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Critter Psychology: On the possibility of nonhuman animal folk psychology

Kristin Andrews

1. Introduction

Humans have a folk psychology, without question. Paul Churchland used the term to describe “our commonsense conception of psychological phenomena” (Churchland 1981, p. 67), whatever that may be. When we ask the question whether animals have their own folk psychology, we’re asking whether any other species has a commonsense conception of psychological phenomenon as well. Different versions of this question have been discussed over the past 25 years, but no clear answer has emerged. Perhaps one reason for this lack of progress is that we don’t clearly understand the question. In asking whether animals have folk psychology, I hope to help clarify the concept of folk psychology itself, and in the process, to gain a greater understanding of the role of belief and desire attribution in human social interaction.

To start, we can construct a simple argument in favor of animal folk psychology, based on a standard definition of the term. According to what I am calling the standard view, humans attribute specific mental states to a target, using a folk psychological theory, a mental simulation, or some combination of the two in order to generate predictions of intentional behavior. To count as a proper target for folk psychological analysis, the agent must engage in behavior that is predictable through the attribution of beliefs and desires. We see this commitment in Daniel Dennett’s intentional stance, for

example (Dennett 1987; 1991).¹ That folk psychology centrally involves the attribution of beliefs and desires also seems to be endorsed by Alvin Goldman, who takes attribution of mental states via simulation to be the primary means for predicting behavior.² These views reflect the standard notion of folk psychology, according to which intentional agents predict others' intentional behaviors via the attribution of mental states. Though one doesn't have to use belief/desire attribution in every instance of predicting behavior, to have a folk psychology one must be able to conceive of others as the sorts of things that have beliefs and desires, and be able to use specific mental state attributions to predict behavior; thus you have to conceive of others as intentional agents.

On these views, folk psychology is not seen merely as a useful heuristic for making predictions, but rather it is thought that the *primary* function of folk psychology is the prediction of behavior.³ Any other role for folk psychology, such as the explanation of intentional behavior, is derivative of prediction. This assumption is clearly made in discussions of animal and child theory of mind, and in the debates between simulation and theoretical accounts of the subpersonal mechanisms driving our

¹ For Dennett, the intentional stance is an easy and reliable method for predicting behavior, and more. The predictive power of folk psychology makes possible all our interpersonal projects and relations; without it, "we would be baffling ciphers to each other and to ourselves" (Dennett 1991, 29).

² While Goldman does think that people can make predictions of intentional agents by means of "generalizations or other inductively formed representations (schemas, scripts, and so forth)", these methods are derivative of simulation, and can only be used by a "mature cognizer" who has already engaged in many acts of mental simulation (Goldman 1995, 88).

³ This story is consistent with the general views associated with both the simulation theory and the theory theory accounts of the form of folk psychology. (However, Robert Gordon's rather radical simulation, which involves attending only to the environment rather than the agent, would be excluded by this definition.) It is clear that theory theory implies that we predict and explain behavior by attributing mental states, but it may be less apparent that simulation theory makes use of mental state attribution. Nonetheless, according to most views of simulation the attribution of mental states is necessary to get a simulation started, according to such simulation theorists such as Alvin Goldman. When beginning a mental simulation, he suggests we assume that the agent is like us, that we share relevant psychological features. This assumption makes us accept explanations that seem natural to us, and reject those that are less natural (Goldman 1995). Goldman even suggests that the simulator should assume shared basic likings and desires, unless there is reason to think otherwise. In order to make these assumptions, we must attribute propositional attitudes (e.g., Bill wants to stay alive, Bill doesn't want to be injured, Bill believes that being injured causes pain, etc.)

folk psychological behaviors (Andrews 2003). Dennett accepts this position when he writes, "... our power to *interpret* the actions of others depends on our power...to predict them" (Dennett 1991, 29). Folk psychology as the attribution of beliefs and desires is presented as the simplest predictive heuristic available for making accurate enough predictions across different domains. For this reason, advocates of the predictive power of folk psychology suggest that we use the attribution of beliefs and desires when we make all sorts of predictions, from the prediction that someone will duck if you throw a brick at him (Dennett 1991) to the prediction that you will arrive on the 3 p.m. flight if you say you'll arrive on the 3 p.m. flight (Fodor 1989). If there were quicker or easier heuristics we could use to make accurate predictions of behavior across domains, then there would be no reason to think that these examples are in fact examples of folk psychological prediction (rather than the result of using some other heuristic device). Since the standard view of folk psychology promised to help us understand the nature of beliefs and desires by presenting them as things that are used to make fast, easy, and accurate enough predictions of behavior, we can define folk psychology as how (non-Laplacian) intentional agents routinely predict the behavior of other intentional agents, namely through the attribution of beliefs and desires. The claim here is that without a folk psychology, predictions of behavior would not get made routinely, easily, and accurately (enough) across domains. In a world without folk psychology, we would not be able to predict that someone would duck if a brick were thrown at him, nor would we be able to predict that you will arrive on the 3 p.m. flight given that you said you will arrive on the 3 p.m. flight. Instead, everyone would be 'baffling ciphers'. Given such views, we may be tempted to think that though there may be more complex ways of

predicting intentional behavior, such as the Laplacean super-physicist's method of following a deterministic causal chain, there are no more efficient and accessible heuristics available to us than the attribution of beliefs and desires. If so, then any non-Laplacean who routinely, easily, and accurately predicts behaviors across different domains has a folk psychology.

