically all of the animal kingdom—a point that was not lost on David Hume (1748/1993: 69) and La Mettrie (1747/1994: 43), who, unlike Descartes, gave like-consideration to the faculties of the mammalian brain. Studies in animal cognition during the Scientific Revolution thus tend to emphasize efficient causal principles of instincts, learned habits, or appetites for locomotion and/or reflexive behavior (\textit{e.g.}, for finding food, mating, and signaling). While these terms made for ready explanations of complex animal behavior, they could likewise theoretically explain any human behavior as well, thereby ushering in a new era of explanatory crisis.

\textbf{2.1 Descartes’ \textit{Bête machine} Hypothesis and the Evolution of Stoic Strategies}

A proto-Cartesian perspective on the differences between humans and animals first appears in the work of Spanish physician Gomez Pereira (1500—1567), who, in 1554, claims that animals are appropriately described as automata, “capable of complex
behavior, but wholly incapable of speech, reasoning, or, on some interpretations, even
sensation.” Descartes denied reading the Pereira’s writings (Gaukroger 1995: 271),
though he was likely aware of Giovanni Alfonso Borelli’s (1608—1679) work on
comparative anatomy, who Justin Lieber (1994: 64) considers an “early architect of the
Cartesian mechanistic approach to animal physiology.”

Cursory awareness of Descartes’ “monstrous thesis” (Harrison 1982: 221),
traditionally interpreted as affirming that animals are unconscious autonoma incapable of
pain (or any experience), is widespread among scholars of philosophy and animal studies
(Allen and Trestman 2017). Beginning in the late 1970s and early 80s, convincing
scholarship begins to emerge that paints a more “enlightened” portrait of Descartes’
views on animals, granting them not only consciousness in the form of subjective
experience (Cottingham 1978), but—remarkably, to the Old Guard314—capacities for
thought (Harrison 1982) and corporeal imagination (Gaukroger 1995). On the other
hand, contemporary theorists like Gary Steiner (2005: 134) argue that such interpretations
“are based on a selective reading of Descartes’s remarks about animals,” which “distort”
his views to make them “acceptable [to] contemporary standards.” Central to Descartes’
place in this critical genealogy, however, is not so much Descartes’ own understanding of
“autonoma,” but the philosophical backlash that his writings inspired. Many of
Descartes’ contemporaries (e.g., Henry More [1614—1687] and John Ray [1627—
1705]), after all, did interpret the bête machine hypothesis as entailing that animals do not
experience qualia (Guerrini 2011: 124). If my overarching thesis is correct—that the

314 I am referring here both to Descartes contemporaries, e.g., Henry More (1614—1687), Marin Mersenne
(1588—1648), William Cavendish (1592—1676), and Pierre Gassendi (1592—1655), as well as standard
interpretations of Descartes’ views on animals in the late 19th and early-to-mid 20th centuries, e.g., Thomas
Huxley (1874), L.D. Cohen (1936), and Edward Thorndike (1949).
history of the philosophy and science of animal minds is a history of “explanatory crises” set against a backdrop of figures repeatedly defending uniqueness and exceptionalism claims in the face of empirical challenges to discontinuity hypotheses—then Descartes himself plays a relatively small role. Descartes never quite acknowledges a “crisis” in the first place, since he does not acknowledge the existence of an animal mind.

For Descartes, the very idea of the “animal mind” is dispelled a priori by virtue of his understanding of what a mind entails: a rational soul, which is “of a nature entirely independent of the body.” Animals are self-moving corporeal entities, lacking in mind. Minded beings are ensouled beings, and—while animals may have “corporeal souls”—the souls of humans are immaterial, immortal, and the source of all mental faculties. Descartes assumes that immaterial souls are immortal souls, and as a Christian, he is vocal in his abhorrence of granting animals the latter, equating the idea to atheism. These de facto ontological assumptions of categorical differences between humans and animals evade the very notion of there being any “crisis” when animals produce human-like behavior. As Katherine Morris (2011: 407 [emphasis in original]) writes, “within Descartes’ framework, possession or non-possession of a rational soul is part of something’s nature or essence,” and for Descartes, “[t]he nature of a creature is not something to be empirically determined.” On this reading, it does not matter if members of a non-human species behave in ways strongly indicative of possessing human mental faculties; intelligent-looking behavior need not be the product of an intelligent being, and

315 Philosophical Writings (Vol 1: 141).
316 E.g., “the souls of animals are nothing but their blood.” (Philosophical Writings Vol 3: 62)
317 Descartes declares the pineal gland as the intermediary between willed directives of the rational, immaterial mind, and the movement of “animal spirits” throughout the arteries and muscles of human bodies (Philosophical Writings, Vol. 1: 101).
318 Ibid. 141.
can be more parsimoniously explained in terms of mechanistic principles of efficient causation. A tension arises here: why does Descartes defer to epistemic parsimony while likewise denying the existence of the animal mind \textit{a priori}?

The argument from parsimony forms the crux of the logical problem in the contemporary literature, and Descartes provides two empirical arguments—which read as statements of fact—in support of it: it is unconceivable that (1) animals could produce meaningful language or (2) solve problems in contexts entirely novel to their natures. These empirical arguments predate contemporary positions and methodologies in comparative cognition, yet Descartes does not, if his \textit{a priori} argument is sound, need arguments of an empirical nature. Because automata—by dint of lacking a rational soul—are without mind, Descartes’ strategy of dispelling crises of human exceptionalism is \textit{ad hoc}, \textit{i.e.}, “criticism of the beast-machine hypothesis that came from outside of the metaphysical foundations of Descartes’s theory could straightforwardly be dismissed by that theory” (Fudge 2006: 153). Likewise, Nicolas Jolley (2015: 35-6) observes that Descartes’ “thesis that animals have no reason or intelligence is really a sub-conclusion; given the extra premise about the necessity of having a faculty of pure intellect for any mental states, he can validly infer that animals are bare machines.”

In the interest of painting a more nuanced picture of Descartes’ view than is typical in the animal studies literature, Jolley’s choice of the phrase “bare machines” is injudicious to what Descartes likely meant by the term \textit{automata}. Descartes almost certainly visited the famed Royal Gardens in Saint-Germain decked out with hydraulically powered statues and an array of mechanical creatures that could dance, play music, and produce vocalizations (Gaukroger 1995: 64). However, while Descartes’
experiences with real machine creatures may have influenced his hypothesis, Descartes “never considered animals to be literally machines” (ibid.). As was common during the Scientific Revolution, Descartes is invested in an intellectual paradigm (effectively beginning with Galileo) purporting that the natural sciences be aided by explanatory principles derived from the mathematics of mechanical movement. The aim of the bête machine hypothesis is to apply the principles of efficient causal explanation to the internal and external movements of animals (including, to a large extent, humans). Descartes “was the first to provide a detailed account of reflexive behavior,” arguing that “the learned behavior of animals, and much of the learned behavior of humans, is as automatic and involuntary as innate reflexes and instincts and can be explained without reference to mentality or consciousness” (Greenwood 2015: 81, 83). As I discuss below, Greenwood’s choice of the phrase “can be explained without reference to mentality” is an under-appreciated, progressive aspect of Descartes’ attitude on the subject.

What Descartes actually meant by automata remains a subject of debate, e.g., centuries later, the jury is still out as to whether he maintained that animals could have subjective experiences, and if so, whether he thought these experiences are analogous to types of human experience.319 Descartes was well aware of the biological and anatomical evidence for material continuity between species, “differ[ing] only a little” from the views of William Harvey (Ibid. 228). In an early letter to Mersenne, Descartes writes that in order to “explain all of [man’s] principle functions” he is turning from “those that pertain to life, such as the digestion of food, the beating of the pulse, the distributing of nutrients, etc., and the five senses. Now I am dissecting the heads of different animals in

319 See Cottingham’s (2016) chapter on Descartes for a review of scholarship on this question.
order to explain what imagination, memory, etc., consist of.”320 Here again is the aforementioned tension: Descartes both denies the possibility of psychological continuity with animals, but is open-minded enough to dissect to the animal brain to explain the workings of imagination and memory in humans. While it is easy to focus on the role played by Descartes’ substance dualism in his uniqueness claims, Descartes is chiefly concerned with mechanistic approaches to human and animal physiology as explanatory principles, rather than dogmatic statements of human exceptionalism. The tension I have raised here is somewhat quelled by turning to this aspect of Descartes’ thought.

Along with leading scientists of his day, Descartes conceived of the interior movements of animal bodies (including those of humans) as automatically produced—an idea which he then applied to all of the external movements of animals, as well as the unconscious or reflexive behaviors that pervade much of human life:

When people take a fall, and stick out their hands so as to protect their head, it is not reason that instructs them to do this; it is simply that the sight of the impending fall reaches the brain and sends the animal spirits into the nerves in the manner necessary to produce the movement even without any mental volition, just as it would be produced in a machine. And since our own experience reliable informs us that this is so, why should we be so amazed that the ‘light reflected from the body of a wolf onto the eyes of a sheep’ should be equally capable of arousing the movements of flight in the sheep?321

One interpretation of this passage is that “fear” is nothing but a mechanical response in sheep, like the blinking of eyes. In which case, the fear-response in animals is nothing like the fear-qualia experienced by humans, since the human experience of fear includes conscious awareness of the threat, and for Descartes, autonoma have “no consciousness at all” (Beck 1987: 24) or “no experience of any kind” (Williams 1978: 284). Descartes’ example of the sheep fleeing automatically from the wolf is lifted directly from earlier

320 Philosophical Writings (Vol. 3: 479; qtd. Gaukroger 1995: 393)
321 Philosophical Writings (Vol. 2: 161).
purveyors of the dominant tradition: Avicenna and Aquinas. So too is Descartes’ use of the clock metaphor to explain the inner-workings of corporeal bodies. Like Aquinas, Descartes maintained that, when it comes to the movements of animals, non agunt sed magis agunter (they do not act but are rather acted upon). Unlike Aquinas, Descartes does not directly evoke God as an explanatory principle. For Descartes, animal behavior is non-rational because, absent a mind, “their desires and their actions are determined by the effects that external objects have on their bodily organs” (Steiner 2005: 150). Animal behavior is explained by virtue of mechanistic bodily responses to the contingencies of any given environmental situation—a view not terribly different from the Stoics, insofar as the latter argue that animals are born with species-specific constitutions that reflexively motivate actions catered to the context at hand (though, to be clear, this is not Descartes’ position). Neither Descartes nor the Stoics grant animals freewill, and—as demonstrated in Chapter Three—the Stoics likewise grant that automatic movements are a necessary part of everyday human activities. But for Descartes, while animals lack self-determination, they are not rational actors moved by a God-given hegēmonikon or sensitive soul; animals are automata—self-moving machines. His rationale is rather simple: human beings can devise complex machines that resemble animals, so why not assume that an omnipotent God is all the more talented in this capacity?

As for the ultimate source of organic movement, like Periera before him, Descartes promotes a kind of “endogenous vitalism” which “provided a mechanistic

322 Summa Theologica 1-2, q. 89. art 1; see Joe McGinnis’ Avicenna (2010: 98) for an overview of the wolf/sheep example, as well as Dominik Perler’s “Why is the Sheep Afraid of the Wolf? Medieval Debates on Animal Passions” (2012).
323 Summa Theologica 1-2, q. 13. art 2. Philosophical Writings, Vol 1: (141).
324 Philosophical Writings (Vol 1: 335) See Sections 2-3, Chapter 3 for discussion of the Stoics.
325 The extent to which “self-moving machines” is compatible with the description I have provided here, where animals behave reflexively in response to environmental and inner-bodily conditions, is debatable.
326 Philosophical Writings (Vol 1: 139)
account of biological functions in terms of an emergent force of organized matter [fn: “as opposed to some exogenous or externally imposed force”], [which] stimulated a fertile tradition of physiological research” later critiqued in the 19th century (Greenwood 2015: 86-7). For Descartes, vital processes of organized matter are the seat of life, not the immaterial soul (Harrison 1992: 224), which is why animals are not literally machines. In a Letter to Plempius, Descartes writes, “I accept that the brutes have what is commonly called ‘life’, and a corporeal soul and organic sensation.”327 As noted above, whether or not “organic sensation” entails feeling or qualia for Descartes is uncertain.

At the very least, Descartes does claim that, “animals do not see as we do when we are aware that we see, but only as we do when our mind is elsewhere […] In such a case we too move just like automatons.” 328 In this case, Descartes’ denial of consciousness to animals presents a similar puzzle to that faced by the meaning of assent in the Stoic arguments that animals lack “perception,” i.e., animals lack perception because it requires the rational ability to assent to appearances. Indeed, as Fudge (2006: 170) describes Descartes’ follower Antoine Le Grand’s (1629—1699) views on the matter: “an animal cannot reflect on what its eyes perceive because, by its nature, it has no further—or higher—faculty of perception.” The puzzle presented in Chapter Three, recall, is the following: either humans share a rudimentary capacity for sense experience with animals that makes appearances roughly the same across species, or, humans perceive the world in a fundamentally different way. Descartes and Seneca are both ambiguous on this point; though they presumably agree that sense perception without

327 Philosophical Writings (Vol 3: 62)
328 Ibid. (61-2)
“pure intellect” (or a rational *hegênomikon*) is strictly corporeal or reflexive, despite the animal displaying “skills” for executing intelligent-looking, apparently thoughtful behavior.

Similarly, despite occasionally using the word *memory* in his discussions of the *bête machine* hypothesis alongside basic physiological and psychological processes (e.g., the digestion of food, the beating of the heart, and the “retention or stamping of these ideas in the memory”), it is unclear whether—like Aristotle—Descartes is fully comfortable granting basic memory to animals, or—like the Stoics—whether he thinks that “true” memory necessarily involves self-conscious reflection. In support of the pro-Stoic interpretation, Descartes includes memory as one of the components of the rational soul, alongside with language and volition. That said, presumably Descartes grants that animals can learn from experience, which implies associative memory functions.

Descartes’ place in the dominant tradition is therefore closer to the overarching Stoic strategy than the Aristotelian strategy for positing uniqueness and exceptionalism claims. Regardless of whether or not he grants sensation to animals, Descartes refuses to grant them any of the other traditional “perceptual faculties” associated with mentality as seen in Aristotle, *i.e.*, *phantasia* and *phronesis*. Descartes’ ambiguous position on animal sensation does not alter Bernard Williams’ (1978: 284) interpretation of Descartes as putting forth an “all or nothing” view of mental faculties. Minded beings are in possession of—or, like children, are capable of—all the mental capacities that come part and parcel with a rational soul, *e.g.*, language, metacognition, recollection, abstract

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329 Seneca, *On Anger* 1.3.7; qtd. Sorabji (1993: 25); see also Inwood (1993: 73-4)
330 *Philosophical Writings* (Vol 1: 108)
331 *Ibid.* (Vol 1: 111-12)
332 Thanks to John Greenwood for this point.
reasoning, capital-R Reason, thought, and even consciousness. This “all or nothing” package of uniqueness claims still leaves open the possibility that Descartes grants sensation to animals. It also recalls the overarching Stoic strategy discussed in Chapter Three, whereby figures such as Seneca argue that, because animals possess an undeveloped hegēmonikon (denying them all the mental faculties granted to humans), they navigate their environments entirely by impulse and appearance.

As I have shown in Chapters Three and Four, figures in the marginalized tradition (such as Porphyry, Plutarch, Lucretius, and Montaigne) critique the Stoics on the ground that those who deny mind to animals trap themselves into denying mind to human infants. Likewise, Descartes’ frequent interlocutor Henry More (1614—1687) presents the same counter-argument, to which Descartes replies:

Infants are in a different case (ratio) from animals: I should not judge that infants were endowed with minds unless I saw that they were of the same nature as adults; but animals never develop to the point where any certain sign of thought can be detected in them.

Descartes’ short reply—quoted in full—is clear yet unconvincing: unlike animals, human infants develop into thinking beings. Jolley (2015: 36) critiques this response as “question-begging” on the grounds that it assumes what it sets out to prove while ignoring the issues at stake: Are infants minded beings? and, if not, When and how does mind emerge? Neither of these questions is addressed in Descartes’ brief reply to More, from which all Descartes is “entitled to claim on the basis of observation is that the bodies of newborn infants are of the same nature as those of adults” (Ibid.) Descartes then, like the Stoics before him, lacks substantive responses to these developmental challenges that, as I have shown, can be directed at most uniqueness claims. Descartes

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333 *Philosophical Writings* (Vol.1: 111-12)
334 *Philosophical Writings* (Vol 3: 347); qtd. Jolley (2015: 36)
seems intent on avoiding the rabbit hole of granting minds to ensouled human infants, from which it follows that souls can exist without rational faculties, and that biological and neurological development is necessary for the rational soul to emerge. If this is true, then the activities of the rational soul are contingent upon development in the brain. Descartes then has no clear answer for where development of the corporeal soul ends and development of the rational soul begins.335

To his credit, Descartes continues the progressive trend in the dominant tradition of being wary of the uncritical use of anthropomorphic language and arguments from analogy. Responsible epistemic attitudes of this sort do not develop in the marginalized tradition until the late 19th and early 20th centuries. In a letter to Henri Regnier, he writes, “Most of the actions of animals resemble ours, and throughout our lives this has given us many occasions to judge that they act by an interior principle like the one within ourselves, that is to say, by means of a soul which has feelings and passions like ours. All of us are deeply imbued with this opinion by nature.”336 Descartes is claiming that anthropomorphism is a part of human nature, and—in line with his skeptical methodology—we should not be deceived by appearances. However, when viewed alongside his a priori rationale for denying mentality to animals, Descartes fails to offer a picture of what non-anthropomorphic descriptions of behavior might look like. We have returned to the tension highlighted above. Presumably Descartes believes that any ascription of mental faculties to animals (such as language) is anthropomorphic and misguided, however he does offer empirical and epistemic—rather than ontological and

335 To be clear, however, Descartes does not claim that all rational souls must confer the capacities of a normal adult human; presumably, the rational soul loses these capacities when the body dies. Thanks to John Greenwood for this point.
336 Philosophical Writings (Vol 3: 99)
metaphysical—reasons in defense of the uniqueness claim that only humans possess a faculty for language, ostensibly open to experimental refutation:

...we can also know the difference between man and beast. For it is quite remarkable that there is no man so dull-witted or stupid – and this includes even madmen – that they are incapable of arranging various words together and forming an utterance from them in order to make their thoughts understood; whereas there is no other animal, however perfect and well-endowed it may be, that can do the like. This does not happen because they lack the necessary organs, for we see that magpies and parrots can utter words as we do, and yet they cannot speak as we do; that is, they cannot show that they are thinking what they are saying. On the other hand, men born deaf and dumb, and thus deprived of speech-organs as much as the beasts or even more so, normally invent their own signs to make themselves understood by those who, being regularly in their company, have no time to learn their language. This shows not merely that the beasts have less reason than men, but that they have no reason at all.

This argument is flawed for a number of reasons. To begin, the first clause of Descartes’ second sentence is false. As per the argument from marginal cases, certainly there exist humans that are incapable of making their inner lives understood, e.g., due to severe brain damage, or severe end-of-life conditions. Second, Descartes’ generalization that any animal in possession of the necessary organs for language fails to use them to communicate with humans is hasty and anthropocentric. Descartes never considers the fact that animals may communicate in creative (i.e., non-reflexive) ways with conspecifics that humans fail to comprehend (this is the crux of what I call Gassendi’s Challenge, discussed below). Third, the assumption that animals lack language so they necessarily “have no reason at all” relies upon a highly exclusive—albeit common—no what “Reason” entails. Noam Chomsky (1966) praises Descartes’ reasoning on this subject due to the stress the latter places on “genuine” language being fundamentally innovative, compositional, and/or creative in character. Like Chomsky, I find this to be a progressive feature of Descartes’ thought. Since the signaling behavior of animals can be explained by means of attributing them a pre-programmed inventory of vocalizations and

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337 Philosophical Writings (Vol. 1: 140)
movements, Descartes and Chomsky both defend this explanation as more parsimonious than any assertion that the differences between human and animal communication are mere matters of degree. In line with rhetoric common throughout the dominant tradition, Descartes writes that while animals appear to communicate, they lack “real speech,” \footnote{Philosophical Writings (Vol. 3: 366)}\textit{i.e.}, as defined exclusively by human ability.

The only way to quell the tension emphasized in this section is to maintain that, \textit{if} Descartes were to witness an animal constructing complex, creative sentences in a wide variety of contexts, he would—by dint of the Scientific Method—grant them the accompanying mental states attributed to humans in these contexts. For instance, it is now common knowledge in primatology that—contrary to Descartes’ assumption that animals are incapable of “inventing their own signs”—captive chimpanzees do develop distinct modes of gestural communication never observed in their wild counterparts, and that the emergence of these unique imperative (\textit{i.e.}, demanding/requesting) gestures is most parsimoniously explained as the apes responding to novel problems of captivity that do not exist in the wild: using human beings as instruments to attain desired objects like food (Tomasello 2008). Both of Descartes’ empirically-grounded uniqueness claims, then, arguably turn out to be false, as Descartes also argues that animals and machines would “inevitably fail”\footnote{Philosophical Writings (Vol 1: 140)} if faced with “problem solving in the form of rational adaption to novel situations” (Greenwood 2015: 85).

That said, Descartes’ \textit{a priori} assertion about the limitations of animal signaling was given empirical support in the 20th century by cross-fostering experiments with sign-language trained chimpanzees (\textit{e.g.}, Terrace \textit{et al.} 1979), as well as by Tomasello and
colleagues’ experiments on chimpanzee gestural communication (Tomasello 2008). Both Terrace and Tomasello found that apes can learn to produce imperative gestures (like begging) but never declarative gestures (e.g., pointing out “look at that sunset!”) or iconic gestures (e.g., scissoring one’s index and middle fingers to signify walking). Regarding this point, there is little to no difference between Tomasello and Terrance’s claims and what Descartes writes to William Cavendish in critique of the marginalized tradition: “Montaigne and Charron may have said that there is a greater difference between one human being and another than between a human being and an animal; yet there has never been known an animal so perfect as to use a sign to make other animals understand something which bore no relation to its passions.” Experimental history has largely been on Descartes’ side here.

2.2. Descartes, Epistemic Parsimony, and the Roots of the Logical Problem

Justin Lieber (1994: 14) writes that there “are two Descarteses: the solipsist Descartes of Meditations and the mechanistic experimentalist of Le Monde and many other writings.” The chief difference, Lieber contends, is in epistemic attitude. The animal studies literature rarely acknowledges the Descartes who understood the bête machine hypothesis as an hypothesis—or, more accurately, as the hypothesis most likely to be true in terms of explaining the causes of animal behavior. Recently, scholars have suggested Descartes’ denial of mental faculties to animals is not as dogmatic as it appears, since—so the argument goes—Descartes’ position is based on a “Morgan’s Canon” type principle of privileging the most parsimonious explanation, which, for Descartes, is the mechanical explanation (Harrison 1992; Lieber 1994; Gaukroger 1995;

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Steiner 2005; Jolley 2015). For instance, Jolley notes the existence of a “second argument” in Descartes, “which is perhaps never explicitly spelt out,” that “turns on the Principle of Parsimony or Ockham’s razor. According to Descartes’ new mechanistic programme, there is no aspect of animal behaviour that cannot in principle be explained in mechanistic terms” (37), so there is no empirical reason to ascribe to them rationality.341

For example, when pressed by Henry More to explain his dogmatism that animals do not think, Descartes replies with an intellectual humility largely foreign to the sections on animals in his published books: “though I regard it as established that we cannot prove there is any thought in animals, I do not think it can be proved that there is none, since the human mind does not reach into their hearts.”342 That said, in another letter to More, Descartes writes that the only reasons one might think that “dumb animals think” are that they share similar bodily organs with us and that popular opinion encourages it, but that “there are other arguments, stronger and more numerous, but not so obvious to everyone, which strongly urge the opposite.”343 This suggests that Descartes’ position is based on the model of an argument to the best explanation. As Harrison (1992: 226) describes this under-appreciated aspect of Descartes views…

Descartes himself continually stressed the significance of the negative aspect of his case. Thus, to More: ‘we cannot at all prove the presence of a thinking soul in animals’; to Reneri: the behavior of animals ‘is not at all a sufficient basis to prove [that they have souls]’; to the objections of Arnauld: ‘we have had no cause for ascribing anything more to them [animals], beyond […] the principle depending solely on the animal spirits. […]’ It needs to be emphasized that Descartes’ denial of animal souls must be understood in the light of the available alternatives.

341 For Descartes, “the most parsimonious explanation of animal activities is mechanism. The significance of the Cartesian view is what it denies, not what it asserts” (Harrison 1992: 226).
342 Philosophical Writings (Vol 3: 365); qtd. Harrison (1992: 227)
343 Ibid.
What we see here is a nascent version of Morgan’s Canon in response to what is currently
called the logical problem. Descartes is the first figure in the dominant tradition to evoke
Ockham’s Razor to explain animal movements by means of principles of reflexive
behavior in response to “the problem of other minds” in animals.\textsuperscript{344} Perhaps Harrison
(1992: 227) is right when claiming that Descartes “merely recognized the limits of
philosophical speculation” when it came to animals.

One of Descartes’ core arguments that animals lack rational souls is that such an
attribution would imply that animals have \textit{immortal} souls—an idea that he finds
outrageous, but nonetheless casts in terms of probability.\textsuperscript{345} Descartes puts forth a novel
strategy for the dominant tradition when discussing this subject: if animals had “thought
like we do, they would have an immortal soul like us. This is unlikely, because there is no
reason to believe it of some animals without believing it of all, and many of them such as
oysters and sponges—these creatures are too imperfect for this to be credible.”\textsuperscript{346} In
Descartes’ hands, this is a weak argument (\textit{i.e.}, why must we generalize to all species?),
though it has epistemic potential. This defensive strategy becomes increasingly common
in the following centuries and can be stated as follows: if we grant \textit{one} species a human-
like mental faculty, what then are the implications for our positions on the cognitive
capacities of \textit{other} species? There exists an analogous argument in contemporary
personhood debates in animal ethics, \textit{i.e.}, if we grant personhood to chimpanzees, what is
stopping us from granting \textit{all} animals personhood? It is easy to identify analogous
arguments in the animal minds literature. For instance, Beckers and colleagues (2006: 92)

\textsuperscript{344} As Greenwood notes in conversation, “Somnambulism shows he has the same problem with humans.”
\textsuperscript{345} “It is more probable that worms, flies, gnats, caterpillars and other animals move like machines than that
they all have immortal souls.” (\textit{Philosophical Writings} Vol. 3: 366; qtd. Jolley 2015: 37)
\textsuperscript{346} \textit{Philosophical Writings} (Vol. 3: 304)
claim to demonstrate that forward blocking in rats (a token case of Pavlovian conditioning) “is flexible and sensitive to constraints of causal inference […] This suggests that complex cognitive processes akin to causal inferential reasoning are involved in a well-established Pavlovian animal conditioning phenomenon commonly attributed to the operation of basic associative processes.” If casual judgment is ascribed to rats, one might argue that mollusks and even spinal cords—which likewise utilize blocking mechanisms (Hochner 2016; D’Mello and Dickenson 2008)—deserve the same or similar ascriptions.347

On one hand, whether it appears in the animal minds literature or the animal ethics literature, this argument is flawed because its rhetoric is implicitly normative and anthropocentric. A legitimate response is simply: *What of it, then? It is far from unusual that challenges to presumed double standards in classification may require large-scale reorientations of conceptual schemes.* Descartes’ Christianity and his “all or nothing” account of mental faculties make him unwilling to seriously consider such a reorientation. Contrary to Harrison’s point, then, it is more reasonable to claim that Descartes established “a theoretical framework by which the behavior of animals could be (pre)judged” (Fudge 2006: 154) than that he was “cautiously agnostic” about animal cognition.348 I also disagree with Harrison that Descartes’ experimental attitude toward the animal mind is “not a case of a double standard, nor did it betray an unwillingness to live up to the implications of his own philosophy” (227). Christianity is clearly offering grounds for double standards here, and, as I argue below, La Mettrie builds a much stronger empirical case for expanding the *bête machine* hypothesis to promote the

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347 Thanks to John Greenwood for this point.

