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From Infants to Great Apes: False Belief Attribution and Primitivism about Truth

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Abstract There is a growing body of empirical evidence which shows that infants and non-human primates have the ability to represent the mental states of other agents, i.e. that they possess a *Theory of Mind*. We will argue that this evidence also suggests that infants and non-human primates possess the concept of truth, which, as we will explain, is good news for primitivists about truth. First, we will offer a brief overview of alethic primitivism, focusing on Jamin Asay's conceptual version of the view. Next, we will survey relevant work on Theory of Mind which indicates that children younger than two and non-human primates are able to attribute false beliefs. Then, we will bring these false-belief data to bear on Asay's form of primitivism, arguing that the data support two of the four distinctive theses of this view and offering some remarks about the empirical evaluability of the two remaining theses. We hope that our discussion will help to bridge the gap between psychological and philosophical inquiry and that it will encourage further empirical research on the cognitive significance of the concept of truth for humans and other thinking creatures.

Keywords primitivism about truth; deflationism about truth; experimental philosophy; developmental psychology; false belief attribution; theory of mind

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1 Introduction

Suppose there is a box of cookies on the table, and we watch Anja eat the last cookie. Lucjan enters the room after Anja finishes eating the cookie and sees the box of cookies on the table. Unbeknownst to Lucjan, there are no cookies left for him to eat. We know that he doesn't know that Anja ate the last cookie because we were the only people who saw Anja eat the last cookie. Because Lucjan didn't watch Anja eat the last cookie and because we didn't tell him that she ate it, we attribute to Lucjan the false belief that there is at least one cookie that remains in the box. We also understand that some people hold and act on false beliefs. So, we would be correct to ascribe to Lucjan the false belief that there is a cookie in the box and to predict that because he has this false belief, he will reach for a cookie in the box.

Adults are able to draw inferences about others' mental states to make sense of their actions and interactions, and it seems that having a concept of truth plays a necessary developmental role in acquiring this ability. How and when this ability develops in humans and non-human primates has been widely discussed in psychology and cognitive science. But until now, very few philosophers have considered developmental psychology in general and false belief attribution in particular an important part of philosophical theorising. Our intention here is to show how the literature in developmental psychology on the issue of false belief attribution, which has developed over the past forty years, may inform at least one debate regarding truth.

There is a growing body of empirical evidence showing that infants younger than two years old and non-human primates have the ability to represent the mental states of other agents, i.e. that they possess a *Theory of Mind*. We will argue that this evidence also suggests that infants and non-human primates possess the concept of truth (hereafter "TRUTH"). This evidence for the possession of TRUTH by infants and non-human primates provides, as we will explain in Sect. 4, some good news for primitivists about truth.

Here is how the paper will unfold. In Sect. 2, we will offer a brief overview of alethic primitivism, devoting particular attention to the conceptual variety of primitivism that has been extensively defended by Jamin Asay. In Sect. 3, we will survey relevant work on Theory of Mind which indicates that children younger than two and non-human primates are able to attribute false beliefs. In Sect. 4, we will bring these false-belief data to bear

on Asay's primitivism, arguing that the data support two of the four distinctive theses of this view and offering some reflections on how the two remaining theses might be empirically evaluated going forward. In Sect. 5, we will offer some brief concluding remarks.[2]

2 Alethic Primitivism

A primitivist theory of truth, or a version of what we shall call *alethic primitivism*, is a theory according to which truth cannot be analysed in more fundamental terms. Most philosophers who have developed theories of truth have tried to explain what truth is by isolating concepts, properties, or relations that are more fundamental than truth and then offering a reductive definition of truth in terms of those concepts, properties, or relations. Alethic primitivists maintain that this is simply a hopeless enterprise, because truth is as fundamental as it gets. In light of truth's fundamentality, primitivists maintain, the most that we can hope for is an analysis which connects truth to concepts, properties, relations, etc. that are either less fundamental than or equifundamental with truth.[3] In this way, alethic primitivism goes against the grain of many of the most influential investigations of truth.

2.1 Conceptual vs. Metaphysical Primitivism

Alethic primitivism comes in two main varieties, and it will be important in what follows to differentiate between them. *Conceptual primitivists* hold that the concept TRUTH exists but cannot be analysed in terms of more fundamental concepts. A classic statement of conceptual primitivism comes from Donald Davidson, who suggests that:[4]

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[2] When we had nearly completed this chapter, we learned that in an underappreciated article, Nulty (2008) argued that the data from developmental psychology on false belief attribution in infants and children provide reasons to think that TRUTH is primitive. Specifically, Nulty argues for four main claims: (i) that there are good reasons for believing that possessing TRUTH precedes mastery of a truth predicate; (ii) that TRUTH has a metaphysically robust content; (iii) that the pre-linguistic role of TRUTH offers an explanation for why the concept might be conceptually primitive; and (iv) that the developmental data lend themselves to a novel version of the success argument against deflationism (Nulty 2008, p. 106). In what follows, it will emerge that we agree with (i), (iii), and (iv) but will remain neutral on (ii). We will also offer an up-to-date discussion of the relevant issues that reflects recent work in developmental psychology as well as recent work on primitivist theories of truth, especially that of Asay.

[3] For illuminating remarks on the role of conceptual analysis in theories of truth, see Asay (2013c, Sect. 1.2.3).

[4] Other defenders of conceptual primitivism include Frege (1918, 1979), Sosa (1993a, 1993b, 2001), and Patterson (2010).

> For the most part, the concepts philosophers single out for attention, like truth, knowledge, belief, action, cause, the good and the right, are the most elementary concepts we have…Why then should we expect to be able to reduce these concepts definitionally to other concepts that are simpler, clearer, and more basic? We should accept the fact that what makes these concepts so important must also foreclose on the possibility of finding a foundation for them which reaches deeper into bedrock. (Davidson 1996, p. 264)

We'll have more to say about TRUTH in what follows. To capture the basic idea behind conceptual primitivism, though, it will suffice to note that whatever other characteristic features it may have, TRUTH is meant to be a mental entity that we deploy whenever we have thoughts involving truth. If Harold is talking with Paul and he thinks to himself that all of Paul's predictions about the New Zealand housing market have turned out to be true, then in having this thought, Harold uses TRUTH. Conceptual primitivism entails that there are no more fundamental concepts in terms of which we can analyse TRUTH.