This understanding of folk psychology allows us to construct a cheap argument for critter psychology:

Argument C

1. Any (non-Laplacean) intentional agent who routinely, easily, and accurately predicts the behavior of other intentional agents has the ability to attribute beliefs and desires, and thus has a folk psychology.
2. Animals are (non-Laplacean) intentional agents who routinely, easily, and accurately predict the behavior of their conspecifics, competitors, predators, and prey.
3. From (1) and (2) it follows that animals attribute beliefs and desires, and thus have a folk psychology.

Because the conclusion follows from the premises, and we can assume the truth of (2), any problem with this argument must rest with (1). The main problem with premise (1) is that we have good reason to think that there are methods other than the attribution of propositional attitudes for predicting behavior. Despite what others may suggest, even without appeal to people's beliefs or desires we can predict that someone will duck when a brick is thrown at him, because that's just one thing people generally do; they move to avoid large flying objects. And we can predict that you will arrive at the airport at 3 p.m., because you said you would and people generally do what they say they'll do. Without the ability to attribute propositional attitudes we probably wouldn't understand *why*

people do what they say they'll do, but we could still make predictions by generalizing over past behavior. Since we can make predictions of intentional agents using such a method, perhaps the animals can as well. This, I think, is enough to establish that the attribution of beliefs and desires should not be described as *the* method we use to predict behavior. That is, though we may sometimes appeal to beliefs and desires when predicting behavior, predicting doesn't begin and end with the attribution of mental states. There may be other mechanisms that undergird our ability to anticipate behavior.

This sort of view seems to be what Barbara Von Eckardt endorses, given her definition of minimal folk psychology as consisting of “(a) a set of attributive, explanatory, and predictive practices, and (b) a set of notions or concepts used in these practices” (Von Eckardt 1994, p. 300). Von Eckardt wants us to accept a wider conception of folk psychology that includes “any concept of generalization ordinary people use in their FP practices” (Von Eckardt 1994, p. 305), and her account leaves open the possibility that humans don't need to attribute mental states to make predictions of intentional behavior. I am sympathetic to Von Eckardt's account of folk psychology, and I think there is good reason to accept this critique of (1), for reasons I will present in the next section. After we have in place a wider and, I believe, more satisfactory account of folk psychology, we can create a reconceptualized Argument C and examine what it might tell us about critter psychology.

2. Human Folk Psychology

The problems with the standard view seem to stem from two assumptions found in the various accounts of folk psychology. These assumptions are:

Homogeneity - All folk psychological practices are subsumed under one sub-personal mechanism, and that mechanism involves the attribution of beliefs and desires. For example, since prediction and explanation are both folk psychological practices, and they both involve the attribution of beliefs and desires, it is widely assumed that explanation and prediction are symmetrical; whenever we have generated a prediction of behavior, we also have an explanation of that behavior (Andrews 2003).

Narrowness of function - Prediction and explanation are the paradigmatic folk psychological practices. Other functions of folk psychology, such as coordinating, cooperating, justifying, bonding, evaluating, etc. are largely ignored or seen as variations on the prediction and explanation functions.

If we take as our starting point the idea that folk psychology is “our commonsense conception of psychological phenomena,” then there is clear empirical evidence that our folk psychological practices are not homogeneous. Even if we limit ourselves to prediction, we find that not all predictions of behavior are generated by the same mechanisms, as was hinted at in the previous section. Instead, what has been found is that predictions are extremely sensitive to the context of the prediction, the kinds of knowledge available to the predictor, and the predictor’s own biases and past experiences. For example, research in social psychology has found that if we have no information about a person, we tend to assume they will act like we do (Kreuger 1998; Marks and Miller 1987; Mullen et al. 1985) and when we have just a little information,

we will use stereotypes or base-rates about how people in that kind of situation behave (e.g., [Locksley et al. 1980](#); [Locksley, Hepburn, and Ortiz 1982](#)). However, the better we know a person, the less we utilize these techniques. When we know someone fairly well, we can use inductive generalization over past behavior to predict that a person will continue to do in the future the same sorts of things we know she did in the past. And after observing someone's behavior for a time, we can generate personality traits that we attribute to that person, and form our expectations about that person's future behavior based on those traits ([Ross and Nisbett 1991](#)). For example, if we have decided that a person is generous, we will expect her to leave a good tip and to help out with extra departmental chores. While these techniques allow us to make good-enough predictions, it is widely thought that some of these techniques, especially trait attribution, have some limitations.⁴

This isn't to say that we never use belief/desire attribution in order to make predictions; at the personal level, at least, we do utilize this method as well. However, a concern arises about the degree of accuracy of this method of prediction. Humans are thought to be fairly accurate in their ability to predict behavior, yet there is reason to think that predictions using belief/desire attribution are not terribly accurate. If the belief/desire method of predicting behavior is inaccurate, and most of our predictions are accurate, there is good reason to think that we do not use belief/desire attribution for the majority of our predictions.

