**What would imaginary ancestors do?**

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**Abstract**

In this paper, I identify a novel challenge to reasoning about human cognitive evolution. Theorists engaged in producing a causal history of uniquely human psychology often implicitly or explicitly take the perspective of imaginary hominins to reason about a plausible evolutionary sequence. I argue that such speculations only appear plausible because we have employed our evolved cognitive capacities to decide what the imaginary hominin would think or do. Further, I argue that we are likely to continue making this kind of mistake, and so we must continuously contend with it, even in our best approaches to human cognitive evolution.

**Introduction**

The unique features of human cognition and behavior call for an explanation of their origins and evolution, but this has been notoriously difficult to achieve. Many challenges have to do with a lack of evidence – empirical evidence of ancestral hominin behavior and cognition is relatively limited, and what is available is difficult to piece together. Most obviously, we cannot go out and observe the behavior of extinct hominin ancestors. Fossils of our extinct relatives are rare, the information those fossils provides degrades over time, and even our best fossil specimens preserve information about behavior and cognition only indirectly (Turner 2005). By the standards of evolutionary reconstruction for other species, our closest living relatives are not very close, and our clade appears to be sparse overall – there are few species, extant or extinct, with which to compare our behavioral and cognitive traits (Kaplan 2002).

Despite these challenges, the fact remains that human cognition *did* evolve. Our complex, plastic minds have an evolutionary history and, at least in principle, we should be able to discover it. And we ought to do so – as Kim Sterelny has remarked, “Our evolutionary history *must* be an important part of the explanation of our being the kind of creature that we are” (Sterelny 1995, 365, emphasis mine). The persistent problem is how biologists and evolutionary theorists can and should investigate the evolution of human cognition in light of the challenges above.

Aside from problems with the availability of evidence, a recent and prominent hypothesis has brought to light a general problem for reasoning about the evolution of human cognition. This is Michael Tomasello’s Shared Intentionality Hypothesis (SIH). In this paper, I argue that in several important instances, Tomasello and other theorists have made an especially pernicious mistake in reasoning about the evolution of human cognition: they have judged it plausible that particular inferences would be readily available to an imaginary ancestor on the basis of how easy, natural, or obvious modern humans find that inference. Further, they rely on these misplaced judgments of plausibility as evidence. I argue that because of the unique problems for modern humans reasoning about the evolutionary history of cognition, we should expect even experts attuned to this problem to continue to make mistakes of this kind when imagining the perspective of ancestral hominins.

I focus on Tomasello’s hypothesis for several reasons. It is generally well-received as a recent hypothesis for the evolution of human cognition and has attracted considerable attention in philosophy of science, evolutionary theory, and philosophy generally.[[1]](#footnote-1) It also contains particularly illustrative instances of the error I aim to characterize here. More broadly, Tomasello’s hypothesis represents an emerging approach to human cognitive evolution that contrasts with mainstream Evolutionary Psychology.

Several frameworks for studying the evolution of have emerged and receded over the 20th and 21st centuries. Paul Griffiths separates four distinct phases: instinct theory, classical ethology, human sociobiology, and Evolutionary Psychology (Griffiths 2011; 2006). The sociobiology of Edward O. Wilson’s *Sociobiology: The New Synthesis* was largely replaced by the Evolutionary Psychology of Jerome Barkow, Leda Cosmides, and John Tooby after extensive criticism (Griffiths 2011).[[2]](#footnote-2),[[3]](#footnote-3),[[4]](#footnote-4) Evolutionary Psychology remains the mainstream approach to the evolution of human cognition, though it too has been the subject of much criticism (Griffiths 2011; 2006; Downes 2016).[[5]](#footnote-5) There are, however, a variety of approaches to human cognitive evolution, as Griffiths (2011) emphasizes and, e.g., Scher and Rauscher (2003) exemplifies. Several recent hypotheses, including Tomasello’s, seem to be united as an alternative approach in virtue of their *narrative* structure.[[6]](#footnote-6) The approach consists of empirically establishing the ‘endpoints’ of the relevant portion of evolutionary history – the Last Common Ancestor (LCA) shared among humans, chimpanzees, and bonobos on the earlier end, and modern human cognition on the later end – and then reconstructing, in as much detail as possible, the events and conditions that served as selective pressures and the gradual changes in cognition along the hominin lineage. Theorists endeavor to synthesize a wide variety of evidence to do so. This results, ideally, in a comprehensive causal sequence capturing the evolutionary history of uniquely human cognition.

