

Understanding the aspectuality of belief is regarded by many leading developmental psychologists as a hallmark of full-blown theory of mind. As Hannes Rakoczy (2017, p. 692), who has devoted much work to the experimental investigation of early understanding of aspectuality, has recently put it, “crucially, aspectuality is not just an accidental or peripheral but an absolutely fundamental and essential property of beliefs and other propositional attitudes: there is no grasp of what propositional attitudes are without some basic grasp of their aspectuality.” Providing experimental evidence for understanding the aspectuality of belief in early human childhood is also widely regarded to be a challenging task.

The goal of this post is to argue that, even though it was not the authors’ primary goal, an elegant (2010) study by Victoria Southgate, Coralie Chevallier and Gergely Csibra on early mindreading, widely known as ‘the Sefo task’, does shed light on understanding the aspectuality of belief in toddlers. But first, let me briefly explain what the aspectuality of belief is.

Much philosophy of language and mind has focused on a puzzle first discussed by the logician Gottlob Frege. This puzzle has two sides, one of which illustrates the aspectuality of belief; the other illustrates the *intensionality* of so-called *de dicto* belief-ascriptions.

Consider the following pattern of valid inference:

(1a) Cicero was a Roman orator.

(1b) Cicero=Tully.

(1c) Tully was a Roman orator.

If (1a) and (1b) are true propositions, then so must be (1c). The truth of (1a) and (1b), in other terms, entails the truth of (1c). Similarly, if (1a) is false (and (1b) is true), then (1c) must be false. This inferential pattern is generally valid: in most statements, you can replace a referring expression such as a proper name by a co-referential expression without altering the truth-value of the initial statement.

However, the validity of this inferential pattern no longer obtains in the case of belief-ascription statements such as (2a):

(2a) Sally believes that Cicero was a Roman orator.

(2b) Cicero=Tully.

(2c) Sally believes that Tully was a Roman orator.

While the truth of (1a)-(1b) entails the truth of (1c), the truth of (2a)-(2b) does not entail the truth of (2c). This demonstrates the intensionality of belief-ascription (2a). If Sally doesn’t know that ‘Cicero’ and ‘Tully’ refer to one and the same individual, then she may hold the belief that Cicero was a Roman orator without believing or even while disbelieving that Tully was a Roman orator. The fact that Cicero was a Roman orator is exactly the same fact as the fact that Tully was a Roman orator. However, this unique fact can be mentally represented in at least two distinct ways, e.g. as the belief that Cicero was a Roman orator or as the belief that Tully was a Roman orator, according to whether one and the same individual is being represented under the ‘Cicero’ mode of presentation or under the ‘Tully’ mode of presentation. This illustrates the aspectuality of belief. While aspectuality is a psychological property of beliefs, intensionality is a linguistic property of belief-reports (or belief-ascriptions). The intensionality of belief-ascriptions is the linguistic reflection of the aspectuality of the attributed beliefs: these are the two sides of Frege’s puzzle.

The point highlighted by Rakoczy’s quote is that only if an individual understands that one and the same fact can be represented by at least two different beliefs can she be credited with the capacity

to attribute genuine beliefs to others. Only if one understands the aspectuality of belief can one be credited with a genuine theory of mind.

The experimental investigation of early understanding of the aspectuality of belief has yielded discrepant findings. Some of the evidence is compatible with early understanding of aspectuality. In one study, Scott and Baillargeon (2009) used as stimuli two toy penguins, one made of a single piece and the other made of two pieces that can be assembled or disassembled. When the two pieces of the two-piece penguin are assembled together, the two-piece penguin is visually indistinguishable from the one-piece penguin. They found that 18-month-olds can attribute to an agent the false belief that the two-piece penguin is the one-piece penguin. In this case, the agent's false belief is about two distinct objects with an identical aspect rather than about a single object with two distinct aspects. Still, the capacity to understand the content of an agent's false belief that two visually indistinguishable objects are one and the same object comes close to the capacity to understand the content of an agent's false belief that two distinct properties of a single object belong to two different objects. In a similar vein, Buttelmann, Suhrke and Buttelmann (2015) found that 18-month-olds can represent the content of an agent's false belief that one of two properties of an object fails to belong to this object.