Research in social psychology suggests that by considering a person's beliefs and

⁴ The primary problem with trait attribution as a method of prediction is that it seems to function only in limited situations, because people's cross-situational consistency is not nearly as great as we expect. So, while your colleague might be generous with her money, she may be stingy with her time, or while she may be generous around the office, she may not be generous with her friends and family. See Ross and Nisbett (1991) for a review of this literature.

desires we might actually decrease the accuracy of our predictions, because considering someone's reasons for making a particular prediction causes us to look for confirming facts, not for defeaters ([Wilson and LaFleur 1995](#)). Research also indicates that people will judge a piece of behavior that they predict to be more likely if asked to provide reasons for their prediction. For example, a subject might think that an event has a 70% chance of happening, but after being asked to provide reasons for thinking the event will occur, she will come to think that its chances are greater than 70% (see Kunda 2002 for a discussion). When we predict what someone is going to do by attributing propositional attitudes, we are also coming up with reason explanations for someone to engage in that behavior. Thus, by virtue of considering a possible belief/desire set we automatically promote the behavior as more likely to occur. For example, suppose a student is trying to predict whether her professor will raise her mark if she comes to complain during office hours. The student might wonder about her professor's beliefs and desires, and decide that the professor has a dislike of conflict, and so will give in to her request very easily. In considering whether the professor really has this attitude, the student uses only a positive test and searches for evidence that the hypothesis is correct, and comes up with a number of anecdotes suggesting this is so (the professor has avoided conflict in another situation, the professor said he is a pacifist, etc.). The student is overconfident about the likelihood of her prediction. The act of trying to determine a person's mental state leads the student to talk herself into the theory she comes up with. This is a biased method of seeking evidence, and does not result in accurate predictions.

The attribution of propositional attitudes doesn't exhaust the adult human's methods of predicting behavior. But further, given that our predictions are generally

accurate and that research suggests that our predictions based on belief/desire attribution may often be inaccurate, there is reason to suspect that it may not be nearly as common a method of predicting behavior as is suggested by the standard view. Humans clearly are plural in the techniques underlying their predictive behaviors, and thus the homogeneity assumption is false with regard to prediction. There is also evidence that we use different techniques to explain different kinds of behavior, and different people's behavior ([Malle 2004](#)). As social psychologists learn more about the mechanisms human use while practicing folk psychology, the evidence against the homogeneity assumption increases.

Turning to the second assumption, the narrowness of the function of folk psychology, I want to suggest that folk psychology should be seen as more than predicting, and derivatively, explaining, behavior. Narrowness is a problem because, coupled with the homogeneity assumption, it results in hasty generalizations about the mechanisms underlying other folk psychological practices. If we begin with an understanding of folk psychology as how the folk understand psychological phenomena, it seems apparent that such an understanding can take many forms. I can understand in the *Verstehen* sense, insofar as your behavior makes sense to me and I can relate to it, even if I don't have a covering law that describes the behavior. I can understand by feeling empathy for you. Or I can understand you by coordinating my behavior with yours. I can understand you insofar as your behaviors don't surprise me. I can understand you by knowing what you mean. I can understand you when I am able to explain your actions to someone else. I can understand you by justifying your behavior. In short, our folk psychological understanding involves the class of social behaviors that

make up our social environment. By focusing on only one of those behaviors, we ignore the richness and the complexity of human social cognition.

What are we doing when we exercise our folk psychological skills?

Fundamentally, we are interacting with others as intentional agents, even if that interaction takes the form of *analysis*. For example, when I watch a poker game and try to figure out whether a player should raise, call, or fold, I make use of my folk psychology. I look at other players, observe their bodily movements and interactions with one another, and try to read their faces in order to determine how good their hands are. And I also try to make predictions about what the other players will do next. But primarily, I want to know who is being deceptive, and who is being honest with their bets. The end of this analysis isn't behavior, since I am not playing, but rather coming to some conclusion about the best description of the situation. Nonetheless, the act of coming to that conclusion is a folk psychological act. Why? Because I am trying to determine something about others' behaviors, moods, honesty, and so forth.

Another thing our folk psychology allows us to do is to *coordinate* behaviors with others. Consider for example a driver who tries to coordinate his driving behavior with others on the road so as to avoid accidents, or consider simply walking down a crowded city street. Coordination problems like these involve multiple agents who are all trying to achieve some goal. A strategy we use for getting out of such situations, according to Adam Morton, is to recognize one another's goals, rather than focusing on the contents of one another's minds (Morton 2003). Given the situation and the goal, we can anticipate the appropriate behavior.

Our folk psychology also aids us in *detecting deception*, so we use it not just for cooperation but for *competition* as well. Competition and coordination, which are considered key to the evolution of sophisticated human cognition, help us survive in social worlds whether they are full of friends or full of enemies. We coordinate actions with our friends, and we check for deception in order to compete with those who may be adversaries. In deception, as in cooperation, analysis at the level of belief-desire attribution can lead to a perhaps unanalyzable degree of recursive complexity.

Perhaps one of the most important folk psychological practices (but least discussed in the philosophical literature) is the practice of *bonding* with other individuals. Bonding requires us to create and sustain emotionally intimate relationships with relatives and those who become our friends, and an essential part of these relationships involves attempts at *understanding*. It is our ability to understand that allows us to know when our intimates need to be comforted, want to play, or when they could use some distraction. All these folk psychological practices, and others, are important because they allow us to take part in society. For humans, such folk psychological practices may have been the most important in our development into a sophisticated technological species. Psychologists have suggested that the understanding we arrive at via our folk psychological practices may serve as a kind of glue that holds society together. Folk psychology qua the forming of emotional relationships and caring about others' behavior (and gossiping about it) may be the roots of human intelligence, culture, and all that goes along with it (See, e.g., Dunbar 1996; Greenspan and Shanker 2004; de Waal 1996).

The common folk psychological practices of predicting and explaining behavior are just the tip of the iceberg. When other acts, such as coordinating, cooperating,

justifying, bonding, evaluating, etc., are considered, it seems clear that they too play an important role. And, if the function of folk psychology is to help us interact with other agents in our environment by doing things such as predicting, explaining, coordinating, judging, etc., then folk psychology cannot be merely the attribution of beliefs and desires, as the textbook version puts it. Attribution of beliefs and desires is not sufficient for any one of these practices, nor is it a plausible complete account of any one of these practices, including explanation.

