

## **Pluralistic Folk Psychology in Humans and Other Apes** for *The Routledge Handbook of the Social Mind*

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How much continuity is there between the social cognition of humans and other animals? To answer this question, we first need accurate descriptions of the kinds of social cognition that exist in humans, and the kinds of social cognition that exist in other animals. Offering such descriptions, it turns out, is surprisingly difficult.

Nonetheless, claims of discontinuities abound. Michael Tomasello's research on the abilities of children and nonhuman great apes leads him to conclude that only humans are true cooperators, who share a joint goal and work together to achieve it (Tomasello 2014). Kim Sterelny's apprenticeship hypothesis shares such a commitment to human uniqueness in cooperation and mindreading, for these skills are what facilitate the uniquely human practice of active teaching (Sterelny 2012). Tad Zawidzki argues that the uniquely human sociocognitive syndrome, which consists of language, cooperation, imitation, and mindreading, developed due to our intrinsic motivation to shape others and be shaped by others in a way that demonstrates norm following (Zawidzki 2013). And according to Gergely Csibra and György Gergely's (2011) Natural Pedagogy Hypothesis, humans alone engage in active teaching, because humans alone have an innate mechanism that produces and responds to signals indicating that a learning opportunity is at hand.

I aim to challenge the view that there are stark discontinuities between the social psychology of humans and other animals—in particular between humans and the other great apes—by downgrading the mechanisms for human social cognition. Humans often rely on a relatively simple set of mechanisms that, together with the ability to identify intentional action, permit much of our sophisticated-looking social cognitive practices. Our social cognition involves a process of model building and forming expectations of how intentional agents should live up to these models. The models include normative elements—aspirational stereotypes of how people and groups should act—rather than mere descriptions of how people do in fact act. At least some other animals also have elements of pluralistic folk psychology—something that becomes apparent when we look for the right sorts of similarities and differences.

I will start this chapter by arguing that mindreading beliefs is not the place to look for continuity between human and nonhuman social cognition, because mindreading beliefs, desires, and other propositional attitudes is a small and late-developing piece of our social cognitive skill set.<sup>1</sup> Next, I will argue that a better account of human social cognition is pluralistic. There are three elements to the account of Pluralistic Folk Psychology that I defend: we understand other people in a variety of ways, we build

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<sup>1</sup> In this paper I am going to use the term “mindreading” in this narrow sense of ascribing propositional attitudes such as belief and desire to others. There is no handy term for this subset of mindreading capacity, and “mindreading propositional attitudes” is unwieldy to repeat. “Mindreading” *could* be used in a wider sense, too, and include ascribing mental content such as perceptions, emotions, and sensations.

models of individual people and groups, and the models are largely prescriptive rather than descriptive. After sketching the position of pluralistic folk psychology, I will present evidence that human children and other great apes share the ability to identify intentional action and see social behavior through a normative lens. Because perceiving intentional action normatively is key to folk psychology, finding it in other species serves as evidence of continuity between humans and other animals in the domain of social cognition.

## 1. Mindreading and the received view

A familiar view is that to understand another person, we mindread propositional attitudes; that is, we see that someone has a belief—a propositional attitude that has the aim of representing reality, and a desire—a propositional attitude that has the aim of making the world fit one's mind. Since together, this coupling of belief and desire can cause their bearer to act, mindreading allows us to predict people's future behavior and to offer causal explanations of what they have already done. If social cognition has the function of predicting and explaining behavior, the mindreading account appears to offer a description of our key social capacity.

This familiar view has been in the background of almost 30 years of empirical research on the ontogeny and phylogeny of social cognition *qua* belief and desire reasoning. It is widely accepted that human children are able to mindread once they reason about false belief, around four years of age, and that other animals fail to demonstrate evidence of belief reasoning—though they may be able to take into account others' desires or perspectives. Since successful mindreading only permits prediction and explanation if one knows what behaviors are associated with the various beliefs and desires, a mindreader also has some knowledge about the causal consequences of a set of beliefs and desires. The received view has adult social cognition consisting of belief and desire concepts, as well as knowledge of the particular causal relations that obtain between particular beliefs, desires, and behaviors. Hence the received view conceives of social cognition as largely individualistic and internalistic—focused on hidden beliefs and desires of the person of interest. And it presents social cognition as a form of causal reasoning, like our reasoning about the operations of the physical world. The central difference between causal reasoning about people and things is that people's causes are often hidden—people are self-propelled—while the movements of non-agents are usually caused by visible external events.

The research in the development of social cognition examines the question of when these abilities arise in humans, and the research in the evolution of social cognition examines whether these abilities exist in other animals. But there are reasons to reject this project as based on a mischaracterization of human social cognition.

There are at least four reasons for rejecting the idea that adult humans typically ascribe hidden causes to others when they are *predicting* behavior. First, since we are not aware of thinking about others' beliefs in our daily interactions with others, this processing would be occurring automatically and without conscious attention. But the claim that belief reasoning is automatically implicated in our predictive tasks has not been supported by evidence. In a direct investigation of the question, Ian Apperly and colleagues found that, in both false belief and true belief contexts, it takes people longer

to answer probe questions about belief than to answer probe questions about the situation (Apperly et al. 2006; Back and Apperly 2010). Apperly suggests that a certain motivation is required for adults to mindread beliefs on-line. Mindreading beliefs is unlike mindreading perspectives, since adults track what others see quickly and efficiently, even when we don't need to and even when it interferes with our own goals (Samson et al. 2010; see the discussion in Apperly 2011). Apperly and Butterfill's (2009) development of a two-systems model for belief reasoning reflects the view that reasoning about propositional attitudes, like calculating long division problems, is cognitively demanding (but with practice and development of expertise, we can efficiently calculate some division problems, and we can efficiently ascribe beliefs and desires in familiar situations). Even psychologists who had previously argued that belief attribution is automatic (Cohen and German 2009) now think that the automatic/controlled distinction in ToM processing is not useful (German and Cohen 2012). While we may automatically take in the details of the situation, those details don't always lead us to think about belief. The idea that it is belief that we are tracking—theoretical entities with causal powers that have the logical property of opacity and a world-to-mind direction of fit—rather than, say, patterns of behavior and emotions in situations, isn't supported by either the behavioral or neuroscience studies on mindreading.