However, most studies of early understanding of aspectuality so far have been based on explicit (not implicit) false-belief tasks, in which children are directly asked a question. In these explicit tasks, children know that a funny toy has two aspects: for example, a bunny toy can be transformed into a carrot toy, a pen is also an eraser or a ball is also a rattle. In these studies, the children know that the toy has two aspects, but the mistaken agent thinks that each aspect is a property of a distinct object. These explicit false-belief tasks about an object-identity are often referred to by psychologists as *aspectual* tasks. For a while, most studies found that explicit aspectual tasks are more challenging for children than explicit non-aspectual false-belief tasks about an object's location (cf. Apperly and Robinson, 1998; 2003; Sprung, Perner, & Mitchell, 2007). One significant step was taken by Rakoczy, Fiske, Bergfeld and Schwartz (2015): after suitably simplifying the aspectual tasks, they found that the performances of 4-year-olds in explicit false-belief aspectual tasks and in explicit false-belief tasks about an object's location were reliably correlated. Rakoczy and colleagues' conclusion is well captured by the title of their paper: "Explicit [of full-blown] theory of mind is even more unified than previously assumed: belief ascription and understanding aspectuality emerge together in development."

A couple of weeks ago, Dan and I were having lunch and we were talking about how best to experimentally investigate early understanding of the aspectuality of belief. It occurred to me that perhaps the wonderful (2010) paper by Southgate, Chevallier and Csibra, entitled "Seventeen-month-olds appeal to false beliefs to interpret others' referential communication," contains the fundamental ingredients for such an investigation. Here is how.

As is typical of studies on false-belief understanding, the first study in this article involves a false-belief condition and a true-belief condition. In both conditions, a first experimenter, Vicky, brought a pair of unfamiliar objects (e.g. a green watering can spout and a red lemon squeezer) for the children to play with. After a short while, Vicky took the objects, placed each in one of two boxes, and closed the lids. She then told the toddlers that she had to go out of the room for a minute and left. At that point, a second experimenter, Coralie, appeared from behind curtains, greeted the infants and approached the boxes. She opened the boxes, switched the objects, closed the boxes, and crept back behind the curtains.

In the false-belief condition, Vicky returned to the room just after Coralie had disappeared behind the curtains. Vicky sat on the floor behind the two boxes and pointed towards, say, the left box and said, 'Do you remember what I put in here? There's a sefo in here. There's a sefo in this box. Shall

we play with the sefo?’ She then reached forward and simultaneously opened both boxes, without looking. At this point, the contents of the boxes were visible to the infant, but not to Vicky. She then said to the infant, ‘Can you get the sefo for me?’, while looking directly at the infant, and not signalling either box.

In the true-belief condition, the procedure was identical to the one used in the false-belief condition except that Vicky returned to the room just after Coralie had removed the toys from their initial boxes and she watched as Coralie placed each of the objects in the opposite boxes. Coralie then disappeared back behind the curtains and Vicky sat behind the two boxes. She then did exactly what she had done in the false-belief condition, opened the boxes and asked the infants ‘Can you get the sefo for me?’

What Southgate and colleagues found was that in the true-belief condition, the toddlers gave Vicky the toy that was in the box that she pointed to, but in the false-belief condition they gave her the toy that was in the other box. Suppose Vicky was pointing to the box on the left. In the true-belief condition, toddlers gave Vicky the toy that she is verbally referring to and that is in the demonstrated box, i.e. the toy in the box on the left. In the false-belief condition, toddlers gave her the toy that she is verbally referring to but that is not in the demonstrated box, i.e. the toy in the box on the right.

Now that I have described the true- and the false-belief conditions of the Sefo study, I want to do two things. First, I want to formally convince philosophically-minded skeptical readers that in the false-belief condition, Vicky’s predicament is a genuine instance of Frege’s puzzle. Secondly, I want to offer a plausible interpretation of the inferences that enable toddlers to give Vicky the toy in the non-demonstrated box or the toy in the demonstrated box, according to whether she holds a false belief or a true belief about the toy’s location.