In addition to Tomasello’s SIH, exemplars of the narrative approach include Sarah Blaffer Hrdy’s *Mothers and Others* (2011), Celia Heyes’s *Cognitive Gadgets* (2018), Kim Sterelny’s *The Evolved Apprentice* (2012), *The Pleistocene Social Contract* (2021), and, with Ronald Planer, *From Signal to Symbol* (2021). The development of these hypotheses and the narrative approach they represent is exciting, as their historical narrative structure provides a potentially promising strategy for incorporating the directives that have come out of debates on adaptationism and criticisms of Evolutionary Psychology.[[7]](#footnote-7) These narrative hypotheses are historically focused and phylogenetically constrained, their temporal scope makes them well-suited to tracing gradual changes in selective pressures over time, and their sequential causal structure means they need not commit to one sort of cause over another and can easily incorporate adaptive hypotheses as well as environmental events or developmental constraints.[[8]](#footnote-8) However, the narrative approach may also invite speculation more frequently than other approaches (Currie and Sterelny 2017). Because they aim for a detailed causal story, authors of narrative hypotheses must make and justify a large number of constitutive causal claims, including adaptive hypotheses about the origins of particular cognitive capacities. The relatively poor evidential situation leaves theorists with gaps in the narrative that cannot be straightforwardly filled, potentially inviting speculation. This may mean that the narrative approach is more susceptible to the errors in taking the perspective of early humans that I demonstrate here – that is to say, theorists engaged in the narrative approach may encounter more occasions on which they are liable to make these errors. This should be taken into account in our evaluation of these hypotheses in particular and the narrative approach overall.

The paper proceeds as follows: in §1, I introduce several examples of the sort of error I aim to illustrate. I identify two occasions in Tomasello’s defense of the SIH on which he uses an explicit thought experiment to establish a causal claim on the basis of perceived plausibility of certain inferences from the point of view of early humans. In §2, I argue that Tomasello’s is not an ordinary adaptationist error. I give two other instances of the same sort of mistake that also reveal its severity – because theorists are reasoning about imaginary ancestors, it is especially difficult to identify and correct the error. Further, some results from empirical psychology suggest that as modern humans, we are in a relatively worse psychological position to avoid making this error compared to contexts in which we are reasoning about other, non-cognitive traits. I then conclude with some positive suggestions. While judgments about the ease or obviousness of an inference from the perspective of agents without the cognitive capacities that facilitate those inferences will never be acceptable as evidence, this does not mean that causal claims about the origin of such capacities could not, in principle, be established. I argue that even if the narrative approach presents opportunities for dangerous speculation of the kind described here, the promise of the approach overall gives us good reason to characterize, evaluate, and pursue it.

**§1 Thought Experiments in the Shared Intentionality Hypothesis**

Tomasello presents and defends the SIH across three books: *A Natural History of Human Thinking* (2014), *A Natural History of Human Morality* (2016)*,* and *Becoming Human: A Theory of Ontogeny* (2019). He strives to develop his hypothesis in line with comparative psychology and the phylogenetic history of hominins and their closest relatives – a considerable portion of his books are concerned with properly characterizing the LCA. His extensive work on primate psychology informs this characterization. He assumes that the cognitive capacities shared among humans, chimpanzees, and bonobos were present in the LCA, and this forms the ‘starting point’ for his narrative. He then assumes that the unique features of modern human cognition developed as adaptive responses to selective pressures on populations along the hominin lineage, and attempts to reconstruct the events, changes in selective pressures, and concurrent changes in hominin cognition such that the cognition of the LCA was gradually modified to produce modern human cognition. Because I will discuss several specific examples that come from Tomasello’s presentation of the SIH, a summary of its main tenets will be useful. In *A Natural History of Human Thinking* (2014)*,* Tomasello posits three major stages of human cognitive evolution:

1. *Individual intentionality* is a type of thinking in which an organism can cognitively represent experiences, simulate the effects of actions it might take on those representations, and take such simulations into account in determining the organism’s own behavior. The thinker can represent behavior of another agent, but only as a relevant feature of the environment to the thinker. An organism with individual intentionality may, e.g., exploit cues for another agent’s intention as a relevant factor in determining its own behavior, but it does not conceive of the other agent as having intentions like its own (Tomasello 2014, 9).
2. *Joint intentionality,* the second stage and Tomasello’s primary novel proposal, is a kind of thinking in which only two partners can conceive of themselves as jointly holding the same intention, while also representing their own individual roles and perspectives (Tomasello 2014, 33)
3. *Collective intentionality* is the later end of the narrative – it is the abstract, group-oriented thinking of modern humans. Modern humans can coordinate with any member of the group, as opposed to the transient pairs of joint intentionality. Modern humans form “objective” representations (from “anyone’s” perspective), make inferences vias reasons that “anyone” should find compelling, and adhere to norms that would apply to any member of the group (Tomasello 2014, 81).

Because individual intentionality is found in both great apes and modern humans (though modern humans have joint and collective intentionality in addition), it is attributed to the LCA and forms the ‘starting point’ for the evolutionary history of uniquely human cognition. Tomasello proposes that an intermediate form of thinking – joint intentionality – “must” have evolved between individual and collective intentionality, emerging about 400,000 years ago (Tomasello 2014, 153).[[9]](#footnote-9)

Tomasello frequently reasons about the conditions in which ancestral hominins would have found themselves and the way that their cognitive traits would interact with and respond to those conditions, resulting a mixture of general causal claims and many adaptive hypotheses. It is in several of these adaptive hypotheses that we find Tomasello appealing to thought experiments. I discuss two of them here. Both apply to the second step of the SIH – the transition from joint intentionality to collective intentionality. They do not concern the entirety of joint and collective intentionality, but rather are focused on particular cognitive capacities that Tomasello thinks of as components of each.