A second reason to reject the idea that we typically attribute beliefs to others in order to predict their behavior is that attributing beliefs isn't a very accurate way of predicting behavior—and we are pretty good at predicting quotidian human behavior. There are a number of reasons to question the accuracy of belief attribution for prediction. For one, thinking about someone's reasons for action—their beliefs—triggers cognitive biases that lead us to accept the first possible set of reasons for action (by considering someone's reasons for action, we come to see the action as more likely) (Wilson and LaFleur 1995; see Andrews 2012 for a discussion). And since behavior underdetermines sets of reasons, it is usually not the case that the first reason is the correct one (Andrews 2012). This worry has been articulated by Tad Zawidzki, who argues that the holism of the propositional attitudes causes an intractability problem (Zawidzki 2013). The relationship between observable behavior and the propositional attitudes that presumably cause behavior would be too complex to allow for timely, much less accurate, prediction of behavior. The unmitigated search space would be too great. Apperly (2010) thinks we can limit the search space by appealing to scripts of typical behavior (a type of normative reasoning), and Zawidzki thinks that our ancestors' practices of mindshaping, which led to cohesion in their community as well as differences between different communities, limit the search space for each community. These moves make mindreading easier, but only once the mindreader has had the right sort of enculturation. They each make mindreading dependent on normative reasoning—thinking about how others *should* act rather than how they *do* or *will* act. I will argue that this normative reasoning is very powerful and can do much of the social cognitive work that is often ascribed to an ability to think about others' propositional attitudes.

A third reason to think that we do not usually ascribe beliefs in order to predict behavior comes from the developmental literature. Infants demonstrate sensitivity to others' false belief with violation of expectation looking time studies at 15-18 months (Onishi and Baillargeon 2005 at 15 months; Yott and Poulin-Dubois 2012 at 18 months).

They will help someone with a false belief open a locked box (Buttelmann et al. 2009), but until 4 years old children won't make a correct prediction in a false belief task (Wellman et al. 2001). And they do not consistently explain behavior in terms of belief until after age 6 (Priewasser 2009, as cited in Perner in press). Indeed, when 4-year-olds pass the false belief task and are asked to explain their answer, they rarely refer to the character's false belief. Rather, the children tend to offer explanations like, "He looked for the chocolate there because that's where he left it" (Wimmer and Mayringer 1998; Andrews and Verbeek unpublished manuscript; Perner et al. 2002). At 6 years children still do not give explanations in terms of beliefs, but instead talk about the character as "not seeing" or "not knowing" (see Perner in press for a discussion).

Hannes Rakoczy (2012) has argued that the debate between romantics who think babies mindread, and the killjoys who think they don't, is based on a confused use of the terms at issue rather than a deep disagreement (see also Schaafsma et al. 2015). The gist of the data, as Rakoczy sees it, is that infants have a subdoxastic state that allows them to predict behavior, whereas older children have propositional attitudes about others' propositional attitudes. It is a conceptual issue as to whether we want to consider each of those capacities as a capacity to attribute belief—and an answer to that question rests on your account of belief; this is true for Apperly and Butterfill's two-systems view as well. A representationalist about belief, who takes belief to be an attitude toward a proposition, would have to accept that having a belief about a belief requires having the concept of belief with all its logical properties (e.g., Fodor). A dispositionalist about belief, on the other hand, can have lower standards for the conceptual and logical abilities needed for having a belief about a belief, since such a belief just is a disposition to respond to the disposition seen in another (e.g., Marcus 1990; Schwitzgebel 2002).

Butterfill and Apperly explain the infant data via their two-systems model; infants solve the tasks using an early-developing implicit approximate system, and older children who have developed an explicit system that permits forming beliefs about beliefs are able to pass the verbal elicited response false belief style tasks (Apperly and Butterfill 2009; Butterfill and Apperly 2013). Another explanation comes from Cecilia Heyes and Chris Frith, who have argued that infants have a domain-general capacity that allows them to track others' beliefs, whereas success in verbal false belief tasks requires culturally inherited conceptual knowledge about the nature of beliefs (Heyes and Frith 2014).

If infants are able to track false belief, and likely do so without having the rich concept of belief, then however they do it they use mechanisms that are simpler than the mechanism described by the full blown theory of mind account. These simpler mechanisms may also be at play when young children pass the false belief task, as will be discussed in the next section. Rather than offering evidence in favor of belief reasoning in infants, then, the infant findings about false belief tracking undermine the assumption that older children, and even adults, use belief reasoning when they track false belief. If human cognitive systems prefer fast and frugal heuristics over slower deliberative reasoning whenever possible, then the infant data supports the claim that human adults do not need to reason about belief in their quotidian anticipation of social behavior (Fiebach 2013).

A final reason to reject the idea that we are constantly attributing beliefs to others in order to predict behavior is that we have other methods for predicting behavior that do not suffer from the limitations of belief attribution. A positive argument for the received

view is a form of exclusion argument, leaving mindreading as the only means for predicting behavior caused by the invisible theoretical entities of belief. But exclusion arguments are only as strong as the alternatives are comprehensive, and the alternatives on the table have been limited to the proposal that there is a single mechanism or at most two mechanisms involved in our tracking behavior, and that these involve a form of belief reasoning.

I propose that humans use a number of mechanisms when predicting behavior, and that belief reasoning comes into play when explaining behavior more so than it does in predicting behavior. According to Pluralistic Folk Psychology, in addition to doing a little mindreading from time to time, humans use a host of different methods to predict *and explain* behavior that don't involve considering the beliefs of actors (Andrews 2012). We can see what people are going to do next because we understand people not as bags of skin filled with reasons for actions, but as people—richly developed like characters in a good novel, with past histories, relationships, character traits, and habits, who are embedded in a community with social norms and particular roles to play. On this view, regardless of the method of prediction, the folk psychologist sees the actor as an intentional agent. Seeing others as people is key.