The second basic variety of alethic primitivism is *metaphysical primitivism.* Metaphysical primitivists hold that the property/relation of truth (hereafter "*truth*") exists but cannot be analysed in terms of more fundamental properties/relations. Two notable articulations of metaphysical primitivism come respectively from the young G.E. Moore and Trenton Merricks:[5]

> A proposition is constituted by any number of concepts, together with a specific relation between them; and according to the nature of this relation the proposition may be either true or false. What kind of relation makes a proposition true, what false, cannot be further defined, but must be immediately recognised. (Moore 1899, p. 180)

> I conclude that *being true* has no analysis. That is, *being true* is a primitive property. (Merricks 2007, p. 183)

[5] See also Moore (1901-2). In his early work, Russell also endorsed metaphysical primitivism; see Russell (1904, 1906/7, 1994).

Again, a great deal can of course be said about *truth*, and we will say a bit more in Sect. 2.2. However, when fixing the basic idea behind metaphysical primitivism, it suffices to note that *truth*, whatever other features it might have, is meant to be the property that is possessed by all and only the true truth-bearers. If propositions are bearers of truth and Maria asserts the proposition that Auckland is New Zealand's most populous city, then the proposition that Maria asserts possesses *truth*, since Auckland is indeed New Zealand's most populous city. By contrast, if Maria had asserted that New Plymouth is New Zealand's most populous city, then the proposition that Maria asserted wouldn't have possessed *truth*. Metaphysical primitivism entails that in attempting to better understand the nature of *truth*, we will not be able to identify properties that are more fundamental than *truth* in terms of which we can analyse its nature.

Conceptual and metaphysical primitivism are mutually consistent, so one could certainly endorse both of them. However, since the views have distinct targets–TRUTH and *truth*, respectively–it is also possible to endorse one of these views and reject the other. Indeed, the foremost contemporary defender of alethic primitivism, Jamin Asay, has taken great pains to develop and defend a unique variety of conceptual primitivism while also roundly rejecting metaphysical primitivism. In what follows, our concern will be to determine how Asay's conceptual primitivism stacks up against the false-belief data, so we will now rehearse the main components of this view.

2.2 Asay's Conceptual Primitivism

While alethic primitivism has been endorsed by a number of prominent philosophers, including those mentioned above, no philosopher has defended the view as meticulously and creatively as Jamin Asay. Over a substantial body of work,[6] Asay has developed a systematic case for a theory of truth which aims to harmonise two outlooks on truth that are standardly thought to mix about as well as oil and water. The first outlook is primitivism, and the second is *deflationism*, a characteristic thesis of which is that *truth* is an insubstantial property. Asay has argued that primitivism is most attractive when it is offered as a theory of TRUTH, whereas deflationism is most attractive when it is offered as a theory of *truth*.

[6] See Asay (2013a, 2013b, 2013c, 2014, 2016, 2020, 2021a, 2021b).

Our aim in this paper is to reflect on what the false-belief data teach us about the primitiveness of TRUTH. To properly investigate this issue, it will be essential to associate the idea that TRUTH is primitive with testable empirical hypotheses about TRUTH. We take Asay to have developed several hypotheses of this kind. In the remainder of the paper, we will set aside Asay's deflationary account of *truth*, as this component of his views is not germane to our discussion here.

Asay's conceptual primitivism consists of four main theses about TRUTH:[7]

Fundamentality: TRUTH is fundamental—it cannot be analysed in terms of more fundamental concepts

Explanatory Indispensability: TRUTH is explanatorily indispensable—we must invoke facts involving TRUTH to explain certain phenomena

Omnipresence: TRUTH is a structural component of every propositional thought

Ability: TRUTH is the ability to have propositional thoughts.

Let's unpack each of these theses a bit further. (Fundamentality) is based on the idea that we should think of concepts as being arranged in a *hierarchical dependence structure*. The basic ideas are (i) that if concept C_1 is at a higher level in this structure than concept C_2, then possession of C_1 depends upon possession of C_2, but not vice versa and (ii) that every concept C that is possessed by some possible thinker is at a determinate level within the structure. To illustrate these ideas, consider the complex concept ELECTRIC CAR. To possess this concept, one must possess the concepts ELECTRICITY and CAR, but not vice versa. This means that the level of ELECTRIC CAR within the dependence structure will be higher than the levels of ELECTRICITY and CAR.

With the idea of this dependence structure in place, we can articulate (Fundamentality) more precisely. (Fundamentality) is the hypothesis that TRUTH is at the ground level of every possible conceptual dependence structure. In other words, (Fundamentality) is the hypothesis that for any possible creature A that possesses any concepts: (i) A possesses TRUTH and (ii) there is no concept C within A's conceptual

[7] See Asay (2013a, 2013c, 2016, p. 189, 2020, pp. 106-107, 2021a, 2021b). Parts of this summary of Asay's conceptual primitivism are based on the summary in Wyatt (2022b).

dependence structure such that possession of TRUTH depends upon possession of *C*, but not vice versa.[8]

So articulated, it is clear that the modal force of (Fundamentality) is quite strong, given that it is meant to apply to all possible creatures.[9] In the following sections, we will restrict ourselves to actual creatures, as the data that we will survey pertain to actual humans and non-human primates. We will argue in Sect. 4 that when it is restricted to actual creatures, (Fundamentality) receives support from these data.

(Explanatory Indispensability) has it that we must appeal to facts involving TRUTH to explain certain phenomena. The issue as to which phenomena these might be is of course controversial, but we can illustrate the hypothesis with a well-known example. Davidson (1984) famously advanced the view that we must invoke facts involving TRUTH to explain facts about what linguistic expressions mean.[10] Davidson would maintain, for instance, that the meaning of the sentence 'New Plymouth is New Zealand's most populous city' is to be understood in terms of this sentence's truth-conditions. If this is right, then it looks as though we simply cannot do without TRUTH in constructing a satisfactory theory of linguistic meaning. In Sect. 4, we will argue that the false-belief data also lend support to (Explanatory Indispensability).

(Omnipresence) has its roots in seminal work on truth by Gottlob Frege. A characteristic passage appears in Frege (1918, p. 293):

> It may nevertheless be thought that we cannot recognize a property of a thing without at the same time realizing the thought that this thing has this property to be true. So with every property of a thing is joined a property of a thought, namely, that of truth.