In **TE1** below, Tomasello proposes a start to the formation of abstract linguistic constructions by proposing a way that early humans might have acquired the capacity to create novel combinations of communicative conventions – a step on the way to modern human linguistic capacities as well as modern humans’ abilities to represent and reason about the mental states of others (also called “theory of mind”). Abstract linguistic constructions emerged, Tomasello claims, due to the “demands” presented by situations in which the intended meaning of a communicator’s gesture is not understood by the recipient (Tomasello 2014, 99). “Linguistic constructions begin with such simple item-based schemas but then are elaborated and made more abstract through discourse interactions,” he writes, “The key aspect of the process for current purposes is the communicative pressure – *the demand for sufficient information* – coming from the recipient. This forces the communicator to make things explicit that he otherwise might have left implicit” (Tomasello 2014, 99, emphasis mine). We need to be convinced first that when a communicator is faced with a situation in which it would help to make intentions explicit, they would recognize this and forge novel connections among conventions with ease, and second, that once such a novel connection is formed, it is similarly easy to generalize and apply this pattern to other conventional gestures. Because Tomasello’s wording and presentation of his thought experiment are important to my argument, I quote it at length. It runs as follows:

**TE1** If we imagine early modern humans with a small inventory of single-unit (holophrastic) communicative conventions, along with general cognitive abilities for creating novel mental combinations (possessed by all apes), we can easily imagine them creating multiunit linguistic combinations. And so, for example, perhaps there was a communicative convention for requesting eating by moving the hand to the open mouth. And perhaps here was an unrelated communicative convention for requesting going foraging for berries (miming a picking motion). It would not take a genius, in a situation in which someone offered something unpalatable to eat, to gesture eating followed by berries. Then, given an existing ability for schematization (possessed by apes and early humans, but now applied to conventions), one could imagine this individual generalizing the conventional eating gesture to other conventional food gestures, much like human toddlers do as they first say things like “more juice,” followed soon by “more milk,” “more berries,” and so forth in a “more X” pattern (Tomasello 2014, 99).

The inferences described in **TE1** – first creation of the new conventional phrase “eat berries,” and second the generalization of that combination’s form to other conventional gestures – must be plausible enough to conclude that inferences of this type were easy for (some significant proportion of) early humans who *do not have the cognitive capacities of modern humans*. Such inferences must occur frequently enough to drive abstract construction formation and to be a factor in the evolutionary transition from joint intentionality to collective intentionality.

We were supposed to find it plausible that an early human could have strung together conventional representations of the concepts “eat” and “go foraging for berries” in response to being offered something unpalatable and mean, “I do not want to eat that, and I want to eat berries instead, so let’s go forage for some berries to eat.” Further, we should find it plausible that the same individual could generalize that innovation and apply it to other conventional gestures. But to convince us, Tomasello asks us to imagine that an early human with single-unit conventional gestures and remarks that “it would not take a genius” to begin using conventions in novel mental combinations. To convince us that the imagined early human could generalize the innovation, “one can imagine” that they would generalize the way that human children do. The “demand for sufficient information” is presented as an objective communicative need, and the response as a readily available solution. But when we judge these statements, we are assessing how easy it would have been for an early human (again, by hypothesis, without our modern human cognitive capacities) to make the kind of connections that we routinely make *using* our capacities for abstract linguistic construction. As a modern human with the ability to use such schemas to innovate with conventions, it *is* obvious that appending the gesture for “eat” to “forage for berries” should modify the meaning just so, and it *is* obvious that this is a useful thing to do across a variety of communicative contexts. But we are not in a position to evaluate how obvious such inferences would be without the capacities that we already have. We have no experience of cognition without abstract constructions already in place; we cannot, based on our own experience, conclude that it would be easy for an early human to form and generalize them prior to their emergence.

Tomasello presents this next thought experiment when he argues that early humans limited to communication by pantomime would have found themselves in situations where the recipient did not immediately associate the relevant background assumptions or common ground information with the communication at hand. Situations like this, he claims, demand the communicator to make those assumptions explicit to help the recipient comprehend. He therefore must show that first, a situation of this particular ambiguity would arise, second, that such a situation demands the hominins involved to innovate and provide additional, explicit assumptions to supplement the original communication, and third, that communicating in this way would then demand the communicator to reflect on their own thoughts in such a way that facilitates collective intentionality. He aims to establish these claims in **TE2**, which runs as follows:

**TE2**: [S]peakers are often forced to make explicit some of the background assumptions and/or common ground to help the recipient to understand. For example, assume we are foraging together for honey, a cultural practice with which we are both very familiar from our cultural common ground. The knowledge we share about this practice… directs many of our activities. Thus, if you go off and start picking and weaving together leaves, I wait for you patiently as we both know that a vessel will be needed for transport. But this shared knowledge is all implicit in our (cultural) common ground. An early human might make this knowledge overt by pointing out to his partner the presence of some appropriate leaves. But now imagine that I, as a modern human, express my intention that you notice the leaves’ presence by means of some shared communicative conventions… This draws your attention to the leaves in much more explicit way, but there is still room for misunderstanding (good for what?). So perhaps you look over at the leaves but draw a blank. Depending on my assessment of what you are not comprehending, I might say, “It’s banyan leaves,’… I am making explicit for you the reason I am directing your attention to the leaves’ presence… [and making] explicit the bases for my own thinking for communicating. Once more, this makes it possible for me to reflect on my thoughts and their connection in a way that I could not when they were only an implicit part of our common ground (Tomasello 2014, 108).

Tomasello is arguing in **TE2** that because it is plausible that ambiguity of this type would arise for early humans, and because a modern human would solve it by further explaining their reasons for behaving as they did, such solutions *evolved to* resolve such ambiguity. Once again, Tomasello has presented us with the “demands” of a scenario and asked us to look inward to see how those demands must be met.

We were supposed to find it plausible that the situation of ambiguity having to do with background assumptions would arise and be recognized as such by early humans, that they would *need* to respond by innovating to make those assumptions explicit, and that this process *makes it possible* for agents to reflect on their own thoughts from the perspective of another. For **TE2** to work, we must have accepted “early humans’ use of spontaneous iconic gesture” (Tomasello 2014, 95). TE2 then serves to convince us that in scenarios that we recognize to be ambiguous in this way, giving explicit, additional information is *demanded*. But this suggests that the fact that this problem and solution seem obvious to us is reason enough alone to conclude that situations of this type would have arisen and provided a selective pressure that *demanded* the particular solution of imagining the perspective of another to decide what relevant information needs to be made explicit. Again, it is our ability to make explicit the relevant background assumptions in response to another’s perceived confusion that makes it the obvious solution to the problem.

The events described in **TE1** and **TE2** may, indeed, seem plausible. But they turn on the assumption that an early human would find the same inferences obvious or easy to make that we do using the very capacities that the early humans, by hypothesis, do not have. In these thought experiments, Tomasello has not simply overlooked the need for empirical evidence to support the causal relationships he is proposing; he explicitly relies on judgments of plausibility instead. Tomasello is imagining exactly the situations in which we employ the capacity in question, and then because we readily use that capacity in that situation, we are to conclude that those situations *demand* that capacity and that its development is a *small enough* step for us to accept it on plausibility alone. To assess the plausibility of the events in the thought experiments, we must make qualitative judgments about what, for the imagined early humans, would have been the *obvious* solution to a problem, what would be *reasonable* to do or think, or what inferences would be *easy* to make. But it is the evolution of those capacities for reasoning that Tomasello is trying to reconstruct – those are the capacities we are imagining the early humans to be without. We do not have access to a cognitive experience without our own evolved capacities. Our judgments of what would be easy or obvious to do cannot be attributed to the imagined agents, and so such plausibility cannot be the basis for accepting the proposed causal claims as steps in the evolutionary history of modern human cognition.

**§2 The Scope of the Problem**

While I have shown that the two thought experiments in the previous section exhibit the same kind of error, one might wonder whether this is no more than a simple mistake or an isolated poor inference. Indeed, this error is similar to the classic adaptationist error of accepting a hypothesis on insufficient evidence simply because it “makes good adaptive sense,” and it is not unusual for the set of adaptationist hypotheses to be determined by what appears “biologically plausible” to the scientist (Griffiths 1996; 2011). However, in this section, I argue that this is not an ordinary adaptationist error. I give two further cases in which theorists made the same kind of error. These will show this is not an isolated mistake – Tomasello makes the same error elsewhere, and other theorists do as well. Indeed, in one case, Tomasello himself was responsible for correcting the error. Evidently it is still difficult to avoid even if one is an expert who is attuned to the problem of projecting human cognition onto other agents. These further examples will also show that the fact that it is human cognition we are concerned with not only makes the error inherently more difficult to avoid making (because, as I emphasized earlier, we cannot imagine an early human reasoning with similar yet importantly different cognitive capacities prior to the evolution of the capacities we use to reason the way we do), but it makes the error more difficult to identify and correct. One reason for this is the problem of evidence discussed in the introduction. Another is our documented tendency to mentalize when observing even minimally ‘agential’ objects. Thus, the error is neither a simple mistake nor an isolated one. In fact, we have reason to expect theorists and anyone evaluating hypotheses for human cognitive evolution to continue to make this sort of error if asked to imagine the perspective of an early human. This is partially due to our tendency to mentalize, and partially due to evidence from work on confirmation bias showing that making thinkers aware of a deeply held tendency does not necessarily prevent similar errors in the future. Imagining the perspective of early humans cannot be performed without significant risk of the errors described here.