## 2. Pluralistic folk psychology

There are three main aspects to Pluralistic Folk Psychology: (1) Pluralism—we understand, predict, and explain other people using a variety of mechanisms and heuristics; (2) Modeling—we build models of individuals and groups; and (3) Normativity—the models are largely prescriptive rather than descriptive. Let us look at each in turn.

### *Pluralism*

The pluralistic commitment challenges the idea that we primarily understand others in terms of their propositional attitudes. Despite the importance that is often placed on our ability to think about others' thoughts, when we predict behavior we rarely need to think about beliefs, largely because people behave consistently with their past behavior, their social status, and the norms of their society. Though sometimes it can be useful to offer reasons for action in terms of propositional attitudes when explaining, justifying, or criticizing behavior, in predicting behavior it is relatively rare that we need to think about others' beliefs and desires.

If we don't regularly use the attribution of propositional attitudes when predicting behavior, how is it that we are so good at coordinating with others in our quotidian social activities? I have identified a number of different methods folk psychologists use to understand others, and there are certainly others (see Andrews 2012 for a full discussion of these):

<b>Method of prediction</b>	<b>Brief description</b>
primary intersubjectivity	Regulating interactions using ostensive signals such as eye contact
self-reference	Expecting others to behave

	as oneself would
stereotypes or social roles	Generalizing about types of people
situation	Generalizing about what people should do in a typical situation
inductive generalizations over past behavior	Expecting an individual to act consistently
norms	Expecting people to follow social norms
emotions and sensations	Forming generalizations about behavior as caused by non-propositional mental states
teleology or goal	Forming expectations based on the attribution of a goal understood in terms of achieving some state of affairs
trait attribution	Relying on trait attributions of a person in order to predict future behavior
perceptual state	Expecting others to act on objects they can see
causal history	Expecting others to act based on their past experiences

*Table 1. Non-propositional methods of predicting intentional action*

What unites these methods is that they are all used in predicting the behavior of intentional agents. Central to folk psychology, then, is this ability to discriminate intentional actors from the non-agential world. But we can see others as agents without filling their minds with propositional attitudes.

Even in those contexts where we suppose mindreading is essential, we may be making predictions without needing to think about others' mental states. Consider successful performance on the false belief task. To predict that someone will look for an object where they left it, even after the object has been moved, we don't *need* to think about the belief of the target, but instead we may use general knowledge about perception and action. If the target didn't have a direct line of sight to the object when it is moved, she will continue to seek it where she left it, using a "people seek objects where they left them" heuristic. Children can come to learn this generalization from their object play and observations of caregivers. Children whose lives are full of important objects quickly come to learn that these objects sometimes get misplaced, causing consternation in adults. Parents may muse out loud, "Now, where did I put my keys?" Mischievous children may find it fun to hide their parents' important objects, and then watch the parent looking for the keys on the rack and worrying about where they left them. Experience with the world

permits children to recognize patterns of behavior, forming expectations about how others will, and should, act in certain situations. They can do this before they are able to explain why people do as they do in terms of people's beliefs. Indeed, as we saw, when children pass the false belief task at ages 4 to 6, they do not give propositional attitude attributions to explain their reasoning, even though we might expect such attributions to be primed if they were just used to make a prediction. Instead, children explain by talking about the target's past action, or the past location of the object.

We can predict that the mother will smile when she looks at her smiling infant, we can predict that our friends will like a sushi dinner (who wouldn't like sushi?), we can predict that the waiter will bring the food we ordered, we can predict that the audience will clap after the performance, that Dexter will bring the doughnuts, that standers will step to the right on the escalator, that getting a raise will make her happy, that that the cat will pounce on the toy, and that the nervous student won't ask a question after the talk. And, sometimes these predictions are wrong, leading us to seek an explanation. These methods are not foolproof. Dexter might be busy. Our friends might be vegans. The escalator riders might be visiting from the countryside.

Sometimes, too, we appeal to propositional attitudes to predict behavior. But those cases are relatively rare, and they are often cases about propositional attitudes in the first place. Suppose you tell me what you desire or believe, and I want to change your belief or desire. I then do need to think about these mental states—to mindread. For example you tell me that you believe that candidate A is great, but I want you to vote for candidate B. To change your mind I might think about your beliefs about the issues that the candidates support.

We understand people when their behaviors match our expectations. When behavior makes sense, we don't need to explain it. But when we fail to make sense of someone's behavior, we might want to explain it. Here too we have pluralism. We can explain behavior in different ways: he put his feet on the table because he is a slob; because he wasn't raised right; because he's the dominant; because he wants us to leave, etc. Different kinds of explanations have different social consequences; we can dehumanize by offering certain kinds of explanations ("He has 15 children because he can't control himself—he's an animal"), or we can repair damaged relationships ("She spoke harshly because she wants to help you improve your confidence").

### *Modeling*

Once we have pluralism, we have to have some way of integrating the different kinds of information we have about others. Following an early suggestion of Ron Giere, I propose that we integrate by constructing and manipulating models (Andrews 2012).

Giere suggested that folk psychology might involve modeling social information rather than representing it in propositional form, which he took to dissolve the debate between simulation theory and theory theory (Giere 1996). Giere defends this view based on his acceptance of the semantic view of theory, according to which scientific theories are not sets of propositions that scientists share, but rather methods for modeling aspects of the world (Suppes 1960; Suppe 1972). According to semantic accounts of theory, theories are not composed of laws because there isn't evidence to support individual laws outside of a context. Only within systems can we extract generalizations the model can make true (Giere 1988). A model is a fictionalized and simplified

representation of some subset of the world that we create to make the world easier to understand. Models always abstract away from the complexity of the actual world; but they are used to understand patterns that we can extract from the complexity of the actual world, and they can be used to test these patterns.