348 Katherine Morris (2000: 407-8) makes the same point.
likelihood of psychological continuity between humans and animals than Descartes does for restricting it to non-human species.

2.3 Gassendi’s Challenge (and other responses to Descartes)

In addition to Henry More’s critical dialogue with Descartes, the bête machine hypothesis was likewise the subject of Descartes’ ongoing correspondences with Marin Cureau de la Chambre (1594—1669), William Cavendish (1592—1676), and Pierre Gassendi (1592—1655). In terms of motivating the crisis at the heart of this dissertation, Gassendi is Descartes’ most significant interlocutor. The following passage contains the heart of what I refer to as Gassendi’s Challenge:

You say that brutes lack reason. Well, of course they lack human reason, but they do not lack their own kind of reason. So it does not seem appropriate to call them irrational except by comparison with us or with our kind of reason; and in any case [...] reason seems to be a general term, which can be attributed to them no less than the cognitive faculty or internal sense. You may say that animals do not employ rational argument. But although they do not reason so perfectly or about as many subjects as man, they still reason, and the difference seems to be merely one of degree. You may say that they do not speak. But although they do not produce human speech (since of course they are not human beings), they still produce their own form of speech, which they employ just as we do ours.\footnote{Philosophical Writings (Vol. 2: 189 [emphasis added])}

There are two major claims to unpack here. First, Gassendi is defending a nascent version of Frans de Waal’s (2016: 158) call for discussions of mental ability that are amenable to “all the various cognitions found in nature” (see also Bekoff and Pierce [2009]). Second, Gassendi is sympathetic to concerns of double standards in comparative cognition brought about by highly exclusive and anthropocentric definitional limitations on what constitutes a given mental faculty.

Combined, Gassendi’s Challenge relies upon two intuitions that open-minded philosophers of varying opinions might mutually accept: (1) that there are varieties of
mentality throughout the animal kingdom, and (2) that something is lost when the sole lens by which we evaluate and study mentality is not only how they differ from human cognition (which is a natural and perhaps necessary vantage point) but how they are inferior to forms of human cognition, i.e., what animals lack in terms of mental faculties. Gassendi’s Challenge is deficit in terms of putting forth a positive research program, but it partially makes up for this by suggesting the need for one, namely, a research program that rejects the de facto vantage point of evaluating animal cognition through a lens of species hierarchy. The framework that Gassendi has in mind is non-orthogenetic, i.e., it is not framed in terms of a “a single evolutionary trajectory culminating in Homo sapiens” (Bekoff and Pierce 2009: 49)—or, in pre-Darwinian terms, that rejects the study of the animal mind from the starting point of humanity’s place in a scala natura. The pith of Gassendi’s Challenge is clear enough: everyone acknowledges that there is tremendous variation in physical attributes spread throughout the animal kingdom, so why not assume (at least some) like-variation in psychological attributes as well? Perhaps the human mind is not the best model for theorizing the minds of dolphins, octopuses, insects, or the proverbial bat (Nagel 1974).

As Steiner (2005: 93) interprets Gassendi, “subjective experience can take many forms, and that the seeming lack of capacities for language, logic, mathematics, and the like in animals is no bar in principle to their having their own forms of communication and ways of reckoning with the contingencies of life.” Despite the fact that “Gassendi offers no argument in support of his claim” (140), his point is forward-thinking in that such considerations were likewise present in the early years of comparative psychology,
e.g., Lloyd Morgan (1894: 39) noted it was “likely that we much under-estimate the capacity in animals to communicate with each other by a language of their own.”

The challenges that Gassendi presents to Descartes have an Aristotelian character to them. Recalling arguments made in Chapter Two, Aristotle remains the most progressive figure in the dominant tradition up to the Enlightenment due to his acknowledgment of the possibility of multifarious cognitive abilities in nature that are functionally analogous (in Aristotle’s terms: “by analogy”) to like-capacities in humans, and which, crucially, may be just as complex, unique, or exceptional as human capacities in their own ways. Aristotle does subscribe to a scala natura, but recall how he rarely makes exceptionalism claims about human beings, opting instead for uniqueness claims lacking in the anthropocentric normativity clearly on display in the arguments of the Stoics, Christians, and Cartesians. Gassendi is more of a continuity theorist than Aristotle, but alongside Aristotle, Gassendi expresses genuine interest in studying animals for their own sake, explicitly viewing human beings as animals themselves (145).

Like La Mettrie after him, Gassendi strengthens his Challenge by adding several empirically informed arguments implying inference from material and behavioral analogies to psychological analogies. Gassendi presses Descartes as follows: Humans and animals alike flee from danger and chase food, so “[y]ou must consider whether the sense-perception which the brutes have does not also deserve to be called ‘thought’, since it is not dissimilar to your own. […] The brutes have nerves, animal spirits, and a brain, and in the brain there is a principle of cognition that receives the messages from the spirits” analogously to human perception. In response, Descartes writes:

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350 See Wesley Mills (1898: 28) and Margaret Washburn (1908: 3) for the same point.
351 *Philosophical Writings* (Vol. 2: 187-88)
I do not see what argument you are relying on when you lay it down as certain that a
dog makes discriminating judgments in the same way we do. Seeing that a dog is made of
flesh you perhaps think that everything which is in you also exists in the dog. But I
observe no mind at all in the dog, and hence believe there is nothing to be found in a dog
that resembles the things I recognize in a mind.\textsuperscript{352}

First, Descartes is correct that physiological continuity does not necessarily entail
psychological continuity and is thereby justified in pushing back against Gassendi on this
point. Descartes is arguing that Gassendi’s assumption of a plurality of overlapping
cognitions throughout animal kingdom is not grounded in anything but speculation and
analogical reasoning, but it must be noted that the behavioral criteria that Descartes
himself evokes for “mind” is also based on an argument from analogy, namely that
humans as minded beings act in certain ways, so all minded beings must naturally act the
same, \textit{e.g.}, possessing language and adapting to novel situations. Second, Gassendi never
says that dogs (or any animal) have powers of discrimination—or any powers—in the
“same way” as humans do. Descartes has made a straw man of Gassendi’s statements. As
Steiner (2005: 145) notes, like Plutarch, “Gassendi’s point is that any being that has a
sensation (a visual image, a feeling of hunger, pain, or whatever) must in principle be
\textit{aware} of that sensation, or it simply would not be a sensation.” Gassendi does not claim
that humans and dogs perceive the world in the “same way.” Rather, he is challenging
(what he took to be) Descartes’ assertion that animals are not conscious beings at all.\textsuperscript{353}

Another frequent interlocutor with Descartes on animals, William Cavendish
(1743/2000: 13), situates Descartes within a tradition of what might be called “anthro-
imperialism,” \textit{i.e.}, “[t]he learned will hardly be brought to allow any degree of

\textsuperscript{352} \textit{Ibid.} 247-8

\textsuperscript{353} Cottingham (1978: 553), Smith (1963: 135), and Gaukroger (1995) suggest that Gassendi and Descartes
are in agreement on this point, \textit{i.e.}, Descartes “is not denying that animals have cognition; only that it is not
the kind of cognition that he is interested in, namely human cognition” (Gaukroger 1995: 454). See Steiner
(2005: 145-6) for a critical discussion
understanding to horses; they only allow them a certain *instinct*, which no one can understand; so jealous are the schoolmen of their rational empire.” A similar critique is present in Montaigne’s follower Cureau, who is highly critical of the “liberty” taken by Descartes “to assign to every thing the rank and order which they ought to hold in the world, and to prescribe them the function they are to exercise.” ³⁵⁴ Here again, Aristotelian functional biology is adopted by a figure from the marginalized tradition to combat the *bête machine* hypothesis. As Cureau (1647) responds to Descartes, “the faculty of reasoning universally […] is the true difference of Man, which marks the spirituality and immortality of the soul;” nonetheless, “beasts reason” in context of achieving ends in particular instances and in relation to their specific needs and faculties. ³⁵⁵ Indeed, Fudge (2006: 162) notes that, “It was to Aristotelianism that Cureau returned to make his case for animal capacity.”

In their opposition to the *bête machine* hypothesis, Cavendish and Cureau adopt the common thread of the marginalized tradition: there exists a tapestry of cognitive capacities in the animal kingdom—even within individual species—making categorical differences along species-lines difficult and unnecessary to draw. Cavendish (1743: 12) appeals to his personal experience with animals to argue that the *bête machine* hypothesis must be wrong because it cannot explain how complicated it is to train a horse—a point that reflects the tension raised above about the role of memory in Descartes’ view of animals. Cavendish relies upon two points. First, memory is a kind of thought or inner experience that “forms a judgment by what is past of what is to come,” and second, one cannot train an animal that lacks sensations such as pleasure and fear (*ibid.*). This focus

³⁵⁵ qtd. Fudge (2006: 162)
on the like-development of animal and human minds from infancy is common to the marginalized tradition. As Fudge (2006: 165) describes Cavendish’s contribution, “While Descartes had assumed a similarity of oyster to monkey and dog to sponge, Cavendish recognizes that there are vast differences of capacity and of character within one species.” This distinction recalls the “singularity of causation” underlying Stoic explanations for animal behavior (Chapter Three) in contrast with Aristotle’s more nuanced account of the various perceptual capacities granted to the “sensitive soul” and the views of inner-species variation by figures in the marginalized tradition (Chapter Four).

Taking stock, the irony of Descartes’ place in a critical genealogy of human exceptionalism is that, despite being its most famous historic proponent, his influence was not a boon to the dominant tradition. Like Aristotle, the Stoics, and the Christians, Descartes ultimately attempts to dispel explanatory crises by means of a priori uniqueness claims—a strategy necessarily in tension with any progressive ideas about the cognitive gap between humans and animals also brought to the table. It is also ironic that Descartes champions a substantive hypothesis about animal and human bodies that would instead—as in the writings of La Mettrie—add fuel to empirical crises of human uniqueness alongside the emerging, continuity-friendly sciences of comparative anatomy and evolutionary biology. The tension emphasized above between competing epistemic attitudes of the “two Descartes’” is indicative of growing pains in the dominant tradition. Descartes’ “all or nothing” approach to mental faculties echoes the Stoic strategy that has guided the dominant tradition up to the Enlightenment. At the same time, his emphasis on epistemic parsimony and his willingness to provide empirical criteria for mental faculties in animals suggest progressive steps for discontinuity theorists.
3.1 Hobbes: Intersecting Traditions and the Origins of Associative Psychology

Somewhat indirectly, the philosophy of animal minds was also ushered into the Scientific Revolution by Thomas Hobbes. Despite defending uniqueness and exceptionalism claims, Hobbes’ strict materialism led him to an empiricist framework for cognitive continuity between human and animal minds that would be later adopted with refinements by John Locke, David Hartley (1705—1757), and David Hume (1711—1776), among others. While there exist substantive differences between these philosophers, their respective positions on animal cognition can be expressed fairly concisely. The core of this two-part section is spent discussing the associative psychology of Hobbes and (especially) Locke, the latter of whom responds directly to Descartes’ views on animal minds.

Neither Hobbes nor Locke fit neatly into the dominant tradition. As informed by the scientific paradigm of their day, the Empiricists reject the “all or nothing” Stoic strategy that defined the dominant tradition up to Descartes, and, in doing so, effectively resort back to the Aristotelian strategy of couching uniqueness claims amid what is otherwise a broad overlap of cognitive ability, ranging from simple to complex iterations of mental faculties, refusing to sit comfortably amid dichotomies of the rational and the perceptual. Rejecting Descartes’ notion of innate ideas, the Empiricists seek the foundations of human knowledge in sense experience, which serves as the building blocks for ideas and concepts. As Greenwood (2015: 94) notes of Hobbes, and which holds equally well for Locke and Hume, the “difference between cognition and sense perception is a matter of degree (of intensity), but not a fundamental difference in kind.” Calling to mind the idea of a sparrow, for instance, is not fundamentally different from
the perception of a sparrow, only fainter and/or less vivid in orientation. The Empiricists thus largely dismiss ontological explanatory crises regarding whether animal behavior is caused by perceptual or rational faculties.

As a consummate materialist, Hobbes argues that “life is but a motion of limbs” and that behavior is explainable by the movement of “so many wheeles, giving motion to the whole body.” In consequence, Hobbes claims that mental states can be reduced to brain states, i.e., that such processes are “nothing really, but motion of some internal substance in the head,” and that human and animal behavior alike can be reduced to appetitive motivations to seek pleasure and nourishment and to avoid pain. The latter point stands in contrast to traditional theories of the will, which Hobbes understood to be nothing but a nebulous metaphysical concept that—like the idea of final causation—has no place in scientifically-informed philosophy, nor in theories of human nature.

The relevant facets of Hobbes’ thought are the consequences of his contention—singular in the dominant tradition to date—that animals think. Like humans, animals form “ordered chains of thought,” namely, sequences of images stored in memory, stimulated by present environmental conditions, and structured by an ability to grasp—at some level—relationships of cause and effect recalled from past experience. Similar to Aristotle’s discussion of phantasia, Hobbes refers to this ability as imagination, which is “common to Man and Beast” and which he refers to as a form of “understanding”, e.g., “a dog by custom will understand the call […] of its master.”

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356 Leviathan (1655/1985: 81)
357 Ibid. 31; qtd. Greenwood 2015: 94)
358 De Corpore (1655: 96; qtd. Greenwood 2015: 94)
359 Leviathan (1655/1966: 54; qtd. Steiner 2005: 156)
360 Ibid. 89
361 Ibid. 52; qtd. Duncan 2017
understanding equates to the retention of images formed by prior experience, which are capable of producing—if not expectations of future experiences—then associationist aversions (or desires) to stimuli that previously caused the animal pain or discomfort (or pleasure). While Hobbes does occasionally use mentalistic words like understanding, deliberation, prudence or anticipation to describe the machinations of animal cognition,362 is it not necessary for him to do so given his more foundational associationist psychology. Hobbes likely holds that imagination in animals, as in humans, automatically forms associations between objects of cause and effect, which produce movements based on previously experienced links to desires and aversions.363 For different reasons, then, both Descartes and Hobbes allow that animal behavior can be explained with explanatory principles also applicable to everyday human life.

Hobbes’ work is not devoid of uniqueness claims. As Hobbes writes, the difference between understanding in humans and animals are the former’s capacity to form “conceptions and thoughts, by the sequel and contexture of the names of things into Affirmations, Negations, and other forms of speech.”364 In short: the effect of language on cognitive ability, which leads to a singular ability for humans to reason abstractly, share knowledge, and express intentions (Steiner 2005: 156). Note that instead of using the “all or nothing” strategy common to the dominant tradition, Hobbes opts for an Aristotelian “scaffolding” strategy of sorts,365 constructing uniqueness claims from constituent parts explainable within his associationist psychology.

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362 See Chapter 6 of Leviathan for many examples.
363 Ibid. 54
364 Ibid. 101-2
365 Chapter 2, Sections 4.2 and 6
Hobbes’ uniqueness claims about communication situate his thought in historic relationship with the Stoic notion of *oikeios*is* (Chapter Four). Like the Stoics, Hobbes denies animals membership in the moral community because, like “fooles” and “madmen” animals “never had power to make any covenant, or to understand the consequences thereof.”366 Unlike the Stoics, his position is not speciesist, as in addition to excluding human “marginal cases,” he also lists “children” as those who remain—until they develop the power to form and understand covenants—outside the moral community.367 Ultimately, it is the strength of communal humanity in a dog-eat-dog world that justifies humans’ dominion over animals, and—often enough—other humans as well.

In both his *First Treatise of Government* (1689) and *Second Treatise of Government* (1689), Locke makes the same exceptionalism claim: animals are incapable of access to the social contract because they cannot engage in language and abstract reasoning.368 In making his argument, Locke evokes a long-standing fixture of the dominant tradition, the argument of providence: “Inferior creatures” were made for human use by God,369 and may be “destroyed” when necessary.370 With few exceptions, Locke’s ties to the dominant tradition stop here, and there is no concrete evidence that—unlike the Stoics, for instance—the argument from providence plays any role in Locke’s views on animal cognition.

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366 *Ibid.* 317
368 *I.e.*, “it is the *Understanding* that sets Man above the rest of sensible Beings, and gives him all the Advantage and Dominion, which he has over them.” (1690/1998: 43)
370 *First Treatise of Government* (1689/2016: 26, 28)
3.2 Locke contra Descartes: Rekindling the Aristotelian Strategy

Writing a generation after Hobbes, Locke retains many of his predecessor’s foundational ideas about human and animal minds. Locke maintains that all knowledge is forged of simple and complex Ideas derived from perceptual experience(s); humans and animals form associations of cause and effect between particular experiences stored as images in memory. Animals are incapable of constructing complex ideas, but experience strongly suggests that they do possess mental lives above and beyond mere sensation. For instance, Locke writes that “Birds learning [...] tunes, and the endeavors one may observe in them, to hit the Notes right, put it past doubt with me, that they have Perception, and retain Ideas in their Memories, and use them for Patterns.”

“Perception” is defined as...

…the first step and degree towards knowledge, and the inlet of all the materials of it; the fewer senses any man, as well as any other creature, hath, and the fewer and duller the impressions are that are made by them, and the duller the faculties are that are employed about them. Locke thus identifies varying degrees of cognitive ability throughout the animal kingdom, including amongst human beings. Locke uses the common strategy of the marginalized tradition of evoking the mental lives of human “marginal cases” to demonstrate that, if children and those of “decrepit old age” have mental lives, then it is likely that animals do as well. Like Hobbes, however, humans are said to possess singular capacities for language and forming abstract ideas; in arguing as such, Locke “reproduces the thread of reasoning that persists throughout the tradition from Aristotle to Descartes: Language and abstract rationality are inseparable, so that any being lacking one must necessarily lack the other” (Steiner 2005: 158). Yet to claim, as Kristin Andrews (2016) does, that “Locke

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372 Ibid. 147
373 Ibid.
agreed [with Descartes] that animals cannot think, because words are necessary for
comprehending universals,” is too hasty and does disservice to the nuances of Locke’s
attitudes toward animal cognition. I argue that Locke plays a more substantive role in
fueling the epistemic crisis of challenging assumed differences between human and
animal cognition than either Hobbes or Descartes.

Unlike Hobbes, Locke is genuinely interested in questions of animal minds, both
in terms of their place in his own theory of mind, and also in terms of his desire to
critique Descartes’ bête machine hypothesis and the uniqueness claims he derived from
it, i.e., “if [animals] have any ideas at all, and are not bare Machins (as some would have
them) we cannot deny them to have some Reason. It seems as evident to me, that they do
some of them in certain Instances reason, as that they have sense; but it is only in
particular Ideas, just as they received them from their senses.”374 This passage is
remarkable in terms of how cavalier Locke is about the possibility of granting “some”
reason to animals. Locke’s dismissal of the traditional role of Reason is unsurprising, as
the Empiricists generally sought to explain the machinations of knowledge without
recourse to vague mentalistic terminology. Locke is aware of Reason’s customary role,
defining it in anthropocentric terms: a “faculty in Man, That faculty, whereby Man is
supposed to be distinguished from Beasts, and wherein it is evident he much surpasses
them.”375 The inclusion of the phrase supposed to be is quite telling here; I read it as
indicating Locke’s acknowledgment that he diverges from the dominant tradition. While
Locke claims that humans “much surpass” animals in reason, he does not deny it to them,
for he sees no empirical reason to do so. It was customary of scholars of the Scientific

374 Ibid. 156
375 Ibid. 590
Revolution, after all, to adhere to the Baconian method of questioning and dispelling the jargon and arguments of past centuries in favor of what can be directly observed.

Like Hobbes, Locke denies animals the power of forming generalized ideas (e.g., “sphere” or “predator”) abstracted from particulars. Where Hobbes and Locke differ on the animal mind is primarily in epistemic attitude; Locke comes across as at last willing to grant animals this capacity if they were to demonstrate evidence of it. “The having of general ideas,” he writes, “is that which puts a perfect distinction between Man and Brutes. […] For it is evident, we observe no foot-steps in them, of making use of general signs for universal Ideas; from which we have reason to imagine, that they have not the faculty of abstracting, or making general Ideas, since they have no use of Words, or any other general Signs.”

Consequently, Locke grants animals “ideas of sensation” but not “ideas of reflection” because (1) there is no empirical evidence of the latter, which may be explained by (2) Locke’s biologically informed functional psychology (discussed below) wherein the psychological faculties of different species are proportioned to the needs of their environments as distributed by God.

Much of Locke’s discussion of animal cognition takes place in tacit or explicit dialogue with Descartes. While agreeing that “animals are imprisoned in the concrete present and the immediate future” (Steiner 2005: 159), Locke denies that animal behavior can be comprehensively explained by means of mechanistic principles alone, e.g., birds often sing, writes Locke, in contexts that are “no use to the Bird’s Preservation.” Like Descartes, Locke is concerned with adhering to the most parsimonious explanation for a given phenomenon, but unlike Descartes, Locke remains open-minded about how new

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376 Ibid. 159-160
377 Ibid. 104-105
378 Ibid. 152
evidence can shift the scales of what is to be considered the most parsimonious explanation. Locke is skeptical of the claim, for instance, that “Dogs or Elephants do not think, when they give all the demonstration of it imaginable, except only telling us, that they do so.” Locke thus acknowledges the historic crisis of positing uniqueness and exceptionalism claims in the face of empirical evidence to the contrary.

Writing to his friend, the materialist Anthony Collins (1676–1729), Locke chastises proponents of Cartesian philosophy who, “against all evidence of sense and reason decree Brutes to be machines only because their hypothesis requires it.” In making mentality an “all or nothing” phenomenon by identifying it with an immaterial soul denied to animals, “the Cartesians have exploited the thesis that immateriality entails immortality to argue for the beast-machine doctrine” (Jolley 2015: 48). Locke supposes no contradiction in denying animals immaterial souls while likewise allowing them mental lives, since an omnipotent God can surely imbue matter with the faculty of thought. As such, Locke argues that perception is “in some degree, present in all sorts of animals,” even “oysters and cockles”—creatures that possess, at least, “some small dull perception.” Like Aristotle and La Mettrie, Locke explains the reasons for there being degrees of cognitive ability in disparate species: cognition is proportioned to biological needs; even oysters, he writes, presumably require some phenomenal capacity to detect sustenance and predators. This is also clear in Locke’s contention that there is a distinction to be made between “dull perception” and “perfect insensibility,” of

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379 Ibid. 118
382 Ibid. 38. Hume likewise grants perception to oysters (Treatise I.4.6).
383 E.g., “What good would Sight and Hearing do to a Creature, that cannot move itself to, or from the Objects, wherein at a distance it perceives Good or Evil? And would not quickness of Sensation, be an Inconvenience to an Animal, that must lie still, where Chance has once placed it; and there receive the afflux of colder or warmer, clean or foul Water, as it happens to come to it?” (Ibid. 38)
which “we have plain instances even in mankind itself” such as the mental faculties of young children\(^{384}\) and persons of “decrepid old age”…

How far [a human in “decrepit old age”] (notwithstanding all that is boasted of innate principles\(^{385}\)) is in his Knowledge and intellectual Faculties, above the Condition of a Cockle or an Oyster I leave to be considered. And if a man had passed Sixty Years in such a State, as ’tis possible he might […] I wonder what difference there would have been, in any intellectual perceptions between him, and the lowest degree of Animals.\(^{386}\)

Locke’s suggestion is that it would be a double standard to grant mentality to human “marginal cases” but not to animals—an argumentative strategy that has been a fixture of the marginalized tradition since antiquity.

Taking stock, by (1) denying the Stoic/Cartesian claim that “either a creature has a full range of mental faculties or it has no such faculties at all” (Jolley 2015: 38), (2) expanding the cognitive powers associated with “perceptual” faculties far into the animal kingdom (indeed, to oysters!), and (3) accounting for cognitive variation in terms of functional biology, Locke is employing an Aristotelian strategy of allowing continuities between humans and animal cognition as well as a small number of (related) uniqueness claims: abstract reasoning and language. Indeed, as Jolley (2015: 42) likewise notes, “Locke can thus agree with Descartes and indeed with the Aristotelian tradition that animals are incapable of scientia [knowledge of universals], but he refuses to infer from this that they lack mental faculties in general.” And, like Plutarch, Lucretius, Montaigne, and Hobbes, Locke conscientiously dissolves the traditional boundaries between “rational faculties” and “perceptual faculties,” openly granting animals some of the former. In these ways, Locke straddles the line between the most progressive strategies of the dominant tradition and the marginalized tradition.

\(^{384}\) Ibid. 17
\(^{385}\) This is a not-so-subtle attack on Cartesianism.
\(^{386}\) *An Essay Concerning Human Understanding* (1690/1998: 147)
4.1 La Mettrie: The Crisis Naturalized

The animal kingdom costs no more than the vegetable kingdom, the loftiest genius no more than a head of wheat. We should judge, then, by what we can see of what is hidden from our eyes and our research, and not make anything up beyond that. Let us follow the performances of the ape, beaver, elephant, etc. If they obviously cannot operate without intelligence, why refuse it to them?


La Mettrie was the most progressive representative of the marginalized tradition to arise from the Scientific Revolution. Armed with a markedly confrontational rhetorical style, epistemic humility, and evidence from the emerging sciences of comparative neuro- and physical anatomy, La Mettrie denounces the substance dualism of the Cartesians in favor of a strictly materialist ontology wherein all things are composed of a single “diversely modified substance” that emerges in various “organizations” throughout nature. Descartes’ evocation of a uniquely human “rational soul” as the harbinger of human exceptionalism is but an outmoded referent for workings of the brain, from which it follows—according to La Mettrie—that there is both material and psychological continuity between the inner-workings of human and animal minds. La Mettrie’s assumption that evidence of material and behavioral analogies between humans and animals entails evidence of psychological analogies is problematic (Greenwood 2015: 90). However his emphasis on improving the probability of analogical arguments being valid or sound by adding increasing evidence from the natural sciences so as to construct an *argument to the best explanation* remains a progressive epistemic model. “The only recourse remaining for our adversaries,” challenges La Mettrie, “is to deny thousands of facts that anyone can easily verify” (1747/1994: 61). Indeed, much of *L’Homme machine* (1747) reads as a series of empirical challenges against uniqueness and exceptionalism claims; the final sentence is a case in point: “So there is my system, or rather the truth, short and simple, if I am not very much deceived. Deny it if you can!” (76) Whereas
Descartes largely rejects the empirical and epistemic import of crises of psychological continuity, La Mettrie revels in them.

While agreeing that “animals are machines,” and consenting that Descartes was “the first to demonstrate fully” this conjecture, La Mettrie observes, “I think Descartes would have been a respectable man in all respects [...] if he had known the value of experience and observation, and the dangers of straying from them” (70-1). For La Mettrie, simple and unbiased application of the scientific method is the only responsible way to mitigate explanatory crises. La Mettrie thus shifts the marginalized tradition away from anecdotal evidence and uncritical analogical reasoning from human to animal minds, to acknowledgment that positive analogies are strengthened with a “concilience of inductions” (Whewell 1840) drawing credibility from a multitude of sources, e.g., biology, behavioral research, and comparative neurology and physiology. “Philosopher-physicians” are the only individuals “who have the right to speak here,” declares La Mettrie against the “obscure studies” and “fanaticism” of theologians, which have led “to a thousand prejudices” about other animals (29-30). After Aristotle, La Mettrie is thus the next major figure in history to naturalize the crisis. Insofar as the spirit of the Enlightenment is to dispel the “wretched hotch-potch of traditional error” affecting even those most “advanced in wisdom and learning,” La Mettrie does more to shoulder this responsibility regarding human exceptionalism in mental faculty than anyone until the mid-to-late 19th century.