What follows is that the main descriptive claim of the standard account, i.e., that we must be able to attribute beliefs and desires in order to predict behavior, is false. Humans don't need to appeal to mental states in order to predict and explain behavior, at least not in every case. The standard account doesn't begin to capture what humans do when they engage in their folk psychological practices, nor does it capture how children develop their folk psychological practices. It is widely accepted that children do not begin to attribute beliefs and desires that are different from their own until age 3 ½ to 4. However, before this time children engage in a host of behaviors that can only be described as some understanding of psychological phenomenon (see Greenspan and Shanker 2004 for a discussion). As early as 4 months infants begin to engage in emotional signaling with a caretaker by participating in bouts of back-and-forth interactive verbalizations or behaviors. When toddlers are still using only single-word utterances, from 9- to 18- months, they are developing a sensitivity to the moods of their caretakers, and will respond differently according to a person's mood. For example, if a child's mother is sad, the toddler may attempt to console her by giving her a favorite toy. If a child's father is angry, the toddler may hide. In the second year of life, children are

already predicting people's behavior depending on the target's mood. They also demonstrate understanding about the causes of other's moods, and knowledge about how to change them. For example, children as young as 1 ½ appear to initiate reconciliations with their parents after having a tantrum ([Potegal and Davidson 1997](#)). All these behaviors demonstrate social cognition skills, including prediction, and this is before the child has any significant language skills, before she passes the false belief task, and before she has a concept of belief. Nonetheless, in these cases there is some conception of psychological phenomenon. The young children are reacting as agents to agents.

Again, given the social psychological and the developmental evidence, folk psychology cannot be the attribution of beliefs and desires to predict and explain behavior, unless one wants to both preclude children from having a folk psychology until age 4, despite their being highly social, and to accept that humans rarely use folk psychology to predict behavior. One might insist on this definition, and accept the consequences of it. While those who want to limit folk psychology to the prediction and explanation of behavior based on the attribution of propositional attitudes are free to do so, they owe us an account of why this subset of our understanding of psychological phenomenon is theoretically relevant, given the evidence from social and developmental psychology. Folk psychology understood narrowly doesn't exhaust the adult human's methods of predicting behavior. Since our predictions are generally accurate and since research suggests our predictions based on belief/desire attribution are not so accurate, there is reason to suspect that such attribution is not a particularly common method of predicting behavior. Nor does folk psychology understood narrowly capture the various methods adult humans use to explain behavior, such as explaining by using situational

facts such as historical precursors or enabling conditions (Andrews 2003, [Malle 2004](#)).⁵

Given that folk psychology was supposed to correctly describe at least those two behaviors, the standard account of folk psychology fails to deliver on its promise. It is for this reason that we ought to reject the standard definition, and rather begin to develop a wider conception of folk psychology. Our examination of animal folk psychology can help us determine what a wide conception of folk psychology might look like.

3. Critter Psychology

A critter psychology requires us to look not at how *humans* understand animal minds, but at how the *animals themselves* understand other minds (if they do at all). If animals do understand other minds, then there are bound to be differences between their understandings and our own. Given the criticisms of homogeneity and narrowness of function, we should modify our original question so that it is more specific. First, for a moment we can leave aside the question of the method used for our folk psychological practices, and ask whether animals other than humans engage in any folk psychological practices, such as predicting, explaining, coordinating, justifying, bonding, and evaluating. To have a folk psychology, one needs to engage in at least some of the folk psychological behaviors. Do animals engage in such behaviors? The answer to the question is easy: Sure, they do. Some of them.

From Darwin's anecdotes to Donald Griffin's accounts of animal behavior, and throughout the current literature, there is plenty of evidence that many different animal

⁵ For example, I can explain why Henry Rollins did a Gap advertisement by saying that after living in poverty for so long he sold out. I might not know what he told himself to rationalize the action, and he might not agree that his poverty played a causal role. He probably would disagree that he sold out. Nonetheless, it is natural to give such an explanation, even though it does not attempt to describe the agent's own reason explanation. Not all psychological explanations are Davidsonian rationalizations.

species engage in some of the behaviors associated with folk psychology (e.g. [Bekoff and Byers 1998](#); [Byrne and Whiten 1998](#); [Cheney and Seyfarth 1990](#); [Griffin 1992](#); [de Waal 1982, 1996](#)). Animals clearly *predict* the behavior of their conspecifics, predators, and prey. Without this ability, individuals would soon be dead, and species would soon be extinct, since predicting allows animals to engage in such essential behaviors as mating, eating, and avoiding being eaten. Anecdotes and formal studies have provided evidence of behaviors consistent with folk psychological practices such as competition, deception (at least tactical deception), justification, punishment, social bonding, and more. Let's look briefly at the evidence for one important folk psychological practice—coordinating behavior—in one species, the chimpanzee.

Chimpanzees live in stable social groups that allow the animals to develop long-term and dynamic relationships with other members of the group. Among the practices that the apes engage in are food sharing, exchanges of services such as grooming, deference to authority, and tactical alliance formation (often based on these other criteria). In addition to these behaviors, and sometimes as part of them, chimpanzees will coordinate behavior. One simple example can be seen in the dominance hierarchy of a social group. The dominant animal might have one or two animals he relies on for tactical support, and these animals might help the dominant fight off attacks by usurpers, or they might turn on the dominant if joined by a willing (and capable) assistant. These relationships involve coordination of behavior in order to achieve a common goal, be it the support or the downfall of the alpha ([de Waal 1996](#)).

