

A Linguistic Review of *Baboon Metaphysics: The Evolution of a Social Mind* by Dorothy L.

Cheney and Robert M. Seyfarth

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In their book *Baboon Metaphysics* (2007), Cheney & Seyfarth undertake the ambitious task of explaining how the human mind came to be, via the forces of natural selection. They propose the *social intelligence hypothesis*, or the idea that many of our mental faculties evolved in response to the social pressures of group living. Central to their argument is that, as with humans, baboons' vocalizations convey meaning, thus giving us insight into their minds. In their own words, "Primate vocalizations, in fact, provide the key that unlocks the primate mind." (14)

Communicative considerations form a central part of C&S's argument, claiming the two chapters leading up to their final conclusion. For C&S, baboons' ability to communicate serves as both a window onto their world – i.e. a primary means of investigation – and proof of the social intelligence hypothesis. Therefore we approach this book with the critical eye of a linguist, and – insofar as linguistics is concerned – see how the arguments stand up. What does linguistics have to say toward *Baboon Metaphysics*?

We start with a general review of the argument. Following trails left in Darwin's notebooks, C&S set out the framework for their investigation in Chapter 1. Darwin thought that our mental faculties were a result of our evolution like any other physical trait. The brain is a physical organ

after all, which in turn gives rise to our thoughts and instincts. C&S note that brains can be highly specialized toward specific functions and attentive biases, and it is these predispositions which natural selection purports to explain. Since brain tissue is extremely costly to maintain, there must be selective pressures at work favoring the development of brain tissue needed for these specializations, i.e. “Traits arise or are maintained because they help the individuals who possess them to solve a problem.” (10)

For baboons, the problem is social life, and their brains are specialized accordingly. C&S chose to work with baboons over other primates presumably because they speak the most toward the social intelligence hypothesis. If one wants to prove the social intelligence hypothesis, it only makes sense to study creatures whose brains specialize in social skills, and uncover what types of intelligence they possess accordingly. Indeed, if there is one thing *Baboon Metaphysics* shows unequivocally, it is that baboons are unsurpassed at maneuvering the complex social networks of which they are a part, and have developed a number of mental capacities for this task.

Yet if that were all the book had to say, it would not be telling us much, other than to explain that baboons are great at what they do, why this is the case. C&S face the challenge of extending the social intelligence hypothesis to *any* species which undertakes complex social interactions, or at least primates. Otherwise, all they have succeeded in telling us is that baboon intelligence is social intelligence.

C&S address this problem explicitly in Chapter 7. After an interesting foray into the history of human perceptions of primates in Chapter 2, C&S spend the next three chapters setting the scene, portraying in extensive and fascinating detail the daily lives of baboons. Even taken out of context from the rest of the book, these chapters are a fun, informative overview of baboon social interaction for the everyday reader. Chapter 5 also introduces the ingenious playback method

used for the majority of experiments in this book, and it is here that C&S present their assertion that “[baboon] vocal communication is rich enough in meaning to tell us a great deal about how they think” (14).

In Chapter 7, C&S explicitly lay out the social intelligence hypothesis as follows:

[T]he hypothesis argues simply that all group-living animals confront a multitude of social problems, and that intelligence in primates—and perhaps many other species—must have evolved at least in part because natural selection has favored individuals who are skilled at solving these problems. (122)

The authors then discuss the various arguments against the hypothesis, and consider them each in turn. Four in particular show themselves as problematic:

1. The behaviorists may be right – learned contingencies may explain all of baboon intelligence
2. Primate societies aren’t necessarily more complex than other animals’
3. The ability to recognize social relationships can arise in animals with non-complex societies
4. Larger brain sizes may be caused by technological – rather than social – pressures

The first argument is discussed in Chapter 6, ‘Social Knowledge’, where they ask, “Can a few simple rules explain the complexity of baboons’ social knowledge? Some learning psychologists...have argued that monkeys’ apparent recognition of other individuals’ kin (or close associates) is simply an example of associative learning and conditioning” (111). And from Chapter 8: “...behaviorist interpretations dog almost every experiment and observation that suggests a form of mental state attribution in animals.” (153) Regardless, there are three notable aspects of all their experiments (cf. 109) which lead them to conclude that “The social knowledge of baboons is too varied and complex to be explained by simple learning

mechanisms.” (14) Additionally, they give numerous and adequate defenses against behaviorism, including but not limited to: the insurmountable memory tasks required to keep track of each individual in the group; the fact that baboons can belong to several classificatory groups simultaneously; and that following the basic ‘rules’ which behaviorists propose would not be an adequate guide to baboon social life. Finally, all their experiments build in controls meant to protect against a behaviorist interpretation. If anything, C&S give *too much* credence to behaviorism.