As Greenwood (2015: 70-1) notes, the scientific revolution “amounted to a full-scale revolution in intellectual attitude” largely by means of “adjudicate[ing] between

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387 Chapter Two, Section 6
388 Francis Bacon (1603: 172; qtd. Fudge 1999: 98)
competing theoretical explanations of the same range of empirical data.” La Mettrie is not only the first proponent of the marginalized tradition to employ this epistemic model, he is the first figure in the history of either tradition to employ it with an anti-speciesist attitude. In Enlightenment spirit, La Mettrie chastises “Descartes and all the Cartesians” for making “the same mistake. They said man consists of two distinct substances, as though they had seen and counted them” (27). For La Mettrie, the term reason—like “soul”—is hardly deserving of the tremendous reverence that is has long held in the history of natural philosophy. Employing the token strategy of the marginalized tradition of critiquing problematic rhetoric in defense of uniqueness claims, La Mettrie writes that “[t]he excellence of reason does not depend upon its immateriality, a big word empty of meaning, but from its power, extent, and clear-sightedness” (28). La Mettrie makes this strategy more effective by combining it with a principle of epistemic parsimony. Consider the following attack on the “abuse of language” undergirding Cartesian dualism as a foundation for uniqueness claims:

...why do we divide the sensitive principle that thinks in man’s mind? Is this not a manifest contradiction for advocates of the simplicity of the mind? If you divide something, it is absurd to continue to claim that it is indivisible. The abuse of language leads to such nonsense, as does the use of those big words spirituality, immateriality, etc. that even intelligent people scatter about without understanding them. (43)

The principle thesis of L’homme machine is that the behavior of humans and animals alike can be explained by means of efficient causal mechanistic explanation (including human language, thought, and reason). It is by attempting to demonstrate the likelihood of this hypothesis that the text is largely dedicated to attacking those who erect categorical (or otherwise “philosophical,” i.e., non-empirical, as La Mettrie uses the term) distinctions between the cognitive faculties of human and non-human animals. La Mettrie has no qualms distinguishing himself from Descartes on this point:
…even though [Descartes] harps on the distinction between two substances, it is obvious that this is only a shrewd move, a clever stylistic trick to make theologians swallow a poison hidden behind an analogy [i.e., human organization to animal organization] that everyone sees but them. This impressive analogy forces all scholars and meticulous investigators to admit that however greatly these proud and vain beings desire to exalt themselves, they are at bottom only animals, perpendicularly crawling machines, more distinguished by their pride than by the name of man. (71)

While Descartes remained committed to the theological backbone of his substance dualism, La Mettrie was in agreement with his contemporary David Hume that the existence of God is highly unlikely. The advancement of science in the study of nature, he writes, “consequently cannot help but produce unbelievers, as witnessed by the ways of thinking of its most successful investigators,” and “if there is a God,” it makes little sense why this being would implore us “to distrust the knowledge we can draw from animated bodies” (ibid.). Leaving behind Cartesian doubt, La Mettrie moves on to demonstrate his case for cognitive continuity in the spirit of a strictly scientific enterprise.

### 4.2 Biological Functionalism, Scala Natura, and the Origins of Mind

The transition from animals to man is not abrupt. […] A man is distinguished from the ape and other animals only as the ape himself is distinguished from the other animals, that is, by a physiognomy that shows more discernment than theirs. (41)

La Mettrie’s beliefs were largely informed by the emerging field of comparative anatomy spearheaded by Oxford neurobiologist Thomas Willis (1621—1675), whose *The Anatomy of the Brain* (1664) and *Two Discourses Concerning the Soul of Beasts* (1672) he was familiar with (Greenwood 2015: 90). In the vein of a proto-Carl Sagan (1977), La Mettrie reasoned from these texts that brain-body mass ratio correlates to intelligence and the size of each creature’s brain is proportioned to its biological and environmental needs, which is the reason why “man has a very large annular protuberance; this diminishes by

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389 That Descartes is guilty of “self-censorship” is dubious (Gaukroger 1995: 1); though see Lafleur (1956) for support of this claim.
degrees in the ape and the other animals…” (1748/1994: 37). This hypothesis led La Mettrie to a relatively enlightened stance on the traditional notion of a *scala natura*.

The same year *L’Homme machine* was released, La Mettrie published a shorter text in his “Natural History of Man” entitled *L’Homme plante* (1748/1994), the argument being that although “men and plants differ more than they resemble one another” (87), there are nonetheless more material “analogies between the plant and animal kingdoms” than had formerly been considered (77). In both texts, La Mettrie conceives of life in terms of “a ladder so imperceptibly graduated that nature climbs it without ever missing a step through all its diverse creations” whereby “one goes from white to black through an infinite number of nuances or degrees that render the passage infinitely agreeable. Man and plants are the white and black. The quadrupeds, birds, fish, insects, and amphibians are the intermediary shares that soften that striking contrast” (89). Despite rarely being read today (or, indeed, during the 19th and 20th centuries) passages such as this and the arguments—discussed in this section—that they are based on, “presaged a fundamental principle of evolutionary theory” (Greenwood 2015: 93).

La Mettrie contends that humans are the “king of the animals,” as they are, “the only animal suitable for society, the only one to produce language, the only one with the wisdom to establish laws and morality” (91). But he immediately qualifies this statement in two ways. First, human exceptionalism is true only in the limited sense that human material complexity allows them to confront the greater number of “needs” they are faced with in comparison to the relatively fewer “needs” of other species. Akin to the functional biology of Aristotle and Locke, La Mettrie evokes a *scala natura* in a descriptive sense, with little-to-no normativity implicit in higher rungs, *i.e.*, “because

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390 E.g., the lengthiest section is dedicated to analogous mechanisms for reproduction (79-84).
[humans] have infinitely more needs, it follows necessarily that man must have infinitely more mind” (90). For La Mettrie, “mind” is an emergent property of complex brains and bodies. He dismisses the Lockean notion of mind as a *tabula rasa*, which “suggests both the perfectibility of human beings and their complete malleability” instead opting for an account of mind, “both in individuals and in species” that can account for “a range of inherited and inborn anatomical and neurological features, compulsions and limitations” (Lieber 1994: 4). The extent to which a *scala natura* is present in La Mettrie is thus dictated by his biological functionalism: the more needs an organism has, the more complex its organization will be to accomplish said needs. If one species has more needs to sustain itself than another species, this does not make the cognitive capacities of the former species are inferior, just less complex (85).

Despite chastising philosophers, La Mettrie knew a good philosophical question when he saw one. In *L’homme plante*, when considering the material relationship between organisms belonging to the “entire cycle of kingdoms” from “the bottom-most of these bodies to the first genius,” La Mettrie perceptively asks, “Does mind disappear here?” (89). Instead of answering the question as a metaphysician, La Mettrie adopts a theory of functional emergence: “I might introduce here a curious bit of natural history to demonstrate that intelligence has been given to all animals in proportion to their needs” (89). “Beings that have no needs,” he writes, “have no minds” (85). In a somewhat perplexing statement, La Mettrie claims that plants do not possess minds because they “have no needs” due to being rooted in the earth which nourishes them. La Mettrie’s point seems to be that—unlike animals—plant life is naturally maintained by the earth and the sun, with minimal problem-solving work on the part of the plant itself.
Though never explicitly defining the word “mind”, on my reading, La Mettrie holds a materialist view of mind as an emergent problem-solving mechanism for living bodies to address their varying kinds and degrees of needs. While this is a vague and unsatisfactory account of mind, it does open up the gate for La Mettrie to attribute a breadth of uniquely distinctive cognitive capacities throughout the animal kingdom. In a critique of the dominant tradition reminiscent of Aristotle’s insistence that we speak of diverse animal capacities “by analogy” with human capacities, La Mettrie writes that theologians “ought to be content to observe that throughout the animal kingdom the same acts of seeing are carried out by an infinity of different means…,” e.g., “[ears] have a striking diversity in form, without humans, animals, birds, and fish using them differently. All ears are made in such a mathematical way that they all serve the same purpose, that of hearing” (55). La Mettrie thus follows Aristotle’s and—to a certain extent—Locke’s penchant for making uniqueness claims rather than exceptionalism claims about the human mind, an attitude that follows from their collective appreciation for explanations drawn from functional biology (though not Aristotelian teleology).

La Mettrie also seeks to destroy categorical distinctions between plant and animal kingdoms, largely by evoking Trembley’s (1744) discovery of the fresh-water polyp as an organism that fits into both. Although reproducing through shoots like a plant, it uses tentacles to attain food, which is then directed toward a “mouthlike opening that leads to a stomach” (Lieber 1994: 9). La Mettrie draws the following lesson from this discovery:

Polyps do more than move after being sectioned. In eight days, they reproduce into as many whole animals as there are separate parts. This makes me feel sorry for the naturalist’s system of generation, or actually, this discovery pleases me, because it teaches us never to make conclusive generalizations, even from all the best known and most decisive experiments! (61)
This passage shows La Mettrie’s open-mindedness and willingness to suspend judgment. The question still confronting modern philosophers of science and biology—what are the origins of mind?—is left unanswered by La Mettrie, and he is content with future scientists to figure it out. The key point is: just as La Mettrie saw degrees of overlaps between the plant and animal kingdoms, he saw no reason to deny overlaps and degrees between humans and other animals. The same sentiment drawn from *L’homme machine* above can be found in *L’homme plante*: “How can a scrupulous physician, a supposed follower of experience alone, dare conclude on the basis of a few observations of a single species that the same phenomena are to be found in another that he has, on his own confession, not observed?” (81).

This line of questioning leads to the second way in which La Mettrie qualifies his statement that humans are the “king of animals.” La Mettrie argues that, just as the freshwater polyp challenges the tenuous dividing line between the plant and animal kingdoms, so too does the great ape for the place of humanity in the animal kingdom. Most notably, La Mettrie suggests teaching apes the then-new method of sign language, with the same methods recently developed by J. C. Amman (1669—1724), to challenge long-standing exceptionalism claims about language (38-9). Note the confrontational tone La Mettrie adopts in presenting this idea of teaching apes “a multitude of signs” to communicate with humans…

Not only do I defy anyone to cite any truly conclusive experiment that proves my project impossible and ridiculous; but the structure of the speech organs in apes are so similar to those in man that I have almost no doubt that if one trained this animal perfectly, one would finally teach it to articulate and, thus, to learn a language. Then he would be no longer either a wild man or a man manqué. He would be a real man, a little man about town, as well set up or muscled as we are for thinking and profiting from his education. (40-1)
As discussed above, such experiments did indeed become popular in the 20th century (e.g., Gardner and Gardner 1969; Terrace et al. 1979). Despite La Mettrie’s sardonic humor in the final two sentences, his reasoning—in addition to citing similar “speech organs”—is again based on the contention that the brain-body size ratio dictates learning ability and general intelligence, and that the ratio is roughly the same in humans and chimpanzees (38-41).

La Mettrie’s critical emphasis on uniqueness claims pertaining to language is intentional. According to La Mettrie, language, along with reason and morality, all derive from principles of reflexive learning—or, as he puts it: “mimicry.” Mimicry is an instinctive and (often) involuntary process shared by all sentient beings. “Consequently,” writes Greenwood (2016: 206), La Mettrie “held that the same form of reflexive explanation that accommodated sensory-motor reflexes could be extended ‘all the way up’ to higher cognitive capacities,” explaining why he believed—as evinced by his proposal to teach sign language to apes—“that animals could be trained in the higher cognitive capacities commonly held to be exclusively human.” La Mettrie is arguably the first philosopher to staunchly defend an “all the way up” hypothesis with the aid of scientific knowledge; even Hobbes and Locke draw the line somewhere, and Hume’s continuity hypotheses are not explicitly based in comparative anatomy. La Mettrie thus agrees with Descartes that human linguistic ability has yet to be observed in the animal kingdom, and that language is the root of abstract thought and advanced social organization. In contrast, La Mettrie predates 20th century behavioral psychologists in explaining the development of human language with principles of reflexive learning.
La Mettrie even goes so far as to suggest that the apes in question should be taught sign language from infancy for a greater chance of success, and that “language” itself is not restricted to the province of vocalizations, lest our investigations of its presence in other species be biased (41).

Like Lucretius and Montaigne, La Mettrie emphasizes that human and animal communication is multi-modal insofar as it can be manifest in posture, eyes, lips, and a variety of gesticulations (ibid.). Although he does not say it outright, the implication is that uniqueness claims pertaining to language and communication have traditionally been constructed on anthropocentric foundations, i.e., defined in terms of complex (human) vocalizations. La Mettrie claims that “education” is that “which alone draws us up from the level of animals,” and in making this claim he is explicitly anti-speciesist: “But will we say the same about the deaf, those born blind, imbeciles, madmen, wild men, or those raised in the woods by wolves, those whose imagination is corrupted by hypochondria, and finally all those creatures in human shape who have only the coarsest instincts? No. All these men in body, but not in mind, merit no particular classification” (48). This passage is contentious not only for the epoch in which La Mettrie is writing, but also for the 21st century. La Mettrie’s claim is that the boundaries of intelligence—or any cognitive capacity—should not be set at the level of species; if we follow the dominant tradition of defining “the human” as a being with capacities X, Y, and Z, there will always be some humans which lack these capacities and some animals which possess them to some degree. This is, recall, the crux of the argument from marginal cases. Either human marginal cases are not, strictly speaking, classified as “human” or else “an ape full

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391 “Similar accounts of imitative learning formed the basis of the theories of social behavior developed by Gustav Le Bon (1841—1931) and Gabriel Tarde (1843—1904) in the late 19th century, which played a major role in shaping the development of twentieth-century social psychology” (Greenwood 2015: 92).
of intelligence is just a little man in another form” (75). La Mettrie even goes so far as to suggest that apes have the same chance of success at learning sign language—or perhaps better chance—than human marginal cases with perceptual and cognitive disabilities “because of the great analogy between ape and man” (39).

La Mettrie largely employs the argument from analogy as it should be employed, namely (1) by drawing from as many disparate sources as possible to strengthen the probability of positive analogies between the causes of like-behavior in human and non-human animals, and (2) with epistemic humility: “Doubtless the most extended analogy leads the mind to believe that all the differences between animals and man are produced by the causes I have mentioned, although I must admit that our feeble understanding, limited to the grossest observations, cannot see the ties between causes and effects. That relation is a sort of harmony that philosophers will never understand” (38). Epistemic ties to Humean skepticism are evident here. La Mettrie’s perspective on the problem of ultimate causes comes across in the form of an attempt to provide a more parsimonious explanation than anything offered by theologians. He implores his readers to “grant me only that organized matter is endowed with a motive principle,” which “alone differentiates it from what is not so organized […] everything in animals depends on the diversity of this organization, as I have sufficiently proved, and this is enough to solve the riddle of substances and that of man” (68). In short, there is no riddle: “Man is to apes and the most intelligent animals what Huygen’s planetary pendulum is to a watch of Julien le Roy. If more instruments, wheelwork, and springs are required to show the movements of the planets than to mark and repeat the hours…” then this should be
expected (69). It is this motive principle, La Mettrie claims, that provides the explanatory backbone for understanding the efficient causes of all plant, animal, and human behavior.

With the exception of what Descartes took for an anomaly—the human mind—this picture is not radically different from bête machine hypothesis (66). The disparity rests in the scope of application. According to La Mettrie’s theory of psychological emergence, “the material unity of man” (64) is forged from some “inborn force in our bodies” that is found not in any particular organ, but in “the organization of the entire body, and that, consequently, each part contains in itself springs whose forces are proportioned to its needs” (61). La Mettrie is aware that such a picture opens more questions than it answers (e.g., what is this inborn force? Is this a nascent theory of embodied cognition?), but he earnestly sees it as the best hypothesis to explain “this ill-understood teeming swamp” that is the human and animal body (62).

Another key figure in the rise of La Mettrie’s materialism is Albrecht Haller, whose writings on muscular irritability (1757—1766) led to the view that muscles are not passive chunks of meat that require “animal spirits” for animation; “muscles have an animation of their own; the nerves transfer a signal to this mechanism” (Lieber 1994: 8). In short, thought and feeling no longer require explanatory principles divorced from the machinations of corporeal bodies; individual muscles are mechanisms working within a larger mechanism, as is the brain, which functions as “the point of origin of the nerves through which it exercises its rule over all the rest of the body” (64) and is therefore the material cause of all conscious and unconscious movement, ranging from the rate of palpitation of the heart from sexual arousal or the threat of danger, to the depths of moral conscience and remorse.
4. Concluding Thoughts on the Enlightenment

The dominant tradition encounters growing pains during the Enlightenment. As evinced by Cartesians and Empiricists alike, this tradition at once holds onto vestiges of classic defenses of uniqueness and exceptionalism claims, while also contending with its largest opponent to date: the Scientific Revolution. The result is that the marginalized tradition is given a breadth of new tools to work with—largely suggesting cognitive continuity—and that the dominant tradition must now adapt. This pattern of adaptation is observable in Descartes, Hobbes and Locke, where the Aristotelian strategy—rarely evoked after Aristotle himself—now comes into favor, and the more regressive “all or nothing” Stoic strategy largely falls into obscurity after Descartes, who struggles to effectively combine empirical arguments about animal behavior with traditional, \textit{a priori} claims with respect to the limitations (or absence) of animal cognitive ability.

There is at least one crucial area where La Mettrie should have been more cautious in following Aristotle: like many ancient and medieval philosophers, Aristotle accepts material continuity between the bodies of all species, but nonetheless understood that this does not in itself entail psychological continuity (Greenwood 2015: 91). La Mettrie, on the other hand, naively took for granted that “all forms of human psychology and behavior may be re-identified in other animals, albeit in attenuated form, because human psychology and behavior are merely more complex forms of animal psychology and behavior” (\textit{ibid}). Despite serious flaws, La Mettrie offers the strongest sustained argument for cognitive continuity in intellectual history prior to Charles Darwin. Like Darwin, the former’s retrospective stature is that of an unapologetic figure whose reasoning about the long-dominant human-animal divide evoked the ire of theologically-
minded intelligentsia. La Mettrie faced genuine danger in his life. His conclusions were to the emerging fields of biology, neurology, and comparative anatomy what Galileo’s writings were to astronomy: more empirically tangible than the predominant alternatives and markedly dangerous to the argument from providence. Descartes made famous the *bête machine* hypothesis; La Mettrie made a crisis out of it.

Despite being ignored in Thomas Huxley’s (1825—1895) writings on animals as automata (1874), La Mettrie’s works went through multiple printings and translations during the Enlightenment. Even when his name was not evoked, as in Denis Diderot’s (1713—1784) amusing *D’Alembert’s Dream* (1830)—clearly inspired by *L’homme machine*—and multiple articles in his popular *Encyclopedie* (1751—1772), the empirically-grounded challenge to human exceptionalism raised in *L’homme machine* struck at the heart of the dominant tradition in an age largely willing to grant it some consideration. Consider the entry on “Animal” written by Louis-Jean-Marie Daubenton (1716—1800) for the *Encyclopedie*: “it will be very difficult for us to fix the two limits between which animality, if it is permitted to express itself thus, begins and ends. A definition of the animal will be too general, or will not be extensive enough, will embrace beings that perhaps should be excluded, and exclude others that it should embrace.”

Many scholars consider La Mettrie’s work to exemplify not only the culmination of the *bête machine* hypothesis, but also “the decisive climax of a major chapter in human thought” (Lieber 1994: 13).\footnote{E.g., Hastings (1936), Rosenfield (1940), and Vartanian (1953, 1960).} In my view, this is both true and false. On one hand, the *bête machine* hypothesis did not survive the Enlightenment—at least not in one piece. On the other hand, La Mettrie can be said to effectively *open the chapter* on the role that
evolutionary theory and behaviorist psychology will play in fueling the crisis at the turn of the 20th century.
Continuity as Crisis:
Two Traditions of Theorizing about Animal Minds

Chapter Seven
Anthropomorphism and Analogy:
Methodological Crises in Early Animal Psychology

1. Overview

Only a few persons now dispute that animals possess some power of reasoning. Animals may constantly be seen to pause, deliberate, and resolve. Charles Darwin (1871: 66)

From antiquity to the present, the dominant tradition in the philosophy of animal minds has been rightly skeptical of a popular sentiment about that which is only ostensibly observable: many non-human species perform complex and human-like behaviors; often, this appears to imply possession of human-like minds. While the first clause cannot be doubted, incredulity toward the inference that follows—which beginning in 19th century is referred to as “the argument from analogy”—largely captures the essence of the “explanatory crises” discussed in all previous historic periods, i.e., when evidence of mental continuity is predictably met with challenges in defense of human uniqueness and exceptionalism. In the modern era, the argument from analogy was popularized in the writings of David Hume (1711—1776), who famously claimed that “the minds of men are mirrors to one another” (T II.2.5) and that when we see “other creatures, in millions of instances, perform like actions, and direct them to like ends, all our principles of reason and probability carry us with an invincible force to believe the existence of a like cause” (T I.3.16). But clearly, just because the behavior of another species is observed to be similar to the behavior of our own in similar circumstances,

393 Hume’s A Treatise Concerning Human Nature will be cited as T and his An Enquiry Concerning Human Understanding will be cited as EHU.
such an argument does not allow us to conclude an additional similarity, namely that both sets of behavior were caused by the same motivation or cognitive mechanism/process.

Opposition to the argument from analogy is commonplace among philosophers and scientists who have, by-and-large, been highly defensive of uniqueness claims and exceptionalism claims pertaining to faculties and/or processes of the human mind. In contrast, the weakest feature of what I have referred to as the marginalized tradition is their largely uncritical acceptance of analogical arguments of the above type. This form of argumentation, traditionally based on a combination of introspection and anecdotal evidence, is present in varying degrees of credulity from Plutarch to Montaigne, La Mettrie to Darwin, Huxley, and Romanes, and Donald Griffin to Frans de Waal. Indeed, in her popular textbook, *The Animal Mind* (1908/1917), Margaret Washburn (1871—1939) notes that in “recent times, we find argument very like those of Montaigne used by the earlier evolutionary writers,” to which she cites an example of the argument from analogy from Darwin’s *Descent of Man* (1871: 169): “As dogs, cats, horses, and probably all the higher animals, even birds, have vivid dreams, and his is shown by their movements and the sounds uttered, we must admit that they possess some power of imagination”—an argument borrowed directly from Montaigne.394 The most vocal animal minds skeptic of the past twenty-five years, Daniel Povinelli (2000: 12), is correct that “Comparative psychology was born with the argument by analogy” and that “[e]ven today, the invisible tentacles of this assumption run deep and tangled in our efforts to understand the minds of other species.”

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394 “Even brute beasts are seen to be subject to the power of imagination; witnesse some Dogs […] whom we ordinarily see to startle and barke in their sleep” (*Apologie* 277).
Povinelli is wrong, however, to cast all forms of analogical reasoning in animal psychology as outmoded and dangerous to scientific methodology; quite the contrary, exaggerated focus on ridding the animal minds literature from (what is presumed to be) anthropomorphic analogical reasoning leads to idealized and confused epistemic aspirations that, I suggest, invite more tough-minded “logical problems” than they dispel. “Escaping the argument from analogy,” writes Povinelli (2000: 2), “allows us to take a fresh look at the mental lives of other species, a look which may one day allow us to see them without the fog of our own way of thinking about the world shrouding their true natures.” This passage is based on two claims that are regressive for the dominant tradition: (1) anthropomorphism can be eliminated with proper experimental conditions, thus opening the door for knowledge of the “true natures” of animals, and (2) the argument from analogy is something that can be “escaped”. Povinelli’s caricature of the argument from analogy stems from his Thorndike-like obsession with idealized laboratory conditions, which in turn informs his skepticism about what can be known of animal minds. Indeed, Povinelli’s deference to principles of cognitive simplicity, the promise of objectivity through crucial experiments, and his vocal rejection of any belief about animals attained outside these conditions (including all field research), has much in common with late 19th century trends in the nascent science of animal psychology.

In contrast, late-19th century figures like Washburn, Thomas Huxley (1825—1895), Wesley Mills (1847—1915), Leonard Hobhouse (1864—1929), and Robert Yerkes (1876—1956) share strategies for mitigating methodological crises in animal psychology that remain relevant to contemporary efforts to confront the logical problem. This chapter challenges the predominant attitude that analogical reasoning about animal
minds suffers from a “logical weakness” (71) leading skeptics to believe that the logical problem will always exist whenever analogical reasoning about animal minds occurs. This is an overly skeptical attitude that must be rejected in order to revive the problem-solving abilities of the dominant tradition. The logical problem is not endemic to analogical reasoning. Following a line of reasoning that extends into the following chapter, I argue instead that the assumptions underlying the logical problem stem from various historic conditions. These include what were indeed legitimate tough-minded attitudes tied to the origins of experimental animal psychology in the 19th century. While there will always be a place for scientific incredulity about animal minds, tough-mindedness in the 21st century need not emulate tough-mindedness in the 19th century.

2. The Logic of Analogy

In one of the most oft-cited examples of analogical reasoning, Thomas Reid (1710—1796) presented an argument for the existence of life on other planets. Using the astronomical science of his day, Reid (1785/2012: 24) drew a series of inferences from presumed similarities between the Earth and other planets in our solar system, concluding that it is “not unreasonable to think, that those planets may, like our earth, be the habitation of various orders of living creatures.” A brief discussion of the structure of Reid’s argument and the serious flaws inherent in its justification will help setting the groundwork for Hume’s analogical argument about animal minds.

Mary Hesse (1966) distinguishes “material analogies” from “formal analogies.” The former identifies analogies based entirely on similarities identified by experience (whether first-hand or in the natural sciences), and may be exemplified by Reid’s argument. In the latter, two domains are said to be formally analogous if their relevant
similarities can be interpreted under the same mathematical theory or physical law, e.g., “heat and fluid flow exhibit formal analogy because the relevant physical laws have a common mathematical form” (Bartha 2013). In what follows, I assume that all arguments about animal minds exist in the form of material analogy, wherein support for hypotheses about “target” systems that are beyond observation is formulated by drawing a series of “positive analogies” between the target system in question and a “source” system that is observable and taken to be homogenous to the target (Hesse 1966). The strength of positive analogies must be weighed against the existence of any relevant “negative analogies,” i.e., observable dissimilarities between the source and the target systems.

The arguments of Reid and Hume are similar insofar as both cite “accepted similarities between two systems to support the conclusion that some further similarity exists,” thus belonging in the category of inductive or abductive reasoning, “since their conclusions do not follow with certainty but are only supported with varying degrees of strength” (Bartha 2013). This is typical of arguments from analogy. Consider, for instance, Darwin’s (1860) acknowledgment that his argument for evolution by natural selection is based on analogical reasoning:

…why may I not invent the hypothesis of Natural Selection (which from the analogy of domestic productions, and from what we know of the struggle of existence and of the variability of organic beings, is, in some very slight degree, in itself probable) and try whether this hypothesis of Natural Selection does not explain (as I think it does) a large number of facts…

Darwin demands a reason why he cannot employ analogical reasoning as a heuristic device to formulate hypotheses to help “explain a large number of facts.” Indeed, Darwin’s analogical argument from the direct observation of several cases of artificial selection (the source domain), to his theory of evolution by natural selection long

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395 Letter to Henslow [May 1860] in Darwin, 1903
predating the existence of our species (the target domain) is also rightly recognized as a scientific discovery. Any argument for the theory of evolution by natural selection—and, I argue, for animal minds—will rest on abductive reasoning, *i.e.*, it will purport to offer the *best explanation*, based on a far-ranging set of facts from various disciplines, of what has been observed in order to explain the unobserved processes which brought it about.

Unfortunately, neither Hume nor Reid take into account relevant *dissimilarities* between the source and target—a point that opponents of “the argument from analogy” about animal minds seize upon (Povinelli 2000, Andrews 2015). There is no reason why this should be the case. Below, I argue that Povinelli (2000: 71) creates a strawman out of arguments from analogy about animal minds by selectively using examples that paint the argument as entailing the following three points: (1) it does not take into account relevant dissimilarities, (2) it relies wholly on anecdotal evidence, and (3) it is based on naïvely presumed certainties drawn from common sense.