An example of sophisticated behavior coordination can be seen in the chimpanzees of the Taï Forest of Cote d'Ivoire, who engage in a highly complex

cooperative hunting strategy. These chimpanzees also follow meat-sharing rules whereby the amount of food an individual receives depends on the role(s) he performed during the hunt ([Boesch 2002](#)). Typically, there are four roles that the animals could take on in a hunt for monkeys: driver, chaser, ambusher, and captor. When the prey is spotted, the hunters take on one of these roles based on their location in relation to the monkey and their anticipation of the monkey's behavior. The hunters have to behave flexibly, for they will change roles as the situation dictates. Each of these roles is rather difficult to perform, and it can take the Tai chimpanzees twenty years to become a proficient hunter.

Given this sampling of the empirical evidence, let us now premise our deliberations with the claim that at least some animals engage in folk psychological practices such as predicting, coordinating, and bonding. If we identify folk psychology as the ability of intentional agents to engage in these behaviors, Argument C can be reformulated as follows:

Argument C'

1. Any intentional agent who engages in behaviors including predicting, explaining, coordinating, detecting deception, bonding, understanding and justifying has some kind of folk psychology.
2. Some animals are intentional agents who predict behavior, coordinate behavior, and bond with other individuals.
3. From (1) and (2) it follows that some animals engage in folk psychological practices, and hence have some kind of folk psychology.

If folk psychology is defined as the ability to engage in behaviors that can be interpreted as folk psychological, then it would follow that many animal species have a folk psychology. But like our first argument, Argument C' also seems a bit cheap,

because the traditional question about folk psychology, for humans as well as for animals, was thought to involve fundamentally the attribution of mental states. This issue is completely avoided in a purely functional analysis of folk psychology. It seems we are in a quandary. The traditional question is to ask whether animals attribute beliefs and desires to predict behavior. But we saw that the attribution of beliefs and desires need not be necessary for humans to predict behavior, and that children engage in folk psychological behaviors before they have an understanding of belief. Thus, it seems that we cannot require that animals attribute beliefs in order to have a folk psychology.

To avoid this quandary we must determine whether there is something important about folk psychology that is captured by the standard definition, something that we should preserve in a new account. Engaging in some social behaviors and being an intentional agent are both necessary for one to have a folk psychology, but unless Argument C' satisfies, they can't be sufficient. What is clearly missing from the definition of folk psychology in premise (1) is the understanding that others are minded, intentional creatures. Having this sort of knowledge about other minds is part of the standard definition, and we can preserve that aspect without insisting that the understanding of others as minded *requires* the concepts of belief and desire. There is some other understanding of others as intentional agents that children are developing when they begin to engage in folk psychological practices. As children learn to respond differently to an angry mommy and a happy mommy, the children are seeing the caretaker as a minded agent, even though they don't yet have an understanding of belief. To see someone having a mood, feeling a pain, or desiring a cookie is to see an intentional agent.

Rather than insisting that the ability to attribute both beliefs and desires is necessary for having a folk psychology, we can look at both the mental concepts demonstrated by adults in our various folk psychology practices, and the mental concepts demonstrated by children who are developing a more robust folk psychology.⁶ Children younger than 3½ don't attribute beliefs, but they do have a folk psychology based on mentalistic concepts such as desire, seeing, intentionality, and so forth (Wellman 2002). They know that people seek out things that they desire, and avoid things that disgust them. And they know this as early as 18 months ([Repacholi and Gopnik 1997](#)). Children use their knowledge about other people's minds, moods, desires, etc. to make predictions about people's behavior. By the time we develop into adults, humans have additional mental concepts such as personality traits and beliefs.

In addition to the mental concepts that we see discussed in social psychology and developmental psychology, we can also examine whether animals have any other intentional attitudes such as seeing, feeling, liking, hating, etc.. And finally, we can examine qualitative states such as hunger, discomfort, softness, and so forth. Anyone who attributes personality traits, intentional attitudes, or qualitative states to other agents, and who engages in some folk psychological behaviors, seems to fulfill the basic intuitions that led to the construction of the standard account of folk psychology.

To ask whether animals understand any mentalistic concepts is much closer in spirit to the question first asked by [Premack and Woodruff \(1978\)](#) about whether an

⁶ I should note that in this section I am using the term "concept" very loosely, as whatever it is that allows one to abstract, and hence to generalize and categorize. This is in keeping with the standard psychological notion of concept, which operationalizes the term as the ability to categorize and make discriminations. However, I am uneasy about some of the more specific commitments some psychologists have about the nature of concepts. For example, Josep Call argues that the chimpanzees' concepts are 'intervening variables' that are used to construct and apply general rules that can be applied to novel situations. I am concerned that this view is a misrepresentation of both the human's and the chimpanzee's use of concepts. However, the current argument remains neutral on this issue.

animal has a theory of mind, given that their study focused on the mental state of seeing. However, in asking whether the chimpanzee has a theory of mind we must be careful to avoid the mistakes made in the traditional approaches to answering this question. We should avoid looking for mentalistic concepts only in acts of prediction, given that we know humans can make predictions without appeal to the target's mental states. And we need to shift focus away from beliefs and desires, without ignoring such concepts all together.