The model approach to folk psychology sidesteps the original debate between simulation theory and theory theory by suggesting that folk psychological capacities can be understood as the ability to create and manipulate a model, or models. In endorsing something along the lines of Giere's suggestion, Peter Godfrey-Smith notes that modeling is a strategy used in many domains of science, including robotics, artificial intelligence, physics, and evolutionary biology, but that it is also part of how we understand other people (Godfrey-Smith 2005, 2006). He proposes that our social cognitive capacities comprise a facility with manipulating models. In the practice of folk psychology we create multiple models—models of the individual target, but also general models of human behavior that reflect the typical folk psychological information of which particular sets of beliefs and desires cause behavior. These models of individuals, however, do not consist of just propositional attitudes, but also include the person's emotional state, moods, and sensations (Godfrey-Smith 2005). When we construe the model as a realistic causal model, we can use it to predict and explain others' behaviors.

Heidi Maibom (2003, 2007, 2009) expands Giere's approach beyond simply modeling psychological properties of people. She argues that in addition to general models of behavior we also have social models. Social models represent information about social structures, institutions, and relations in a culture, and allow individuals to engage with people in that culture smoothly. Around the same time, a number of philosophers came to the realization that a significant amount of social interaction goes so smoothly because we follow the norms or scripts of our culture; we don't need to think about the mind of the waiter when we order our iced latté, at least if we are doing it in our local coffee shop (Andrews 2003; Bermúdez 2003, 2005; Gauker 2003; Morton 2003). We use theoretical models of social information to engage in this interaction. Maibom makes the point that these models are normative, not just descriptive, because they describe how people in certain roles ought to act.

Maibom identifies three kinds of folk-psychological models: (1) models of how an individual's mental states cause individual actions, (2) models of the relationships of mental states to one another, and (3) models of how the world causes an individual's mental states. Taken together, Maibom thinks that the use of these models can account for the richness and complexity of human social cognition. But the models are not always used together: "Since each focuses on a different aspect of subjects and what they do—how an organism relates to its environment, what internal events cause an action, or the role that a subject plays in a social structure—they each provide a different understanding of the situation" (Maibom 2007, 572). Folk psychological models fulfill much the same role as theories do in traditional belief-desire psychology, such that mental states are seen as causing actions, and these actions can be predicted and explained in terms of these causally efficacious mental states. Added to this picture, however, is the ability to make discriminations about types of people based on their social constraints.

More recently Albert Newen has advocated a person model account of folk psychology, according to which our folk psychological practices are facilitated by person

models of ourselves, other individuals, and of groups (Newen 2015). By ‘person model,’ Newen means “a unity of properties or features that we represent in memory as belonging to one person or a group...of persons” (Newen 2015, 12). There are explicit and implicit aspects to person models, such that we do not have introspective access to all aspects of our person models. These person models are supplemented with general folk psychological knowledge, as well as models of situations and cultures. Thus, like Maibom’s account, on Newen’s view we can go some way to understanding individual differences among the people in our social domain. But unlike Maibom, Newen doesn’t stress the normative nature of the models.

On my view, humans build two general types of models: models of individuals and models of groups, and neither of these reflect the kind of information typically appealed to in accounts of folk psychological theory. For individuals, our models consist of the information types that come from the pluralistic mechanism described above. The models do not take others to be bags of skin filled with propositional attitudes, but richly drawn out characters with past histories, relationships, ticks, ways of moving, preferences, and personalities. How much would you miss were you to model your wife, your kid, or your mother, using only propositional attitudes? Compare that model with the model that only takes away propositional attitudes and leaves their personality, past history, tendencies, quirks, moods, emotions, relationships, social role, and so forth. How little would be missing from the latter model?

Building these models isn’t a lonely task, carried out in an isolated space without input from the target or others in the social context. Rather, these models are built through interaction with their targets. When interacting with another person, your model of her will be affected by her model of you (Andrews 2015a, 2015b). A child whose teacher thinks poorly of her will tend not to do well in class, and not thriving in the teacher’s classroom will cause the child to think poorly of the teacher in turn. Likewise, a teenager who finds out that an attractive acquaintance has a crush on her will tend to think more highly of the acquaintance for having such good taste. Our interactions with others play an important role in the creation of our other models.

We also create models of groups of people. These groups may be small, like a family, or large, like the species of humans. In between we model types of people—women, Canadians, philosophers, racists, teenagers, the generous, and so forth. We use stereotypes—generalizations about groups that state the properties and traits that group members supposedly have. These properties can include behaviors, beliefs, attributes of physical appearance, and goals; all these elements are structured such that they relate to one another. Stereotypes permit fast thinking and are also richer than trait attribution (Andersen and Klatzky 1987). Our biases about groups, while sometimes deserving of their bad reputation, are also much more likely to be accurate than is commonly accepted (Jussim 2012, 2015; see Andrews forthcoming for a discussion). Because a single person is going to fit a number of different stereotypes (the white mother police officer), we also activate the appropriate stereotype pragmatically, according to what is most useful (Stangor et al. 1992), or how accountable you will be in getting it right or wrong (Pendry and Macrae 1996).

There are familiar stereotypes for race, gender, and nationalities, but we also construct stereotypes for groups that are salient for us—philosophers and runners, for families—the Munsters and the Clintons, for types of individuals that crosscut other

categories—the dominants and subordinates, and for species—humans and dogs. In our human models we get many elements associated with traditional belief-desire psychology, but we also get many of these other elements in our models of other species (as when we think that animals can seek out what they perceive, or that mammal females care for their young). Our easy attribution of mental states to other animals challenges the position that our folk psychology is limited to understanding other humans, or humans of a particular cultural variety.

Our models of individuals and groups allow us to make quick and fairly accurate predictions of others, but we can also use them to understand others. For example, we can explain someone's behavior in terms of a stereotype about her—that she's a philosopher—in order to demonstrate that the individual is living up to some kind of group norms, rather than demonstrating an individual personality trait. These models are normative, not merely descriptive. I agree with Maibom that we build normative models of social systems (or as I put it, of social groups).