Here, the idea seems to be that whenever I think that a thing *a* has a property *P*, I am also–or really only just–thinking that the thought that *a* has *P* is true. (Omnipresence) is in

[8] Notice, then, that (Fundamentality) leaves open the possibility that there are (actual or possible) creatures that don't possess TRUTH, as they don't possess any concepts at all. Thanks to an anonymous referee for prompting this clarification.

[9] Asay isn't explicit about what sort of possibility is in play here, so we leave this unspecified.

[10] Asay (2013c, Sect. 8.4) is sympathetic to Davidson's proposal.

league with the stronger interpretation of Frege's remark, insofar as it entails that TRUTH is a component of every propositional thought that is had by any possible creature.

To clearly grasp (Omnipresence), we must define a few terms. A *propositional thought* is meant to be a state of mind–e.g. a prediction, fear, or guess–that has propositional content. Asay suggests that we treat propositional thoughts as being composed of concepts. Moreover, he suggests that we should think of propositional thoughts as having two distinct kinds of conceptual components. Some conceptual components of propositional thoughts are *aboutness-determining*, in the sense that they at least partially determine what the given thought is about. Other conceptual components are *structural*, in the sense that they at least partially determine the structure of the given propositional thought without determining what it is about.

Take, for instance, the thought that either New Plymouth or Cambridge is a New Zealand city. This thought, the idea goes, is composed of the concepts NEW PLYMOUTH, CAMBRIDGE, NEW ZEALAND, CITY, and DISJUNCTION. The former four concepts are aboutness-determining components of the thought, given that the thought is about New Plymouth, Cambridge, New Zealand, and cities. By contrast, DISJUNCTION is a merely structural component of the thought, as this concept gives the thought a disjunctive structure without making it a thought about disjunction.

According to (Omnipresence), TRUTH is like DISJUNCTION, except for the fact that TRUTH is a structural component of absolutely *every* propositional thought that is had by any possible creature. This means that even if we aren't ordinarily inclined to use the word 'true' when describing a thought (e.g. 'the thought that either New Plymouth or Cambridge is a New Zealand city') TRUTH is in fact part of the thought's structure.[11]

(Omnipresence) is meant to apply to all possible propositional thoughts, so it entails that TRUTH is a structural component of every actual propositional thought. Thus at least insofar as it concerns actual propositional thoughts, (Omnipresence) is clearly a hypothesis with testable, empirical content. In Sect. 4, we will suggest that (Omnipresence) is compatible with the false-belief data, though these data do not lend adequate support to this thesis. We will also raise the concern that while (Omnipresence)

[11] Asay (2013a, Sect. 3, 2013c, Sect. 5.2, 2021a, Sect. 3.3) motivates (Omnipresence) using what he regards as a new-and-improved successor to Frege's treadmill argument.

has clearly discernible empirical content, a great deal of methodological work remains to be done on how we should approach an empirical evaluation of this hypothesis.

The last component of Asay's conceptual primitivism is (Ability).[12] In contrast to the three theses that we've described so far, (Ability) is a claim about the *kind* of entity that TRUTH is. According to (Ability), TRUTH is the ability to have propositional thoughts, so that what it is for a creature *A* to possess TRUTH is for *A* to be able to have propositional thoughts.

To get a better purchase on this claim, it is helpful to contrast TRUTH, as Asay conceives of it, with other familiar concepts. NEW PLYMOUTH, for instance, can be plausibly construed as being some kind of mental representation–namely, a representation of New Plymouth. The same goes for many other concepts, including CAMBRIDGE, NEW ZEALAND, CITY, CAULIFLOWER, and GALAXY. By contrast, Asay maintains that TRUTH is not a mental representation; rather, it is a particular sort of ability, and thus differs in kind from any concepts that are mental representations, including perhaps the concepts just listed.

(Ability) certainly raises many difficult and interesting questions, some of which Asay addresses in Asay (2021b). In Sect. 4, we will argue that the false-belief data provide neither direct nor indirect support for (Ability). Much as we do in discussing (Omnipresence), we will also raise the concern that while (Ability) is an empirical hypothesis about the kind of entity that TRUTH is, it isn't entirely clear how to empirically evaluate this hypothesis.

3 False-belief Data

Now that we have reviewed the core theses of Asay's conceptual primitivism, we can shift our attention to the false-belief data. The literature in developmental psychology which shows that a Theory of Mind is present not only in young children but also in infants younger than two years old is very large, and we will only be able to touch on some of the main findings. We will also briefly review some recent studies which have reported data

[12] Asay (2021b, Sect. 4.2) uses (Omnipresence) to motivate (Ability) by way of inference to the best explanation. Since Asay motivates (Ability) using (Omnipresence), (Omnipresence) can be fairly regarded as a more central component of Asay's conceptual primitivism than (Ability). However, treating these theses as being equally central to the view won't substantially affect the discussion to follow.

showing that non-human primates, especially great apes, are able to attribute false beliefs to agents.

Developmental cognitive psychology, and particularly work on Theory of Mind, has focused upon our ability to attribute beliefs, intentions, desires, and emotions to ourselves and others, which allows us to explain and predict others' behaviour. The Theory of Mind literature has primarily focused on the comprehension of false beliefs and the development of this ability in childhood, especially in young children between the ages of three and five (See Wellman et al 2001). Research on Theory of Mind has recently extended into the domain of infant and animal cognition. Looking ahead, one of our main contentions will be that evidence of false belief attribution in pre-linguistic infants and non-linguistic animals suggests that TRUTH is possessed very early on in human development and even among great apes.

3.1 False Belief Attribution in Young Children

The standard experiment used to test for the ability to understand others' false beliefs is the *false-belief task*, which was first developed by Wimmer and Perner (1983) and further employed by Baron-Cohen et al. (1985). In the experiment devised by Wimmer and Perner, children are presented with a story in which a protagonist misses a piece of information and thus, unlike the child participant, has a false belief about the situation. The child participant is then asked to either make an explicit statement about the belief of the protagonist or to predict how the protagonist will act. Children who anticipate that the protagonist will look in the wrong place seem to exhibit an understanding that other people's beliefs may not accurately reflect reality. That is, such children seem to understand that people may have, and act upon, false beliefs.