In the false-belief condition, reflective adults would correctly ascribe to Vicky a true belief as in (3a). They would further accept the identity statement (3b). Both (3a) and (3b) are true propositions. Although (3c) is the result of replacing one description of the toy in (3a) by a co-referential description (in accordance with identity (3b)), (3c) is a false belief-ascription and would be recognized as false by reflective adults:

(3a) Vicky believes that the toy that she placed in the box on the left is the toy that she wants.

(3b) The toy that Vicky placed in the box on the left is the toy that is now in the box on the right.

(3c) Vicky believes that the toy that is now in the box on the right is the toy that she wants.

In a nutshell, the fact that the replacement of one description in (3a) by a co-referential description turns (3a), which is a true belief-ascription, into (3c), which is false, shows the intensionality of belief-ascription (3a), which in turn reflects the aspectuality Vicky’s beliefs. Hence the two sides of Frege’s puzzle are being re-instantiated.

The fact that Vicky’s predicament in the false-belief condition meets all the conditions for being a bona fide instance of Frege’s puzzle is not sufficient to show that toddlers do understand the aspectuality of Sally’s false belief. Nor do toddlers need reason explicitly in accordance with (3a)-(3c).

In both the true- and the false-belief conditions, while Vicky’s utterance is the same: ‘Do you remember what I put in here? There’s a sefo in here. There’s a sefo in this box’, there is a relevant dissociation between the two parts of her utterance.

In the false belief-condition, toddlers understand the aspectuality of Vicky’s beliefs if (and only if)

they understand that she just expressed a true belief about where she last placed the sefo (i.e. the toy that she now wants) and a false belief about its present location. In other words, they understand aspectuality if they understand that Vicky is correctly thinking of the sefo under the description 'the toy that I earlier placed in the box on the left' and incorrectly thinking of it under the description 'the toy that is now in the box on the left', while they know that the description 'the toy that is now in the box on the right' correctly applies to the sefo (i.e. the toy that Vicky wants).

One bold deflationary hypothesis is that in the false-belief condition, the toddlers show no understanding of the aspectuality of Vicky's beliefs. Rather, they selectively attend to the part of Vicky's utterance that expresses her true belief about where she earlier placed the sefo (that she now wants), and they just ignore the part of her utterance that expresses her false belief about the sefo's present location.

But in the true-belief condition also, there is a relevant, though different, dissociation between the two parts of Vicky's utterance. When Vicky says 'There's a sefo in here. There's a sefo in this box. Shall we play with the sefo?' most competent adults would take her to be referring to the toy that she wants under the label 'a sefo'. But when she reminds toddlers of what she earlier placed in the box she is pointing at ('Do you remember what I put in here?'), most competent adults would assume that she is talking about the other toy, not about the sefo.

One further bold deflationary hypothesis is that in the true-belief condition, the toddlers selectively attend to the part of Vicky's utterance in which she is talking about the sefo and they just ignore the part of her utterance in which she is reminding them of the object that she earlier placed in the box she is pointing at (which is not the sefo).

According to these two deflationary hypotheses, which are not particularly compelling, unlike adults, toddlers would selectively disregard a distinctive chunk of Vicky's utterance in both the true- and the false-belief conditions. It is at least equally plausible that, like adults, toddlers take into account Vicky's full utterance in both conditions. If they do, then they understand the aspectuality of Vicky's relevant belief in the false-belief condition.

Although the Sefo study was initially designed to investigate toddlers' capacity to attribute to others false beliefs about an object's location, it turns out to provide all the ingredients necessary for investigating toddlers' understanding of the aspectuality of belief. Further experimental work is needed to know whether toddlers understand the aspectuality of Vicky's beliefs in the false-belief condition or whether the deflationary hypothesis stands. On the one hand, the issue can be addressed experimentally. On the other hand, if the deflationary hypothesis turns out to be correct, then the Sefo study fails, not only to show that toddlers understand aspectuality, but also that they can attribute to others false beliefs about an object's location.[\[1\]](#)

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[\[1\]](#) Thanks Dan for many conversations and comments on this post.