Before we attempt to answer the question about whether any animal has a mentalistic concept, a few words should be said about why psychologists think animals have *any* concepts. The major players in the debate over chimpanzee theory of mind agree that chimpanzees have some non-mentalistic concepts, such as 'same' and 'different'. The evidence for this conclusion comes from a number of standard research paradigms, such as the paradigm that requires subjects to judge whether a novel pair of objects is the same or different. If the objects are different from the objects the chimpanzee is trained on, the chimpanzee's ability to succeed at this task cannot be explained by the animal's association between stimulus and response. Rather, the chimpanzee is able to generalize from a training set to novel objects, thus suggesting that the animal's response is made possible by abstract conceptualization. The chimpanzee's success in this and other experimental paradigms such as stimulus equivalence, sorting based on perceptual and functional features, and transitivity tasks is taken as sufficient evidence for a variety of chimpanzee concepts (see, e.g., Call 2001; Povinelli and Vonk 2004).

Our question, then, is whether animals have any mental concepts. This question is subtly different from Premack and Woodruff's original question about theory of mind. For Premack, and for those who followed, 'theory of mind' refers to the ability to "attribute states of mind to [others], and use these states to predict and explain the behavior of [others]" ([Premack 1988, p. 160](#)). Note that this definition makes the narrowness assumption: to have a theory of mind is to predict and explain behavior by attributing mental states. There is very little in the way of consensus about whether any non-human animals do have a theory of mind. Because the majority of the research on this issue is on the great apes, primarily chimpanzees (the subject of Premack's original question), I will continue to focus on that species in the discussion that follows.

Seeing is thought to be a good place to start looking for mentalistic concepts other than belief and desire, given ethological evidence that chimpanzees monitor gaze and modify their behavior when they are visible to others. In 1978 the ethologist F.X. Plooi reported that wild chimpanzees glance at other animals' faces, presumably to check whether someone can see them. This behavior develops over time; infant chimpanzees, like infant children, are not sensitive to the gaze of others, and will gesture to their mothers with requests for grooming without first looking to see if their mother is attending to them. But around 10 ½ months we see a change in the behavior of young chimpanzees, who begin to attend to their mothers' gaze before making a request.

There are other naturalistic behaviors that are suggestive of chimpanzee sensitivity to others' ability to see. For example, low-ranking primates tend to mate and feed outside of the sight of dominants ([Whiten and Byrne 1988](#)), and will suppress vocalizations that accompany forbidden behavior (such as sex between a subordinate male and a female preferred by the dominant) ([Goodall 1986](#)). In some cases, when a third party observes these secretive acts they will alert the dominant, who then moves in to interrupt the behavior. Chimpanzees also seem to recognize that letting others see

their fear behavior is to be avoided. In one case, a chimpanzee began fear-grinning in response to threatening vocalizations by another chimpanzee. The rival couldn't see the fear-grinner, who was facing away from him. Before turning around to face his rival, the fear-grinner used his hand to pull his lips down over his teeth to stop the facial expression. It took him three tries, but after he succeeded in wiping the fear-grin off his face, he turned to confront his rival (de Waal 1996). Having a concept of seeing seems to help chimpanzees play politics, and generally engage in desirable behaviors while avoiding negative consequences.

Laboratory studies have been of mixed success in determining whether or not chimpanzees have a concept of seeing. Some early studies, such as those done by David Premack, suggested that chimpanzees do understand seeing. Another set of experiments led others to conclude that chimpanzees do not understand seeing (Povinelli and Eddy 1996). Most recently, a new set of studies suggests that chimpanzees understand both seeing and intentionality (Hare, Call, et al. 2000; Hare, Call, and Tomasello 2002).

In Hare et al.'s experimental set-up, a subordinate and a dominant chimpanzee are released in a room baited with food. Normally, if both animals can see the food, or saw one another witness the baiting, a subordinate animal will avoid the food and allow the dominant access, since dominants are known to punish subordinates for eating food without permission. However, in these experiments, when the food is occluded from the dominant's view, the subordinate will approach it. Only if the dominant can see the food will the subordinate avoid it. The animals are across the room from one another, so the subordinate has to consider the visual perspective of the dominant in order to judge correctly whether he can see the food or not. Because it seems that the subordinate is able to make different judgments about whether to seek out the food based only on

whether it is visible to the dominant, this study is thought to indicate that the apes have a concept of seeing.

In subsequent discussion of these results, one criticism is that as a predictive paradigm, the subordinate could be using a nonmentalistic strategy to predict the behavior of the dominant. It has been argued that performance on this task can be explained by the fact that chimpanzees (like humans) probably form abstract representations/categories and general rules about the behavior of others that are used to predict others' behavior and to modify their own behavior accordingly ([Povinelli and Vonk 2004](#)). Recall that induction over past behavior is one method that humans use to predict behavior, and Povinelli and Vonk suggest that the chimpanzees could be using just this technique.

But, the authors of the study point out that this interpretation won't work, because not all experimental conditions involve reading behavior. To test whether the subordinate could be using a rule such as, "Avoid food when the dominant is bodily orientated toward it, or when his head is turned toward it, otherwise approach food," the experimenters have a condition in which the dominant isn't visible until after the subordinate has already started moving. Because the dominant is hidden behind an opaque door, and is released only after the subordinate makes his decision whether to head toward the food or not, the subordinate has no behavior to read. In this condition, the subordinate continues with the same behaviors as before: when the food is obscured from the dominant's point of view at his doorway, the subordinate approaches the food. When the food is visible from the dominant's doorway, the subordinate refrains from approaching the food. Thus, it seems that there could be no decision-making purely on

the basis of behavioral abstractions. In addition, when the food is obscured from the subordinate, but visible to the dominant, and the subordinate is given the opportunity to observe the dominant's behavior before being released into the room, the subordinate is not able to determine where the food has been placed. So it seems unlikely that the chimpanzees are able to make judgments about whether or not the dominant would seek out food simply from the way he moves his body ([Tomasello et al. 2003](#)). As another control, when both the dominant and subordinate are able to watch the baiting of the room, the subordinate will avoid all food, even when it is placed behind a barrier and no longer visible to the dominant. Given the results of these conditions, it is highly unlikely that the subordinate can make a generalization based on the dominant's body positioning.