The early studies completed by Wimmer and Perner, as well as Baron-Cohen et al., were followed up by studies designed to test for when, exactly, young children develop the ability to identify false beliefs in others. Studies on children four and older were successful in finding false belief attribution, but many studies have shown that children under the age of four fail to acknowledge false beliefs even if they answer control questions correctly. Researchers (see Gopnik 1993; Flavell et al. 1990; Perner and Ruffman 2005; Wimmer and Weichbold 1994) found that children younger than four typically cannot identify that the protagonist's belief is false or anticipate that the

protagonist will act upon his false belief. This led them to conclude that there is a radical shift in children's understanding of other minds around the age of four.

In a meta-analysis of 178 studies, Wellman et al. (2001) argued that based upon the accumulated data on differences in children who completed the false-belief task, there is a conceptual shift in children's understanding between three and four years of age. Wellman et al. contend that it is around four years of age where children begin to develop an ability to identify that their own mental representations differ from the mental representations of others. Children under the age of four, according to their meta-analysis, rarely respond correctly to the false-belief task. Perner and Ruffman (2005) went so far as to argue that children undergo a 'conceptual revolution' around the age of four, which enables them to understand false beliefs. Call the view that children develop false belief understanding at around four years of age the *late competence view*.

There have been a variety of explanations given for why this conceptual revolution occurs between the ages of three and four. Some have attributed the failure to pass the false-belief task before the age of four to children's lack of a concept of belief (e.g. Gopnik 1993; Perner 1991), and others have maintained that children younger than four have an incomplete concept of belief (Wellman 1990). Still others have proposed that young children's inability to process large amounts of information leads to errors early in cognitive development (*cf*. Fodor 1992; Frye et al. 1995; Gordon and Olson 1998; Leslie and Thaiss 1992; Mitchell 1996; Riggs et al. 1998; Roth and Leslie 1998; Zelazo 2000).

The late competence view, however, does not come without its challenges. An early study by Chandler et al. (1989) argued that false belief understanding occurs much earlier than the age of four, but fails to manifest because of testing constraints. The standard false-belief task for testing children younger than four seems to require abilities other than understanding others' mental states. For example, Baillargeon et al. (2010) and Bloom and German (2000) have argued that the standard false-belief task requires sufficient verbal and executive control abilities that may interfere with young children's ability to identify others' false belief states.

A second problem with the standard false-belief task is that children under four may not have the requisite linguistic competence to respond to investigators' questions about the scenario. As a result, researchers had to shift from asking questions of child

respondents to employing a non-verbal paradigm to test for children's understanding of false beliefs (see Clements and Perner 1994). Results from the implicit paradigm studies have been mixed, with several studies failing to show that children under four are capable of understanding others' belief states. In the kind of *predictive looking paradigm* employed by Clements and Perner (1994), where researchers measure the child respondent's specific expectation of where the protagonist will search, it was discovered that children do poorly at tasks that require inhibitory control, i.e. the ability to inhibit their impulses and natural, habitual, or dominant behavioural responses to stimuli. However, when researchers corrected for this by modifying the test to account for inhibitory control, children as young as two years and eleven months old were able to pass the false-belief task (see Carlson et al. 1998; Surian and Leslie 1999).

A third problem with the standard false-belief task is that a child's knowledge about a situation may interfere with their ability to respond accurately. Children suffer from a so-called 'reality bias' (see Birch and Bloom 2003; Mitchell and Lacohée 1991).[13] Children with a reality bias are unable to shake free from the constraints of the actual conditions of the world to accurately identify the protagonist's belief states.

Finally, there may be a pragmatic difficulty in interpreting results from the standard false-belief task. When investigators asked children the 'where' question–e.g. 'Where is the hidden object?' as in Clements and Perner (1994)–young children may have interpreted the question as asking for the *actual* location of the hidden object rather than where the protagonist believes the hidden object is (see Southgate et al. 2007; *cf.* Csibra and Southgate 2006).[14]

In short, empirical studies of children's ability to understand others' beliefs have reported mixed but promising results. Whereas some of the early studies found that children between the ages of three and four undergo a significant conceptual shift in

[13] It is unusual that the reality bias did not seem to affect the results reported by Onishi and Baillargeon (2005), who tested for false belief attribution among fifteen-month-old infants. One hypothesis is that Onishi and Baillargeon's studies show that there may be a strong correlation between reality bias and linguistic competence. This suggests that the verbal nature of the standard false-belief task elicits the reality-based response.

[14] The results of Southgate et al.'s (2007) study have not emerged unscathed from the replication crisis in psychology. We will say more about this in Sect. 3.2 and in subsequent sections on the relevance of this research to alethic primitivism. However, suffice it to say here that at least one attempt to replicate the results of Southgate et al.'s (2007) study was unsuccessful (Kampis et al. 2021).

understanding others' false beliefs, more recent studies using modified methods have shown that there is reason to be optimistic about young children's abilities to understand others' false beliefs. When the focus of experiments was pre-linguistic infants, further evidence was collected which showed that infants have an implicit understanding of others' false beliefs.

3.2 False Belief Attribution in Infants

Our main concern in this chapter is whether TRUTH is primitive. The empirical evidence that we have called upon so far suggests that this concept may not be primitive, as there may be a point fairly late in development where we move from not possessing TRUTH to possessing this concept. When completing the false-belief task, respondents are asked to determine whether the confederate in the experiment will act in accordance with their false belief that the object is located where they believed it to be before they left the room. If the respondent is able to identify the confederate as having a false belief, then the respondent must possess the concept FALSITY, and in turn the concept TRUTH. If the respondent isn't able to do this, that is at least an indicator that they don't possess TRUTH and FALSITY. Accordingly, given the mixed results that we have reported so far for respondents under the age of four, one may argue that TRUTH isn't primitive because respondents younger than a certain age are unable to identify false beliefs in the confederate.

Yet, we should point out that these mixed results may have come about because of the experimental methods that were employed, rather than because infants and young toddlers don't possess TRUTH. Studies that employ different experimental methods may be more likely to provide information about young children and infants' abilities than merely asking them a series of questions. Moreover, it is reasonable to hope that such studies will be able to identify a more continuous development from infancy to later childhood.