3. Hume’s Analogical Argument about Animal Minds

Although the analogical argument for belief in other minds may be traced back to Hume and La Mettrie, its first explicit exposition appears in John Stuart Mill (1865), who used it to deflate the problem of other minds with an inference from common sense. Like Hume, Mill acknowledges that belief in other minds is natural for human beings, but he is dissatisfied with grounding that belief on intuition. His argument has two premises. First, other humans have similar anatomical properties as I do, which seem to be antecedent conditions for my own mental events. Second, other humans exhibit behavior similar to mine, which by introspection I believe to be the effect of certain mental operations that cause them. Similarly, Hume writes…
‘Tis from the resemblance of the external actions of animals to those we ourselves perform, that we judge their internal likewise to resemble ours; and the same principle of reasoning, carry’d one step farther, will make us conclude that since our internal actions resemble each other, the causes, from which they are deriv’d, must also be resembling (T I.3.16).

Hume’s argument ultimately stems from his belief in the continuity of associative learning across animal minds. But as Hume was writing over a century before Darwin, his argument was never really about drawing conclusions concerning what we can know about animal minds; Hume was making claims about the way other animals reason largely in order to prove his claims about the inner-workings of the human mind. In particular, Hume’s “analogical proof” about animal minds is intended to “demonstrate the veracity of Hume’s claim that beliefs concerning matters of fact are derived from ‘custom’ rather than abstract, demonstrative reasoning grounded in a ‘real connexion among objects’” (Boyle 2003: 8).

Hume maintained that all of our beliefs about the world originate from an instinctive, non-rational faculty that he refers to—sometimes interchangeably—as custom, habit, and imagination—a faculty shared by pre-linguistic children and other animals. Human beings, like other species, learn to navigate their environment and form expectations about its contents solely from their experiences. It is only through living alongside, and interacting with, the objects of a given environment—including one’s own body—that one can come to know the attributes of, and relationships between, these objects. A pre-linguistic human infant only learns the attributes of a stove after a sufficient number of like-experiences, allowing her to draw inferences about the attributes of all stoves and stove-like objects in the future. Likewise…

An old greyhound will trust the more fatiguing part of the chase to the younger, and will place himself so as to meet the hare in her doubles; nor are the conjectures, which he forces on this occasion, founded in any thing but his observation and experience (EHU 70).
All sentient creatures possess a common faculty for “experimental reasoning” to infer that like-events follow from like-causes, which, according to Hume, “is not only a true species of reasoning, but the strongest of all others” (*T* 1.3.7). Recalling the above epigraph from Darwin, according to many figures in the marginalized tradition “Reason” identifies a multi-faceted and gradualist—as opposed to “all or nothing”—faculty in humans and animals alike. Hume also refers to this faculty as *analogical reasoning* (*EHU* 69) because it allows us to infer beyond our immediate and past experience to the unobservable, thereby informing us “of existences and objects, which we do not see or feel” (*T* 1.2.3). According to Hume and Huxley (1878), human beings are no different from other animals in this regard. “The whole conduct of life,” writes Hume, “is nothing but a species of instinct or mechanical power, that acts in us unknown to ourselves; and in its chief operations, is not directed by any such relations or comparisons of ideas, as are the proper objects of our intellectual faculties (*EHU* 72). Hume is opposing the Cartesian and/or rationalist conception of Reason as a distinctive, species-unique faculty where manipulating “relations of ideas” in abstract representations is taken to be the ultimate basis for human knowledge. As discussed below, this idea was hardly radical amid the current of associative learning theories in the 19th century.

Like most figures in the marginalized tradition, Hume uses developmental psychology to support his claims about animal minds. Human infants and non-human animals, he argues, are capable of being educated and disciplined precisely because they learn to draw inferences from what are initially arbitrary sounds to expectations of punishment and reward (*EHU* 70). The early comparative psychologist Wesley Mills (1898: 12-3) makes a similar point, describing the development of kittens as “nothing
more than the conduct of a child of unusual determination and intelligence—in fact, just the sort of child that I should expect to succeed in the world, no matter what the obstacles in its path.” The most basic conclusion of Hume’s analogical argument, contrary to popular opinion, is hardly controversial: “from all the rules of analogy” one would be applying a double standard to assume that humans and animals do not share this fundamental faculty for associative learning. Just as animals need not use “any process of argument or reasoning” to make inferences based on cause and effect, nor is this necessary for infant or adult humans in their ordinary affairs, who, upon introspection, clearly do not consistently and consciously think in terms of demonstrative reasoning in daily life—though they sometimes do after the fact (EHU 70). In line with Hume’s argument, and the related argument from marginal cases, Huxley (1878) claims:

Whatever cogency is attached to the arguments in favor of the occurrence of all the fundamental phenomena of mind in young children and deaf-mutes, an equal force must be allowed to appertain to those which may be adduced to prove that the higher animals have minds. (102)

The instinct of custom is therefore not only the most parsimonious explanation for like-behavior between humans and animals; it is—for Hume and Huxley (1878: 101)—the only answer: “since it is highly probable and cannot be disproved, we are quite safe in accepting it as, in any rate, a good working hypothesis.” Hume, Mill, and Huxley alike are clear that all arguments from analogy admit of degrees of certainty. According to Hume, all reasonings concerning our experiences of the world, including animal psychology and indeed the entire edifice of the natural sciences, are “founded on a species of analogy” wherein…

…when the causes are entirely similar, the analogy is perfect, and the inference, drawn from it, is regarded as certain and conclusive […] But where the objects have not so exact a similarity,
Similarly, Mill (1843/1930: 333) writes that, “there can be no doubt that every resemblance affords some degree of probability, beyond what would otherwise exist, in favour of the conclusion.” The claim here is that increasing the strength of a positive analogy by adding more relevant similarities between the source and target systems increases the probability that a conclusion is justified; importantly, the converse is also true—a far cry from the strawman of Hume’s argument painted by Povinelli. In a material analogy an hypothesis is, at best, more likely to be true than known alternatives.

Hume’s analogical argument can be read in two ways: (1) a limited application that applies only to associative learning, and (2) an extended application wherein like-behavior is a justifiable indicator of “complex” faculties, e.g., theory of mind, empathy, metacognition. When Kristin Andrews (2015: 30) claims that the “argument from analogy to other minds is flawed enough to be reasonably rejected,” she is presumably referring to the latter. Contrary to popular belief, Hume might have agreed. Since he defends an Empiricist account where all or most mental faculties are extensions of associative reasoning, the question is somewhat moot, but Hume never applies his argument to suggest demonstrative reasoning in animals—likely because he found this improbable due to lack of evidence. The emerging picture is that Hume’s argument from analogy is not as irresponsible as history has painted it.

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396 Also see Dialogues Concerning Natural Religion (1779/1947: 144).
4. The Argument from Analogy: From Hume to Huxley

The obvious issue with the argument from analogy comes from cases—e.g., in artificial intelligence—where fundamentally different types of cognitive processes cause the same or similar behaviors (Searle 1992). Particularly in its extended form, one would be hard pressed to find an argument for the continuity of human and animal minds that is more prone to anthropomorphism than the one that Hume offers. For this reason, it is surprising that Hume found his greatest 19th century ally in a figure no less esteemed than Thomas Huxley—Darwin’s confrontational “bulldog” who wore his particular affinity for the apostle Doubting Thomas on his sleeve (Boakes 1984: 17). Indeed, Boakes describes Huxley’s influence as “the main source, partly through his student Lloyd Morgan (1852—1936), for the very skeptical attitude which first came to permeate animal psychology” (ibid.). Huxley’s skepticism is responsible largely because it has much in common with Hume’s (1748) mode of response to apparently insoluble problems like the problem of other minds.

Although Hume and Huxley are widely considered “skeptics” in their approaches to epistemology, both distance themselves from “the skeptics [who] end in the infidelity which asserts the problem to be insoluble…” (ibid.). Hume and Huxley reject global skepticism in favor of a fallibilistic theory of knowledge wherein the process of “solving problems” does not entail arriving at evidence deemed “conclusive.” One must work with as much evidence is currently available in proportion to how strong said evidence appears to be, and how thus likely it is to add up to a “true” state of affairs—assuming that future findings may always contradict those of the past. For instance, in *Man’s Place in Nature* (1863: 36), Huxley suggests that it will be merely a matter of time before evidence
appears to refute explorer, anatomist, and evolutionary theorist Alfred Russel Wallace’s (1823—1913) discontinuity hypothesis that the human mind has a supernatural origin.\footnote{397 Co-discoverer of evolution by natural selection, Wallace (1889: 23) nonetheless argued “Man’s body may have developed from that of a lower animal form under the law of natural selection; but […] we possess intellectual and moral faculties that could not have been so developed, but must have another origin.”}

It is largely because of his confidence in science that Huxley’s views on animal minds come across as dogmatic. Here is, for instance, one of many like-quotes from Huxley’s (1878: 104) little-known book on Hume: “it seems hard to assign any good reason for denying to the higher animals any mental state, or process, in which the employment of the vocal or visual symbols of which language is composed is not involved.” Indeed, Huxley’s (1878) chapter “Mental Phenomena in Animals” cites with approbation practically all of Hume’s major claims about animal cognition, though—unlike Hume—Huxley has additional evidence from comparative anatomy, evolutionary theory, and the discovery of fossils of hominid ancestors. Fifteen years before Huxley wrote his book on Hume, and four years after Darwin’s \textit{Origin of Species} (1859), Huxley (1863: 103) intentionally describes his rationale as a naturalistic “updating” of Hume’s original argument: “It is not merely that the observation of the action of animals almost irresistibly suggests the attribution to them of mental states, such as those which accompany corresponding actions in men.” Indeed, the “minute comparisons” of anatomists and physiologists between “the organs we know to constitute the apparatus of thought in man” and those of animals, reveal the “closest similarity,” “not only in structure, as far as the microscope will carry us, but in function, as far as functions are determinable by experiment” (102). As such…

Whatever reason we have for believing that the changes which take place in the normal cerebral substance of man give rise to states of consciousness, the same reason exists for
the belief that the modes of motion of the cerebral substance of an ape, or of a dog, produces like effects. (103)

As with analogical arguments based on evolutionary theory (discussed below), Huxley’s claim about the relative ease of drawing conclusions about comparative psychology from findings in comparative anatomy is deceptively attractive. Both fields, he argues, one much younger than the other, point “to the same conclusion,” namely—as La Mettrie argued a century earlier—that both the physical and mental processes of humanity are “but the last term of a long series of forms, which lead, by slow gradations, from the highest mammal to the almost formless speck of living protoplasm, which lies on the shadowy boundary between animal and vegetable life” (104). Most of Huxley’s evidence in *Man’s Place in Nature* is based on analogical reasoning from anatomical analogies: skulls, teeth, bones of all sorts, and embryonic development from various species demonstrates “beyond all doubt the structural unity of man with the rest of the animal world, and more particular and closely with the apes” (83). Of course, evidence from comparative anatomy might play a role in supporting mental continuity hypotheses, but only as part of a larger, less-conclusive argument than Huxley’s. One can accept Huxley’s claim about “the impossibility of erecting any cerebral barrier between man and the apes,” and nonetheless accept hypotheses that there are mental faculties possessed by humans that do not exist in other apes (115).

To be fair to Huxley, there is one passage in *Man’s Place in Nature* where he acknowledges the problem of inferring mental similarities from anatomical similarities. Huxley draws an analogy between different musical instruments and the minds of various species, suggesting that, “Art and industry may get much music, of a sort, out of a penny whistle; but, when all is done, it has no chance against an organ. The innate musical
potentialities of the two are infinitely different” (111). I assume that Huxley is referring to innate disparities in brainpower. Indeed, contemporary neuroscience can assist in extending analogical arguments about animal minds. As Andrews (2015: 53) notes, “neurological research relies heavily on analogy,” citing in particular the “Cambridge Declaration on Consciousness” (2012) as based on “a form of argument from analogy” as the “search for neural correlates to conscious experience” requires “looking for similarities in neurological structure and activity between humans and other animals.”

Hume would have approved. Against modern-day detractors like Povinelli (2000), there is no evidence that Hume believed his argument from analogy to be “complete” with behavioral analogies alone. To the contrary, Hume maintained that the methodology employed in philosophical inquiry should be continuous with the physical sciences, thereby maintaining that the “experimental method of reasoning” that he employs in investigating the mind, i.e., “human nature,” could serve as an analogue to contemporary developments by Newton in the field of physics. Namely, begin from a wealth of particular experiences and proceed from these observations to form “principles as universal as possible” (EHU 8). Just as William Harvey’s (1628) principles explaining the circulation of blood have proven true when observed in many animals, the same likely holds of all animals (69). Turning then to the mind, Hume states that…

These analogical observations may be carried farther, even to this science, of which we are not treating; and any theory, by which we explain the operations of the understanding, or the origin and connexion of the passions in man, will acquire additional authority, if we find that the same theory is requisite to explain the same phenomena in all other animals (EHU 69).

It is in forward-thinking passages like this one—which applies equally to evidence for biological evolution—that one can sense Huxley’s (1878: 105) adoration for “Hume’s sagacity” in that “he perceived the importance of a branch of science which, even now,
can hardly be said to exist; and that, in [this] remarkable passage, he sketches in bold outlines the chief features of comparative psychology.”

5. Attacking the Citadel: In Defense of Indirect Knowledge of Mind

At age 29, Darwin (1838) wrote in his notebook that “To study Metaphysics, as they have always been studied appears to me like puzzling at astronomy without mechanics.—Experience shows the problem of the mind cannot be solved by attacking the citadel itself—the mind is a function of the body.” Washburn (1908: 14) likewise notes that knowledge of the minds of others “must always be indirect, a matter of inference,” i.e., in terms of bodily anatomy and behavior. And, as George Romanes begins Animal Intelligence (1877: 1), “in our objective analysis of other or foreign minds we have no such immediate cognizance; all our knowledge of their operations is derived, as it were, through the medium of ambassadors—these ambassadors being the activities of the organism.” Philosophers of animal minds in the late 20th and 21st centuries rarely speak this way, but our situation has not changed. The fact that the mental lives of others are, at the most basic level, inferred by analogy with introspective awareness of our own mental states and their respective patterns of behavior is, of course, a classic problem of philosophy. It need not be a scientific problem though.

The logical problem has historically been interpreted in two ways, often simultaneously: (1) the normal state of affairs in science, where “complementary” (i.e., behaviorally indistinguishable) hypotheses compete to offer the best explanation of a given phenomenon, or (2) the classic “problem of other minds” dressed up to accommodate arguments from analogy about the mental lives of non-human animals, where—in the interest of responsible science—associative learning hypotheses are
preferable to mentalistic hypotheses. These problems are legitimately more pronounced in the animal minds literature than in developmental psychology, but there is no “unique problem” to the former foreign to the latter worthy of debilitating skepticism (Halina 2015). As the early comparative psychologists rightly acknowledged, the study of consciousness and mental states in animals need not, and should not, be debased by fears of traditional “other minds” skepticism, such as the sort lingering in Behaviorist critiques.

As Watson (1913) notes in his watershed paper on Behaviorism, traditionally, behavioral data “must have at least an analogical or indirect reference to belong to the realm of psychology,” however, he writes, this “emphasis upon analogy in psychology […] will inevitably force us to the absurd position of attempting to construct the conscious content of the animal whose behavior we have been studying.”398 In contrast, the early comparative psychologists do not conceive this position as “absurd” since, unlike the positivist, the fallibilist need not view the problem of other minds as an epistemic roadblock to scientific progress. As Hume and Huxley imply, it is precisely because knowledge of other minds is indirect that the likelihood of conclusions about them is strengthened with each additional source from a variety of research programs. Leonard Hobhouse (1904), for instance, states the Hume/Huxley position as entailing responsible skepticism and analogical reasoning based on a consilience of inductions:

At no point, perhaps, is the evidence [for animal psychology] conclusive, but it is to be remembered that these functions are indicated so that evidence of capacity for one is indirect evidence of capacity for another. We have, therefore, a set of independent arguments all pointing in the same direction, and it is on this convergence of evidence rather than on decisive proof at any point, that our hypothesis must rest.399

The same perspective is present in Morgan (1903: 37), who writes that “we have direct and immediate acquaintance with no other psychical processes than those which we can

398 This “inevitability” recalls Povinelli’s (2000) talk of a “logical weakness” in the argument from analogy.
399 Qtd. Mills (1904: 751)
study by the introspective method in ourselves.” In practical response to this situation, Morgan echoes Hume, Huxley, and Hobhouse:

> When he compares and correlates his own results with those of other introspective observers, he becomes so far a comparative psychologist, and by widening his basis renders his conclusions more comprehensive. A further stage of the comparative method is reached, when he endeavours to correlate the results of introspective psychology with the conclusions reached by the physiological study of those nervous processes which are the concomitants of psychical states. (36 [emphasis added])

For Hobhouse and Morgan, rather than rejecting analogical reasoning about other minds, the right position is to advocate strong, pluralistic arguments from analogy in the necessarily “indirect” study of other minds. One more figure from the marginalized tradition will suffice to demonstrate how widespread this anti-skeptical attitude was. According to Robert Yerkes (1905: 142-3)…

> Human purposes well may be material of science, albeit we know only our own directly; and in precisely similar fashion the mental life of an insect, a fish or a monkey may be studied indirectly. [...] Certainty of the truth of these inferences there is none, nor can there be; but neither is there certainty of the truth of any of our inferences concerning the states of consciousness of our fellow beings. [...] Consequently our knowledge of the mental life of animals must vary, for all practical purposes, with our knowledge of their anatomy, physiology, habits, instincts and reactions.

> These historically marginalized responses to animal minds skepticism remain progressive: arguments from analogy must be strengthened from as many disparate research programs as possible to forge arguments to the best explanation. The same attitude was present in La Mettrie, who was well aware of the problem of mental attributions being “indirect”, and the “solution” of strengthening arguments from analogy with various evidential sources. It is largely in this spirit that Romanes (1883: 13) claims that we must be careful not the “abuse” analogical reasoning (ironic given his reputation), because it is “the only instrument available.” To be clear, one does abuse analogical reasoning if the extent of one’s rationale is Hume’s basic argument that like-

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400 Chapter Six, Sections 4.1 and 4.2
behavior implies like-mentality, which Darwin and Romanes often and uncritically fall into. That said, none of these figures, including Morgan, advocate the expenditure of intellectual resources on crucial experiments capable of shouldering the weight of mentalizing hypotheses alone, as has been widely advocated over a century later.401

6. The Logical Problem and Tabular Representation

In response to apparently debilitating skeptical problems such as the logical problem, Hume’s strategy is to convert such inquiries into questions that we can say something about pertaining to the role our experience plays in forming such ideas (Biro 2005: 39). There will never be a conclusive answer to whether chimpanzees have a theory of mind, but evidence on this subject can be swayed in one direction or another by increasing the number of positive and/or negative analogies; that is all one can ask for, and there is nothing unusual about this method that is worthy of skepticism. One possible avenue for representing situations like the logical problem is inspired by Hesse (1966), who famously provided a visual aid to representing analogical arguments by representing their similarities and differences in the form of tabular representation:

<table>
<thead>
<tr>
<th>SOURCE (S)</th>
<th>TARGET (T)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( P )</td>
<td>( P^* )</td>
</tr>
<tr>
<td>( A )</td>
<td>( \neg A^* )</td>
</tr>
<tr>
<td>( \neg B )</td>
<td>( B^* )</td>
</tr>
<tr>
<td>( Q )</td>
<td>( Q^* )</td>
</tr>
</tbody>
</table>

According to Bartha (2010: 16), the above argument may thus be summarized: “It is plausible that \( Q^* \) holds in the target because of certain known (or accepted) similarities with the source domain, despite certain known (or accepted) differences.”

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401 E.g., Povinelli and Eddy 1996; Povinelli and Vonk 2004; Lurz et al. 2014
Consider the following tabular representation of an analogical argument assessing the evidential strength for attributing empathy to chimpanzees and rhesus macaques, respectively. Empathy is defined here as requiring a theory of mind to represent the mental states of others, which is contrasted with more basic and widespread (though behaviorally-indistinguishable) reflexive acts of *emotional contagion*, i.e., social animals become emotionally distraught when observing others in pain, but not necessarily because they are adopting the perspective of that individual. This argument is intended for heuristic purposes only.

<table>
<thead>
<tr>
<th></th>
<th><strong>Humans (S)</strong></th>
<th><strong>Chimpanzees (T1)</strong></th>
<th><strong>Rhesus macaques (T2)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Known similarities:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Von Economo neurons (associated with making self/other distinction)</td>
<td>Von Economo neurons (only found in apes and humans)</td>
<td>No Von Economo neurons</td>
</tr>
<tr>
<td></td>
<td>Chimpanzees are our closest living evolutionary ancestors</td>
<td>Humans are one of their closest living evolutionary ancestors, far closer than T2</td>
<td>Humans are a close evolutionary ancestor, but less close than T1</td>
</tr>
<tr>
<td><strong>Inferred similarity:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Has capacity for empathy</td>
<td>Likely has capacity to empathize; much more likely than T2</td>
<td>Capacity to empathize far less likely than T1</td>
</tr>
</tbody>
</table>

402 Jackson and Decety (2004) claim to have found “a window into the neural processes involved in empathy” by discovering parts of the prefrontal cortex activated only when humans dissociate their own actions from similar actions in others. Allman et al. (2005) found a set of mirror neurons called “Von Economo neurons” or “spindle cells” are active only in *social emotions* (e.g., shame, pride, etc.). Dense networks of these neurons exist only in humans and great apes—not monkeys—suggesting the ability to differentiate between one’s own perspective on the world and that of others in social contexts.

403 An animal is placed in front of a mirror with a painless mark on its forehead. If the animal recognizes and attempts to remove the mark, this behavior is viewed as a basic level of self-awareness. There is debate over what this test measures. Nonetheless, the fact that chimpanzees and humans—but not monkeys—pass counts as a positive analogy for chimps (and a negative analogy for monkeys) since self-recognition appears relevant to making a self/other distinction.

404 Not a particularly strong reason (see Section 7, below) since distantly related species display similar or identical behaviors in response to comparable environmental problems, suggesting convergent selection pressures and not because they are closely related.
This argument could be strengthened with more positive analogies and—importantly—made more critical and nuanced with the addition of negative analogies.

It is particularly frustrating that Povinelli (2000: 71) acknowledges this point in his criticism of the argument from analogy: “It is an inherent aspect of arguments by analogy that their strength depends not simply on the extent of the similarities under scrutiny, but even more so on the relevance of those similarities. Likewise, of course, such arguments are weakened by relevant dissimilarities.” *This is exactly right.* After sixty-four pages of argumentation in which Povinelli promises to uncover the “logical weakness” of analogical arguments as used in the animal minds literature, his conclusion is merely a caricature of the term “argument by analogy” based on the assumption that contemporary philosophers widely believe the extended version of Hume’s argument to be justified—which is wrong (Andrews 2015: 9-11) and, as I have shown in the previous section, Povinelli is over a century late in pronouncing this. Povinelli has thus created a strawman and—as one of the most widely read scholars in the literature—done unnecessary damage to the idea of analogical reasoning from human to animal minds.

Lest my reader think I am myself making a strawman of Povinelli, in his highly critical review of *Folk Physics for Apes* (2000), Colin Allen (2002: 6) describes the “carelessness of about what exactly the argument from analogy is arguing for” in Povinelli and Giamboni’s chapter, noting that…

…the fact that arguments by analogy are not deductively valid is hardly news, but it is far from clear what they mean by “logical weakness” if it is not the failure of the premises to imply the conclusion, especially given their own use of the word “implies”. Things get murkier still when their exact target of their attack seems to shift, just two sentences later. They assert that they “are not indicting arguments by analogy in general” but that their target is “the argument by analogy’ for the existence of other minds” (9). However, the question of whether other minds exist is rather different from the question of whether the minds of other animals are like ours. […] Far from pointing out a special “logical weakness” in the argument by analogy, what we learn is that the more behavioral
information we have, the more accurate our assessments of cognitive similarity are likely to be. No news there.

Here is why my criticism of Povinelli’s discussion is important: even a simple analogical argument of sort I just provided for empathy could be instrumental in determining how serious the logical problem should be taken on a case-by-case basis. What contemporary skeptics do not consider is that, in order to be grounded in scientific method rather than philosophical skepticism, the logical problem itself must be recognized as arising in degrees, e.g., given the tentative conclusions in the above example (again, for heuristic use only), one should be more skeptical of the claim that monkeys possess empathy than the claim that chimps do. The modern logical problem is not treated with this nuance; nor is it amenable to arguments to the best explanation; those like Lurz et al. (2014) who dwell on this problem state the “challenge for researchers” as follows: “to design protocols for which positive results cannot be plausibly explained by the behavior-reading theory but can be explained by the mindreading theory” (431 [my emphasis]). As discussed below, late-19th century philosophers and scientists were correct that practically any behavior can be “plausibly explained” with associative mechanisms; indeed, it is difficult to imagine a complex human behavior—without evoking introspection—that satisfies this same criterion. These points were present in Hume (1748) and Huxley (1874), who argued that experience suggests “Reason” to be an advanced form of associative learning.

The future of the study of animal minds (more generally) and the strength of a given analogical argument about animal minds (more specifically) depends upon forming analogical arguments to the best explanation forged from various areas of inquiry, e.g., evolutionary biology, comparative cognition, comparative anatomy, neuroscience,
linguistics, ethology, anecdotal evidence, statistical field reports, anthropology, developmental psychology, and the philosophy of mind. The processes and contents of animal minds should thus be conceived of as *abductive* rather than—as Hume thought—inductive in character. The term abduction was originally coined by Charles Sanders Peirce (1839—1914), who—according to Bernstein (1983: 69)—offered the following revisionary account of scientific justification that is highly relevant here:

Peirce criticizes the picture of scientific reasoning that represents it as a linear movement from premises to conclusions or from individual ‘facts’ to generalizations [*i.e.*, induction]. In its place he emphasizes the multiple strands and diverse types of evidence, data, hunches, and arguments used to support a scientific hypothesis or theory. Any one of these strands may be weak in itself and insufficient to support the proposed theory, but collectively they provide a stronger warrant for rational belief than any single line of argument.

With respect to topics in the animal minds literature related to longstanding uniqueness claims about humans, this is by no means an easy task. The disciplines that I briefly consider in this chapter—comparative anatomy and evolutionary theory—are relevant to these ends, but do not offer as much support to analogical arguments for species continuity as they may originally appear.

**7. Evolution and Arguments from Analogy**

If two species are closely related in evolutionary time, and behave in similar ways, is such evidence sufficient to claim that they possess similar cognitive faculties? Despite evolution by natural selection offering the best theoretical reasons to support mental continuity hypotheses, arguments utilizing facts about common descent to prop up analogical reasoning about animal minds rest upon a precarious empirical foundation.

In a paper entitled “Can evolution explain how minds work?” Bolhuis and Wynne (2009) claim that “Biologists have tended to assume that species with shared ancestry will have similar cognitive abilities, and that the evolutionary history of traits can be used
to reveal how we and other animals perform certain mental tasks.” However, they note, “evolutionary convergence may be more important than common descent in accounting for similar cognitive outcomes in different animal groups.” In other words, many distantly related species have demonstrated similar or identical behaviors in response to comparable environmental tasks and problems, suggesting that they arrived at these behaviors and cognitive skills due to convergent selection pressures and not because they are closely related.

Bolhuis and Wynne provide a number of examples to demonstrate their point. They note, for instance, that many avian species “are capable of feats that match or even exceed those reported in monkeys and apes.” Magpies, for example, have recently passed Gallup’s (1979) “mirror test” for self-awareness, a feat only accomplished by great apes, dolphins, and elephants. Bolhuis and Wynne identify a bias in this literature wherein when apes and elephants pass the test this behavior is typically taken as evidence of “self-consciousness,” but magpies are seen only to have evinced a degree of “self-recognition.” The fact that it is surprising to us that magpies can pass this test while monkey species never have, reveals the seductive nature of this dangerous foundation for arguments from analogy. It would likewise be irresponsible to deny Langford et al.’s (2006) claim that certain pro-social behaviors of mice are suggestive of empathy, on the basis that our species is “more evolved” than mice. This very sentiment is hugely outmoded in biology.