The second problem for the social intelligence hypothesis is that primates are not the only ones to live in complex societies with multiple families and stable dominance hierarchies – dolphins, elephants, and pinyon jays are just a few examples. Thirdly, one cannot resort to group *size* as the correlate to intelligence, because group size doesn’t correlate to cognitive abilities in most animals. It does, however, in primates, so this argument might yet be saved. But fourthly and finally, even group size among primates may not be the determining factor in brain size: “within the primate order, social learning, innovation, and tool use are strongly correlated with brain size but not with group size.” (130)

Despite these rather large obstacles, C&S claim that there are at least five other components of primate knowledge which may set them apart from other species: (1) the ability to track short-term changes in social rank, (2) the ability to classify members according to more than one criteria, (3) knowledge that members of any single class are not mutually substitutable, (4) ability to discern when vocalizations are directed at them, and (5) the observation that “baboons seem almost irresistibly compelled to recognize other individuals’ social relationships, even when these social relationships involve the members of another species.” (145) This last point,

however, falls prey to the same potential fallacy raised earlier, that of simply showing how baboons are good social beings without saying anything significant.

Still, it seems that based on the argument above C&S are justified in holding onto the social intelligence hypothesis. At the very least, there is still ample room for the hypothesis to be true in light of current evidence. But does this extend the hypothesis to *any* species operating under the correct social conditions? This is difficult to say, because much of the debate over the social intelligence hypothesis is *which* social conditions it is that give rise to (i.e. give selective pressure for) intelligence. The saving grace of this hypothesis may be the fact that Cheney & Seyfarth – to their great credit – in treating the enormous volume of literature which they have, are able to support their data with that of numerous other studies from a variety of different species, and show how similar cognitive processes arise from the everyday problems which animals must cope with. While the social intelligence hypothesis, in my opinion, is not yet proven unequivocally, there certainly doesn't seem to be adequate evidence to refute it.

Frankly, even were there such refuting evidence, I feel no need for the establishment of a link between social complexity and cognitive abilities (although in baboons the connection clearly exists); it is impressive enough that C&S show how these cognitive faculties came to be, whatever their evolutionary motives for appearing. If Cheney & Seyfarth must say that it is a combination of social complexity, tool use, and other factors which give rise to intelligent, cognitive faculties, then so be it – it still shows the evolutionary basis for fundamental aspects of human cognition. Further, regardless of how other species brains' may function, C&S's work makes it clear that baboons' mental capacities are a direct result of their social environment. In light of current evidence, who knows whether, deep in the recesses of human history, we weren't once the same way?

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On to the linguistic argument. As mentioned earlier, what C&S hope to do with their work is construct the bridge between baboon and human metaphysics. Chapters 6 (on the social knowledge of baboons), 8 (on baboons' theory of mind), 9 (on baboons' self-awareness), and 10 (on the structure of baboon thought) flesh out baboon metaphysics, answering the question 'what are baboons' minds like?'

Chapter 10 focuses explicitly on the idea that we can discern the structure of baboon thought via their vocalizations. While the focus of the chapter is really the structure of baboons' minds (structure in a very literal sense of how they divide up the world into discrete and hierarchical concepts), C&S then take the discussion and apply it in Chapter 11, discussing its implications on the evolution of language. Finally, Chapter 12 is meant to show us what the four chapters on baboon metaphysics tell us about human metaphysics. What, then, is the role of Chapter 11?