For instance, in a remarkable study by O'Neill (1996), it was found that two-year-olds were likely to name a toy and gesture to its location when they, but not their parents, had observed someone place the toy on a high shelf, a place not easily discoverable by someone who didn't see a person hide the object. This behaviour suggests that two-year-olds reason about mental states. Because of this study and because of some of the ways

in which false-belief tasks have been modified to identify implicit beliefs in pre-linguistic children, it is sensible to conjecture there is not such a radical conceptual shift between the ages of three and four and that even infants are able to understand others' mental states. We will focus here on two novel sorts of paradigm: *anticipatory-looking paradigm* and *violation-of-expectation paradigm*.

Anticipatory-looking false-belief tasks use a modified nonverbal design to measure a child respondent's spontaneous gaze, which reflects their tendency to anticipate actions. Tasks of this sort have been used in experiments on infants' ability to predict other people's actions (Falck-Ytter et al. 2006). Clements and Perner (1994), whom we mentioned above, were the first to use a non-verbal task to measure children's false belief understanding. In their experiment, they used the standard change of location false-belief task, but instead of asking the child a series of questions and waiting for a response, they tracked children's anticipatory looks while prompting them to anticipate the protagonist's behaviour. Only after the anticipatory phase were the children asked the explicit false-belief action prediction question. They found after analysing children's anticipatory looks that children from two years and eleven months reliably looked at the old location of the now-hidden object in the false belief trials and the current location of the target object in the true belief trials, which indicates an implicit understanding of false belief.[15]

In a later landmark study, Onishi and Baillargeon (2005) discovered that children as young as fifteen months understand false beliefs in others. They used a violation-of-expectation paradigm, which had been used successfully in testing infants' understanding of others' goals (*cf.* Gergely et al. 1995; Woodward 1998). In Onishi and Bailargeon's experiment:

> 15-month-old infants first watched an actor hide a toy in one of two locations [a yellow or green box]. Next, a change occurred that resulted in the actor holding either a true or a false belief about the toy's location. The experiment asked whether the infants would expect the actor to search for her toy based on her

[15] Notably, however, the children involved in the Clements and Perner (1994) study were not able to verbally predict the agent's searching behaviour in the false belief trials. This suggests that they lacked explicit false belief understanding.

> belief about its location, whether that belief was true or false. (Onishi and Baillargeon 2005, p. 255)

In a violation-of-expectation paradigm for false belief understanding, the hypothesis is that children will look reliably longer when their expectation is violated. For example, if the infant expects the actor to search for the hidden toy in the green box because they attribute to the actor the belief that the toy is in the green box, then they should look reliably longer when that expectation is violated, i.e. when the actor looks in the yellow box.[16] This hypothesis was borne out by Onishi and Baillargeon's data. Infants expected the actor to reach where she believed the toy to be, and they tended to look reliably longer when she did not. This suggests that fifteen-month-old infants possess at least an implicit Theory of Mind, which has it that others act on the basis of their beliefs and that others' beliefs are representations that may or may not accurately represent reality.

Besides these two landmark studies reporting experimental evidence of false belief understanding in children younger than two, there have been a number of studies using anticipatory-looking paradigms that show promising results (e.g. Garnham and Ruffman 2001; Ruffman et al. 2001; Senju et al. 2011; Southgate et al. 2007; Surian and Geraci 2012; Surian and Franchin 2020; Surian et al. 2007; Thoermer et al. 2012; Wang et al. 2012). Elsewhere, researchers have used different paradigms to equally good effect, showing false belief understanding in infants between thirteen and eighteen months old (see e.g. Buttelmann et al. 2009; Buttelmann et al. 2014). These results, however, have been challenged polemically, and some of them have been empirically criticised in light of replication failures.

Grosse Wiesmann et al. (2017) have argued that there is experimental evidence suggesting a vast difference between the explicit responses of children who are four years old or older and the implicit responses of younger children and infants. Their data indicate that there is a significant developmental change that occurs between the ages of three and four, such that at three years old, children typically fail the explicit false-belief tasks but children who are at least four years old pass the explicit false-belief tasks. This

[16] This applies equally well to true belief understanding. The infant should look reliably longer when the location in which the actor searches is inconsistent with the actor's true belief about the toy's location. The true belief task begins like the false belief task, but instead of the object being removed from one location and hidden, unbeknownst to the protagonist, in another location, the object is put into the location where the protagonist would expect it to be.

view is further supported by evidence that both three- and four-year-olds pass the implicit false-belief tasks, and the differential developmental trajectory is reflected by the finding that explicit and implicit false-belief tasks do not correlate. Grosse Wiesmann et al.'s view suggests that the syntactic and executive functions required for passing standard explicit false-belief tasks are not present in implicit tasks. So, even if they are capable of passing the implicit false-belief tasks, we should not jump to the conclusion that young children and infants are able to identify false beliefs in others.

The polemical challenges of false belief understanding in infants and young children should not necessarily weigh heavily upon those with an interest in developmental psychology and its philosophical implications. Given the sheer number of studies completed, it should be clear that false belief attribution in children may depend upon contextual factors involved in the experiments themselves. What the literature shows us is that we should refrain from making sweeping claims, such as the claim that *all* children under *any* circumstances are able to attribute false beliefs to others. There could be many different factors that play a role in explaining false belief attribution in infants and young children. Despite this, there is reason to believe that infants as young as fifteen months old are able to attribute false beliefs.

Besides polemical challenges, there remains the replication problem for studies in different subdisciplines of psychology, among them developmental and social psychology. In essence, the *replication problem* is that a novel finding may not be replicated, despite the fact that the replication's experimental design overlaps nearly exactly with the conditions laid out in the original study (see Machery and Doris 2022). In fact, over the past several years, there have been several reports of failed attempts at replicating positive findings with infants and toddlers in non-traditional false-belief tasks (see e.g. Dörrenberg et al. 2018; Kulke et al. 2018). Some of these non-replications suggest that children younger than four possess the capability for false belief understanding (see e.g. Kulke et al. 2018; Poulin-Dubois et al. 2018; Powell et al. 2018). In addition, there is mounting evidence against the validity of data derived from different implicit false-belief tasks.