In contrast to Jean-Baptiste Lamarck (1744—1829) and Herbert Spencer (1820—1903), who maintained that life on Earth (including mental phenomena) is explainable in terms of a directional, progressive movement from simple to complex forms of organization, Darwin rejected teleological accounts of the origin and evolution of species.
According to Darwin (and Wallace), in addition to Lamarckian principles of inheritance, of equal importance to evolutionary theory are individual variation and selection pressures acting like a generational sieve on populations of a given species. The Malthusian result of this evolutionary recipe (i.e., inheritance, variation, selection) is not a Great Chain of Being. It is a picture of natural history akin to an irregularly branching tree, where the survival of each species is appropriately explained in relation to the disparate survival of its individual members owing to selection pressures acting on particular phenotypes over others in relation to specific environments; species themselves are not, therefore, “higher” or “lower” in relation to one another. This is nomenclature that, while used occasionally by Darwin, has no proper place in his understanding of species differences.

8. Darwin as a Marginalized Figure

Many authors have insisted that man is divided by an insuperable barrier from all the lower animals in his mental faculties. I formerly made a collection of above a score of such aphorisms, but they are almost worthless, as their wide difference and number prove the difficulty, if not the impossibility, of the attempt.

Charles Darwin (1871: 54)

In the introduction to her recent textbook, Sara Shettleworth (2013: 2) states that, “What unifies this diverse field is the overarching question with which the modern study of comparative cognition began, how true is Darwin’s (1871) assertion that humans’ ‘mental powers’ are different in degree but not in kind’ from those of other species?” Is there a fundamental discontinuity or “gap” between the kinds of capacities and behaviors exhibited by other species when compared to those of our own? Do there exist qualitative differences between our species and the rest of the biological world that make some of our cognitive capacities truly unprecedented amongst those of other extant creatures? In
line with his own rejected list of potential uniqueness claims, Darwin himself wanted very little to do with these sorts of questions. He was well aware of their historical tenacity; he understood their large-scale interest to the scientific community, the religious orthodoxy, and the general public. Nonetheless, contrary to the dominant research tradition before, during, and after his lifetime, Darwin was chiefly and unapologetically concerned with understanding the similarities between species rather than their differences. Darwin remained transfixed by the behavioral ingenuity of non-human species, placing little emphasis on the uniqueness of his own. He was markedly unconcerned with respect to an animal’s size or apparent stature in the animal kingdom, not-so-famously spending years observing and conducting detailed experiments on the behavior of earthworms, attributing them rudimentary forms of consciousness and even intelligence (1881). As such, when Darwin (1871) did turn his eye squarely toward our species, he mostly adopted a “bottom up” view of the building blocks of human cognition in context of our shared evolutionary history with other animals.

This approach stands in stark relief to the far more prevalent “top down” mode of inquiry that begins with (1) questions as to why—and to what extent—other species seem to lack certain human abilities, and (2) controversial questions arising from evidence suggestive of the need to expand exceptional features of the human mind to the minds of other animals. Darwin had little interest in the lengthy tradition of those concerned with distinguishing the mere appearance of X, from “genuine” or “true” X, i.e., as humans do X, thus implicitly evoking orthogenetic hierarchies in the animal kingdom, culminating in the de facto superiority of human mental faculties.
Despite this difference in emphasis, Darwin is in many ways a paragon of the marginalized tradition, embodying the majority of characteristics (positive and negative) discussed in earlier figures. As with Lucretius and La Mettrie, Darwin defends a non-hierarchical, naturalistic account of the evolution of mind, conceiving of mental faculties as arising in degrees of complexity throughout the animal kingdom. Darwin likewise condemned “all or nothing” definitions of mental faculties, e.g., “‘conscience’ was by no means some fixed mental attribute, which was either possessed or not possessed;” so too can rudiments of language and the moral sense be identified in a diverse array of species (Boakes 1984: 7). Darwin (1871: 51) also set himself the task of breaking down categorical barriers defended by the dominant tradition, most importantly between reason and instinct.\footnote{Chapter Eight, Section 3.2}

The regressive aspects of Darwin’s approach to the animal mind are also par for the course in the marginalized tradition; indeed, Povinelli’s opposition to “the argument from analogy” is at home in much of Darwin’s work. Alongside Plutarch, Montaigne, and La Mettrie, Darwin’s writings on animal minds—particularly in Descent of Man (1871)—suffer heavily from “methodically anthropomorphic analysis” of animal behavior (Mitchell et al. 1997: 17), further problematized by “the dubiously anecdotal nature of the evidence” from which Darwin supported his biological conclusions about mental continuity (Boakes 1984: 8).\footnote{To be clear, not all of the anecdotal evidence in Darwin’s Descent of Man (1871) is problematic; he was arguably the first to popularize the fact that chimpanzees use tools to crack nuts (1871: 51-2).} That said, although Darwin (1971: 404) often tells stories like “that old baboon, who, descending from the mountains, carried away in triumph his young comrade from a crowd of astonished dogs,” he also occasionally makes cautious claims about anthropomorphism, e.g., “Blushing is the most peculiar and
most human of all expressions. Monkeys redden from passion but it would take an overwhelming amount of evidence to make us believe that any animal can blush” (310).

Regardless of Darwin’s undeniable significance today, his influence throughout the period under discussion in this chapter was marginal indeed. At the turn of the 20th century Darwin’s theory of evolution by natural selection was “widely held to be of historical interest only,” as “it was not until the 1930s that natural selection re-acquired, and has since maintained, its central role in evolutionary theory” (Boakes 1984: 4). This was because (1) Darwin’s (1859) estimate that the Earth has supported life for a thousand-million years was, by 1870, widely rejected by leading physicists in favor of shorter span of twenty to thirty million years dictated by principles of thermodynamics, (2) Darwin lacked a theory of heredity, and (3) much hostility and confusion arose over whether the mechanisms discussed in Origin of Species and Descent of Man could actually explain the origins of humanity. As such, “although animal psychology developed against the evolutionary background provided by Darwin, it did so at a time when his major theoretical contribution was thought to be of decreasing importance” (ibid.). The result was that Darwin was not nearly the boon to the marginalized tradition as were the plethora of learning theorists to the dominant tradition. Regardless of the fact that Thorndike and Watson, among others, defended large-scale continuity between species in terms of learning processes, learning theories ended up providing the strongest empirical foundation to date for denying mental processes to animals.

9. Theories of Associative Learning and the Dominant Tradition

Despite his interest in the development of habitual behaviors, Darwin was not terribly concerned with the second major trend in 19th century animal science: the sheer
explanatory power of associative learning hypotheses (Bekoff 2019: 44)—already hinted at by the Empiricists, but now experimentally demonstrable. By observing the first few hours of a lamb’s life, Alexander Bain (1818—1903) noted that what began as a series of random, spontaneous actions became increasingly purposeful as particular movements slowly became associated with sensations of pleasure and pain. Bain (1859: 349) believed that he was documenting a developmental process, based on trial and error, ubiquitous throughout the animal kingdom (including humans), i.e., “throughout all the grades of sentient existence, wherever any vestiges of action for a purpose are to be discerned, this link [between pleasure/pain and ‘active instrumentality’ to achieve ends] must be presumed to exist.” Although Bain was wholly uninterested in defending human uniqueness (indeed, quite the opposite), what came to be known as the “Spencer-Bain principle” would play an important explanatory role in the origins of comparative psychology, particularly in an intellectual climate increasingly skeptical of describing animal behavior as thoughtful.

The influence of Bain (and Darwin) is palpable in the second edition of Spencer’s Principles of Psychology (1870). By applying Bain’s ideas to evolutionary biology, Spencer argued that associative learning mechanisms are not only ontogenetically critical in the development of individual intelligence; they also play a key phylogenetic role in the evolution of species. In short, Spencer uses Bain’s ideas to postulate “a fundamental principle of nature,” reasoning via Lamarck’s principle of inheritance the existence of “a single process of learning, based on the principle of association, which ensured development along a single route” (Boakes 1984: 13 [emphasis added]). Far from Darwin’s picture of evolutionary history as a branching tree, Spencer wrote of the
evolution of the nervous system or the mind, therefore erecting epistemic and biological foundations not only for uniqueness claims, but for statements of human exceptionalism: the very word *evolution* had a normative connotation, *i.e.*, “better” or “more evolved”. It was on this basis that Spencer (1870) infamously hypothesized that those of European decent had superior mental capacities than members of so-called “lower races.”

Most relevant to the history I am telling is Spencer’s influence as part of a contingent of learning theorists responsible for an intellectual climate whereby practically *any* animal behavior (and for the Behaviorists, any human behavior) can be fully and/or satisfactorily explained by means of a single principle or law. For those skeptical or tough-minded about ascriptions of “higher” human-like mental abilities to animals, there was no want of “simpler” complementary explanations—now behaviorally demonstrable by experimentation—for any apparently mentalistic action. In this way, aside from coining the term imprinting (experimentally demonstrated by Douglas Spaulding [1841—1877], the father of ethology), the Stoics are relevant to 19th century discussions of animals because they were the first to postulate a simple explanatory apparatus, based on the link between the brain and the nervous system, capable of explaining all animal behavior (Long 1996: 243). I am not suggesting a conceptual history here. My point is that the dominant tradition became a philosophical force with the Stoics and Cartesians on the basis of a similar idea, *i.e.*, any crisis of human exceptionalism can be resolved quickly by means of the explanatory potential of associative mechanisms tied to the nervous system rather than the mind.

Indeed, citing Bethe, Loeb, and Thorndike, Washburn (1908: 17) notes with concern this “revival” during her time, “in an altered form, of the Cartesian doctrine” that
animal behavior can be thoroughly explained without any reference to “unaccompanied by any consciousness whatever.” She continues that comparative psychologists must resist “the tendency to make purely biological concepts suffice as far as possible for the explanation of animal behavior and to assume the presence even of consciousness in animals only when it is absolutely necessary to do so” (*ibid.*). Young Thorndike’s speculative suggestion that “apes are no more capable of thought than cats of dogs” (Boakes 1984: 179) was based on these growing theoretical and methodological foundations, as was “his general proposal that all non-human intelligence was to be explained on the simple basis of stimulus-response connections established during trial-and-error learning” (177)—an idea that, I have suggested, shares a spiritual history with Stoic deference to a “singularity of causation” in the animal kingdom in response to any and all explanatory crises of human exceptionalism.

9. Anthropomorphism and Clever Hans Errors

Dogs get lost hundreds of times and no one ever notices it or sends an account of it to a scientific magazine. But let one find his way from Brooklyn to Yonkers and the fact immediately becomes a circulating anecdote.

Edward Thorndike (1898:4)

The origins of experimental psychology in the 19th century were largely defined by crises of methodology. If psychological inquiry would come to merit the designation of a “proper” science, then strictly anecdotal or introspective forms of evidence would find no home among those epistemic virtues tied to experimental control and pools of quantitative, behavioral data. The extent to which comparative psychology could aspire to be *more* than the study of behavior relied on a foundational level on agreeing that—given proper conditions—one could reason analogically from observable behavioral patterns to the unobservable mental states presumably related to them. Philosophical
quandaries like the problem of other minds provided all the more reason for early psychologists to stress the necessity of detailed and careful experimentation and to throw away the rest. This general attitude held course whether the subjects were human or non-human. If progress was to be made in animal psychology, a healthy dose of tough-minded methodological skepticism was necessary. So when, as the century came to a close, George Romanes (1883) claimed to have taught a chimpanzee whom he had little experience with to count, Lloyd Morgan’s (1894) skepticism was both important and predictable. By far the most iconic case of warranted skepticism towards apparently complex animal behavior would occur less than a decade later.

At the turn of the 20th century, news spread internationally of a horse in Germany who could not only count, but also perform arithmetic functions, read, spell, and discern musical intervals. “Clever Hans” would respond to questions of this sort by repeatedly tapping his hoof a given number of times (e.g., five times for 2+3) or by nodding his head toward one of several objects or cards to signal the right answer. Having gained credibility by deceiving over a dozen respected skeptics, animal trainers, and zoologists, these feats were not seen as parlor tricks, but as possibly overthrowing long-dominant claims of human exceptionalism. Carl Stumpf, the Director of the Psychological Institute at the University of Berlin, and his student Oskar Pfungst, performed a series of experiments that “read, even now, like a textbook illustration of how to apply experimental methods to a psychological problem” (Boakes 1980: 78). Without going into the detail, the results of these experiments—which went on for some time and involved controlled laboratory conditions—led to the conclusion that Herr von Osten,

\[\text{407}\] Romanes was not necessarily wrong. See Beran et al. (2013) for experimental data supportive of Romanes’ hypotheses, as well as a review of the literature. See also Davis and Mammott’s (1982) “Counting Behavior in Animals: A Critical Evaluation.”
Hans’ owner, had “unwittingly [...] established a chain of stimuli and responses of the kind that both [William] James and Thorndike had described” (ibid.). Unsurprisingly, Stumpf and Pfungst’s (1904) paper received a glowing review from Watson (1908).

As the most famous explanatory crisis in the history of animal psychology, the significance of this precautionary story to this critical genealogy cannot be understated. Clever Hans was a boon to the dominant tradition because, for the first time, and to a wide audience, an explanatory crisis was definitively resolved by objective scientific methods, as opposed to otherwise “philosophical” or rhetorical means of refuting the appearance of complex animal behavior discussed in previous chapters. One could hardly be blamed for citing this story as crucial to the origins of “proper” animal psychology. To leave it there, however, would be to miss what makes it significant in historic context.

Clever Hans is well at home within the deep history of “crisis-inducing” stories of “clever” animals, attractive to the general public, which challenge human uniqueness and exceptionalism in mental faculty. Before the experimenters arrived at their conclusions, the story of Clever Hans was but a modern analogue to famous anecdotes like Chrysippus’ Dog, Thales’ Mule, the Thracean Fox, and dozens of like-stories peppered throughout the most famous historic compendiums of animal behavior, e.g., Aristotle’s History of Animals (4th century BCE), Pliny the Elder’s Naturalis Historia (77—79 CE), Aelian’s De Natura Animalium (3rd century CE), Conrad Gessner’s Historia Animalium (1551), and Comte de Buffon’s Histoire Naturelle (1749)—all of which faced valid criticism due to credulous acceptance of (often fantastical) anecdotal evidence and anthropomorphism. The oldest and most direct analogue to the story of Clever Hans’ numerical abilities can be found in Aelian, cited as fact by Plutarch (c. 100 CE) and
Montaigne (1580). In one story, a herd of cattle from the city of Susa were assigned to
draw precisely one hundred buckets of water a day, and “not even threats of beatings
[could] induce the cattle to exceed their daily quota,” which Plutarch interprets as the
animals possessing “a knowledge of number and a capacity to count” (974E). Anecdotal
reports of animals acting with human-like “cleverness” have long been used as fodder for
figures in the dominant tradition critical of the credulity of their opponents, often eliciting
responses in terms of “as if rhetoric”; they have also, more often, been used as
evidence of mental continuity for figures in the marginalized tradition. In historic context,
it is difficult not to view Clever Hans as the definitive demonstration of the credulity of
latter tradition.

The moral of the story was broader than Hans, of course; it signaled what many
saw as the promise of improved experimental procedures being able to objectively reveal
that what appear to be complex forms of behavior can properly explained by the
operations of rudimentary cognitive mechanisms shared by humans and animals alike.
This leads us to another major contribution to the tough-minded intellectual culture from
which the logical problem originally emerged: laws of epistemic parsimony.

10. The Logical Problem, Laws of Parsimony, and Anthropodenial

The current iteration of the logical problem is indebted to the normative epistemic
conventions underlying Morgan’s Canon (1903) and Wilhelm Wundt’s (1832—1920)
(PoCS) common to these ideas as follows: “barring compelling evidence to the contrary,
the default hypothesis should postulate the simplest cognitive ontology (mechanism,
process, or structure) consistent with the animal’s behavior” (731). Put differently, if the behavior of a non-human animal can be explained in terms of a ‘lower’ or ‘less complex’ cognitive capacity, then the behavior should be explained in terms of that capacity. In this section, I demonstrate the historic and conceptual interrelatedness of the PoCS and the logical problem, particularly through the writings of Wundt, arguably the first person to refer to himself as a psychologist and, in 1879, the first to open a laboratory dedicated exclusively to psychological experimentation (Carlson and Heth 2010).

In his effort to establish psychology as a scientific discipline, Wundt (1863: 350) pushed against the anecdotal-anthropomorphism of Darwin and Romanes, allowing “recourse to be had to complex principles of explanation [only] when the simpler ones have proved inadequate.” Precursors to Wundt’s principle can perhaps be found as early as Aristotle, and—certainly—William of Ockham (c. 1287—1347), though it first came to prominence as part of sound scientific methodology in the Enlightenment with the likes of Gottfried Wilhelm Leibniz (1646—1716) and Isaac Newton (1643—1727), who inspired Descartes to apply it to competing mechanistic and mentalistic accounts of the animal mind. As Wundt suggests, the directness of the Law of Parsimony naturally lends itself as a crucial tool to address the logical problem: “mental activities are so complex and multifarious, that practically every objective action is capable of more than one interpretation” (346).

The logical problem likewise forms the backbone of Morgan’s (1852—1936) most enduring contribution to animal psychology, which he referred to as his Canon: “In no case may we interpret an action as the outcome of the exercise of a higher psychical

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409 That is, barring compelling evidence for a higher cognitive ontology. Otherwise the PoCS should also apply more broadly to explanations of human behavior. Thanks to John Greenwood for this point.

410 “Nature operates in the shortest way possible” (Physics Book V.III).
faculty, if it can be interpreted as the outcome of the exercise of one which stands lower in the psychological scale" (1894: 53). It is well documented that 20th century scholars did Morgan a disservice by consistently misinterpreting the Canon as a justification to dismiss any mentalistic interpretation of animal behavior.411 Indeed, shortly after laying out the Canon, Morgan considers the counter-argument that there are many instances in history where the “simplest explanation is not the one accepted by science” (55), to which he agrees, and warns readers against a dogmatic application of his Canon: “it should be added, lest the range of the principle be misunderstood, that the canon by no means excludes the interpretation of a particular activity in terms of the higher processes, if we already have independent evidence of the occurrence of these higher processes in the animal under observation” (59).

As with Morgan’s Canon, Wundt’s Law of Parsimony does not purport to reject all mentalistic explanations of animal behavior. Yet for Wundt, application of the principle to animal psychology offers a predictable outcome highly relevant still in the 21st century: “it seems the entire intellectual life of animals can be accounted for on the simple laws of association” (350). In his Introduction to Comparative Psychology (1894: 308), Morgan agrees: “I am very far from wishing to occupy the false position of dogmatic denial of rational powers to animals. I think it is a subject for further and fuller investigation. But I do express the opinion that the fuller and more careful the investigation, the less is the satisfactory evidence of processes of reasoning and that, though the question is still an open one, the probabilities are that animals do not reason.”

Wundt (1863: 362-3) and Morgan (1894: 305) defend uniqueness claims pertaining to language and abstract thought, but neither fall neatly into the dominant or

411 e.g., Costall 1993; Sober 2000, 2006; Fitzpatrick 2008; Andrews 2015
marginalized traditions described in earlier chapters. They both perceive the popularity of Romanes’ *Animal Intelligence* as a threat to their discipline (Boakes 1984: 40), but not because they disagree with Romanes’ conclusions (though they *did* largely disagree with them); rather, because they view them as arrived at by unscientific avenues: anecdotal evidence based on the argument from analogy. In this sense, the significance of Wundt and Morgan in the history animal psychology is not that of skeptics but of responsible philosopher-scientists hoping to unite their discipline under reasonable methodological principles, and against hasty anthropomorphistic judgments.

A common reason for evoking a PoCS when interpreting animal behavior is the presumed naturalness of anthropomorphistic judgment in humans. For instance, in criticizing Darwin on grounds of anthropomorphism, G. H. Lewes (1860: 385) alleviates some of the blame, noting that after all, “we are incessantly at fault in our tendency to anthropomorphise, a tendency which causes us to interpret the actions of animals according to the analogies of human nature.”

412 Descartes made the same point against Montaigne. 413 Two-hundred and fifty years later, Wundt (1863: 342) developed his Law of Parsimony in response to…

…the inclination of animal psychologists to see the intellectual achievements of animals in the most brilliant light. This, of course, is due to the natural pleasure which the objects of our observation always give us, and which is the most effective spur to continuous devotion to a particular subject.

According to Wundt, then, anthropomorphism is not inherently bad. Indeed, as noted above, practically all the founders of the discipline agree that using the human mind as a model for the animal mind is practically unavoidable. The *quality of evidence* for ascribing mental states to animals varies on a case-by-case basis, but the dominant

412 Qtd. Andrews (2015: 41)
413 *Philosophical Writings* Vol. 2: 342
assumption that anthropomorphism *entails* bad evidence is historically a case of guilt by 
association, *e.g.*, the anecdotalism of Montaigne, Darwin, and Romanes. In the 18th and 
19th centuries, anthropomorphism—in any guise—becomes the central evil to be purged 
from the discipline—a task seen as more important than concerns over *under*estimating 
the complexity of animal minds. Indeed, this bias (deference to parsimonious explanation 
over all else) has engendered a form of close-mindedness in the dominant tradition that 
Frans de Waal (1999) has called “anthropodenial” and that Cecilia Heyes (2012) critiques 
as “simple-mindedness” in animal psychology. The default position when observing 
human-like behaviors in animals is that the source of those behaviors is not akin to that 
which functions in humans; the mechanism under discussion is assumed to be “simpler” 
and perhaps different in kind. Anthropodenial should be understood in terms of the false, 
but historically preferred, understanding of Morgan’s Canon: if an animal behavior *can* 
be explained in terms of a simple mechanism, than it *should* be explained as such. 

Morgan’s Canon is a necessary tool, but it is insufficient on the grounds that 
anthropomorphism is not the only prejudice that pervades the literature. Wundt and 
Morgan agreed. In the next and final section, I show how both were concerned that 
comparative psychologists have a tendency to *over*estimate human cognitive abilities, 
and/or use them as a base-level from which to evaluate the existence, sophistication, and 
complexity of analogous features of animal cognition. Ignorance of this prejudice can 
lead to *anthropocentric* double standards when applying Morgan’s Canon, because in 
order to fairly apply a PoCS, terms like “parsimonious” must apply evenly to analogous 
cases of human behavior, *i.e.*, if we overestimate the mechanism at play when humans do
X, we are more likely to set an unfair or unattainable standard to ascribe X to animals (Heyes 2012, 2015).

11. Morgan’s Challenge and Huxley’s Challenge

To interpret animal behavior one must learn also to see one’s own mentality at levels of development much lower than one’s top-level of reflective self-consciousness. It is not easy, and savors somewhat of a paradox.

Conwy Lloyd Morgan (1930: 250)

While Morgan’s Canon is taught to all students of comparative cognition, Morgan’s Challenge is not, though meeting it is a requirement for doing good comparative work in psychology.

Kristen Andrews (2015: 44)

Nearly thirty years after publishing his Introduction to Comparative Psychology, Morgan (1930: 250) wrote the above passage, which Andrews (2015) has recently referred to as Morgan’s Challenge. It appears in a curious piece that that Morgan published—to some chagrin, at the behest of his friend Carl Murchinson—as his short “Autobiography” to be featured in the second volume of Murchison’s The History of Psychology in Autobiography. Whereas Morgan’s Canon “serves to balance the natural human tendency to interpret observed behavior in terms of complex psychological processes” (Karin-D’Arcy 2005: 190), the impetus for Morgan’s Challenge, on the other hand, is to balance an equally dangerous tendency that Buckner (2013) has recently called anthropofabulation: “our tendency to tie the competence criteria for cognitive capacities to an exaggerated sense of typical human performance,” which is a “distinct bias that loads the deck against animal mentality.” Yet next to a brief mention in Andrews’ recent primer The Animal Mind (2015), Buckner (2013) appears to have published the only paper that explicitly explores this bias in contemporary comparative psychology. If Buckner (2013) is right that “our tendency to exaggerate our own
intelligence, rationality, and reflective prowess is a feature of human psychology as well-established as our tendency to anthropomorphize,” this is a problematic state of affairs.

Uniqueness and exceptionalism claims grounded on anthropofabulation threaten the integrity of the dominant tradition. This bias is most readily seen in examples of semantic anthropocentrism, which I have identified as early as Aristotle’s Davidsonian definition of “belief”, and practically every cognitive capacity discussed by the ancient Stoics (e.g., for whom all processes of “memory” are defined as “recollection”). The clearest contemporary example of this prejudice can be seen in standard definitions of theory of mind, which some have argued—correctly, in my estimation—to be a rarely used, specialized capacity in humans, rather than constantly functioning somewhere behind our social interactions. The standard definition of theory of mind very likely “overly intellectualizes what is involved in our basic encounters with others” (Hutto et al. 2011: 15), thus stimulating progressive shifts toward “minimal” theories of mind in the past decade (e.g., Butterfill and Apperly 2013).

Morgan’s Challenge is relevant to contemporary debates insofar as both the logical problem and Morgan’s Canon rest upon one’s ability to effectively distinguish simple/lower from complex/higher mechanisms—an aptitude that Morgan rightly calls into question as far more difficult than it appears. According to Andrews (2015: 44), Morgan’s Challenge tempers the uncritical, anthropofabulous use of these terms to identify historic divisions between cognitive processes in humans and animals:

The apparent variety and complexity of associations undermines claims that associative learning is always simpler than reasoning, planning, or insight. Rather, these so-called

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414 Chapter 2, Section 6.2.
415 Spaulding 2008; Hutto et al. 2011; Andrews 2012; Heyes 2012; Butterfill and Apperly 2013
416 According to Butterfill and Apperly (2013), “several recent discoveries in developmental, cognitive, and comparative psychology indicate the need for […] the construction of a minimal theory of mind […] which […] does not require representing propositional attitudes, or any other kind of representation.”
higher cognitive mechanisms may be fancy versions of associative learning. As Morgan reminds us, the mere fact that we introspect fancy mechanisms for our own behaviour doesn’t mean that there are fancy mechanisms at work. And we should be wary of simple explanations of animal behaviour, be they explanations in terms of associative learning or insight, without a full understanding of what exactly the mechanism at stake looks like. The worry is that such accounts [of animal behavior] do nothing more than gesture toward the existence of an explanation, rather than provide one.

The “complementary behavioral rule” hypothesis in mindreading debates should be critiqued along precisely these lines, i.e., because “it is too under-specified to make determinate predictions, and hence there is no risk of it turning out to be wrong,” these hypotheses are “unfalsifiable in a quite straightforward way” (Fletcher and Carruthers 2013: 461). The assumption undergirding the logical problem in mindreading debates is that behavioral rule hypotheses provide more parsimonious explanations for animal behavior than any given mindreading hypothesis, but as an increasing number of commentators have pointed out,\(^\text{417}\) the apparent associative processes upon which these hypotheses are based are vague insofar as “an explanation in terms of the animals’ deployment of some or other behavior rule can always be constructed after the fact” (ibid.). This is precisely the state of affairs fueling the logical problem: “distinguishing between the behavioural predictions of cognitive […] and associative accounts is not straightforward because associative theory can mimic rational and inference-driven explanations” (Dickinson 2012: 2734). The crux of Morgan’s Challenge in this context is that explanations in terms of associative mechanisms should not be applied to animal behavior until they can provide empirically tractable explanations for analogous human behaviors, which demands that “students of animal cognition should be sensitive to current developments in associative learning theory” (ibid.).