Stereotypes are prescriptive—little girls might be criticized for getting too dirty or climbing trees, while little boys are praised for the same action. President Obama has been criticized for not being “black enough.” People think that females should be more nurturing than males and that blacks should be more athletic than whites (Burgess and Bordiga 1999; Eagly 1987; Fiske and Stevens 1993). Stereotypes are not just descriptions, but also reflect norms about what someone ought to do. This is true of individual models as well as group models. When a person acts contrary to her usual habits, friends and family worry that something is wrong. For example, when your punctual friend doesn't show up to dinner at the agreed-upon time, you may wonder what happened to her, but if another person were just as late, you might not be bothered at all. Our individual models are not just descriptive, but they serve as a kind of agreement with the people in our lives; we all agree that the punctual friend is, and should be, punctual, and a violation of that norm is going to let us down. This is why we tend to be harder on a good person who violates a moral norm than a bad person who violates the same norm, because we expect more of the good person. Furthermore, since these models are created by interactions with the person in question, acting against one's model is seen as a violation of the agreement that was created by past interactions.

Like Maibom I think that we build models of social systems and types of people, and that these models are normative. What I add is that the models we build of *individuals* are also normative. In addition, these models are not individually created, but are co-created through interaction between the modeler and other individuals.

### *Normativity*

When thinking about models, causal models may be the first example that comes to mind. Causal models are input-output systems that can be used to predict what will happen by appeal to the causal structure from the input until the point of interest is reached. However, causal models are only one kind. Godfrey-Smith describes models this way:

[A model is] “usually a class of hypothetical systems, similar to each other in general pattern, and constructed from a common repertoire of elements. When a scientist has facility with a model, the scientist has an understanding of a whole

category of hypothetical systems... Two scientists can use the same model to help with the same target system while having quite different views of *how* the model might be representing the target system... For example, one scientist might regard some model simply as an input-output device, as a predictive tool. Another might regard the same model as a faithful map of the inner workings of the target system. So both scientists, in a sense, are hoping for a resemblance between model and target, but they are looking for very different *kinds* of resemblance” (Godfrey Smith 2005, 4).

Godfrey-Smith stresses that models alone don't give us science; models need to be construed before we use them to make claims about the nature of the world. In folk psychology, the relationships between mental states and behavior are usually described as causal relations. In a model view of folk psychology, one could construe the model as offering a causal story of the actual workings of the target. However, construing the model in causal terms doesn't reflect the folk commitment to free will. Human cognitive flexibility is seen in terms of making a choice, and people can be held responsible for the choices they make. Our models of individuals, as well as our models of groups, are largely construed normatively rather than causally. The person who isn't acting like herself is viewed with suspicion (“what is she up to?”), or the person who is acting outside her group norm may be ostracized from the community (“we don't want a cakesniffer around here!”). In understanding other people, we think about what they should do given who they are. This permits prediction and explanation, but attributions of propositional attitudes to others also have the force of a commitment. If he *really* believes that Santa exists, and if he *really* wants a present, he *should be* nice rather than naughty.

The kind normativity I see in folk psychology isn't of a moral or a rational sort, but it is the foundation for developing these more sophisticated normative sensibilities. Infants' early mental states reflect how the world *is*, and how the world *should be*; we have evidence of the latter given their protests when things don't go right. Later, infants begin thinking in other modes, about how things *will be*, how things *were*, and even later about how things *could have been*. Normative thinking is a distinct mode of thought, on a par with thinking about past and future, counterfactuals and possibility, but it is a mode of thought that is central to typical social cognitive engagement. Inspired by Hannah Ginsborg's (2011) notion of primitive normativity, I have developed a corresponding account of the cognitive capacity required for such basic normative practice, which I refer to as naive normativity. The normative lens does not require having any normative concepts or rules. Rather, the normative lens is more accurately characterized by thinking in terms of 'ought' rather than 'is,' and that allows group members to *see how we do things around here* (Andrews 2015a, b, in preparation). The two central elements to naïve normativity are the *we* and the *way*. Having naïve normativity involves having a feeling of belonging, which later leads to in-group/out-group discrimination, and a motivation to do things the way in-group members do them. Thus, engaging in naïvely normative reasoning requires a feeling of belonging which leads to in-group identification as well as identification of the proper behaviors of the in-group.

Others also stress the normative nature of folk psychology. Victoria McGeer argues that the central function of folk psychology, and in particular belief reasoning, is

to help us regulate behavior, not to help us in causal thinking for predicting or offering causal explanations (McGeer 2007, 2015). Regulative practices shape how people act and think, and this makes it easier for people to coordinate with one another. When we use folk psychology to make sense of someone's behavior, we are noting how well the person is living up to the norms, and hence, how intelligible their behavior is. When the behavior fits the model, the pattern that we expect, then we have made sense of that behavior; but when it doesn't, the person becomes unintelligible.

For example, when two people are engaged in a joint action, they should continue to work on the project until it is finished, or until they agree to stop. If one individual walks away mid-project, the partner may inquire, "Why aren't you staying to finish the project?" Suppose the individual answers, "Because we don't have the supplies." This answer sets up another expectation: that if they really do have the supplies, or if the supplies are acquired, the individual will return to the project. Our explanations of our own behavior are mini-contracts with the people to whom we offer them. If we fail to live up to those contracts, then we lose status and trust.

The normativity apparent in our individual and group models reflects the tendency the folk have to construe models as descriptions of how people should act, rather than just as causal stories about how they will act; and it forms the foundation for our ability to coordinate behavior—both at an intimate level between dyads and at a global societal level. Of course, this is not to say that people do not also offer what appear to be causal explanations in terms of mental states ("she thought that going to the opera would make her more cultured") and emotions ("she screamed because she was so happy"). The point is that at its core folk psychological models are interpreted normatively, describing how individuals should act. This difference is illustrated by looking at cultural differences. In Japan, one should walk on the left side of the stairs; in Canada, one should walk on the right. Violations damage coordination and result in protest of one sort or another. There is no reason for one norm over the other, no causal account that is part of the commonsense understanding of how we should do things around here. Norms work so well that they are largely invisible—until visiting a culture that doesn't share them, or teaching an immigrant our ways.