For instance, in one of the most recent replication studies by Kaltefleiter et al. (2021), the researchers employed the multi-trial, anticipatory-looking false belief

paradigm originally used by Grosse Wiesmann et al. (2017). They failed to find in 185 children aged two to four years old above chance belief-congruent looking in a combined score of two false belief conditions in any of the age groups. Independent of that finding, however, Kaltefleiter et al. did find in all age groups above chance in one of two false belief conditions. They thus conclude that their findings 'are in line with, and add to, the growing number of partial or failed replications of implicit false belief understanding. The increasing number of studies finding no clear evidence of implicit false belief understanding calls into question whether anticipatory looking paradigms exist which can robustly assess children's implicit Theory of Mind abilities' (Kaltefleiter et al. 2021, p. 13).

Replication studies such as that of Kaltefleiter et al. (2021) provide some evidence against the use of anticipatory-looking implicit false belief paradigms. Given the mixed results found by Kaltefleiter et al. (2021), more research should certainly be done on potential internal flaws in anticipatory-looking implicit false-belief tasks for different age groups. However, given our aims in this chapter, we would emphasise that given its breadth, the current evidence in favour of false belief understanding in infants and young children outweighs the contrary evidence provided by these replication studies. Having surveyed this evidence, we will now briefly survey the current evidence on false belief understanding in non-human primates before revisiting Asay's conceptual primitivism in light of these bodies of evidence.

3.3 False Belief Attribution in Non-Human Primates

The design and structure of the false-belief task was outlined long before developmental psychologists began testing young children and infants. In their paper 'Does the chimpanzee have a theory of mind?' Premack and Woodruff (1978) argued that humans are not the only animals that are able to attribute mental states to others and use these attributions to predict others' behaviour. Commentators were quick to point out that if we want to know whether a chimpanzee can reason about others' mental states, it is not sufficient to demonstrate that chimpanzees can predict others' actions, since it is conceivable that they can do so without understanding others' mental states. In particular, if they are presented with a scenario in which an object is in location *l* and asked where the protagonist will look for the object, then the chimpanzee may predict

that they will look in *l* simply because the chimpanzee knows that the object is in fact in *l* (*cf.* Burge 1978; Dennett 1978). A more adequate test would involve predicting the behaviour of another animal based on an inferred mental state that differs from reality– a false belief. This would show that the individual is indeed reasoning on the basis of a mental state attribution, rather than their own belief about the actual state of the world. It seems, then, that the current literature on false belief attributions stems from a question over animal cognition.

Interestingly, if not somewhat ironically, it is only in the recent past that empirical research has tested for whether non-human animals, especially higher primates such as the great apes, can pass implicit forms of the false-belief task. Early work with great apes was conducted by Call and Tomasello (1999), but their study showed that there was no reliable evidence that great apes can pass a non-verbal false-belief task.[17]

Several subsequent studies have fared better than Call and Tomasello's early work. This research has investigated the question whether non-human primates possess a Theory of Mind and, in particular, whether such primates are able to attribute false beliefs to either humans or non-humans.[18] The results have been quite surprising. For example, great apes, such as chimpanzees, bonobos, and orangutans, have passed several implicit false-belief tasks that were designed to test for false belief understanding in human infants (Buttelmann et al. 2017; Krupenye et al. 2016).[19] The paradigms used in these studies were minimally demanding anticipatory-looking tests, so more studies needed to be conducted to ensure that the apes were not just responding to domain-general cues. Tests of the submentalising hypothesis, however, have further confirmed that the apes were, in fact, understanding others' false beliefs (see Krupenye et al. 2017 and Kano et al. 2017).

Just as we have seen with implicit studies in young children and infants, there is room to challenge this interpretation of the empirical findings pertaining to apes. One alternative hypothesis is that the apes learned a rule and acted upon that rule, rather than

[17] Three other studies also supported Call and Tomasello's findings: Kaminski et al. (2008) and two studies by Krachun et al. (2009, 2010).

[18] In a retrospective article on Premack and Woodruff (1978), Call and Tomasello (2008) contend that chimpanzees likely possess a Theory of Mind, but they stop short of saying that chimpanzees have a rich enough cognitive repertoire to understand others' false beliefs.

[19] For an excellent summary of the Krupenye et al. (2016) study, see Bugnyar (2017).

their beliefs about other agents' beliefs. The rule, for example, may be 'agents search for things where they last saw them.' Heyes (1998) proposed an experimental design to distinguish reading an agent's mind from other forms of anticipating an agent's behaviour. In the *goggles test*, goggles are employed to ensure that study participants are not understanding others' belief states based on observable behavioural cues but are rather projecting their own mental states onto them. The goggles test forces the study participant to use their own past experience of visual access through a set of goggles to determine whether others can see through the same goggles. The participant has to understand others' mental states not based upon what the participant observes but by projecting their own mental state onto them. Kano et al. (2019) tested apes using a goggles version of an anticipatory-looking test modelled on earlier anticipatory-looking paradigms. Their findings suggest that great apes 'used their own past perceptual experiences to determine an agent's perceptual access and anticipate how the agent would behave' (Kano et al. 2019, p. 20907).

4 Alethic Primitivism and the False-Belief Data

In Sect. 3, we reviewed the literature on Theory of Mind that has identified false belief attribution in infants and in great apes. In this section, we want to bring these findings to bear on alethic primitivism. Specifically, we will highlight the ways in which the false-belief data either support or fail to support Asay's conceptual primitivism, taking care to outline a couple of empirical concerns for Asay's views.

As we mentioned in Sect. 2, in evaluating Asay's conceptual primitivism, we will only be concerned with what this view entails about the actual world, given that the false-belief data concern actual humans and non-human primates. So construed, each of the distinctive theses of conceptual primitivism is an empirical hypothesis about the actual concept TRUTH. The relevant hypotheses are the following:[20]

> *Fundamentality*$_A$*:* for any actual creature *A* that possesses any concepts: (i) *A* must possess TRUTH and (ii) there is no concept *C* within *A*'s conceptual dependence structure such that possession of TRUTH depends upon possession of *C*, but not vice versa

[20] We employ the subscript "A" to underscore the fact that these hypotheses concern the actual world.

Explanatory Indispensability$_A$: we must invoke facts involving TRUTH to explain some actual phenomena

Omnipresence$_A$: TRUTH is a structural component of every actual propositional thought

Ability$_A$: TRUTH is actually the ability to have propositional thoughts.