Though marginalized in the contemporary and historic literature, these concerns

\(^\text{417}\) Micheal et al. 2013; Spaulding 2010; Halina 2015
and suggestions are hardly new. Neither Buckner nor Andrews trace awareness of anthropofabulation—and the requirement to engage with it (Morgan’s Challenge)—to its earliest explicit appearance, which appears to be in Wundt’s *Lectures on Human and Animal Psychology* (1863). According to Wundt, one of the major roadblocks to comparative psychology is an exaggerated picture of human psychology:

> When we began our consideration the mental life of animals, we condemned the tendency of animal psychology to translate every manifestation of ‘intelligence’ into an intellectual operation. The same reproach could be made against certain more or less popular views of our own mentality. *The old metaphysical prejudice that man ‘always thinks’ has not yet entirely disappeared.* I myself am inclined to hold that man really thinks very little and very seldom. Many an action which looks like a manifestation of intelligence most surely originates in association. Besides this, man is constantly translating acts of logical thought back again into customary associations, and so increasing the sphere and the intellectual consequences of the associational processes. By practice we can reduce anything to association. (363 [emphasis added])

With respect to the history of explanatory crises of human exceptionalism, the most important idea in this passage is contained in the sentence that I have italicized, which highlights one of the most regressive features of the dominant tradition. Mindreading debates, for instance, are still widely reliant upon an exaggerated definition of what a theory of mind likely entails. Wundt goes on to cite Hume and the Empiricists as early figures who were ahead of the curve in this regard, *i.e.*, as those who not only refuse to draw lines between “intellectual” and associative processes, but who acknowledge “the fruitfulness of this interaction,” in contrast to those who “translate all mental activity into logical reflection” ignoring or downplaying the fact that “ready-made thought-forms furnished by association play no small part in the whole process” (*ibid*).

Though Wundt and Morgan are not, strictly speaking, parts of the marginalized tradition, they share a deep concern over double standards between human and animal psychology. In recent years, scholars have legitimately questioned whether unjustified
anthropocentric bias informs applications the PoCS in animal psychology.\textsuperscript{418} Such concerns have existed since the origins of the discipline, \textit{e.g.}, writing in response to Morgan’s Canon, Mills (1906: 9-10) warns that this principle runs the risk of…

\begin{quote}
\ldots reduc[ing] the mental life of the animal very considerably […] But is there not a danger of cutting down the possibilities of animal intelligence too much, and of assuming that in the mental life of the great mass of mankind there enter more of those higher intellectual processes […] than there really are.
\end{quote}

Likewise, even before Morgan had formulated his Canon, Romanes responded to Morgan’s incredulity about ascribing mentality and consciousness to animals as follows:

\begin{quote}
In whatever measure [Morgan] is on principle a skeptic touching the inferences which this science [of comparative psychology] is able to draw as to the existence and nature of animal psychology, in that measure I think he ought in consistency also to be a skeptic with reference to the same points in the science of human psychology.\textsuperscript{419}
\end{quote}

What prompted this response was Morgan’s (1884) insistence that inferences about the mental states of human beings were justifiable due to verbal confirmation, to which “Romanes objected that acceptance of verbal reports of other people is just another form of inference on the basis of observed behavior,”\textsuperscript{420} and therefore “Morgan could not consistently endorse inferences about the mental states of other humans but not animals, given obvious similarities in their adaptive and intelligent behavior” (Greenwood 2016: 226). Another token member of the marginalized tradition, Robert Yerkes (1905: 527), similarly argued that “human psychology stands or falls with comparative psychology. If the study of the mental life of lower animals is not legitimate, no more is the study of human consciousness.” More recently, Heyes (2015: 313) has likewise suggested that it is imperative to uncover more information about the behaviors of our own species in order to prevent potential bias against the cognitive abilities of other animals.

\textsuperscript{418} E.g., Sober 2005; Fitzpatrick 2008; Buckner 2013; Andrews and Huss 2014; Meketa 2014.
\textsuperscript{419} Romanes (1884; cited in Greenwood 2015: 226).
\textsuperscript{420} Romanes (1884: 379)
Often, anthropocentric bias is so engrained in terminology that it is difficult to recognize. Huxley (1863: 109), for instance, provided a strong critique of the explanatory power of the word “instinct”, effectively stating that the vagueness of the term does not amount to a scientific explanation, since (1) it is “wholly impossible to draw any line of demarcation between reflex actions and instincts,” and (2) practically all human and animal behaviors can, in theory, be “explained” by reference to this term:

It is ‘instinct’ which leads a chicken just hatched to pick up a grain of corn; parental love is said to be ‘instinctive;’ the drowning man who catches at a straw does it ‘instinctively;’ and the hand that accidentally touches something hot is drawn back by ‘instinct.’ Thus ‘instinct’ is made to cover everything from a simple reflex movement, in which the organ of consciousness not be at all implicated, up to a complex combination of acts directed towards a definite end and accomplished by intense consciousness. (109)

Huxley (1863: 110) goes on to suggest a conceptual history between 19th century uses of the word “instinct” and the Rationalist notion of “innate ideas, in the most extended sense ever imagined by Descartes,” who “illustrates what he means by an innate idea, by the analogy of hereditary diseases or hereditary mental peculiarities, such as generosity.” Following a train of thought reminiscent of La Mettrie, Huxley (1874: 14) asks: “As actions of a certain degree of complexity are brought about by mere mechanism, why may not actions of still greater complexity be the result of a more refined mechanism?” I’ll henceforth refer to this passage as Huxley’s Challenge. While Morgan’s Challenge encompasses a much wider set of concerns related to anthropofabulation, the question that Huxley presents is certainly relevant to the ontological and epistemic challenges for doing good work in comparative psychology emphasized by Wundt and Morgan.

Both challenges tacitly emphasize cross-disciplinary research between associative psychology, animal psychology, and developmental psychology. Wundt, recall, notes that “we can reduce anything to association” because, as Hume and Huxley also suggest,
“[t]rains of thought which at first involved considerable intellectual labour are completed
with increasing certainty and mechanical facility the oftener they are repeated.”
Therefore, philosophers and scientists concerned with whether capacities like theory of
mind are present in other species should not use as a point of reference an adult human
theory of mind. This is because the more we “exercise” our mental faculties, the more
automated they become, and thus the more difficult it is to experimentally discern when
we ourselves are relying upon so-called “behavioral rules” when interacting with others.
In this sense, more explicit “clues” or indications of what mindreading entails will likely
be present when the faculty first develops in infants. Likewise, experiments designed for
pre-linguistic human infants will likely be more effective in revealing these clues—a
point demonstrated by the fact that false-belief tests (the long-time “litmus test” for
theory of mind [Lurz 2011: 10]) initially designed for pre-linguistic infants have been
more effective at demonstrating theory of mind in apes than the classic “Sally-Anne test”
designed for older children (Krupenye et al. 2017; Buttelmann et al. 2017).421

These suggestions are present in Morgan’s Challenge, which as Morgan claims,
“savors somewhat of a paradox.” The “paradox” is that reflective self-consciousness is
necessary to imagine experience without it.422 This same sentiment is found in Mills
(1898: 3, 5), who notes how history has viewed the animal mind “in a distorted fashion,”
which can in part be tempered as follows: “In the understanding of the lower animals we
must each become as a little child…” The idea is not to promote imaginative
introspection as proper methodology in animal psychology; it is that developmental
psychology presents opportunities to level the playing field in terms of evaluating

421 Chapter 8, Section 5
422 Morgan’s suggestion seems reminiscent of his contemporary Edmund Husserl’s (1859—1938)
    phenomenological method of introspectively bracketing (epoché) levels of conscious experience (1906).
uniqueness claims. Wundt, Morgan, and Mills all believe that there is a vast difference between humans and animal cognition, and that continuity and discontinuity hypotheses have strong points in their favor, but they also agree that “Nothing is to be gained for any cause, however, by overstating the case” for human exceptionalism (Mills 1898: 16).

Taking stock, Morgan’s Challenge and Huxley’s Challenge serve to temper Morgan’s Canon (and the logical problem) by bringing to the forefront complications that arise in classifying mechanisms as either “simple” or “complex”. The logical problem asks, how can one choose between competing explanations? Morgan’s Canon replies: choose the simpler one. Morgan’s Challenge then provides a necessary additional step: before we apply laws of parsimony to hypotheses about animal minds, the comparative psychologist should apply them to the mechanisms in question as they function in human cognition. When humans perform behavior X, what are the various means of explaining that behavior? Could a “simpler” mechanism explain this (human) behavior? Over a century before Andrews’s (2015) The Animal Mind, Washburn (1908: 2-3) offered the following suggestion, akin to both Morgan’s Challenge and Huxley’s Challenge, in her book of the same name: “The nervous systems of many animals vary widely from our own. We have, perhaps, too little knowledge about the functions of our own to conjecture with any certainty what difference this must make in the conscious life of such animals.” Dispelling logical problems in the current literature demands taking this advice.

12. General Conclusions

While Darwin retroactively accomplished more than anyone in history to open the door for continuity hypotheses, he was not a boon to the marginalized tradition during the formative years of animal psychology. Instead, 19th century developments in psychology
brought to the forefront widespread agreement that (1) anything akin to Humean “arguments from analogy” are recipes for credulous, anthropomorphic explanations of animal behavior, that (2) laboratory conditions are necessary for making any substantive claims about the operations underlying animal behavior, and (3) that in the absence of laboratory studies, the only scientifically responsible explanations of animal behavior are those evoking stimulus-response mechanisms. It was the laboratory, after all, which ultimately resolved the Clever Hans crisis; anecdotal field reports fooled an international coterie of skeptics. The fact that Stumpf and Pfungst’s (1904) findings were consistent with attitudes championed by Thorndike and Morgan engendered a quick and easy response to explanatory crises of human exceptionalism, still ubiquitous today: deferring any and all continuity hypotheses in the name of waiting for “further evidence”.

The uniqueness claims of the dominant tradition, where “animals may be studied scientifically as part of the natural world, but their philosophical importance lies in what they lack” (Radner and Radner 1996: 7), henceforth gained additional traction due to an increased atmosphere of incredulity about presumed causes of complex animal behavior. This state of affairs is very much present in the contemporary literature, where automatic skepticism toward field research is common, “complementary” behaviorist explanations remain both ubiquitous and vague, and where many scholars see crucial experiments as the only means to resolve logical problems when interpreting animal behavior.

The argument from analogy is not, as Povinelli (2000) suggests, the root cause of the logical problem, which should—following Hume, Huxley, Wundt, and Morgan—be conceived as a normal state of affairs in the natural sciences, rather than an epistemic problem inherent to analogical reasoning about animal minds. Povinelli’s attitude has a
deep historic precedent and serves to encourage skeptical trends that have largely 
stalemated the current literature. As practically all the original comparative psychologists 
emphasize, analogical reasoning is a fundamental part of studying the animal mind, and 
“with proper safeguards” (Washburn 1917: 24) it is clearly possible to strengthen 
arguments from analogy by a consilience of inductions (Whewell 1840) from various 
sources. I have suggested tabular representation (Hesse 1966) as one way to model these 
arguments and to mitigate skeptical gridlocks in the animal minds literature.
Continuity as Crisis:  
Two Traditions of Theorizing about Animal Minds  

Chapter Eight  
Theory of Mind: A Degenerating Research Program  

1. Overview  
...the social structure of research on animal mindreading has changed. In earlier years there were a number of active research groups, each publishing a significant volume of empirical work and voicing their own theoretical perspectives. More recently, [...] these researchers now express doubts (Seyfarth & Cheney 2012; Whiten 2013) or outright scepticism (Penn & Povinelli 2007, 2013). [...] So, in these respects, research on animal mindreading has declined.  
- Cecilia Heyes (2015: 317)  

Despite forty years of empirical research, animal minds skeptics contend that little progress has been made in terms of answering Premack and Woodruff’s (1978) landmark question: Does the chimpanzee have a theory of mind? In this chapter, I blend terminology from Irme Lakatos (1970) and Larry Laudan (1977) to conceptualize the animal mindreading research program as degenerative, i.e., unable to solve the problems it poses for itself, due to reasons traceable to the research tradition to which it belongs. 

Following the popular commentaries to Premack and Woodruff’s paper, the mindreading research program has been motivated by the hypothesis that theory of mind is uniquely human. This is a worthwhile project, but although the mindreading research program started out promising, it has developed into another chapter in a long-running research tradition mired in what I have referred to—following Sorabji (1993)—as explanatory crises of human exceptionalism. In line with my reading of this history, Lori Gruen (2011: 9, 12) describes a “bar-raising dialectic” throughout debates over human uniqueness in the late-20th and early 21st centuries as “misguided attempts by those who cling to the idea of an insurmountable divide between humans and other animals to

423 Harman 1978; Dennett 1978; Bennett 1978
establish human exceptionalism—even in the face of clear evidence establishing continuities between human skills and the skills used by some non-humans.” Throughout this genealogy I have unearthed and critiqued argumentative strategies commonly used to buttress the authority of age-old uniqueness and exceptionalism claims. The present chapter recaps these strategies, identifies their presence in modern theory of mind debates, and analyses the present state of the logical problem in relation to them.

The logical problem is a conceptual problem masquerading as an empirical problem. According to Laudan (1977: 45), “If empirical problems are first order questions about the substantive entities in some domain, conceptual problems are higher order questions about the well-roundedness of the conceptual structures (e.g., theories) which have been devised to answer the first order questions.” Put differently, conceptual problems rarely arise from the subject matter itself (the domain of empirical problems), but from the basic assumptions, constraints, and methodologies from which researchers approach that subject matter. Empirical problems are usually easier to identify and contend with, but they often stem from conceptual problems that are so engrained in a tradition that they become simply matter-of-course.

The situation of 21st century mindreading debates within the dominant tradition is a perfect example. In addition to empirical questions concerning the relevance of the behavioral, biological, and neuroanatomical facts about chimpanzee and human social behavior, there is the epistemic (conceptual) question here as to how much, and what kind, of evidence will suffice to demonstrate the conclusion that apes attribute mental states to others (pending further evidence). In a progressive research program there can be large-scale disagreement over what the evidence tells us and how much is sufficient,
and there can be—should be, ideally—competing hypotheses to explain the data/behavior in question. This is the nuts and bolts of a normal, healthy situation in the natural sciences, but this is not the case in the mindreading literature, where “the worry arises that no experiment can in principle avoid these alternative explanations” (Andrews 2015: 147). This “worry” is centuries old, and it is not resolvable by empirical means—at least not on the scale to which it arises; I suggest here that this worry owes more to the problem of other minds than it does to problems of underdetermination. To suggest, as Robert Lurz (2011) has, that resolution of the logical problem in mindreading debates is contingent on designing crucial experiments is wishful and ahistorical thinking.

The logical problem can be viewed as an empirical problem, of course, but in order to revitalize the problem-solving effectiveness of mindreading debates, it should first be recognized as emerging from conservative epistemic values and research constraints endemic to the dominant tradition—a tradition wherein, “even in the face of clear evidence establishing continuities between human skills and the skills used by some on humans, skeptics either deny it actually happened or minimize the significance of that activity” (Gruen 2011: 12). Conceptual problems and argumentative positions associated with the current theory of mind debate are not unlike those historically tied to debates over the presumed uniqueness of belief, judgment, language, abstraction, foresight, and the perennial Reason. This chapter concludes by drawing from the marginalized tradition to offer progressive strategies for engaging explanatory crises of human exceptionalism, thus promoting healthy terms of debate in the dominant tradition.
2. Human Exceptionalism as a Research Tradition: The Problem Determining Role

According to Laudan (1977: 86-90), research traditions perform three roles: (1) a “problem-determining role,” which influences the range and weighing of empirical and conceptual problems, (2) a “constraining role” which “establishes a general ontology and methodology for tackling all the problems of a given domain or set of domains,” and (3) a “heuristic role” which provides ready-made means for dealing with empirical anomalies or challenges. The dominant tradition in animal minds research is no different, where exceptionalism and uniqueness claims occupy central seats in the problem-determining role. That said, those features of this tradition that I identify as degenerative are not a result of this problem-determining role, but rather of the problem-solving capacities isolated to the constraining and heuristic roles. Framing things in this way allows me to identify unproblematic features of the dominant tradition and to isolate problematic features. My aim is not, after all, to advocate the rejection of this tradition.

The problem-determining role can be distilled into the following four claims that collectively stimulate inquiry within research programs in the dominant tradition:

**Uniqueness claims:** Humans are the only beings that do or have X (where X is some activity or capacity). X has no parallel amongst extant species in the animal kingdom.

**Exceptionalism claims:** X is a superior (i.e., more advanced, complex, etc.) capacity to any X-like capacities or X-like activities of non-human species. By relying upon scala natura language (“higher” and “lower”), exceptionalism claims presuppose cognitive hierarchies in the animal kingdom. Within the dominant tradition, these hierarchies are orthogenetic, i.e., presented in terms of “a single evolutionary [or teleological] trajectory culminating in Homo sapiens” (Bekoff and Pierce 2009: 49). Importantly, exceptionalism claims can admit of differences of degree between species, though this is not the case—of course—when coupled with uniqueness claims.

**Challenge claims:** Certain non-human species perform X-like behaviors, or behaviors that appear to demonstrate an X-like capacity.

**Parsimony claims:** X-like behaviors of non-human animals can be explainable in terms of alternative, simpler mechanisms than those responsible for X in humans.
Think of these four claims as providing the problem-determining recipe for the dominant tradition. Every research program will include all four.

According to Descartes, for example, humans alone possess a rational soul granting them singular capacities for reason and language (uniqueness claims). Animals, in contrast, are referred to as “dumb”\textsuperscript{424} and are said to lack “real speech,”\textsuperscript{425} i.e., as defined exclusively by human ability, due to their lack of immaterial souls (exceptionalism claims). Like Chomsky (1966), the perspective from which Descartes writes of the innovative, compositional, and/or creative character of human language is orthogenetic insofar as human communication is contextualized as more complex, developed, or otherwise superior to the communicative capacities of other species. Turning to Cartesian challenge claims, Descartes provides two empirical arguments—which read as statements of fact: it is unconceivable that (1) animals could produce meaningful language or (2) solve problems in contexts entirely novel to their natures. Finally, Descartes relies on the parsimony claim that “we too move just like automatons” throughout much of our daily lives, and just as we have no issue navigating the world “when our mind is elsewhere,” why assume that animals need a mind at all?\textsuperscript{426} Descartes’ membership in the dominant tradition thus boils down to the interrelation of these four types of claims, which constitute the problem-determining role of the Cartesian animal research program.

With this example in mind, a few clarifying points should be made. First, challenge and parsimony claims are as essential to this tradition as the uniqueness and exceptionalism claims. Second, sometimes all four claims emerge in the same article or

\textsuperscript{424} Philosopohical Writings (Vol 3: 365)
\textsuperscript{425} Ibid. 366
\textsuperscript{426} Ibid. 61-2
book, and other times they emerge dialectically and/or discursively in response to new arguments and empirical discoveries; they need not arise in any particular order. Third, exceptionalism and uniqueness claims collectively constitute default hypotheses within the dominant tradition. It is the constraining and heuristic roles of this tradition that make it difficult for evidence to be accepted suggesting these default hypotheses to be false.

To see how these four kinds of claims function together to determine problems in the dominant tradition today, consider the development of chimpanzee mindreading debates. Premack and Woodruff (1978) instigated the mindreading research program with a challenge claim: “In this paper we speculate about the possibility that the chimpanzee may have a ‘theory of mind,’ one not markedly different from our own. […] If we succeed with that claim, we may later seek to determine how accurate and complete his inferences are” (515). Based on their experiments, they conclude that chimpanzees are mindreaders in the sense of attributing goals and intentions to others. “Are we to believe,” they ask, “that we are the only species in which it is natural?” (526). The mindreading research program was therefore born of a challenge, from which uniqueness, exceptionalism, and parsimony claims were continually fleshed out and reinforced in the aftermath, i.e., until we can show that “complementary behavior-reading hypotheses” cannot equally explain the data (the parsimony claim), stage 1 and/or stage 2 mindreading should be thought of as uniquely human (uniqueness claims). Furthermore, stage 1 and/or stage 2 mindreading are largely responsible for more advanced social groups and forms of communication that explain the complexity of human culture, i.e., the social intelligence hypothesis (exceptionalism claims).

I turn now to how the chimpanzee

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427 Whiten and Byrne (1988)
mindreading program is a token example of how a once-progressive research program within the dominant tradition can start out healthy and turn degenerative.

Positions on whether chimpanzees have a theory of mind, and—if they do—what kind of theory of mind they may possess, have continuously shifted in response to experiments suggesting radically different responses to these questions. Much of the mindreading research in the 1990s was highly critical of Premack and Woodruff’s original hypothesis. A series of famous experiments by Povinelli and Eddy (1996), for instance, demonstrated that chimpanzees beg for food indiscriminately from a human with a bucket covering their head, and from a human without. But a critical sea change in experimental paradigms for assessing mindreading in chimpanzees occurred around the turn of the 21st century. In an attempt to design experiments in such a way that closely represented scenarios chimpanzees regularly experience in the wild, experimenters began to garner results highly suggestive of mindreading hypotheses. The most powerful evidence came from a series of experiments based on food-competition paradigms. Rather than testing chimpanzees’ ability to cooperate for food, which is a rarity in their natural habitats, these ingenious experiments gave chimpanzees competing for the same food the ability to employ deceptive tactics by placing various occluders between them, controlling what each chimpanzee could and could not see. Experimenters found that during competitive trials, the actions of subordinate chimpanzees are affected by what dominant chimpanzees can and cannot see, as well as whether their opponent possesses or lacks prior knowledge of the food source (e.g., Hare et al., 2000; 2001).

In the aftermath of Hare’s experiments it became increasingly clear that (1) the general problem solving abilities of the chimpanzee mindreading research program were
degenerating and that (2) two very distinct groups of researchers had formed: those—like Hare—who saw this study as suggestive evidence for mindreading, and those—often called “killjoys” or “skeptics”—for whom Hare’s experiments failed to make a dent in the twenty-year old challenge claims posed by Dennett (1978), Harman (1978), and Bennett (1978). While the emergence of the logical problem is often tied to these initial commentaries to Premack and Woodruff’s paper (Hurley and Nudds 2006; Lurz 2011), I offer a different reading of the history. The original parsimony (e.g., complementary behavior-reading hypotheses) and challenge (e.g., can chimps pass a false-belief test?) claims have evolved in such a way that they are—unlike the late 1970s—no longer widely viewed as amenable to empirical resolution.

Consider Povinelli and Vonk’s (2004) claim that “the problem we face is not primarily an empirical one. Instead, the most pressing problem is to come to grips with the fact that the experimental results from the kinds of techniques that are currently in vogue cannot add a single bit of evidence in unique support of the conclusion that chimpanzees reason about mental states—any mental states” (11 [emphasis in the original]). Povinelli and Vonk are correct. The logical problem is not an empirical problem, at least not anymore. Regardless of whether or not it turns out that chimpanzees do indeed possess a theory of mind, from the perspective of the logical problem, twenty extant studies suggestive of mindreading abilities—so long as they all admit of complementary behavior-reading hypotheses—are ultimately as valueless as a single such study. This state of affairs explains the widespread presumption that crucial experiments are necessary to progress the literature. Lurz et al. (2014: 450), for instance, claim that “the best way forward at this point is neither to believe nor to deny the
existence of animal mindreading, but to suspend judgment on the issue until tests have been carried out that overcome Povinelli’s problem.\footnote{I.e., “creating a situation in which subjects can only succeed by applying reasoning that ranges over mental states, in addition to whichever behavior rules are involved” (Lurz et al. 2014: 449).}

The “agnostism” advocated by Lurz and colleagues includes Call and Tomasello’s (2008) claim, on the 30\textsuperscript{th} anniversary of Premack and Woodruff’s article, that the collective experimental literature strongly suggests that chimpanzees “understand others in terms of a relatively coherent perception–goal psychology in which the other acts in a certain way because she perceives the world in a certain way and has certain goals of how she wants the world to be” (191). Call and Tomasello thus respond to Premack and Woodruff’s original question in the affirmative, at least in terms of a “broad construal of the phrase ‘theory of mind’,” noting that the jury’s still out on a “more narrow definition” involving “a fully human-like belief–desire psychology in which they appreciate that others have mental representations of the world that drive their actions” (ibid.). In contrast, for Lurz (2011) even the minimal claim that chimpanzees are capable of attributing of perceptual mental states to others, like seeing, is worthy is great skepticism. Chimp social behaviors indicative of such attributions can be more parsimoniously explained, argues Lurz, by ascribing to them learned behavioral rules wherein others’ behavior is predicted entirely by means of inferences drawn from past and present bodily and facial orientation, \textit{e.g.}, instead of chimps holding the propositional attitude $X$ sees $Y$, the same behavior(s) can follow from them making inferences of the sort $X$ has a \textit{“direct line-of-gaze” to $Y$}, which does not entail mental state attribution.

Lurz \textit{et al.} are correct to advocate scientific fallibilism about belief in animal mindreading, but their position is not standard in at least three respects. First, they portray
these debates as if one must either totally affirm or totally deny chimpanzee mindreading hypotheses (450), rather than viewing them in terms of varying probability based on evidence. Second, they place far too much emphasis—indeed, all their emphasis—on the success of crucial experiments as the only motivator of progress in mindreading debates, whereas the history of science suggests that crucial experiments rarely fill this role (Lakatos 1974; Laudan 1979). Third, in adopting strict “agnostism”, they implicitly reject how progress is most often made in the history of science: arguments to the best explanation drawn from a consilience of inductions, such as the wealth of evidence informing Call and Tomasello’s (2008) more progressive position, decades after the debate began, that chimps arguably possess abilities for stage-1 mindreading.

The source of this impasse in the mindreading literature had nothing to do with the problem-determining role of the dominant research tradition. As the early years of the mindreading debates show, the recipe of exceptionalism claims, uniqueness claims, challenge claims, and parsimony claims can motivate promising research programs.

3.1 Human Exceptionalism as a Research Tradition: The Constraining Role

It is the primary function of a research tradition to establish a general ontology and methodology for tackling all the problems of a given domain or set of domains. As such, it acts negatively as a constraint on the types of theories which can be developed within the domain. There are also many occasions where the methodology of a research tradition rules out certain sorts of theories. […] The research tradition within which a scientist works precludes him from adopting specific theories which are incompatible with the metaphysics or methodology of the tradition (Laudan 1977: 89 [emphasis in original]).

The constraining roles of the dominant tradition are the key players responsible for the amount of undue skepticism in comparative cognition today. This point is most easily introduced by returning to the reaction against Darwin in late 19th and early 20th centuries. As noted in Chapter Seven, responses to the “anthropomorphic anecdotalism” (Griffin 1978) of Darwin and Romanes were quick and forceful, and by no means limited
to those positing and defending exceptionalism claims. Loeb (1918), Morgan (1903), Washburn (1908), Jennings (1906), Mills (1889, 1905), and Holmes (1911) among many others, all reacted forcefully to what came to be what I think of as the three original sins of the literature: (1) anecdotalism, (2) anthropomorphism, and (3) analogy from introspection. The dominant responses to these three sins resulted in an intellectual climate of exacting epistemic and methodological values. This climate influenced the acceptable (and unacceptable) language with which to write about animals, the acceptable (and unacceptable) environments within which to study animals, and the acceptable (and unacceptable) epistemic grounds for drawing mentalistic conclusions about the causes of animal behavior. Though once indicative of legitimate concerns at the birth of comparative psychology, it is evident over a century later that this conservative research climate demands renewed consideration.

3.2 Ontological Constraints

Cecilia Heyes, once a proponent of animal minds skepticism (e.g., 1993, 1994, 1998), has recently expressed her growing concerns with the “current of opinion in the study of comparative cognition suggesting we should assume that animals have simple minds,” arguing that an ontology informed by “simple-mindedness” has not aided the discipline, as “[i]n the most extreme cases, the claim that animals have simple minds amounts to the claim that associative learning is the only way in which animals can think about the world” (2012: 2695). The de facto acceptance of “simple-mindedness” in animal research is a prominent feature of the dominant tradition. It is present not only in the form of the default hypothesis that animals lack mental lives, but also as a basic
ontological assumption influencing linguistic, methodological, and epistemic constraints on responsible comparisons between human and animal minds.