One might be tempted to see Chapter 11 as nothing but an interesting implication of their work (and this is actually what C&S tell us they intend with this chapter), but it is in fact the very crux of their argument, for two reasons. First, it is all well and good to give us a theory of the evolution of the human mind, but such an argument is much more convincing if we can see it in action. This is precisely what C&S do in Chapter 11 – show how their theory explains the evolution of a particular cognitive process in the human mind. Second, the chapter is the only place where C&S explain *how* we go from baboon to human metaphysics – it is the unifying bridge between the starting point and endpoint of their theory. It implies a more general theory of how cognitive faculties in our ancestors evolved to what they are today, a theory which is only stated explicitly in Chapter 12 (p. 279). This is directly related to the task with which I charged

C&S earlier – extending the social intelligence hypothesis to more than just baboons, so that it also explains *human* evolution.

C&S's argument, it therefore seems, hinges crucially on the communicative/linguistic considerations set forth in Chapter 11, as well as their bases in Chapter 10, so it is here we focus our critique.

In Chapter 10, C&S hope to support a representational theory of meaning for baboons, i.e. show that when baboons vocalize (or at the very least, interpret vocalizations) there exists in their minds a mental representation of the thing being vocalized about. The idea is that baboons divide up their world into specific, distinct concepts, and have mental representations of those concepts, which they can then vocalize (referring especially to predator alarm calls). In other words, baboon vocalizations, according to C&S, do in fact represent something in the mind. As we shall see, what C&S actually do accomplish is somewhat different.

The authors approach their task in Chapter 10 by drawing as many parallels between primate vocalizations and human language as possible. This, I think, is a mistake. To begin with, C&S say the aim of this chapter is (or perhaps should be) to show what baboon vocalizations mean (i.e. what they represent) and to show the structure of baboon thought; it is *not* to make claims about the similarity between primate and human modes of communication. Yet the appearance of questions like “When does a sound cease to be just a sound and become a word?” and “are monkey vocalizations really like words?” clearly show that they take a ‘parallelling’ approach in this chapter. While C&S are surely justified in using primate communication to show that baboons have mental representations of things in the world within their own minds, it would be conflating language and the *cognitive faculties that provide for language*, to say that primate mental representations parallel human linguistic structures.

This requires explanation. First, allow me to say that C&S are right when they say that vocalizations are the key to unlocking the primate mind. The evidence presented in Chapter 10, and the Zuberbuhler experiment in particular (pp. 235-7), does seem – rather incredibly – to be convincing evidence for the fact that baboons possess mental representations of their world. They rightly conclude, quoting Gil da Costa et al. (2004), that there exists “a homologous system in non-human primates and humans for representing object information.” (243).

Where C&S stray, however, is in assuming an inherent link between a representational model of the world – which both humans and non-human primates seem to have – and a communication system similar to language, which only humans have. The ability to divide the world into discrete entities and represent those entities in the mind does not entail the existence of a system of communication used to refer to them. However, these cognitive faculties are *necessary* for the existence of language or communication. In essence, language and thought are distinct. This goes against many in the history of linguistics who believe that we cannot think unless we have language as a tool for organizing our thoughts. Most linguists today accept that this is not the case. There is, as Stephen Pinker says, a ‘language of thought’, which exists independently of language. And while I believe this is not the best way to characterize non-linguistic faculties of the mind (much better would be a division between *cognitive structures* and *language*, so as to highlight the fact that a ‘language of thought’ is not just another linguistic system, but in fact the mental faculties which are basic to our psychology), it makes the point well enough: we can think without language.

C&S are aware of this point, and raise the same considerations by citing evidence for non-linguistic thought in Chapter 11, but they do so with the misguided intention of showing how cognitive processes like those baboons possess became *the structure of language itself*. One must

distinguish carefully between the aspects of human cognition which give rise to the grammar of a language, and aspects which are a part of that grammar itself. Let's take just one aspect of language which C&S cite – its hierarchical structure – as an example. The structure of any one language is indeed hierarchical, as C&S note and seize upon in order to draw parallels to baboons. But to say that a mental representation of the familial hierarchy in a baboon troupe could somehow evolve into a mental representation of the syntactic hierarchy which exists between words is patently absurd. What C&S can say – and in fact do say, after a fashion, at certain points – is that baboons developed the ability to create structured, mental representations in their minds. This arose out of a need to track the many complex social interactions within a baboon troupe. Equipped with this ability to form hierarchical mental representations, descendants could then apply these cognitive skills to the construction of a language of communication. One did not evolve directly into the other.