**§2.1 Misplaced Morality**

Identifying the error that Tomasello makes in his thought experiments makes sense of a criticism that P. Kyle Stanford proposed in a review of Tomasello’s 2016 book, *A Natural History of Human Morality* (Stanford 2017b). Tomasello argues that the evolution of moral psychology was part of the two-step cognitive evolution described in the SIH. First a precursory morality emerged between partners, and then was scaled up to the group level. throughout the emergence of joint intentionality, social norms emerged alongside the development of the cognitive capacities for jointly intentional collaborative activities – both driven by a selection pressure that pushed ancestral hominins toward obligate foraging (Tomasello 2016). He claims that hominins with capacities for joint intentionality engaged in such collaborative activity would develop a conception of agent-neutral roles in that activity, along with what he calls a “second-personal morality.” Second-personal morality is a kind of self-other equivalence on its way to modern human moral psychology; because I could just as well serve in my partner’s role in the activity, I see us having a kind of equal standing in the execution of the activity. As joint intentionality was gradually scaled up to collective intentionality, the story goes, this sense of mutual dessert was amplified to a sense of responsibility to a group, imposed externally on all members equally.

Stanford points out that on Tomasello’s picture, the distinctly *moral* part of human moral psychology, supposedly explained by the SIH, is actually presupposed. Tomasello means to explain why modern humans feel a *sense of obligation* to adhere to moral norms, rather than some other nonmoral motivation to follow a pattern of behavior. A norm accompanied by this sense of obligation differs from what Stanford calls an “instrumental” norm. Partners could adhere to a norm simply because they are somehow motivated to treat each other in a particular way, e.g., they could have a mere preference for doing so (Stanford 2017b, 372; 2017a). But the problem of jointly coordinating activity requires only the latter instrumental motivation. If this motivation relies on a kind of self-other equivalence, it is only an *instrumental* self-other equivalence. That is, it is possible to recognize another agent as essential to some goal, and to recognize that one should behave toward that agent in a way that modern humans view as fair, for reasons other than a felt sense of obligation. Tomasello gives no reason that instrumental self-other equivalence and its attendant norms should imply that agents also have or would easily develop a sense of obligation to adhere to those norms. There would then be no second-personal *morality* to ‘scale up’ to the group level. Without this, Tomasello has not explained the emergence of humans’ uniquely moral psychology – the fact that certain norms are experienced as externally opposed in virtue of one’s membership in a group *just is* the morality of collectively intentional agents that needs explanation.

Tomasello implicitly relies on the notion that self-other equivalence concerning roles in a joint activity implies (or even just is) a *moral* kind of self-other equivalence in which partners are mutual deserving, i.e., of what *we* would call fair treatment. Without this implication (or identity) between the two, there is no reason to expect that the external moral obligation of collectively intentional agents would emerge from the partnerships of jointly intentional agents. But why has Tomasello committed to this implication (or identity) at all?

This is, I argue, another slide of the same kind made earlier in **TE1** and **TE2**. Modern humans are already equipped with the moral psychology that prompts us to experience some norms as obligatory. For us, violations of norms in a joint activity are not isolated from modern human moral psychology. Suppose a stranger and I happen to be shopping in the same grocery store aisle, and we notice that there are two containers of chocolate-covered almonds remaining on the top shelf. We would each like to purchase some chocolate-covered almonds. A ladder on wheels is nearby, and we agree that I will hold the ladder while my newfound partner climbs up and retrieves the almonds. We have formed a joint goal, unachievable by either of us alone and for which we are instrumentally equivalent (either of us could have held the ladder while the other climbed). But once my partner is safely on the ground, they take both containers and rush away without a word. Our collaboration was purely instrumental – we have no social relationship, no investment in each other beyond the achievement of our joint goal. And yet it would be a sense of *moral* violation that I feel at their taking all the almonds. I, a modern human, would of course *feel wronged* by my partner because they took all the spoils of our joint effort. *For us*, instrumental self-other equivalence *does* result in a sense of moral obligation to one another. But this does not mean that early humans collaborating prior to the evolution of that sense of obligation would develop it simply by recognizing instrumental self-other equivalence. It only seems so plausible that they would because for modern humans who *already have* our evolved moral psychology, instrumental self-other equivalence falls under its purview. Tomasello has – implicitly, this time – taken the perspective of early humans interacting *prior to the evolution of the capacity in question* and used his experience as a modern human to reach conclusions about the course of evolutionary history.

**§2.2 Channeling Chimpanzees**

So this is not a one-off error. But questions remain – could Tomasello have avoided these errors if he were just a bit more aware? In the following example we will see not only that the error is not unique to Tomasello, but also that as far as we typically expect of scientists, he was in a very good position not to make it.