John Greenwood (2016) has clarified an historical pattern between two traditions in psychology that I take to be indicative of opposing ontological assumptions shared by the majority of figures in the dominant and marginalized traditions, respectively, in animal minds research. Greenwood begins by noting that there are two general positions regarding what he calls strong psychological continuity and strong psychological discontinuity: (1) between cognitive and associative processes, and (2) between human and animal psychology and behavior. According to Greenwood, these “two positions have tended to be affirmed of denied together,” namely…

Those who hold that higher cognitive processes are strongly discontinuous with lower associative or reflexive processes hold that cognitive and associative or reflexive processes are fundamentally different in kind; those who hold that “higher” cognitive processes are strongly continuous with “lower” associative or reflexive processes hold that cognitive and associative or reflexive processes differ only in degree of complexity and not in fundamental kind. [What’s more] those who hold that human psychology and behavior is strongly discontinuous with animal psychology and behavior hold that human and animal psychology and behavior differ in fundamental kind [e.g., Descartes]; those who hold that human psychology and behavior is strongly continuous with animal psychology and behavior hold that human and animal psychology and behavior differ only in degree of complexity and not in fundamental kind [e.g., La Mettrie].

While there is no intrinsic reason why these positions should be affirmed or denied together, and while the views of Aristotle and Locke on human uniqueness are arguably too nuanced to be captured in this way, I have shown how historic figures from the dominant tradition (e.g., the Stoics, Aquinas, Descartes, Wallace) clearly fall into the former category of ontological assumptions, while those in the marginalized tradition (Plutarch, Montaigne, La Mettrie, Hume, Darwin) generally fit into the latter.

The Stoics, for instance, held (1) that animal behavior is motivated by the irrational hegëmonikon acting through associative processes in the central nervous
system, while also (2) maintaining an “all or nothing” view of cognitive capacities—a position that naturally leads to hypotheses of strong discontinuity in mental faculties/processes, as well as tenacious automatic responses to behavioral evidence of mental continuity like those that fuel the logical problem. In contrast, the gradualist accounts of mental capacities historically defended by figures in the marginalized tradition are less amenable to the dualistic, ontological basis of the logical problem, wherein explanations of animal behavior are constrained by their basis in either “simple-minded” perceptual or non-mentalistic faculties or rational/mentalistic (human) faculties. Hume, for instance, saw his brand of associative reasoning as the common basis for both human and animal behavior, which led him to assert strong psychological continuity.

I am not claiming that this ontological distinction between traditions is neat and tidy. Few in marginalized tradition today, for instance, defend the view that strong associationism “all the way up” (Greenwood 2016) can explain behaviors from the smallest of animals to those of human beings, such as were the positions defended by the likes of La Mettrie (1748), Huxley (1874), Watson (1908, 1913), and Hull (1943). What’s more, not all figures in the dominant tradition maintain this strict relationship between cognitive discontinuity and species discontinuity, e.g., consider Aristotle’s not- quite- cognitive accounts of phantasy and phronesis, or Edward Tolman’s (1932) “purposive behaviorism”, based on the idea that stimulus-response mechanisms are explanatorily insufficient for the psychologist’s toolkit, which should acknowledge that animals strive toward goals and—Tolman thought—act on and modify beliefs about their environments.

As demonstrated in Chapters 2-4, explanatory concerns over the ability of “simple-minded” ontologies to account for complex forms of animal behavior are nearly
as old as are philosophical discussions of the mind. This is most evident in the anti-Stoic arguments of the Neoplatonists, who argue from the perspective that, just as explanations of human behavior require blurring the lines between the rational and the perceptual, so too should explanations of animal behavior. This attitude is also present in Montaigne and Charron,\footnote{Chapter 5, Sections 2 and 4} as well as the comparatively minor Renaissance figure of Giovanni Gelli (1963: 130-1), who—in response to traditional uniqueness claims about prudence—raises the pertinent question: “How will you make it appear that prudence is in the understanding and not in the sense?”

In the contemporary literature, Heyes (2015) pegs explanatory constraints tied to either/or dichotomies between association and cognition as a major reason for the “decline” in the mindreading research program. A variety of disciplines are now considering more than ever the apparent fact that “complex” or “intelligent” behavior in human beings—perhaps even the majority of such behavior in daily life—is the product of mechanisms once thought to be “simple.” Shannon Spaulding (2010), for instance, convincingly argues that, “mindreading is a rarely used, specialized skill,” and as Kristin Andrews notes, “if other species predict, manipulate, deceive, compete, and so forth without mindreading, then we have no reason to think that humans need to do so. While it is true that evolution is not a tidy process, we should avoid postulating the development of a unique cognitive process to make better predictions of behavior when the current mechanisms work just fine” (2012: 219 [my emphasis]). Heyes (2012: 2697), then, is correct that the slowly emerging picture entails that “Associative learning is ubiquitous” and “plays an important role in guiding complex human behaviour, in spite of the many ways in which our lives differ from those of all other animals.” The irony is that the chief
ontological assumption behind the traditional denial of human-like cognitive mechanisms to animals is also that which also makes it difficult to prove how humans are exceptional.

Increased emphasis on blurring the lines between associative and cognitive mechanisms is not good news for those hoping to “solve” the logical problem in research programs like theory of mind. This debate has traditionally relied upon rigid distinctions of this precisely this kind, i.e., mindreading hypotheses evoke cognitive mechanisms while behavior-reading hypotheses evoke “simple-minded” associative mechanisms. Further, if we cannot even tell when humans are using a theory of mind—the traditional assumption in the literature being that humans almost always do in social interactions—then how can we convincingly argue when other species are, or are not, mindreading? This is a problem endemic to the dominant tradition. For figures in the marginalized tradition, the line between cognition, reason, and intelligence (on one side), and instinct, emotion, and associative mechanisms (on the other) is blurry; very often, figures from this alternative tradition explicitly note this, e.g., consider La Mettrie’s (1747: 43) critique of Descartes’ substance dualism: “why do we divide the sensitive principle that thinks in man’s mind? Is this not a manifest contradiction for advocates of the simplicity of the mind?” Like La Mettrie, Darwin (1871: 51) likewise claimed that “it is often difficult to distinguish between the power of reason and that of instinct,” providing suggestive examples to argue his case. As we look into the future, Greenwood (2016: 212) is in line with Heyes (2012) and Dickinson (2012) in

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430 See Andrews (2012) for a critical review of this assumption in the literature, particularly Chapter Two.
431 For Plutarch and Porphyry, see Chapter 4, Sections 2-3; for Montaigne and Charron, see Chapter 5, Sections 3-4; for La Mettrie and the Empiricist tradition, see Chapter Six, Sections 3-4, and for 19th and early 20th century figures in comparative psychology, see Chapter Seven, Sections 2 and 7.
432 E.g., the behavior of sled dogs, whose “compact bodies […] diverged and separated when they came to thin ice, so that their weight might be more evenly distributed” (1871: 51).
emphasizing that, “the degree to which cognitive explanations in terms of comparative causal judgment can be extended to encompass associative processes in other animals remains an open and empirical question,” and that “[t]he theoretical possibilities […] include the possibility that some animals have cognitive capacities superior to humans”—a possibility long-entertained by figures in the marginalized tradition.

My overarching claim in the following subsections is that the traditional ontology of tying “lower” associative/instinctive mechanisms with animals and “higher” cognitive/mentalistic mechanisms with humans is a key background condition motivating the logical problem. Long before this problem came into vogue, it was par-for-the-course for ancient, medieval, and Enlightenment figures to adopt the aforementioned ontological constraints on comparative explanations of human and animal behavior. Sedimentations of this ontological framework are present in the 19th, 20th, and 21st centuries, informing influential, tough-minded attitudes in the form of (1) popular readings of Morgan’s Canon as a skeptical device, (2) parameters on what should be dismissed as anthropomorphic descriptions of animal behavior, and—out of fear of committing Clever Hans errors—(3) a research climate indicative of a “demand for perfect evidence” that has stunted progress in the contemporary literature (Griffin 2001: 32). I refer to these points as epistemic constraints, linguistic constraints, and methodological constraints.

3.3 Epistemic Constraints

The most widely acknowledged constraints on research in animal psychology are principles of cognitive parsimony. As discussed in Chapter Seven, Morgan’s Canon and the logical problem share common ontological assumptions. Both are motivated by the ontology of “simple-mindedness” that rests upon tangible divisions between associative
and cognitive mechanisms, despite the fact that “distinguishing between the behavioural predictions of cognitive […] and associative accounts is not straightforward because associative theory can mimic rational and inference-driven explanations” (Dickinson 2012). Morgan’s Canon plays both methodological and epistemic constraining roles in animal minds research: experiments must be designed to distinguish between competing explanations of “higher” and “lower” faculties, and it is always epistemically responsible to choose the latter if experiments cannot accomplish this task. While principles of epistemic parsimony are necessary in animal minds research, they have traditionally been applied too conservatively to address empirical problems such as “Does the chimpanzee have a theory of mind?” This position is in line with a growing number of commentators suggesting “that the Canon has often served as a convenient justification for a priori resistance to attributions of mental states to animals” (Fitzpatrick 2008: 225).433

Arguably the most famous critique is Elliot Sober’s (2000, 2005) view that—contrary to popular belief—the ontological assumptions that follow from Morgan’s Canon clash with evolutionary theory and do not, strictly speaking, rest upon principles of parsimony. As Sober (2005) notes, parsimonious explanations are those that postulate comparatively fewer entities than competing explanations, but Morgan’s Canon does not preference theories of this nature; it preferences theories that postulate comparatively “lower” faculties or processes in terms of a scala natura (or otherwise hierarchical view) of cognitive complexity. What’s more, a close reading of Morgan himself suggests that he “did not think that his Canon could be justified by appeal to simplicity. Not only did Morgan reject the idea that simplicity was an appropriate criterion for theory choice in

433 E.g., Costall 1993; de Waal 1999; Sober 2000; Meketa 2014.
science, he also argued that the simplest explanation for an animal’s behaviour is the most anthropomorphic one” (Fitzpatrick 2008: 230; Morgan 1894: 53-54).

Principles of Cognitive Simplicity (PoCS) encourage researchers to adopt two ontological positions consistent with the cognition/associative mechanism dichotomy underlying the logical problem; first, that “simplicity” entails associative mechanisms and that “complexity” entails cognitive mechanisms, and second, that there exists a relatively unproblematic cognitive hierarchy wherein all associative mechanisms are necessarily at the bottom, i.e., “for a given behavior, the possible cognitive systems driving the behavior can be ordered by complexity” (Meketa 2014: 731).

Relevant to both of these assumptions, Laudan (1996: 79) describes a particularly damming set of conceptual problems that arise when “basic categories of analysis are vague and unclear.” And indeed, according to Meketa (2014: 731), “Crucially, the notion of a scale of cognitive complexity guides scientific decisions despite the fact that concepts like complexity and cognition are often left vague or ambiguous,” and that, “without a clear sense of how cognitive ontologies are to be carved up at the joints—and which tools are appropriate for the job—PoCS rests on shaky conceptual ground.” In precisely the same way, conceptual problems arising from vaguely defined cognitive faculties/processes fuel explanatory crises related to the logical problem. The presence of ambiguities in defining and distinguishing cognitive processes decreases their empirical tractability and, at worst, leads to hypotheses that cannot make novel predictions, and are therefore unfalsifiable. As discussed in Chapter Seven, the role played by the behavior-reading hypothesis in chimpanzee mindreading debates offers a clear example: unlike mindreading hypotheses, it is (1) “too under-specified to make determinate predictions,
and hence there is no risk of it turning out to be wrong,” and (2) *ad hoc*, *i.e.*, “an explanation in terms of the animals’ deployment of some or other behavior rule can always be constructed after the fact,” which is how Povinelli and colleagues use it (Fletcher and Carruthers 2013: 461).

This evaluative process is not empirical; rather, it constitutes an ongoing game of positing hypothetical non-mentalistic explanations for animal behavior, none of which are capable of predicting novel behaviors distinct from the competing mindreading hypotheses, which *do* have a robust research program behind them:

What Povinelli and colleagues have ranged against them [… ] is a regular scientific research program of good standing, which generates determinate predictions capable of falsification when combined with auxiliary assumptions (e.g. concerning the animals’ other forms of knowledge). Moreover, it is a progressing research program, issuing in a stream of positive results and increasingly precise theories. The behavior-rule hypothesis, in contrast, is too indeterminate and ad hoc to qualify as a scientific research program at all. (Fletcher and Carruthers 2013: 461)

In these ways, routine deference to the illusory simplicity of the behavior-rule hypothesis has foreclosed empirically tractable hypotheses about chimpanzee social cognition.

In practice, then, the logical problem does not simply describe an impasse between competing sorts of theories; the logical problem is related to the PoCS in that the former is constrained by arguments from parsimony and bears normative weight, *i.e.*, because there is no functional difference between theory of mind and behavioral rules, and because the latter are assumed to be far less cognitively taxing, it is scientifically irresponsible to conclude that animals possess a theory of mind (e.g., Shettleworth 2012). In line with Sober’s critique of Morgan’s Canon, when the logical problem adopts this normative role it assumes outmoded assumptions about evolutionary biology. My point is not that the logical problem, like the Canon, *necessarily* assumes cognitive hierarchies in

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434 For critiques, see Heyes (2012), Dickinson (2012), Fletcher and Carruthers (2013), and Meketa (2014).
the animal kingdom. In its most abstract sense, it does not. Rather, what I am suggesting is that the logical problem emerged from an intellectual milieu in which outmoded assumptions of this nature were commonplace, and *when evoked as an epistemic constraint to restrict the import of empirical challenges to exceptionalism claims*, the logical problem is presented in terms of the same orthogenetic perspective from which exceptionalism claims themselves are posed.

In the dominant tradition, the logical problem uses human cognitive capacities as the model for what qualifies as “complex” or “cognitive” means of responding to environmental problems; when evidence for that model is underdetermined by complementary behavior-reading hypotheses, exceptionalism claims are preserved by the assumption that the human-like behaviors of the animal in question are caused by “simpler” mechanisms than similar behaviors when humans perform them. As a result, unique skills that other species may use to solve similar problems, and which may entail a high degree of complexity in their own right, are ignored. This is the same issue that Louise Barrett (2011: 220) notes with respect to the influence of Morgan’s Canon:

Morgan’s canon implicitly assumes a scala naturae in terms of the expected distribution of cognitive endowments across the animal kingdom. […] The assumption of a ladder-like process of steady improvement in cognitive abilities from lower to higher faculties represents an outmoded view of how evolutionary processes work. Assuming that, for example, chimpanzees will show many of the precursors to human cognition because they are our closest living relatives assumes that […] we moved up the ladder and left the chimpanzee stuck on a lower rung. […] Such assumptions […] pervade comparative studies. The possibility that these creatures may possess some unique skills [or cognitive processes] of their own is rarely, if ever, entertained.

In this way, the ontological and epistemic constraining roles informing the logical problem can readily lead to semantic anthropocentrism. Consider the way in which, in the theory of mind literature, mindreading is traditionally defined exclusively in terms of attributing propositional attitudes to others (Andrews 2012), rather than “Ask[ing]
ourselves ‘What kind of a theory of mind is adaptive for chimpanzees to acquire?’ and ‘When do they use it?’” (Boesch and Boesch-Achermann: 2000: 243). By virtue of dropping the orthogenetic perspective, these sorts of questions immediately relieve some of the logical problem’s force. Recalling a passage from Peter Godfrey-Smith (2016: 50), when comparing the brainpower of different species, “there is no single scale on which intelligence can be sensibly measured.” Without such a scale, new interpretive possibilities emerge that transcend the theory of mind or “simple-mindedness” dichotomy endemic to traditional formulations of both the PoCS and the logical problem. Namely, while chimpanzees may not attribute proposition attitudes to others, this does not entail that they are not engaging in other “complex” forms of social cognition.

In the concluding section of Do Apes Read Minds?, Kristin Andrews usefully suggests the need for “a new research program” that, in contrast with the sorts of questions motivated by the dominant cognitivist framework of the past sixty years (such as the title of her book), urges researchers and philosophers alike to largely abandon the program of understanding apes as “containers for sets of propositional attitudes,” and—instead—view them “holistically” with personalities, life-histories, “smells, tics, cultures, status, and various idiosyncrasies” (2012: 206-211). Such a perspective is “consistent with a developmental picture” wherein, as the “social domain expands,” “psychological profiles” are formed by means of a “combination of automatic processes” and “general principles […] generated from previous individual personality profiles.” In short, whereas “Mindreading accounts miss the richness and variety in our social interactions,” Andrews is proposing a research program that views apes in a way that “better reflects the way we relate with other people.”
The ontological assumptions upon which the logical problem rests make it inimical to such a project. First, it assumes the same rigid dichotomy between associative and cognitive mechanisms as the PoCS. Second, like the PoCS, it assumes not only that “simplicity” entails associative mechanisms and that “complexity” entails cognitive mechanisms, but that the later should be defined in terms of the mechanisms that humans use, with little to no regard for broader ecological considerations. Third, it assumes that “for a given behavior, the possible cognitive systems driving the behavior can be ordered by complexity” (Meketa 2014: 731) and that this ordering is done from an orthogenetic perspective, likewise dismissive of ecological considerations. These critiques of the logical problem are in line with Meketa’s claim that “The pervasiveness of PoCS-like thinking can be explained historically. Animal cognition researchers have long been wary of an illicit overattribution of complex (sometimes ‘human-like’) abilities and faculties to nonhuman animals” (732). The way the logical problem acts as an epistemic constraint in the dominant tradition can be explained as part of the same story, and this leads us to the impact that the second “original sin” in the literature, anthropomorphism, has had on fostering the intellectual climate responsible for the logical problem.

3.4 Linguistic Constraints

But it is also true that words retort and turn their force back upon the understanding; and this has rendered philosophy and the sciences sophistic and unproductive. [...] When a sharper understanding, or more careful observation, attempts to draw lines more in accordance with nature, words resist.

Francis Bacon (1620/2000: 48)

Tacit *scala natura* assumptions are historically aroused by the placement of scare quotes around mentalistic, subjectivist, or otherwise “anthropomorphic” terms, e.g., “knowing” that, “angry” toward, which function “as markers of skepticism” thereby “exonerate[ing] the writer from a full commitment to the language,” which, “far from
being simply a useful, neutral tool for inquiry, plays a formative part in how animals are depicted” (Crist 1999: 1, 16-17). Unlike Bacon, Laudan (1977) does not mention the constraining role of language, however the ontological assumptions discussed above have long been reinforced by linguistic constraints in animal minds research.

Eileen Crist (1999: 28) describes a telling moment where Samuel Barnett—“a quintessential representative of a skeptical critic of Darwin’s use of mental concepts for animals”—objects to Darwin’s description of a “cat in an affectionate frame of mind.” According to Barnett (1958: 225), “cutaneous stimulation” is a more scientifically appropriate term. Crist rightly identifies this sort of linguistic constraint as a common “move of displacing a mental concept with a technical term under the auspices of achieving ostensibly greater objectivity,” noting—in line with ontological constraints discussed above—that “[t]he assumption that fuels this move is that mind and body are separate realms, such that the [animal’s] behavior might be rendered completely in terms of body—for example, ‘cutaneous stimulation.’” In this sense, semantic anthropocentrism can result from linguistic constraints on presumed anthropomorphic language: restricting mentalistic language-use to explanations of human behavior creates an unrealistic picture of how necessary mentalistic processes may be to the causes of behavior indicative of—for example—a theory of mind.435 At worst, the result is an unwarranted “all or nothing” view of mental capacities, whereby linguistic constraints engender a default attitude of anthropofabulation (Buckner 2013; Andrews 2015), i.e., an inflated perspective of human mental capacities relative to other species of great ape.

Indeed, linguistic constraints emerged in the wake of Premack and Woodruff’s (1978) seminal paper and functioned in much the same way in subsequent chimpanzee

mindreading research. As Burghardt (1985: 905) claims, “Today the dilemma facing researchers reopening questions concerning nonhuman animal ‘mental states’ is still to avoid rash anthropomorphism. Uncompromising attacks on chimp language studies (e.g., Umiker-Sebeok & Sebeok, 1981) illustrate the problems in generating publicly verifiable evidence for phenomena counter to both Cartesian mind-body dualism and the fading, but still potent, behavioristic Zeitgeist.” The “dilemma” that Burghardt is referring to is clearly the logical problem. His claim mirrors my own. The traditional fear of anthropomorphism is partly responsible for creating this problem. This is because the de facto ontology of “simple-mindedness” common to Descartes, the Behaviorists, and the mindreading literature alike (Heyes 2012) makes any non-mechanomorphic interpretation of animal behavior potentially anthropomorphic due of the difficulty of providing “publicly verifiable evidence” in its favor.

3.5 Methodological Constraints

Broadly speaking, there has long been a “history of conflict” in the animal minds literature between those disciplines engaged in laboratory experimentation and those that specialize in field research. This division is not clear-cut, but it exists. I submit that this history can largely be divided along the lines of the dominant and marginalized traditions. In the marginalized tradition, field reports are given more importance and—for some—are more legitimate sources than captive studies (e.g., Boesch 2007, 2008). As a result of heightened skepticism about analogical reasoning from human and animal behavior to

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human and animal minds, the dominant tradition typically holds the opposite position, and as a result, more conservative constraints on what passes for acceptable research.437

The efforts of Darwin and Romanes were justifiably criticized for their reliance upon anecdotal evidence, and to this day, the dominant view remains that anecdotal evidence is “officially unusable” in responsible animal minds research (Dennett 1987: 250). Curiously, despite vast improvements in collecting data from the field, the line between the epistemic value of “anecdotal evidence” and “field research” largely remains—for Povinelli, Heyes, and others in the dominant tradition—a difference in kind. Only a marginalized few today—most notably, Christophe Boesch—defend positions such as those advocated by Tinbergen, Lorenz, and other European ethologists in the 1970s who were highly critical of artificially controlled experimental studies of animal behavior.438 In contrast, the dominant view is that captive environments bring a level of ‘epistemic legitimacy’ that field studies can never hope to provide (see Allen and Bekoff [1997] and Boesch [2007, 2008, 2015] for reviews). This is strange insofar as field experiments are standard in general psychology, e.g., Latané and Darley’s (1970) classic experiments on ‘bystander apathy.’439

I have noted Povinelli’s (2000: 15) contention that “questions about the internal architecture of chimpanzee psychology are virtually impossible to address in the rain forest.” Heyes (1987: 124) has likewise suggested that the time has come for researchers in comparative cognition to “hang up their field glasses” if they hope to justify causal

437 E.g., Heyes 1987, 2015; Premack 1992; McGrew et al. 1994; Tomasello and Call 1997; Povinelli 2000; Call and Tomasello 2008; Suddendorf 2013; Shettleworth 2013; Vonk and Galvin 2014.
438 It was on such grounds that Köhler (1917) and Morgan (1898) criticized Thorndike’s puzzle boxes, i.e., “the cats were precluded from employing insight or reasoning” due to the construction of the apparatus, and because they were starved (Greenwood 2015: 369).
439 Thanks to John Greenwood for this point and example.
explanations of animal behavior. Even Andrew Whiten (2002: 386), who performs
research in both the lab and the field, claims that, “to probe underlying cognitive
processes, an experimental approach would be necessary.” Echoes of Thorndike’s views
on proper methodology in animal psychology still pervade the contemporary literature.
As such, detailed reports on wild chimpanzees suggestive of, for instance, theory of
mind,\(^{440}\) intentional communication,\(^{441}\) culture,\(^{442}\) innovation,\(^{443}\) and extended altruism
towards unrelated group members,\(^{444}\) find themselves at odds with conflicting results
from privileged laboratory studies that are accompanied by the promise of inimitable
opportunities for “complete control” (Allen and Bekoff 1997; Boesch 2007, 2008).

Consider a relatively recent example. In the wake of a series of experiments
undertaken by Povinelli and researchers at the New Iberia Research Center, the following
hypothesis rose to popularity in the comparative cognition literature: “extended altruism,”
_i.e._, altruism towards unrelated group members, is a unique feature of human societies.\(^{445}\)
This hypothesis was quickly put to a variety of uses: (1) forming evolutionary hypotheses
about the minds, economies, and cultural practices of our hominid ancestors;\(^{446}\) (2)
posing ‘socio-cognitive mechanisms’ that make human brains unique;\(^{447}\) thus (3)
supporting arguments that “empathy” is a uniquely human trait;\(^{448}\) and (4) adding
justification to ethical and legal claims that chimpanzees are not equal members of the

\(^{440}\) E.g., Boesch 1992; Crockford 2012.
\(^{441}\) E.g., Schel et al. 2013a; Schel et al. 2013b
\(^{442}\) E.g., McGrew 1992; Whiten et al. 1999
\(^{443}\) E.g., Russon et al. 2008
\(^{444}\) E.g., Hobaiter et al. 2014
\(^{445}\) E.g., Silk et al. 2005; Vonk et al. 2008; Brosnan et al. 2009
\(^{446}\) E.g., Henrich et al. 2008; Komter 2010
\(^{447}\) E.g., Tomasello 2008; Adolphs 2009
\(^{448}\) E.g., Boyd and Richardson 2006; Silk 2007
“moral community.” Only a few years later, however, this widely accepted exceptionism claim came to be provocatively challenged in a paper entitled “Altruism in Forest Chimpanzees: The Case of Adoption,” where Boesch et al. (2010) reported “18 cases of adoption, a highly costly behavior, of orphaned youngsters by group members in Tai forest chimpanzees,” that “can last for years and thus imply extensive care towards the orphans.” Accordingly, Boesch et al. conclude that:

In strong contrast with these captive studies, consistent observations of potentially altruistic behaviors in different populations of wild chimpanzees have been reported in such different domains as food sharing, regular use of coalitions, cooperative hunting and border patrolling. These observations reveal that, under the appropriate socio-ecologic conditions, chimpanzees do care for the welfare of other unrelated group members and that altruism is more extensive in wild populations than was suggested by captive studies.

The Povinelli group never responded to the Boesch group. One can only guess why, but presumably Povinelli and colleagues are dismissive of these findings given their aforementioned views on field research. Did the Povinelli group assert their uniqueness claim about extended altruism too quickly? Arguably, yes (it was based entirely on two near-identical studies on the same population of captive chimpanzees [Silk et al. 2005, 2007]), but that is not my point. Conservative methodological constraints of the sort embodied by the Povinelli group that disparage field research are inimical to the problem-solving capabilities of their parent research programs.

Throughout the twentieth century to the current day, for those in the dominant tradition the import of avoiding weak analogical reasoning is cashed out in terms of designing experiments capable of discriminating between competing interpretations of animal behavior in terms of cognitive and associative mechanisms. The crucial idea here is that because it is more difficult (or impossible [Povinelli 2000; Heyes 1987]) to

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449 E.g., Franklin 2006; Warren 2000
distinguish associative from cognitive explanations in the field, the resulting “quest for complete experimental control” (Allen and Bekoff 1997: 17) to distinguish them—or what Griffin (2001: 32) describes as a “demand for perfect evidence”—have led to a “paralytic perfectionism” (62) in the literature that has certainly influenced the climate fueling the logical problem. In as much as the logical problem is an epistemic problem, it is also a methodological control problem. Ironically, traditional constraints of the dominant tradition have contributed to an intellectual climate where no experimental environment seems fit to solve the logical problem.

4. Human Exceptionalism as a Research Tradition: The Heuristic Role

According to Laudan (1977: 92 [his emphasis]), “Any sound research tradition will contain significant guidelines about how its theories can be modified and transformed, so as to improve its problem-solving capacity.” Emphasis on the important role played by such “guidelines” is also present in Lakatos’s (1970) work, whose notion of “positive heuristics” more accurately captures the relevance of this particular role to the dominant tradition in animal minds than Laudan’s discussion does. Lakatos saw that every research program frequently faces anomalies and refutations, and thus requires a ready-made “strategy both for predicting (producing) and digesting them” (135). Throughout this project I have used the phrase “defensive strategies” to describe patterns of argumentation employed in the dominant tradition in response to philosophical and empirical challenges to uniqueness and exceptionalism claims. The aim of this section is to summarize these strategies—here, heuristics—and briefly discuss their merits and faults in responding to explanatory crises of human exceptionalism.
As Musgrave (1976: 457) describes them, the “heuristics of a research programme can anticipate empirical refutations and can give directions, in advance, about how they are to be handled.” Often, heuristics lead to good research; other times, they have a degenerative effect with respect to creating more conceptual and empirical problems than they divert. Some of the following heuristics of the dominant tradition are corollaries of constraints discussed above. In certain cases, they can be traced to the ancients. They are here listed loosely by frequency of occurrence.