The same critique applies to each parallel to language made in Chapters 10 & 11. Baboons separate their world into discrete units and assign meaning/representation to them (lions, eagles, other baboons), but those units did not necessarily evolve into the modern linguistic units (phonemes, words, or morphemes, depending on your interpretation of the text). Baboons' mental links between the acoustic properties of their predator calls and the predator themselves are arbitrary, but those links did not necessarily evolve into the meaning-word associations of the first human languages. In both these cases and more, we should simply say that baboons developed the cognitive abilities to relate to and represent their world in certain ways, and modern language utilized these faculties in their development.

C&S seem to realize this to varying degrees at different points in their argument. In the concluding thoughts of Chapter 11, they note, "The social origins hypothesis adds a slightly new

wrinkle to theories of language evolution because it proposes that the precursors to language in the cognitive abilities of our prelinguistic ancestors had a grammatical flavor to them.” (271). Here, the mistake is attributing grammatical properties to cognitive abilities. But later on the same page: “Indeed, if one accepts the striking parallels between social cognition and the mechanisms that encode meaning in language, and agrees that the former is a generalized primate trait while the latter are unique to humans, it is hard to imagine that the earliest forms of human syntax did not *build upon these preexisting cognitive skills* [emphasis added].” (271-2). This is clearly the correct assessment, where linguistic systems do not evolve from cognitive skills directly, but rather are a product of them.

They end Chapter 11 with the following:

We conclude, then, that long before our ancestors spoke in sentences they had a language of thought in which they represented the world—and the meaning of call sequences—in terms of actors, actions, and those who are acted upon. Long before they could engage in the computations that underlie modern grammar they performed the computations needed to understand their societies. As a result, the discrete, compositional structure we find in spoken language did not first appear there. It arose, instead, because understanding social life and predicting others’ behavior requires discrete, compositional thinking. And the propositions that are expressed in language did not originate with language. They arose, instead, because to succeed in a social group of monkeys or apes one must understand an elementary form of propositional relations. The linguistic revolution occurred when we began to express this tacit knowledge, and to use our cognitive skills in speaking as well as listening. The earliest syntactic utterances, however, were not entirely original. They described relations that their speakers already understood and had a formal structure that grew out of their speakers’ knowledge of social relationships. (272)

This conclusion is lucid where it isn't brilliant, but it is representative of the fundamental flaw in these two chapters – conflating ideas of linguistic structure with cognitive structure. The problem is, of course, in the last two sentences, where it is clear that the author implies the direct evolution of grammatical syntax from the social hierarchy of the baboon troupe. Fortunately for C&S and the scientific community at large, such a flaw does not prevent the authors from making their point. They finally seem to get it right in Chapter 12, as they discuss the implications of their theory for the human mind: “We suspect that, as our uniquely human traits began to appear, the continuing evolution of a theory of mind played the crucial role as catalyst and prime mover, facilitating and leading to the evolution of all the traits that are uniquely human, including speech, teaching, elaborate tool use, and culture.” (279). This is the general theory of cognitive evolution, if you will, that I mentioned earlier. It is implicit in C&S's discussion of language, in that these human traits arose out of the need to deal with social pressures, and seems to close that final gap between baboon metaphysics and the human mind as it is today. When formulated this way, C&S's theory – in my opinion at least – is close to flawless, despite the fact that the authors clearly don't always intend their theory in this way.

In conclusion, the evidence given in *Baboon Metaphysics* for the social origins of our mental faculties is both extensive and convincing. Cheney & Seyfarth show, through brilliant experimentation and exhaustive research, how the social demands of baboon life give rise to primitive versions of a theory of mind and cognitive structures. Moreover, they valiantly defend the possibility that the social origins hypothesis can extend to human cognition, and show – using baboon communication – how those primitive cognitive faculties may have been the very precursors to our own mental structures. While the linguist is justified in questioning the parallels between primitive cognition and modern language, he would be a fool to deny the

possibility that the former may have laid the evolutionary foundations for of the latter, in light of such an enlightened, well-thought out (and not to mention fun) study like the one given here.

Cheney & Seyfarth, in dedicating years of their lives to such research, have made an undeniably powerful contribution to the field.