Primate behavioral scientists have long been interested in the cognitive capacities of chimpanzees, both in their own right and in comparison to modern humans. Researchers have been particularly interested in whether (and later, to what extent) chimpanzees have a theory of mind. Daniel Povinelli and his research team famously performed an extensive series of experiments that appeared to demonstrate that chimpanzees do not have theory of mind capabilities (Povinelli 2000). Their most convincing experimental support came from object-choice experiments designed to use chimpanzees’ gaze-following behavior to test for whether they take the perspective of other agents into account in their determining their other behaviors. In one version of the object choice experiment, chimpanzees and three-year-old children were taught to search for a hidden treat under one of two cups. In each trial subjects were kept ignorant of the treat’s location, but an experimenter, facing the subject with the cups between them, either (1) turned and looked *at* the correct cup or (2) turned and looked *above* the correct cup. Children selected the correct cup when the experimenter looked *at* it, but chose randomly when the experimenter looked *above* it, suggesting that they use the experimenter’s gaze as informative of the treat’s location. Chimpanzees, in contrast, showed no difference between the two conditions (though in both conditions they eventually associated the direction of the experimenter’s head with the treat’s location). Along with similar results in other versions of the experiment, Povinelli took this kind of evidence to indicate that chimpanzees have no theory of mind. These experiments, he claimed, revealed the anthropomorphic assumptions underlying a popular existing framework at the time – that of David Premack and Guy Woodruff (1978), who had argued primarily by analogy that similarities in human and chimpanzee behavior suggest that chimpanzees *do* have a theory of mind much like that of humans.

In a later set of experiments, Brian Hare, in collaboration with Tomasello, pointed out that Povinelli’s object-choice experiments place chimpanzees in a *cooperative* context, while a competitive context is much closer to the natural cognitive challenges for chimpanzees (Hare and Tomasello 2004). They noted that the results from Povinelli appear to be in tension with observational studies, like those of Goodall (2000) and de Waal (1982), in which chimpanzees had been observed to refrain from retrieving food that they could see until others had left the area and to use their hands to obscure signals like facial expression from groupmates. Hare and Tomasello revealed that Povinelli’s implicit assumption that chimpanzees would understand an experimenter’s intent to cooperate with them in a situation that, in a context more usual for a chimpanzee, would have been competitive. Chimpanzees do not (unless by accident) indicate the location of food to other chimpanzees when they could very well obtain that food themselves, so why should we expect a chimpanzee to understand that a human means to do so? By instead constructing a competitive context in which chimpanzees were tested for representation of the mental states of known competitors (dominant in-group chimpanzees), Hare and Tomasello’s team found that chimpanzees did demonstrate a limited ability to change their behavior depending on what their competitor could or could not see (Hare, Call, and Tomasello 2001; Hare and Tomasello 2004; Call et al. 2004). Given the choice between a piece of food that was visible to both the subject and their competitor and a piece that was visible only to the subject (behind an occluding object the same distance away), chimpanzees preferred to retrieve the piece unseen by the dominant. They concluded that chimpanzees can indeed represent and utilize the perspective of their competitor.

What should lead Povinelli and his research team to assume that the best context in which to test for theory of mind would be one in which another agent is trying to help you? For highly cooperative, social primates like us, a cooperative context is entirely natural. But chimpanzees, who are our closest extant relatives but are importantly different in cooperative features, were simply out of their element. It was evidently difficult to see that another species might exhibit the same sort of capacity under different circumstances but not under the ones familiar to us. It appears to be very difficult to avoid the influence of familiarity with human cognition in the study of non-human primate behavior and cognition. The very researchers who set out to correct influence of this kind repeatedly made a similar mistake: first, Povinelli revealed a problem in the work of Premack and Woodruff. Then Hare, Call, and Tomasello revealed another, similar problem in Povinelli’s work. Now, as we have seen, Tomasello has introduced a new version of the same general problem in the SIH. Premack and Woodruff (explicitly) and Povinelli (inadvertently) imposed their own evolved cooperative cognition on chimpanzees to reach conclusion about what would be easy or obvious for them to understand, just as Tomasello does with our imaginary ancestors.

**§2.3 Consequences**

The fact that it was Tomasello who identified and corrected the error in Povinelli’s experimental setup is non-trivial – clearly he is attuned to the dangers of making assumptions about what organisms with minds importantly different from our own would find obvious or intuitive. Cautionary philosophers of the adaptationism debate would think that Tomasello is in an ideal position *not* to make an error like this. He is informed about the subtle differences between humans and their evolutionary relatives, he is using this knowledge to construct a self-consciously historical hypothesis, and he is attuned to the ways that our intuitions may mislead us in this context. If our best-positioned scientists are considering the best practices from current evolutionary biology and yet failing to implement them in crucial causal claims, perhaps there is something more than an ordinary error going on.