1. **Cognitive Simplicity Heuristic:** In order to demonstrate the presence of capacity X in a non-human species, it must first be shown that their X-like behaviors could not be also caused—or, that it is less likely that they are caused—by “simpler” (i.e., less advanced, complex, etc.) capacities, i.e., Clever Hans Errors.

2. **Disparate Contexts Heuristic:** In order to demonstrate the presence of capacity X in a non-human species, members of that species must perform a wide variety of different types of behaviors in different contexts associated with X. The number and/or types of contests need not be stated.

3. **Redefinition Heuristic:** In order to demonstrate the presence of capacity X in a non-human species, it must first be shown that the behavioral repertoire of the species in question can accommodate a more refined definition of X.

4. **Human Ability Heuristic:** In order to demonstrate the presence of capacity X in a non-human species, it must first be shown that the species in question can perform token behaviors commonly associated with X when humans do X. This heuristic tends to discredit field studies in favor of comparative research with human actors or infants.

5. **Evolutionary Distance Heuristic:** The ability to demonstrate the presence of capacity X in a non-human species decreases “the more distant the animal is in relation to human beings, even if the behavioral evidence remains compelling” (Crist 1999: 47).

6. **Inaccessibility Heuristic:** Because the subjective experiences of others are inaccessible, there are certain cognitive capacities that are inaccessible to scientific study. This heuristic emerges on a spectrum, with one pole indicative of global skepticism about

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450 E.g., Whitten 1996; Heyes 1998; Penn and Povinelli 2013
451 E.g., see Fletcher and Carruthers’ (2013) criticisms of the Povinelli group’s work.
452 In a similar vein, “Interpreting some example of animal behavior as indicating conscious awareness [or any other mental capacity] is often implied to be a claim that the animal is experiencing exactly what a human in the same situation would think or feel” (Griffin 2001: 26).
453 E.g., Heyes and Dickinson (1990: 87) claim that field studies cannot provide evidence of “a mental life built on the rational interactions of intentional states such as beliefs and desires.”
Recalling terminology from the problem-determining role, these heuristics always emerge when an exceptionalism claim is confronted with a challenge claim, and they are always justified—whether tacitly or explicitly—by deference to the responsible avoidance of anthropomorphic over-interpretations of animal behavior. The Inaccessibility Heuristic is rarely used in the modern literature. The Evolutionary Distance heuristic was once extremely popular, but is used less and less due to stinging critiques popularized by Sober (2000, 2005) of its outmoded biological assumptions. The Cognitive Simplicity, Disparate Contexts, Human Ability, and Redefinition heuristics, on the other hand, are staples of the 20th century literature. For each heuristic listed it is possible to provide examples of constructive and non-constructive uses.

A positive example of the Inaccessibility Heuristic in action can be observed in long-standing debates over episodic memory. Despite the fact that great apes have satisfied the same behavioral criteria for “mental time travel” as human infants, the dominant view remains that they possess “episodic-like memory” because, though they may possess “autonoetic consciousness,” that hypothesis should be rejected because “it will always remain impossible to prove its truth” (Tulving 2005: 5; Clayton and Dickinson 1998). While I have reservations about their choice of language, this might be a reasonable supposition because, as Godfrey-Smith (2016: 197) puts it, “episodic memory in humans has such a vivid element of subjective experience,” and we “don’t know whether this is true of […] other animals.” On the other hand, it seems that episodic

\[^{454}\] “[T]he ethologist does not want to deny the possible existence of subjective phenomena in animals, he claims it is futile to present them as causes, since they cannot be observed by scientific methods” (Tinbergen 1951: 5).
memory is not especially “impossible to prove” in contrast to other hypotheses about the mental lives of animals, e.g., empathic perspective-taking, or stage 2 mindreading. After all, arguments to the best explanation can be forged based on a consilience of inductions of evidence about animal memory that is available from comparative neurology (Morris et al. 2001), new experimental paradigms (Eacott et al. 2005, Templer and Hapton 2013), and intersections between developmental and comparative psychology, as young children also cannot be interrogated about their mental lives (Clayton and Russell 2009). I have been arguing that the major inhibitory issues facing the contemporary animal minds literature stem from conceptual rather than empirical problems, and this is a case in point.

The Disparate Contexts heuristic is an extremely valuable tool in comparative cognition, and is likewise used to positive and negative effect in the service of uniqueness claims. The former point hardly requires demonstration. The ability to provide suggestive evidence for a hypothesis across a wide variety of—ideally novel—experimental contexts is an experimental virtue not only in the animal minds literature, but also in scientific method more generally. As Penn and Povinelli (2013: 73) reasonably assert, “demonstrating that a nonverbal subject possess an explicit mental state concept requires ‘triangulating’ across disparate protocols and showing that the subject cognizes the common causal role played by a given mental state across perceptually disparate task contexts.” If a challenge claim is raised that cannot demonstrate these conditions, this heuristic functions in a very simple, effective manner: collect more evidence to eliminate confounding variables. However, due to the tenacity of the logical problem, it is also evident that this heuristic can be overused and turned into a go-to mode of skepticism to shoot down practically any experiment or compilation of evidence. Consider the history
of mindreading debates. How many distinct experimental contexts is enough to
demonstrate a mindreading hypothesis? What types of contexts will suffice? These are
crucial questions that those who take the logical problem seriously rarely have answers
for; Penn and Povinelli (2013) are a clear case in point.

I refer to Chapter Seven for discussions of Cognitive Simplicity and Evolutionary
Distance heuristics, and conclude with a brief discussion of the Human Ability and
Redefinition heuristics. It is easy to imagine cases where an animal satisfies criteria for
possessing a characteristic, e.g., culture, only to have that concept redefined in light of
the fact that there do seem to be relevant differences between, say, human and
chimpanzee material culture (McGrew 2015). In such cases, redefinitions can push the
literature forward if it is fair to assume that the original definition was insufficient to
capture those salient differences. In the same way, it is clear that the Human Ability
heuristic can be a productive tool as well. Namely, if our goal is either to determine (1)
the origins of a human characteristic, or (2) whether or not a species possesses a human
characteristic, it can be reasonable to set the criteria for attributing concepts indicative of
human cognition to other species at the human level of complexity. These two heuristics
can be teased apart, but they are often used collectively.

To see how these two heuristics can be problematic in action, consider popular
debates over whether “truly joint joint attention” (Carpenter and Call 2013) is uniquely
human. The concept of shared intentionality has played a fertile role in many disciplines
as a description of the logic underlying what is arguably the most complex form of
human communication: recursive mindreading, i.e., A understands that B understands
that A wishes B to attend to C. Put as such, C represents a “the human capacity to
establish common ground between interlocutors,” and this third piece of the “referential triangle” is “a crucial aspect of human cooperative communication” (Gentry et al. 2016). Under this definition, to engage in joint attention is to engage in shared intentionality.\footnote{Shared Intentionality in this sense designates the fact that human beings are able to jointly attend to an object ‘triadically,’ to mutually represent such a joint goal or percept, and also to represent the fact that they are doing so” (Tomasello and Carpenter 2007: 121).} Similar to the aforementioned critiques of overly exclusive definitions of “theory of mind”, commenting on this view, Skyrms (2009: 145) claims that “cooperation often involves various kinds of feedback mechanisms, but recursive mind reading, higher-order intentions, and mutual belief are only relevant concepts in very special cases” (145 [my emphasis]). Skyrms is right to oppose Tomasello here. To posit a single ‘socio-cognitive mechanism’ responsible for all joint attentional activities, and then to define that mechanism in terms of the most complex form of human cooperation is a clear case of both anthropofabulation and semantic anthropocentrism. The intimate relationship between these terms—and between the Human Ability and Redefinition heuristics—is highlighted in Griffin (1981: 11-2), who identifies a common “double standard” in comparative cognition wherein definitions for concepts in animal minds are often derived from “the most complex levels of understanding known to human thinkers,” however “meeting these requirements would eliminate many members of our own species.”

With respect to the Human Ability heuristic, the argument of Tomasello and colleagues amounts to the following. While apes appear to engage in collective activities indicative of joint attention, their presumed lack of faculties for recursive mindreading necessitates that we relegate these behaviors to qualitatively different \textit{kinds} of interactions than those that humans are presumed to engage in when they similarly collaborate (\textit{e.g.}, active teaching among chimpanzees [Pruetz 2010; Boesch 2012]) or
enforce social norms (Lorini 2018). This problematic uniqueness claim is simply taken for granted by the Tomasello group by virtue of their use of the Human Ability heuristic.

With respect to the Redefinition heuristic, Tomasello and colleagues have modified the standard definition of joint attention to exclude chimpanzees, making it a uniquely exceptional human ability.\textsuperscript{456} This move is questionable, in part, because it overintellectualizes many human activities that qualify as joint attentional, \textit{e.g.}, if you and I are having a conversation and I direct your attention to a speedily approaching bus with my finger, I do not, at least consciously, run through the logical process that Grice (1989) offers as an explanation of the phenomenon (or even unconsciously). After the fact I might reflect back on the situation and run through the recursive logic that could be said to explain it, but this hardly entails the original presence of a uniquely human “socio-cognitive infrastructure” (Tomasello 2008). Humans clearly have the ability for recursive mindreading, but Tomasello assumes that recursive mindreading is occurring somewhere beneath every interaction indicative of joint attention. Shared intentionality is no longer a \textit{description} of human communication (as Grice [1989] intended); it is now “reified” into a unique “adaptation” or “cognitive machinery” that makes possible, \textit{i.e.}, plays a \textit{causal} role in, the phylogenetic and ontogenetic development of these communicative abilities (Racine 2012). While the Redefinition Heuristic can drive research forward, here it has driven Tomasello’s exceptionalism claim onto precarious conceptual foundations.

Tomasello and colleagues are investigating worthwhile questions about the origins of human communication. There is nothing inherently wrong with using the

\textsuperscript{456} In an influential paper, Bates \textit{et al.} (1975) define joint attention as the ability for two or more individuals to “co-orient” towards a shared goal or locus, is necessary for effective pointing. Pointing gestures only acquire their meaning if both participants “share” a common focus of attention. Insofar as they utilize pointing gestures as means to reach desired ends, apes \textit{do} point effectively (Pika 2008; Leavens and Racine 2009). If effective pointing requires joint attention, it appears, then, that apes engage in joint attention.
observation that our closest living ancestors appear to lack X as an explanatory device for identifying major differences in their X-related skill sets and ours. The above issues stem from background assumptions that lead Tomasello et al. to employ potentially useful heuristic devices to problematic ends by (1) using orthogenetic rhetoric to draw differences in kind between humans and apes, e.g., “truly joint joint attention,” and (2) discounting conflicting field research by evoking a cognitive hierarchy where chimps can only be said to possess joint attention if they satisfy conditions for the most complex forms of joint attention in humans.

Taking stock, the dominant research tradition in comparative cognition can be cashed out in terms of (1) exceptionalism claims, uniqueness claims, challenge claims, and parsimony claims (the problem determining role), (2) a series of interrelated ontological, epistemic, linguistic, and methodological constraints (the constraining role), and (3) at least six heuristics which have traditionally been used to ward off challenges to exceptionalism claims, thus explaining their adaptability over time (the heuristic role).

5. Progressive Strategies for the Dominant Tradition

The history of crisis pervading the animal minds literature is tied to long-running scala natura assumptions and “all or nothing” ontologies of mind motivating uniqueness and exceptionalism claims. These characteristics still inform conceptual problems in the literature, and progressive steps toward revitalizing the problem-solving capabilities of research programs like chimpanzee mindreading require bringing them to the forefront.

There is nothing inherently wrong with adopting an orthogenetic perspective as a starting point for inquiry into animal minds. To the contrary, there are clearly questions that are best approached in this way. Typically, however, orthogenetic perspectives are
adopted when positing continuity arguments. Consider, for instance, Preston and de Waal’s (2002) “perception-action model” for understanding the evolution of empathy. The authors offer a “Russian doll”-style account of how all species with mirror neurons (amongst other neuroanatomical features)—from rodents to humans—possess a basic capacity for “emotional contagion,” while only those species that additionally have a theory of mind possess the capacity for empathy. Despite disagreement over details (e.g., Kitcher 2006), no one seems to deny that Preston and de Waal’s orthogenetic approach to the question, “Is empathy uniquely human?” is consistent with evolutionary biology and does not tacitly evoke outmoded scala natura implications of “higher” (empathy) and “lower” (emotional contagion) capacities. Preston and de Waal’s goal is not to defend exceptionalism or uniqueness claims, but they are evoking a cognitive hierarchy of sorts that explains a facet of human exceptionalism. Elsewhere, de Waal evokes Darwin and “explicitly advocates a research strategy in which complex cognition is explained by identifying the conserved, taxonomically general ‘building blocks’ from which it is constructed” (de Waal and Ferrari 2010: 201). Despite somewhat resembling a scala natura in its own right, this is a responsible use of the orthogenetic perspective as it opens up more questions of potential continuities than it closes off, e.g., “what are the rudiments of a theory of mind?” rather than “do chimpanzees lack (an adult human) theory of mind?”

One of the principle lessons from this genealogy is that beginning inquiry from an orthogenetic perspective is more problematic when the impetus for erecting a cognitive

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457 John Greenwood (in conversation) refers to this approach as resembling a “scala natura lying down” or “on its side.” This image of the natural world is central to the marginalized tradition, e.g., Abraham Keller (1957: 52) describes Montaigne’s worldview as “not a vertical chain of being with links from low to high as in Ficino, but rather a horizontal chain with links stretching across all creation.”
hierarchy is to defend uniqueness claims. We need to be far more cautious when attempting to explain the lack of (what appears to be) a uniquely human behavior in other species in terms of their lack of (what appears to be) a uniquely human mechanism. Much can go wrong by drawing this sort of inference, not the least of which being that just because a chimpanzee, for example, does not perform behavior X (which is associated with mechanism Y in humans), this does not necessarily imply that Y is absent in chimps, i.e., perhaps chimps use Y for other purposes and there are ecological, societal, or anatomical reasons for why they do not do X. It is precisely this argumentative move that rests at the crux of the aforementioned joint attention debates, where “top down” orthogenetic approaches readily lend themselves to semantic anthropocentrism and anthropofabulation. I have been arguing that rhetoric of the form “true X” or “genuine X” or “real X” has no place in comparative cognition. By unnecessarily evoking scala natura assumptions, expressions like “truly joint joint attention” and “real language” are inimical to the clarity of gradualist or minimalistic approaches to mental processes that, for instance, focus on the comparative development of joint attention in infant humans and chimpanzees (e.g., Okamoto and Tomonaga 2006).

There do exist progressive strategies for positing uniqueness and exceptionalism claims. As informed by figures in the marginalized tradition, before we say that animals lack X and navigate their environment with minimal to no cognitive tools, one should ask: Has X been defined too exclusively? Does X arise in degrees in human development, and if so, how might this influence our discussions of X’s possible presence in non-human animals? Does X have functionally analogous counterparts in the animal kingdom, and if so, might it be more accurate to say that humans have one kind of X—a
particularly complex one—rather than argue that non-human animals lack X entirely? The vast middle ground between the heights of human cognition and automata has not been as important to figures in the dominant tradition as have been claims to the effect that animals lack X. This is largely why the dominant tradition is defined by explanatory crises: philosophers would not have such a hard time explaining that X is uniquely human if they had more options waiting in the wings to explain animal behavior without X. The root of explanatory crises of human exceptionalism is not the inaccessibility of the animal mind, it is the challenge of explaining minute differences between human and animal behavior without first charting out the similarities implicit in these grey areas.

Thankfully, skeptics are beginning to recognize what marginalized voices have argued for centuries: comparing the cognitive capacities of humans and animals based upon rigid dichotomies can lead to impoverished accounts of the similarities and differences between human and animal minds. During their most active and influential years, Povinelli and colleagues were ringleaders in emphasizing the “complementary” nature of mindreading and behavior-reading hypotheses.\(^4\) In response to this thorny situation, Penn and Povinelli (2013: 2) now claim that “both alternatives [to the logical problem in ToM research] are equally implausible and the entire dichotomy is specious—or, as Papineau and Heyes (2006) aptly put it, “just Descartes dressed up in modern garb.” I agree. But despite advocating for “a vast and largely unexplored middle ground between construing animals as nothing more than operant learners and claiming that they have a mentalistic appreciation of other minds” (Penn and Povinelli 2013)—which I also agree with—Penn and Povinelli’s response to this dilemma is unattractive insofar as it is

\(^4\) Povinelli & Eddy 1996; Povinelli 2000; Povinelli & Vonk 2004; Penn & Povinelli 2007
just as empirically intractable as the position defended in their earlier articles.

First, they argue what they have been arguing for nearly twenty years: that there is “no evidence” that chimpanzees represent the “internal goals” or mental states of others, and that chimps “do not appear to possess anything remotely resembling a mentalistic understanding of others’ perceptual acts” (ibid.). Penn and Povinelli’s rationale for these claims stems from their position that “one can always reinterpret mindreading as the ability to reason about observable regularities” (Halina 2015). In response to critiques that their position is one of “derived behaviorism”, they emphasize that many species likely navigate their environments with more complex sets of cognitive processes than allowed by Pavlov or Thorndike. According to their “Reinterpretation hypothesis” …

...both human and nonhuman animals possess a rich suite of heuristics, biases, top-down knowledge and inferential mechanisms that allow them to pick out the causally relevant relations in the world amidst all the salient but spurious correlations and to form syntactically-structured mental representations about these relations that can be used in a flexible, reliable and ecologically rational (i.e., adaptive) fashion. (ibid.)

Just as Tomasello and colleagues posit a unique adaptation in evolutionary history to explain why captive chimps do not point declaratively, the crux of the Reinterpretation hypothesis is adaptationist. Penn and Povinelli’s basis for chimpanzees being unable to conclusively display behavior indicative of mindreading is to construct an evolutionary just-so story told from an orthogenetic perspective.

According to Penn and Povinelli, as a result of the complexities of social organization, those chimps who were politically and thus sexually successful were those most adept at identifying acute observable regularities when predicting the social behavior of conspecifics; they were, as the story goes, very talented in behaving as if they possessed a human theory of mind. As Halina (2015) summarizes their view: “only humans evolved the additional ability to reinterpret these observable regularities in terms
of the unobservable cognitive states underlying them.” Penn and Povinelli (2013: 12) claim that, most of the time, humans interact with other humans based on the sort of unthinking “inferential mechanisms” and behavioral-rules described above, and that “the role of explicit mentalistic theorizing in human affairs is more post-hoc than we folk would like to admit,” as “our species’ cognitive system for reasoning about higher-order symbolic relations does not merely subserve our unique linguistic, logical, causal reasoning and mentalistic abilities. It also subserves our inveterate predilection to reinterpret the behavior of heterospecifics in mentalistic terms.”

On one hand, the Reinterpretation hypothesis is a step in the right direction as it breaks down traditional divisions between behavior-reading and mindreading hypotheses, however these divisions are now replaced with another one: those with a unique cognitive infrastructure for reinterpreting behavior in terms of higher-order representations, and those without. Like Tomasello (2008), the whole basis for positing this unique adaptation is the absence of behaviors in chimps indicative of advanced mindreading in humans:

There is no evidence that any nonhuman animal recognizes that another agent’s goal-directed behaviors are sensitive to that agent’s representation of the current value of the goal and to that agent’s representation of the instrumental efficacy of a given action as distinct from the subject’s own representations of the goal’s value and the instrumental efficacy of a given action. (ibid.)

Penn and Povinelli do not postulate what behavioral evidence to this effect might look like, and since “one can always reinterpret a successful mind reader as a complementary behavior reader” (Halina 2015) their rejection of the cumulative evidence of forty years of chimpanzee mindreading studies remains the same as before. What’s more, instead of clarifying what they mean by the “rich suite of heuristics” presumed to play functionally analogous roles in chimpanzee social cognition as mindreading hypotheses do for human cognition—thereby perhaps making behavior-rule hypotheses empirically tractable—
their uniqueness claim about mindreading now rests on the presumption of a unique adaptation somewhere in the evolutionary history of our species. As Tim Racine (2012) notes in response to Tomasello, this is not an explanation likely to impress biologists.

Fortunately, empirical progress is being made in mindreading debates. Ever since Dennett’s (1978) critical response to Premack and Woodruff (1978), non-linguistic iterations of the false belief test (or “Sally-Anne” test)—a litmus test for theory of mind in human infants—have been proposed to evaluate mindreading ability in other species. In comparative psychology, non-verbal variations on the false belief test have been conducted on great apes (e.g., Call and Tomasello 1999; O’Connell and Dunbar 2003), which they have consistently failed (Krachun et al. 2010). This changed in 2017 with two empirical studies highly suggestive that great apes are capable of attributing false beliefs to others (Buttelmann et al. 2017; Krupenye et al. 2017).

Krupenye et al. (2017) claim to have shown that three ape species (bonobos, chimpanzees, and orangutans) pass a clever version of the false belief test—a result that they rightly describe as potentially “overturning the human-only paradigm of the theory of mind.” Krupenye and colleagues were inspired by the success of anticipatory looking models used by, among others, Cheney and Seyfarth’s (1993, 2008) pioneering studies of social cognition in monkey species. These models rest upon the following supposition: we can make inferences about what a subject is thinking (including what predictions they are making about others’ behavior) based on where and how long they look. In one of

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459 Children are introduced to dolls named Sally and Anne. They are told a simple story involving these characters as it is simultaneously acted out. In this story, Sally hides a treat in a box while both dolls are present and then leaves. When Sally is gone, Anne moves the object from its original location to another box. Sally returns to the scene and the test subject is asked, “Where will Sally look for the treat?” When the children tested are four to five years old, they answer the question correctly: the original box. When children under the age of four—as well as most autistic children—are asked the same question, they almost always answer incorrectly: Sally will look in the new location where the treat actually is. (See 2017b)
their experiments, apes watch the following scene: a human dressed as an ape (“Kong”) forcefully steals a rock from a man, then—in front of this man—“hides” the rock under one of two boxes. Kong then scares away the man and moves the cherished rock to a new hiding place under a different box. When the man returns to the scene, over half (17/30) of the apes looked to the place where the man last saw the rock being hidden, only 5 apes looked to the other box, and 8 seemed disinterested in the whole scenario. In a similar experiment, the disparity of apes who (presumably) attributed a false-belief to this man about the whereabouts of the rock was even greater: 20/30. The other empirical study suggesting that (a different group of) apes attribute false beliefs to others (Buttelmann et al. 2017) is fairly similar and does not require summary in the present context.

As de Waal (2017: 40) writes in his commentary on the Krupenye group’s study, “The results contain a lesson for those who jump on negative outcomes regarding animal mental capacities as proof of human distinctiveness. As the old mantra goes, absence of evidence is not evidence of absence.” The reaction from skeptics to new studies of this nature is predictable. While Penn and Povinelli (2007: 891) once argued—in line with the views of many others—that passing a false belief test would provide “compelling evidence” for a theory of mind, they have claimed more recently that “all of the experiments to date that purport to show that nonhuman animals can reason about ‘false beliefs’ lack the power, even in principle, of showing that subjects are reasoning about the epistemic contents of others’ mental states as distinct from observable behavioral cues” (2013: 14). While there are reasons to doubt that Krupenye et al.’s study is indicative of a “genuine breakthrough” (de Waal 2017: 40), the standard Povinelli approach is not one of them. Criticism of Krupenye group’s experiments should be
oriented toward improving their methodology (an empirical problem), rather than asserting that the whole experimental paradigm is flawed “in principle” (a conceptual problem) without offering alternatives. For instance, Ben-Yami (2017) is skeptical that the Krupenye group demonstrated that apes attribute false-beliefs to others, but his skepticism is based on what he views as a flaw in their methods in comparison to similar false-belief tests used for pre-linguistic human infants:

Unlike related experiments that were conducted with children [Baillargeon et al. 2010; Perner et al. 2005], Krupenye and his colleagues did not show that any violations of expectations were involved in the apes’ case when an agent first looked at where an object is and not where he falsely believed it to be. The experiments show that the apes associate a location with an agent, but they contain no measure to indicate that they anticipate any action consequential on this association.

This is a reasonable critique urging the authors to tighten up methodological controls; the logical problem is waiting in the wings, but Ben-Yami does not focus on it. And indeed, Krupenye et al. (2017) do “acknowledge that all change-of-location false-belief tasks are, in principle, open to an abstract behavior rule–based explanation—namely, that apes could solve the task by relying on a rule that agents search for things where they last saw them.” They correctly note, however, that, “this explanatory framework [i.e., behavioral rules] cannot easily accommodate the diversity of existing evidence for ape [theory of mind].” The Krupenye group’s rejection of the import of the logical problem is based on deference to arguments from the best explanation and a “concilience of inductions” (Whewell 1840) based on a plurality of sources. This represents a much-needed attitude in contemporary debates that the marginalized tradition has long brought to the table.

6. General Conclusions

A young Charles Darwin (1838) acutely described the history of crisis presented in this critical genealogy as a history of “attacking the citadel.” Indeed, one gets the
feeling that, to this day, there is something sacred about the presumed uniqueness of the human mind relative to the cognitive abilities of other species. Of course, as was emphasized by Morgan, Washburn, and others at the birth of comparative psychology, there is an important sense in which we are “forced to interpret the psychology of animals in terms of human psychology” (Morgan 1904: 38). Where the dominant tradition has consistently gone wrong is to interpret the analogical reasoning demanded by this situation in terms of a conceptual problem requiring severe skepticism, or, by “responding to the discovery of boundary-threatening abilities in non-human animals by contentious re-conceptualization of human-definitive powers (such as language) so as to keep the boundary in place” (Horigan 1988; qtd. Benton 1993: 17).

As with the histories of biology and zoology, we should expect ontological, linguistic, epistemic, and methodological crises of explanation to regularly emerge alongside increased knowledge of the place of humanity in the natural world, i.e., traditional ontologies of nature and mind are redrawn, traditional terminology is abandoned, traditional forms of evidence are deemed insufficient, and the successes and failures of experimental models are taken into account. This is indeed what the history of animal minds philosophy demonstrates; the problem at stake is therefore how these crises are dealt with, not their presence. As seen in the chimpanzee mindreading debates, anthropocentric research programs only become regressive when conservative values and constraints function as obstacles to the consideration of new evidence and as unknowing promoters of double standards derived from outmoded ways of carving up the world.

The corrosive influence of the logical problem is best seen in how it monopolizes attention away from the specifics of individual studies, meeting each empirical challenge
with the same boiler-plate demands for animal behaviors that cannot be accounted for with non-mentalistic hypotheses. It is unclear the extent to which this demand can be satisfied in human psychology, but the problem of distinguishing cognitive from associative mechanisms hardly has the debilitating and ubiquitous presence in the literature pertaining to pre-linguistic human infants as it does, for instance, in chimpanzee mindreading debates that have long been “fraught with controversy” (Shettleworth 1998) on this same point. Is this controversy related in large part to the fact that the subjects are non-human animals? Undoubtedly. In order to appraise the value of future challenges associated with whether traditional “simple-minded” accounts of animal cognition (Heyes 2015) suffice to explain complex, seemingly thoughtful forms of animal behavior, traditional argumentative strategies for responding to explanatory crises must be critically evaluated. This has been my aim. Conceptual problems afflicting modern research programs can be productively contextualized within a common research tradition linking past and present discourse about differences between human and non-human minds—a tradition that has, ironically, played an obstructive role in finding empirical solutions to worthwhile questions about what makes the human mind exceptional.
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