If the subordinate isn't able to make his decision whether or not to seek out the food based on behavioral abstractions, how does he do it? Perhaps the subordinate, knowing that the dominant is going to be released, uses inductive reasoning to conclude that the dominant will move his body in certain ways if he is released. Knowing that the dominant will move his body in a certain way, perhaps the subordinate can predict that the dominant will then seek out the food. There is one problem with this non-mentalistic account of the subordinate's reasoning, namely that the question is simply pushed back a step. Given this response, we still need to know what makes the subordinate anticipate that the dominant will move his body in certain ways. The answer to that question may be where the mentalistic reasoning lies.

Suppose the subordinate doesn't understand seeing, or the visibility of objects, and he fails the first couple of trials. Then, given his past experience, he knows only that when the door opens, sometimes the dominant first moves his body toward the food, and

then when released heads toward the food to eat it. But sometimes the dominant doesn't move his body toward the food, and he doesn't seek it out when released. At this point, the subordinate is faced with a puzzle he must explain.⁷ He needs to find out what the relevant difference is between the two conditions. He cannot make a straightforward prediction based on inductive generalizations over past behavior, trait attributions, or stereotype. What needs to be explained is why the dominant heads toward the food in some cases, but not in other cases. To answer that question, the subordinate must look at the context of the situation. He must look at the food, the barriers, and find some rule that connects the set-up of the situation in all the cases the dominant seeks out the food, and all the cases where he doesn't. The subordinate doesn't have a simple rule about how behavior differs based on the location of the food. What he needs to do is make an abstract generalization about the property of the food in relation to the barriers in the different conditions. And it is the abstract property of invisibility that leads the subordinate to anticipate that the dominant will not approach it.

With the ability to respond to the abstract concepts of visibility/invisibility, the subordinate can categorize the food item as one that the dominant will approach versus one that the dominant will not approach. No non-mentalistic concept will do. The only thing in common with all the cases where the subordinate avoids the food is its visibility to the dominant, and so the only appropriate abstraction is the visibility of the food. Visibility is a mentalistic concept; in order to categorize the food as visible or not visible by the dominant, the subordinate must understand something about seeing.

⁷ I don't mean to suggest that the chimpanzees in this study developed a concept of seeing in the course of the experiment. The point I am making here is that puzzling behaviors can lead an individual to discover mental states more generally, and it is this developmental claim that I mean to emphasize.

Despite this conclusion, there is reason to think that the chimpanzee's concept of seeing is different from the adult human concept. The human concept of seeing includes the idea that seeing leads to believing. This point is emphasized in the child theory of mind literature. According to the human concept of seeing, someone who sees something happen will then be in a doxastic state regarding that event, whereas one who does not witness the event will not share that doxastic state (*ceterus paribus*). The child who passes the false belief task is described as using the following pattern of reasoning: he knows that Sally didn't see Ann move the marble, and therefore he knows that Sally doesn't believe that the marble is in the cupboard. Given that Sally will act on her beliefs, the child predicts that Sally will seek out her marble in the box, where she believes it is. Note that though passing this task is taken to be evidence of having the concept of belief, the reason we understand it this way is because our concept of belief is related to our concept of seeing. What the child who passes the false belief task knows is that Sally didn't *see* the marble being moved, and from that we presume the child knows that Sally doesn't *believe* that the marble was moved. In adult human reasoning, seeing and believing are two categories that are closely tied. In children, despite the standard interpretation of the false belief task, they may not be.

Our concept of seeing has behaviors associated with it, in addition to having connections with other concepts. So, while humans and chimpanzees may take seeing as referring to roughly the same sorts of behaviors (such as reaching for a desired seen object, running from a threatening seen object, and so forth), there is little current evidence that chimpanzees and humans make the same connections between different concepts; there is little experimental evidence that the chimpanzee concept of seeing is

related to a concept of believing. Since in humans the category of behaviors we call seeing is associated with the doxastic category of believing, in order to say that a chimpanzee has our concept of seeing we would need to determine whether that concept is connected to a chimpanzee concept of believing. Given these considerations, what should we conclude about the chimpanzee's ability to make judgments about what others can and cannot see? Despite the concern that it might be too quick to describe the chimpanzee's concept as identical to the adult concept of seeing, it does seem clear that the chimpanzee uses an abstract mentalistic concept in order to solve puzzles and make complex predictions. Further, it seems that the chimpanzee concept of seeing is not unlike the concept of seeing the child has before her fourth birthday.

If we can take the above evidence as sufficient to claim that chimpanzees have some understanding of seeing, then we can incorporate that fact into our argument about animal folk psychology. The question we began this section with was whether animals, like humans, think that their conspecifics are mentalistic agents. Since seeing is a mentalistic concept, and it seems that chimpanzees attribute something like seeing to other chimpanzees, and use the concept in predicting, coordinating, and competing, we could conclude that the chimpanzee does think of other chimpanzees as intentional agents. So we can reformulate our argument for animal folk psychology in terms of chimpanzee folk psychology as follows:

Argument C"

1. Any intentional agent who engages in folk psychological practices and understands others as minded agents has some kind of a folk psychology.
2. Chimpanzees are intentional agents who engage in folk psychological practices and have some understanding of others as minded agents.