Further, two areas of empirical psychology suggest that our psychology may be stacked against us in identifying that we have inadvertently projected our own cognitive abilities onto an agent (even one who we intended to imagine without them). One is the demonstrated ease and reliability with which humans will assign human-like goals or intentions to entities which we have no rational reason to believe are acting with intention, like shapes moving on a screen (Heider and Simmel 1944; recently replicated in Ratajska, Brown, and Chabris 2020). If humans readily attribute human-like intentions to objects obviously different from us, we should suspect that we are even more likely to do so with agents that are much more like us. Other studies have shown that correcting deeply rooted cognitive tendencies simply by being aware of them is difficult, even ineffective (Pronin 2008; Lilienfeld, Ammirati, and Landfield 2009). If the cognitive abilities that Tomasello is trying to explain in his thought experiments really are evolved traits that we have employed in certain situations throughout our entire development and over generations, we should expect it to be difficult not to use those capacities when mentally simulating those situations. These literatures suggest that we should expect to continue making errors of the kind I describe here, especially in combination with the straightforward fact that we cannot know definitively what it is like to reason without our uniquely human cognitive capacities.

Separately, though, the case of chimpanzee theory of mind illustrates the increased difficulty of identifying and correcting this kind of error in the case of imaginary ancestors. The resources used to identify and correct the error in the chimpanzee case – live, autonomous research subjects are not available to theorists performing (explicit or implicit) *thought* experiments about imaginary ancestors. When reasoning about the perspective, behavior, or thinking of ancestral hominins, we cannot have evidence analogous to the evidence gained from observation and experiment with chimpanzees. We have only the imagined agents to work with. These imaginary subjects are ‘under the control’ of the experimenter. While one can impose constraints on one’s own thinking, it is unavoidable that the decisions made by an imaginary agent are determined by the thinker.

**Conclusions**

If our tendency to use our own cognitive capacities in deciding what imaginary ancestors would do is persistent in a way similar to confirmation bias, this creates a rather bleak picture. We cannot expect to correct the problem by asking theorists to adhere more closely to the standards of adaptive thinking, but also, even if they read this paper and are wholly convinced, they are at best only slightly better off in avoiding the error in the future. It is evidently possible to spot the error, and turning our attention to it gives us a concrete idea of the kind of problems we may encounter in developing and evaluating hypotheses for the evolution of human cognition. But even the considerable effort I have put toward bringing this problem to light cannot simply stop it from occurring. Theorists, and anyone evaluating a hypothesis for the evolution of uniquely human cognitive features ought to adopt a more skeptical attitude toward speculation than they might in other evolutionary hypotheses; because there is an obstacle to our reasoning in this context, a skeptic is epistemically justified and ought not to be considered a pessimist.

And so as I give some positive suggestions, I emphasize that none of these can eliminate the basic problem with this kind of imaginative perspective-taking. Inferences based on judgments about obviousness or ease that are rooted in our own evolved capacities that the imagined agents, by hypothesis, do not have, can never be accepted as evidence, as we are liable to make errors and in a poor position to identify and correct them. However, I have not argued that such claims are in principle impossible to support. It may be unlikely due to the scarcity of evidence, but claims about the origin of some particular capacity could, in principle, be established. What I offer here are not remedies or armor against this error or ways to speculate properly. Instead, I give some reasons that an overall approach like Tomasello’s may be valuable despite the danger it presents for errors like the ones I have described in this paper.

The narrative approach, of which I have taken Tomasello’s SIH to be an exemplar, is distinctly historical in a way that contrasts with Evolutionary Psychology. The structure of a narrative hypothesis – a detailed causal history – is well-suited to a particular event.[[10]](#footnote-10) Narrative hypotheses are not bound to divide and isolate cognitive traits and their selective pressures, as is the reductive, modular program of Evolutionary Psychology (Barkow, Tooby, and Cosmides 1992). Narratives are amenable to any relevant cause (particular events in geological or ecological history, feedback loops and niche construction, etc). The aim of producing a causal sequence over a long period of time that incorporates ecological changes also differs from the aim of Evolutionary Psychology to identify particular selective pressures corresponding to each cognitive module. Instead, authors of narratives adopt a different framework, undergirded by the observation that human cognition appears highly flexible. The assumption is that once certain cognitive structures, features, abilities, etc. emerged, they were broadly adaptive, and so identifying specific functions provides less of a methodological guide. Instead, they adopt a broad strategy of constraint-removal. Rather than asking what the particular function of some cognitive trait would have been, they ask: what factors were in place such that the emergence of the trait was obstructed?