This normative lens through which we see intentional action is at the center of folk psychology and is something we see early on in children, and, as we will see in the next section, may also be present in other species. My working hypothesis is that naïve normativity is an evolutionarily old lens through which we, and some other animals, can't help but see the social world.

### 3. Pluralistic folk psychology in other apes

Once we have identified the various aspects of folk psychology that are part of human social cognition, we can begin to investigate those ways in which other species are similar to, and different from, humans. While a full investigation into these abilities in other animals is an ongoing research project, I can here sketch the kind of evidence we have, and evidence we might look for, in order to do the comparative work. The focus will be on great apes, and in particular chimpanzees, since the majority of the research in social cognition has been done on that species.

Since recognizing intentional agency is key to being a folk psychologist, the first place to examine continuity is in the ability to discriminate intentional action from non-intentional movement. Biological movement is one place to draw comparisons, and here there is data that other species have this capacity. Given the importance of recognizing biological motion for detecting predators as well as potential social and sexual partners, it wouldn't be surprising if many species have the capacity to distinguish agential biological motion from nonbiological motion. Infants of six months respond to point light walkers—moving dots extracted from video of walking humans—as though they are intentional agents, suggesting that infants are sensitive to mere biological movement by this age (Kuhlmeier et al. 2010). Macaques perform like humans when presented with a point light walker display. Like the infants, monkeys show the ability to distinguish the direction of motion, and they display the same pattern of degradation when the stimulus is modified (Churan and Ilg 2001).

The ability to recognize intentional agency has received some attention among animal cognition researchers as well, particularly in research with chimpanzees; and a number of studies suggest the chimpanzees ascribe goals to (what appears to humans as) purposeful behavior (Uller 2004; Warneken and Tomasello 2006). In addition to being able to distinguish between agents and non-agents, chimpanzees also appear to be sensitive to the distinction between the intentional and nonintentional behavior of agents. For example, chimpanzees are more impatient with humans who are unwilling to give them food than with those who are unable to give them food (Call et al. 2004). Chimpanzees can also test to see whether a behavior is intentional or not. A chimpanzee named Cassie noticed when his caregiver started mirroring his movements. Like humans, Cassie would systematically vary his movements while closely watching his caregiver (Nielsen et al. 2005), as through trying to determine whether he was being mirrored.

We have good evidence that chimpanzees and humans share the capacity of recognizing intentional agency. The behavioral evidence suggests similarities between humans' and other primates' perception of biological movement and intentional agency. But these findings shouldn't be interpreted as evidence that nonhuman primates have a concept of desire, intention, or goal, nor from these data alone can we make inferences about the mechanisms underlying these abilities.

### *Pluralism*

What we can do is continue the comparative task, given the evidence that some nonhuman primates can distinguish intentional agents and intentional action from aspects of the nonintentional world. The pluralistic folk psychology approach suggests that the next step is to work through the menu of predictive methods described in Table 1 in order to determine to what extent other apes use and do not use these methods. This is not the venue to rehearse the current state of research on great ape cognitive capacities, though see Table 2 for a summary. For a more in depth discussion of the capacities, see chapters 5 and 6 of *The Animal Mind* (Andrews 2015).

<b>Method of prediction</b>	<b>References</b>	<b>Kinds of evidence</b>
primary intersubjectivity; coordination with caregiver (following Trevarthan	Gómez 2010; Myowa Yamakoshi et al. 2004	Gorilla infant engages in joint cooperative behavior; chimpanzee neo-natal

1979)		imitation.
self-reference	No known data	Unknown whether apes think other apes are like them; future research may investigate using a preference task based on Repacholi and Gopnik 1997.
stereotypes or social roles	de Waal 1982, 2009	Chimpanzee dominance; special treatment of disabled.
situation	No known data	Chimpanzees change behavior in different situations (e.g., boundary patrols), but it's not clear that chimps are predicting others' behavior; future research can look for violations and responses to violations of situational norms.
inductive generalizations over past behavior	Subiaul et al. 2008; Herrmann et al. 2013	Chimpanzees learn traits of unfamiliar humans by watching them interacting with another chimpanzee; orangutans can formulate reputation judgments by observing a human interacting nicely or meanly with another orangutan.
norms	Rudolf von Rohr et al. 2011, 2015; Hockings et al. 2006; Clay 2016	Chimpanzees protest infanticide; chimpanzees aid in road crossing; bonobos protest unexpected social violations
emotions and sensations	Parr et al. 2007; deWaal 2009	Chimpanzees recognize basic emotions on faces; chimpanzee consoles friend after loss.
teleology or goal	Uller 2004	Chimpanzee infants pass Gergely et al's (1995) teleology task.
trait attribution	Subiaul et al. 2008; Melis et al. 2006	Chimpanzees prefer to beg from a generous human donor over a selfish one;

		chimpanzees prefer to select more skillful collaborators
perceptual state	Okamoto et al. 2002; Hare et al. 2000; Karg et al. 2016	Chimpanzee infants track eye direction; chimpanzees seek food that a dominant chimpanzee cannot see; chimpanzees project their experience with opaque and transparent goggles onto another.
causal history	Wittig et al. 2014	Chimpanzees understand the relationships between a past opponent and his social partner.
mindreading belief	Call and Tomasello 1999	Chimpanzees fail nonverbal FB task; there is at this point no published evidence the apes mindread belief.

*Table 2. Evidence that apes use methods of prediction identified in human social cognition*

### *Modeling*

While we have evidence that chimpanzees use some of the mechanisms of Pluralistic Folk Psychology, the question remains whether they use these mechanisms to put together richly drawn models of other individuals and groups. More research will be needed before we can determine whether apes sort individuals into groups, and whether they have higher-order group categories that include various other types. For example, in humans our stereotype of women includes information about personality traits, situational behaviors, norms, and emotions, such that our women stereotype is a higher order category.