4.1 Fundamentality$_A$

Let us first consider (Fundamentality$_A$). The false-belief data lend support to this hypothesis. Young children, including infants, pass the various versions of the false-belief task because they are able to recognise others' mistaken beliefs about the world. For instance, children in both the explicit and implicit false-belief tasks recognise that the protagonist believes that the object will be in the place where they last saw it, rather than where the object is actually located, even though they themselves know the object's actual location. They ascribe a false belief to the protagonist, which means that they possess the concept FALSITY. Given that FALSITY is a complex, negative concept a component of which is TRUTH (in effect, FALSITY is equivalent to NOT TRUTH), these results show that respondents have the more primitive concept TRUTH. That TRUTH is possessed so early in development lends support to the hypothesis that TRUTH is fundamental for humans. By a parallel line of reasoning, the fact that non-linguistic non-human primates are able to pass versions of the implicit false-belief task supports the hypothesis that TRUTH is fundamental for such non-human primates as well. In these ways, the false-belief data lend support in turn to (Fundamentality$_A$).[21]

A critic might suggest that to support (Fundamentality$_A$), it is actually necessary to call on empirical results which *directly* indicate that respondents possess TRUTH, rather than empirical results like the false-belief data that indicate this only indirectly. If this were the case, then it would be reasonable to hold that calling on the false-belief data, as we've done here, isn't an optimal approach.

This concern, however, is misguided. If the empirical studies had tested for possession of TRUTH alone, i.e. used true belief attribution tasks, then (Fundamentality$_A$)

[21] In saying that the false-belief data lend support to (Fundamentality$_A$), we of course mean that they make (Fundamentality$_A$) more probable, not that they entail it.

would not have been nearly as well supported. This is because, as we mentioned in Sect. 3.1, respondents may have a reality bias. Given this possibility, it could be that respondents in studies testing directly for possession of TRUTH aren't attributing a true belief to the protagonist but are rather making predictions about the protagonist's behaviour based upon *their own* beliefs about the actual location of the object.[22] Studies on false belief attribution do not suffer from this problem, so it is preferable to call on these studies in supporting (Fundamentality$_A$).[23]

Another potential concern for our argument is that the false-belief data don't seem to provide support for the hypothesis that TRUTH is *absolutely* fundamental for humans and non-human primates. Rather, a critic might maintain, these data provide support only for a weaker hypothesis. The weaker hypothesis is that young children, infants, and non-human primates possess the concepts TRUTH and FALSITY, where the former is *more* fundamental than the latter, though not necessarily one of the most primitive concepts that humans and non-human primates possess.

In response, we would emphasise that absent evidence that humans or non-human primates possess concepts that are more fundamental than TRUTH, the current data warrant endorsement of (Fundamentality$_A$). We allow, of course, that (Fundamentality$_A$) could be disconfirmed by future studies. These studies might show, for instance, that concepts such as ENTITY, NUMERICAL IDENTITY, or EXISTENCE are possessed earlier in development than TRUTH. Findings of this sort would provide reasons to believe that these concepts are more fundamental than TRUTH. Barring such findings, however, it is reasonable to endorse (Fundamentality$_A$).

4.2 Explanatory Indispensability$_A$

[22] Of course, if possession of TRUTH is necessary for having beliefs, then it would follow that these respondents possess TRUTH. But if this inference were used to support (Fundamentality$_A$), then the support that it provided would be indirect and thus similar in this respect to the support that is provided by the false-belief data. Thanks to an anonymous referee for prompting this point.

[23] A further concern with using true-belief task studies to support (Fundamentality$_A$) is that this would involve looking for confirming evidence, which is subject to cognitive bias, rather than looking for disconfirming evidence.

Turning to (Explanatory Indispensability$_A$), we also take the false-belief data to provide support for this hypothesis. The considerations that are relevant here dovetail with those that we raised in connection with (Fundamentality$_A$).[24]

The false-belief data show significant numbers of humans and non-human primates passing different forms of the false-belief task. Why is it that these respondents pass these tasks, rather than failing them? As we indicated above, the best explanation looks to be that the respondents possess FALSITY and use this concept in attributing false beliefs to the various protagonists. Why is it, then, that the respondents possess FALSITY? As mentioned above, given that FALSITY is an inherently negative and complex concept a component of which is TRUTH, part of the explanation for this fact must be that respondents possess the more primitive concept TRUTH.

The explanans of the second explanation here clearly invokes a fact involving TRUTH, namely the fact that TRUTH is possessed by significant numbers of respondents in extant false belief studies. If we omitted the mention of TRUTH from this explanation, then the explanation would clearly be unsuccessful. These considerations lend support to the hypothesis that to explain some actual phenomena–in this case, the possession of FALSITY by significant numbers of infants, young children, and non-human primates–we must invoke facts involving TRUTH–in this case, the fact that each of these individuals possesses TRUTH. As a result, the false-belief data lend support to (Explanatory Indispensability$_A$).[25]

4.3 Omnipresence$_A$

[24] For additional considerations with which we are sympathetic, see Nulty (2008, Sect. 5).

[25] Initially at least, this result seems to put pressure on deflationary theories of TRUTH, as these theories seem to commit us to rejecting (Explanatory Indispensability$_A$). While we can't go into the details here, it is worth noting that the standard deflationary manoeuvre of invoking a truth schema, e.g. Horwich (1998)'s Equivalence Schema, to eliminate the instance of TRUTH in the explanans of the problematic explanation doesn't seem promising in this instance. Another potential manoeuvre would be for the deflationist to argue that (Explanatory Indispensability$_A$) should be reformulated along the lines that Wyatt (2022a) sketches in discussing deflationism about the property *truth*. An advantage of this manoeuvre is that it would seem to defuse not only the present threat to conceptual deflationism, but also the threat involving assertion that is put forward by Bar-On and Simmons (2007). This manoeuvre seems promising, but we will have to leave discussion of it to future work. Lastly, the deflationist might suggest that what really matters for their purposes is not whether we must invoke facts involving TRUTH to explain some actual phenomena. Rather, they might insist that what matters is whether we must *use* TRUTH to explain some actual phenomena, e.g. the nature of linguistic meaning. If this is correct, then it looks like deflationists can happily accept the argument that we've offered, as that argument only shows that we must *mention* TRUTH in explaining why the relevant subjects possess FALSITY. This response needs to be carefully evaluated, and again, we must leave that evaluation to future work.