This framing of the question makes sense of Tomasello’s closing remark, “[s]omething like the shared intentionality hypothesis just *must* be true” (Tomasello 2014, 153 emphasis mine). The overall strategy of the SIH is one of constraint-removal – given the capacities of the LCA, what must have happened such that individually intentional LCA populations *could develop* the cognition we observe today? Collective intentionality could not emerge from individual intentionality without an intermediate – the answer is the emergence of joint intentionality. Sarah Hrdy and Kim Sterelny’s narrative hypotheses also adopt this overall approach. Hrdy focuses on constraints on the evolution of brain size – she accepts that once brain size *could* increase, the many selective benefits for the hominin lineage could, so to speak, get to work increasing brain size. The important explanatory feature is what removed the constraint on brain size – for Hrdy, it was the emergence of cooperative breeding in the hominin line (Hrdy 2011). In Kim Sterelny’s apprentice model, the unique developments along the hominin line are the product of complex feedback loops, and it was emergence of early forms of cooperative foraging that *allowed* those feedback loops to take off (Sterelny 2012). For narrative theorists, the emergence of traits cannot contradict selection – the small modifications to cognitive capacities that constitute the narrative must be adaptive at that point in the narrative – but it is the removal of ecological or developmental constraints that takes the primary explanatory role for their emergence. This may reflect a shift toward the kind of integration that philosophers of biology, especially those concerned with developmental processes, hoped would replace traditional adaptationism in evolutionary theory (Amundson 1994; 2011; 2005; Maynard Smith et al. 1985). Treating developmental or ecological features as constraints on evolution is typically considered a method of *excluding* them from properly evolutionary explanations (Lala et al. 2015). But reasoning via ordering the removal of constraints on an evolutionary history whose beginning and end we can study empirically treats the *removal* of those constraints as explanatory, and thus the method is centered around the identification of those constraints.

The above advantages may mean that the narrative approach is worth pursuing even if it has a tendency to invite speculation. More optimistically, it is possible that once characterized and evaluated, the framework of constraint-removal can be improved such that theorists are less likely to find themselves in situations where they have incentive to speculate. This would counter idea that narratives invite speculation, which up to now I have granted in this paper.

My aim in this paper has been to highlight and analyze the particularly difficult problem of reasoning about the minds of our hominin ancestors while inadvertently employing the abilities we are imagining them to be without. The discussion on Tomasello’s approach as representative of a new approach to evolutionary psychology serves to highlight the importance of this error as the methods of this phase take form. Human cognition is a different kind of problem for us than other traits for evolutionary reconstruction, because our evolved cognition affects the way that we think about evolutionary possibilities. The core claims of this paper should serve as a warning about a problem we should expect to encounter again, while the proposed advantages of the narrative hypotheses should serve as cautious optimism about the approach overall.

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1. Tomasello’s work on shared intentionality has seen uptake in the philosophical literature on social epistemology (e.g., Gilbert (2020), Zahavi and Satne (2015)) and in naturalized ethics (e.g., Pettit and Hoekstra (2018), Hourdequin (2012)). The SIH for human cognitive evolution has received attention in philosophical literature on the evolution of cognition and cooperation (e.g., Downes and Forber (2021), Shipton and Nielsen (2015), Heyes (2018), Sterelny (2012; 2021)) – none of these lists are exhaustive. [↑](#footnote-ref-1)
2. See also (Kitcher 1989; Lewontin 1979; Gould 1978; Wilson 1975; Barkow, Tooby, and Cosmides 1992; Crawford, Smith, and Krebs 1987; Sterelny 1992). [↑](#footnote-ref-2)
3. As Griffiths shows, there is a substantial degree of continuity between sociobiology and Evolutionary Psychology. The history of the shift from one framework to the other described here is necessarily compressed; for more thorough treatment see Griffiths (2011)and Downes (2001; 2016). [↑](#footnote-ref-3)
4. Following convention from Buller (2005; 2000), I refer to the framework of Barkow, Tooby, and Cosmides as the capitalized “Evolutionary Psychology” to contrast it with the more general “evolutionary psychology,” which refers to the subject area of the evolutionary origins of human psychology and not to a specific framework. Evolutionary Psychology has also been called the “Santa Barbara church of psychology” (Lala and Brown 2011) and “narrow evolutionary psychology” (Scher and Rauscher 2003). [↑](#footnote-ref-4)
5. Examples include Buller (2005), Lloyd (1999), Lloyd and Feldman (2002), and Kitcher (1989). [↑](#footnote-ref-5)
6. The mention of “narrative” here may evoke Gould’s (1978) charge of sociobiology as “just-so storytelling.” However, as Olmos (2022) has clearly articulated, Gould’s accusation was one of accepting scientific conclusions on insufficient evidence, and had little to do with *stories* as such. I use “narrative” here to capture the temporally ordered causal structure of the hypotheses discussed, similar to Beatty’s (2016; 2017) use in his work on narrative explanation. [↑](#footnote-ref-6)
7. See Gould and Lewontin (1979), Gould (1978), Griffiths (1996), Gray, Heaney, and Fairhall (2003), Amundson (1994). [↑](#footnote-ref-7)
8. I give here only a suggestion that the narrative approach represents an emerging “phase” in the study of human cognitive evolution; the suggestion is meant to motivate the special attention I will give to these hypotheses here. The prospect for a full account of the narrative approach including a detailed comparison to Evolutionary Psychology and other frameworks is discussed briefly in the conclusion of this paper but is primarily the subject of work in preparation. [↑](#footnote-ref-8)
9. For a more comprehensive review see Peters (2016). [↑](#footnote-ref-9)
10. See Beatty (2017), Sterelny (2016), Currie (2014) for discussion on narratives. [↑](#footnote-ref-10)