3. From (1) and (2) it follows that chimpanzees have some kind of folk psychology.

On the question of whether chimpanzees might have something analogous to human folk psychology, with the understanding that human folk psychology involves two elements—practices of social interaction, and abstract mentalistic concepts—there now seems to be reason to accept that chimpanzees do have some kind of folk psychology. For one, the definition of folk psychology used above captures both the behavioral and the conceptual aspects that are associated with human folk psychology. However, the argument is limited insofar as it rests on controversial evidence (the seeing studies), a limited mentalistic concept (only seeing), and a limited class of animals (chimpanzees). And, it is important to note that this argument doesn't entail that chimpanzees have the same folk psychology as humans. Given the discussion about the chimpanzee concept of seeing in the previous section, it seems likely that the chimpanzee would not have the same folk psychology as adult humans. If this is the case, then there is no one monolithic folk psychology to be had by all, contrary to what some might think. This examination of nonhuman folk psychology should lead us to rethink some assumptions about human folk psychology, such as the universality of our social cognition. If there are differences in folk psychology across species, there may be folk psychological dialects across human cultures too. In order to determine whether there is only one conceptual scheme when it comes to the minds of other people, additional comparative research in social psychology is required.

To broaden the conclusion of Argument C", research must be done on other mentalistic concepts. Techniques to find mental states concepts among animals might follow two approaches. First, if ontogeny recapitulates phylogeny, we should look

toward the development of mental state concepts in children. Belief concepts are acquired relatively late by children. They begin to develop around age 3½, but children don't have the full adult concept of belief after they pass the false belief task. The understanding of belief continues to develop over the next several years as children begin to develop an understanding of the many properties of belief, such as the opacity of belief ascriptions ([Apperly and Robinson 1998; 2003](#)). Plenty of other mental state concepts develop much earlier, and these are the mental states we should start looking for in nonhuman animals. Those concepts that children develop first, emotional concepts such as 'pleasure', 'comfort', and 'pain', would be a good place to start.

Second, given that our analysis of human folk psychology has undermined the traditional emphasis on prediction, non-predictive experimental paradigms should be explored, as should evidence from ethological observations. If mental states are used by humans to explain intentional behavior, and if humans tend to seek explanations for behaviors they find anomalous, one approach to examining animals' understanding of mental concepts would be to expose them to anomalous behavior that has a simple mentalistic explanation behind it. If the animals seek to find an explanation, that will serve as some additional evidence in favor of having that mental state concept.

4. Conclusion

The main objection to my argument for a variety of folk psychology in chimpanzees will come from those who insist that folk psychology requires a full-blown theory of mind. According to this objection, folk psychology is a robust conceptual scheme that must involve many mentalistic concepts including belief, and can be had

only by those who explain behavior. Since there is no evidence that nonhuman animals attribute beliefs, or that they have a theory of mind, they shouldn't be said to have a folk psychology.

These kinds of criteria for having a folk psychology are too strong, given the general account as the commonsense understanding of psychological phenomenon. First, though a theory of mind is traditionally seen as the attribution of beliefs and desires, we have seen that human social cognition does not place emphasis on belief/desire attribution. The objection falls prey to an over-simplified view of the mechanisms underlying human folk psychological abilities. There is growing recognition that there isn't any one specific mechanism that underlies all our folk psychological practices, but that different practices will tend to rely on different mechanisms, as will different instances of the same kind of practice. While humans do attribute beliefs and desires as part of some of our folk psychological practices, especially explaining behavior, we have seen that humans don't need belief/desire attribution in order to engage in other practices, e.g., in many cases of predicting behavior.

Some techniques humans use to predict behavior, such as generalization from past behavior, or using trait attributions, are almost certainly used by chimpanzees as well. The well-defined social relations of chimpanzee groups depend not only on knowing what animals have done in the past, but whose party they belong to. It is also useful to know whether an animal tends to share food (generous) or hoards it to himself (selfish). Such individual differences are common in chimpanzee societies, and knowing about them is useful for group members who are interested in maximizing their position in the group. We know from ethological observations that chimpanzees treat animals we might

consider selfish differently from those we would describe as generous, for example (Watts 2002).

The definition of folk psychology used in Argument C" emphasizes not only the fact that there are a variety of folk psychological practices and a variety of mental concepts, but also that having a folk psychology comes in degrees. Any creature that fulfills the two requirements of the definition of folk psychology from premise (1) of Argument C", engaging in folk psychological practices and having folk psychological concepts, should count as having some kind of folk psychology. It need not be as robust as ours, nor as complex, but anything that uses mentalistic concepts to engage in social interaction counts. To claim otherwise is to reject the definition.

And we shouldn't reject the definition. Children younger than 3 ½ don't have a full-blown theory of mind, but they have a folk psychology based on mentalistic concepts such as desire, seeing, intentionality, and so forth. They know that people seek out things that they desire, and avoid things they hate. They know things about how people's moods affect their behaviors, and they use this information to predict people's behavior. Again, it seems clear from our definition that knowledge of mentalistic properties such as desire, disgust, pleasure, and so forth allows children to interact in the social domain, and that is sufficient to show that they land on the folk psychological continuum. I hope to have convinced you that some of our nonhuman relatives land on this continuum too.

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