However we do have evidence of in-group and out-group thinking in apes, which should be further investigated to see in what ways other apes think about groups. As in humans, the existence of in-group and out-group thought is a developmental process that begins early on. Chimpanzee and human infants spend much of their first few years very close to an adult caregiver—usually the mother. Infant chimpanzees cling to their mothers for the first several years of life, nursing, observing, and feeling her movements. Kim Bard reports that chimpanzee mothers gaze into the face of their infants and spend a lot of time engaged in tactile games. Captive chimpanzee infants reared by humans in rich social settings also display interest in the familiar social games we play with babies. For example, chimpanzee infants have been known to initiate games of peek-a-boo (Bard 2005) and engage in neo-natal imitation, mimicking an open mouth or tongue protrusion demonstrated by a human caregiver when only 7 days old (Bard 2007; Myowa-Yamakoshi et al. 2004).

As infants move away from their mothers, they interact more with members of their social group—other infants, older siblings, adult females, and adult males. At first, infants recognize the quality of their relationship with a caregiver, monitoring their

mothers to learn how to respond to a new situation. Captive chimpanzees raised in a situation in which they have developed attachment bonds to a human caregiver will, at 14 months, and like human infants, alternate gaze between the caregiver and a novel object in order to gain information about the object. Chimpanzees, like human children, also monitor the emotional valiance of the caregiver's facial expression and will withdraw from objects that the caregiver looks on in fear (Russell et al. 1997). In addition 1-year-old chimpanzees look much like 1-year-old human children when tested in the Strange Situation Procedure. Securely attached human and chimpanzee infants will play with toys when the caregiver is present in the strange situation and will seek security at similar rates when the caregiver is out of the room (Van Ijzendoorn et al. 2009).

As adults, chimpanzees draw clear distinctions between in-group and out-group members. They protect their social group through territory patrols that have the function of drawing clear boundaries between different chimpanzee communities. During patrols chimpanzees move to the edge of their territory, searching for signs of incursion. Occasionally they will cross the boundary into rival territory, searching for, attacking, and even killing and mutilating male and infant chimpanzees (Boesch and Boesch-Achermann 2000; Watts and Mitani 2001).

Like humans, chimpanzees need to distinguish their in-group members from their out group members. As chimpanzee females migrate from their natal community into a new community as adolescents, it takes time for them to transition from out-group members to in-group members; when first joining a new community, immigrants have low rank and are the subject of much aggression from resident females (Nishida 1989; Kahlenberg et al. 2008). Male chimpanzees often intervene in these encounters, almost always supporting the immigrant female. It has been hypothesized that immigrant females form strategic alliances with male chimpanzees, leading to a change in the immigrant's acceptance into the community as indicated by dominance status (Kahlenberg et al. 2008).

### *Normativity*

There is some evidence that other apes also see the social world through a normative lens. Recall that naïve normativity is the ability to identify with an in-group and be motivated to do things the way in-group members do. For a long time we have known that human infants use social referencing when deciding how to interact with new people and situations (for a review see Walden 1991; Klinnert 1984)—choosing to play with a stranger when the mother treats the stranger as a friend and choosing not to play with a stranger when the mother does not first interact with the stranger in a friendly way (Feiring et al., 1984). We also know that 14-month-old children imitate in-group members more than out-group members (Buttleman et al. 2013), and that 3- and 4-year-old children prefer to learn from high status in-group members (Chaudek et al. 2012). Early on, children discriminate between those who are *one of us* and those who are *one of them*.

We might expect to see in-group and out-group thinking in chimpanzees given that there are cultural differences between chimpanzee communities (Whiten et al. 1999). Chimpanzee groups use tools differently, they eat different foods, they engage in different courtship behaviors (e.g., leaf clipping), and they groom one another differently (van Leeuwen et al. 2012). It may be the case that chimpanzee self-medicate differently

as well (Huffman 2001). Chimpanzee cultural differences cannot be attributed to ecological differences, since they are also seen in communities that are in close proximity. There is evidence that it takes new immigrants some time to learn the new way of doing things around here, such as a different way of cracking nuts (Luncz et al. 2012; Luncz and Boesch 2014).

These findings about wild chimpanzee behavior led researchers to test how different groups of captive chimpanzees deal with the introduction of a new behavior into their community. A dominant chimpanzee was shown one way to open a puzzle box that has two different solutions. Once the dominant chimpanzee mastered that method, the next ranking chimpanzee was allowed into the chamber to watch the dominant manipulate the box. Just by watching, the observer learned to open the box in the same way the dominant did. This process continued through the community of chimpanzees, and researchers observed a daisy chain effect in which the original method of demonstration spread through the group. Another group of chimpanzees, in which the dominant female was shown the other way of opening the box, resulted in a community that used this alternate method. In both groups, the undemonstrated method of opening the box was discovered, but was rarely adopted and did not spread among the group members. This study suggests that chimpanzees tend to model high ranking individuals and prefer to manipulate an apparatus in the way the dominant does; these drives permit high fidelity faithful transfer through a group (Horner et al. 2006). In another study of social learning in captive chimpanzees, infant chimpanzees mimicked the behavior of a mother model while learning a new skill, even when the tools necessary for achieving the goal were not available (Fuhrmann et al. 2014). Infant chimpanzees do not try to gain nuts when they move their hand in synchrony with their mothers'; they are motivated to imitate their mothers' movements, and this motivation provides the kind of training that later allows infant chimpanzees to better crack nuts when needed. Among free ranging chimpanzees, there are reports that have been interpreted in terms of imitating influential individuals. In one sanctuary community, chimpanzees began to wear grass in their ears after a dominant female adopted the behavior (Van Leeuwen et al. 2014). And, among wild chimpanzees at Bossou, the transmission of the complex hammer and anvil nut cracking style has been described by primatologist Tetsuro Matuszawa as a case of education by master apprenticeship (Matuszawa et al. 2001). A field experiment with that population found that when a new nut type was introduced into the community, individuals would only observe chimpanzees older than themselves; they didn't seek to learn the behavior from younger individuals, even when they were proficient in the behavior (Biro et al. 2003).