When it comes to (Omnipresence$_A$), we are less sanguine. As we mentioned in Sect. 2.2, the roots of the Omnipresence thesis are in the work of Frege. In motivating the Omnipresence thesis, Asay develops an argument that is meant to be a new-and-improved successor to Frege's well-known, and widely criticised, treadmill argument. While we can't go into detail here about Asay's successor argument, it is worth noting that the argument proceeds on purely *a priori* grounds.[26] This may not be a problem in and of itself. However, what we would emphasise regarding (Omnipresence$_A$) is that since this is an empirical hypothesis about the structure of actual propositional thoughts, we should consider how it might be empirically supported.

The false-belief data are clearly compatible with (Omnipresence$_A$), yet they lend no support to it. (Omnipresence$_A$) is a hypothesis about the *frequency* with which TRUTH is deployed in propositional thought. The hypothesis is that whenever an actual creature has a propositional thought, they deploy TRUTH, insofar as TRUTH is a structural component of that thought. The false-belief data don't tell us anything about the frequency with which TRUTH is deployed in propositional thought. Rather, they tell us interesting things about the point in development at which humans possess TRUTH and the range of creatures that possess, and are thus able to deploy, TRUTH.

Going forward, then, we suggest that more work needs to be done to determine how, exactly, (Omnipresence$_A$) should be empirically evaluated. To his credit, Asay recognises that (Omnipresence) has empirical implications (insofar as it entails (Omnipresence$_A$)), but he doubts that it can be directly empirically evaluated. He suggests that:

> [M]y view has empirical implications, in that it's an empirical matter as to which creatures possess which concepts. It's not straightforward, however, that omnipresence can be directly tested by empirical methods. The falsifier would be someone who could assert, believe, and contemplate but didn't possess TRUTH. But there is no independent means of identifying who possesses a certain concept in the absence of (philosophical) views as to what it is to possess that concept. (Asay 2021a, p. 537 fn. 8)

[26] For further details, see Asay (2013a, Sect. 3; 2013c, Sect. 5.2; 2021a, Sect. 3.3).

We would point out that Asay's scepticism about the potential for (Omnipresence) to be directly empirically evaluated seems to be based on a misunderstanding of what it would take to falsify (Omnipresence). For the sake of continuity, we can focus on the restricted (Omnipresence$_A$), but similar points hold with respect to the stronger (Omnipresence).

According to Asay, the falsifier for (Omnipresence$_A$) would be an actual creature that could assert, believe, and contemplate but didn't possess TRUTH. For one thing, this suggestion is slightly misleading, as (Omnipresence$_A$) (like (Omnipresence)) doesn't say anything about assertions, but rather makes a claim about the structure of *propositional thoughts*.

Additionally, even if we restrict our attention to propositional thoughts, Asay's suggestion is inaccurate on another score. It isn't the case that *the* falsifier for (Omnipresence$_A$) is an actual creature that is capable of having propositional thoughts but doesn't possess TRUTH. It's true that this is one state of affairs that would falsify (Omnipresence$_A$), but there are others as well. Another state of affairs that would falsify (Omnipresence$_A$) is one in which an actual creature possesses TRUTH but has at least one propositional thought that doesn't contain TRUTH as a structural component. For instance, if I have the belief that ceramic mugs are solid, and it is the case that this belief is constituted only by the concepts CERAMIC, MUG, and SOLID, then my belief would falsify (Omnipresence$_A$) (and thus (Omnipresence)).

As we think further about how to empirically evaluate (Omnipresence$_A$), then, one issue to consider is whether there are reliable methods for determining which concepts creatures deploy when they have certain propositional thoughts. We expect that phenomenological methods will have a role to play here, but a proper treatment of this issue will have to wait for future work.

4.4 Ability$_A$

Lastly, let us consider (Ability$_A$). Asay's defence of the Ability thesis is subtle and detailed, but we will confine ourselves here to a few brief remarks concerning the empirical evaluation of (Ability$_A$).

First, just as with (Omnipresence$_A$), the false-belief data lend no support to (Ability$_A$). As we indicated just above, these data provide information about how early in development humans possess TRUTH and about how widely TRUTH is possessed among animals. Absent a background theory of concepts, we cannot draw from this information any immediate conclusions about the sort of entity that TRUTH is, e.g. that TRUTH is or isn't an ability or that TRUTH is or isn't a mental representation.

It would certainly be interesting if empirical inquiry were able to determine that (i) the point in development at which most humans come to possess TRUTH is the same as the point in development at which most humans are able to have propositional thoughts and/or (ii) that the kinds of creatures to which we should attribute possession of TRUTH are all and only the kinds of creatures to which we should attribute the ability to have propositional thoughts. However, this sort of inquiry would clearly go beyond the false-belief studies that we have reviewed.

Asay's defence of (Ability) (2021b, § 4.2) consists in an inference to the best explanation from (Omnipresence) (see n. 11). If this argument is strong, then any findings which support (Omnipresence)/(Omnipresence$_A$) will in turn support (Ability)/(Ability$_A$). However, as we indicated above, we know of no current findings that support (Omnipresence$_A$), and more seriously, it isn't entirely clear to us how (Omnipresence$_A$) should be empirically evaluated.

In sum, then, we think that the false-belief data provide reasons to endorse restricted versions of two of the four theses of Asay's conceptual primitivism. The resulting version of conceptual primitivism, which consists of (Fundamentality$_A$) and (Explanatory Indispensability$_A$), is certainly stripped down compared to the theory that Asay develops. Interestingly, though, this stripped-down conceptual primitivism is highly reminiscent of the versions of the view that were defended by Davidson and Sosa (see Sect. 2.1 and Wyatt (2022b)). A key question for future discussions of conceptual primitivism, then, is whether examining the view in an empirical frame of mind should lead us to favour the simpler (Fundamentality$_A$) + (Explanatory Indispensability$_A$) or the more complex variety of the view that Asay puts forward.

5 Conclusion

In this chapter, our aim has been to examine the implications of the false-belief data for the view that TRUTH is a primitive concept. Working with the most detailed articulation of this view, due to Jamin Asay, we have argued that the false-belief data support restricted versions of two of the four main theses of Asay's conceptual primitivism. We hope that our discussion has gone some way towards bridging the gap between psychological and philosophical inquiry and that it will encourage further empirical research on the nature of TRUTH and its cognitive significance for humans and other thinking creatures.

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