While chimpanzees mimic behavior, they won't mimic just anyone. A reliable model is needed, and that reliable model must be of the right type. In a particularly interesting experiment, chimpanzees were shown how to operate an apparatus by a "ghost"—transparent fishing wire. Without a real model demonstrating the behavior, chimpanzees usually failed to learn the new behavior (Hopper et al. 2007), and even when they did learn the action, they demonstrated lower degrees of fidelity (Hopper et al. 2008).

This interpretation of these findings is not universal. Richard More (2013) argues that salience cuing rather than relationship type or prestige preference can account for many of the above findings. Michael Tomasello (2010) argues that the shared

intentionality we see so early in human children is absent in chimpanzees, so while they can coordinate behavior they cannot act together with a shared goal—they do not cooperate.

While it appears that chimpanzees prefer to model high ranking prestigious individuals over low ranking ones, perhaps chimpanzees do not learn by imitating, but instead learn about affordances in the world and act rationally to achieve the end goal. High-ranking individuals may be those who are better at achieving the goal, and so the affordances are more apparent. One reason given for thinking that chimpanzees do not imitate the shape of a behavior, but instead act rationally to achieve a goal, comes from studies of overimitation in chimpanzees. Human infants, famously, will overimitate human models by doing silly and unnecessary actions when a human demonstrator models those actions (Meltzoff 1988; Gergely et al. 2002, but see Paulus et al. 2011). However, in a study in which wild-born sanctuary chimpanzees were presented with an opaque puzzle box with food inside, a human modeled how to open the box, and the chimpanzees faithfully copied all the human model's actions in order to gain the food. But when the chimpanzees were presented with a transparent box, with all the causal structure of the box visible, chimpanzees failed to overimitate, skipping over the unnecessary actions (such as tapping the top of the box with a stick) (Horner and Whiten 2005). This finding appears to be in stark contrast to the finding that children tend to overimitate actions they know are causally irrelevant, even when warned not to imitate the “silly” actions (Lyons et al. 2007).

Like human children who tend to overimitate demonstrators who speak their own language but fail to overimitate demonstrators who speak a different language (Buttelmann et al. 2013), I propose that chimpanzees who are wild born do not overimitate humans (an obvious out-group), but chimpanzees who have close relationships with humans will spontaneously overimitate them (enculturated apes often appear to identify themselves as human). This proposal is consistent with the finding that chimpanzees prefer to imitate high-ranking individuals, and that chimpanzees, like humans, won't imitate just anyone. Perhaps they will imitate in-group members, and high-ranking in-group members, just as we see with human children. To examine this issue, apes with close and high quality human relationships can be examined, such as Tetsuro Matsuzawa and his “research partner” chimpanzee Ai, a cross-species dyad who has been working together for almost 40 years. If Ai prefers to do things the way Matsuzawa does, it would reflect a drive to do things the way her human in-group members do and would support the existence of a normative lens through which the social world is viewed.

The worry that chimpanzees lack shared intentionality, and hence cannot be normative because they lack the we-sense needed for naïve normativity, is undermined by studies of early mother-infant interaction in chimpanzees (e.g., Bard and Leavens 2014) and in the long-term learning of coordinated goals among adult wild chimpanzees, such as hunting monkeys (Boesch 1994), boundary patrols and intergroup aggressive encounters (Mitani and Watts 2001), and road crossing (Hockings et al. 2006). Experiments with captive chimpanzees find evidence of cooperation in order to access out of reach food (Hirata 2003; Hirata and Fuwa 2007; Melis et al. 2006), sharing high quality food (Byrnie et al. 2015) and spontaneously engaging in joint action when given a choice of who to interact with (Suchak et al. 2014). Tomasello's response to the growing

evidence of chimpanzee cooperation [that “in almost all cases the key to understanding their cooperation is this same overarching matrix of social competition” (Tomasello 2016, 23)] is unconvincing, given the range of situations in which chimpanzees cooperate and given the relatively little we know about wild chimpanzees. Studies of cooperation in captive chimpanzees are usually structured around food tasks, and we know from wild chimpanzees that food sharing is not a typical chimpanzee behavior. (Looking for evidence of chimpanzee cooperation in food sharing tasks is like looking for evidence of human cooperation in toothbrush sharing tasks.) Furthermore, captive chimpanzees are often actively discouraged from cooperating, for when they do it can cause mayhem for their keepers. Randy Wisthoff, the director of the Kansas City zoo, reports that a group of chimpanzees who escaped their enclosure in 2014 were led by an individual who, after setting up a log to be used as a ladder, “beckoned to another six chimps to join him” (Millward 2014). If we fail to see cooperation in captive chimpanzees, it may be because we are unwilling, or unable, to offer them the rich environments that lead to cooperation in the wild.

#### 4. Conclusion

In order to judge how humans are like and unlike other apes, we need to start with a solid foundation of understanding the abilities of humans and the abilities of other apes. We also need to have good evidence about the mechanisms that underlie these abilities. This makes it exceedingly difficult to justify general claims of continuity or discontinuity between humans and other animals.

If Pluralistic Folk Psychology is an accurate description of human social cognition, then it serves as a guide for where to look for continuities in social cognition across species. Given what we know so far about chimpanzees, orangutans, gorillas, and bonobos, there appear to be some places of continuity between humans and the other ape species in their social cognitive capacities. Naïve normativity, that lens through which we see others as in-group members we’re motivated to model, or as out-group members we want to distance ourselves from, is something we have evidence for in chimpanzees. Chimpanzees also appear to make generalizations about other individuals, expecting that another will act in the future as he acted in the past. They also expect individuals to act differently in different situations, and to act according to their dominance role. Furthermore, there is some evidence that chimpanzees expect others to obey certain social norms, be it a method of grooming or tender treatment of infants. Whether chimpanzees form models of other chimpanzees is an open question, but one that may be empirically tractable. Our knowledge of chimpanzee social cognition is in its infancy, but we should expect that their social capacities, like our social capacities, would not be primarily based in metacognitive thinking about the hidden propositional attitudes driving behavior. Just as humans see other humans as persons rather than as biological machines operating mechanistically on beliefs and desires, chimpanzees likely see others as individuals with relationships, social status, past histories, capabilities, and skills.

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