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False Beliefs

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Synonyms

Counterfactual mental states; False perceptions; Mentalizing; Mindreading; Pretense; Psychological reasoning; Reality-incongruent beliefs; Representational mental states; Theory of mind

Definition

False-belief understanding requires understanding (at least implicitly) that the mind is representational in nature and, as such, can hold beliefs that are inaccurate or that deviate from reality in some way.

Introduction

Adults make sense of others' actions by inferring the mental states that underlie these actions; this ability is variously referred to as psychological reasoning, mind reading, mentalizing, or exhibiting a theory of mind. Over the past two decades, numerous reports have presented evidence that psychological reasoning emerges early in life: When infants observe an agent act in a simple scene, they infer the agent's motivational (e.g., goal, attitude) and epistemic (e.g., knowledge, ignorance) states, and they use these mental states to predict and interpret the agent's subsequent actions and to guide their own responses to the agent (for a review, see Baillargeon et al. 2016). Such early competencies naturally give rise to the following questions: How similar is infants' psychological reasoning to that of older children and adults? Is there substantial continuity across development, or do fundamental changes take place in the types of mental states that can be attributed to agents?

When Does False-Belief Understanding Emerge?

For many years, it was generally assumed that a major shift does take place around 4 or 5 years of age in the development of psychological reasoning: Children become capable of understanding false beliefs and other counterfactual mental states (Wellman et al. 2001; Wimmer and Perner 1983). This conclusion was based mainly on evidence from *elicited-prediction* tasks in which children must answer a test question about the likely behavior of an agent who holds a false belief about a scene. In the classic Sally-Anne task (Baron-Cohen et al. 1985), for example, children listen to a story enacted with props: Sally hides a marble in one of two containers and then leaves;

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in her absence, Anne moves the marble to the other container; Sally then returns, and children are asked the test question, “Where will Sally look for her marble?” Beginning at age 4 or 5, children answer correctly and point to the marble’s original location; in contrast, younger children point to the marble’s current location, as though they are unable to understand that Sally holds a false belief about the marble’s location. This developmental pattern – from below-chance to above-chance performance – was consistently observed in different elicited-prediction tasks and in different cultures around the world (Wellman et al. 2001). Based on these results, many researchers came to regard false-belief understanding as a hallmark of advanced or full-fledged psychological reasoning. In essence, success at elicited-prediction tasks was taken to demonstrate that children finally grasp the representational nature of the mind: They realize that beliefs are mental representations and, as such, can deviate from reality.

In recent years, however, the conclusion that false-belief understanding is not attained until the preschool years has been called into question, as evidence has steadily accumulated that toddlers (age 2–3) and infants (under age 2) succeed at simpler false-belief tasks (for reviews, see Baillargeon et al. 2016; Carruthers 2013). To date, converging demonstrations of early false-belief understanding have been obtained in *spontaneous-response* and *elicited-intervention* tasks; key findings with each type of task are summarized in the next sections.

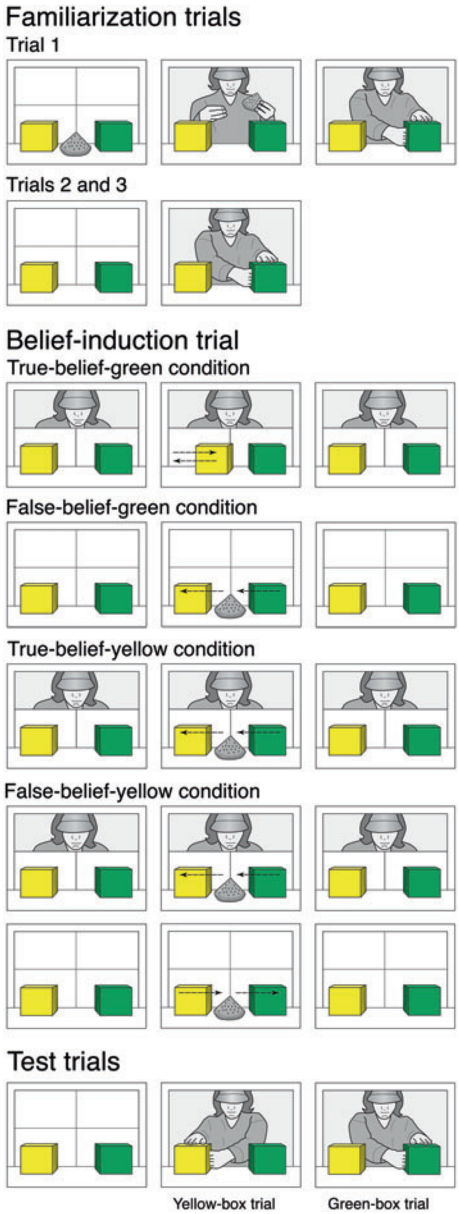
Spontaneous-Response Tasks

In a spontaneous-response false-belief task, children watch a scene in which an agent comes to hold a false belief, and their spontaneous responses to the unfolding scene are measured. The first spontaneous-response task administered to infants (Onishi and Baillargeon 2005) used the *violation-of-expectation* method, which takes advantage of infants’ natural tendency to look longer at events that violate, as opposed to confirm, their expectations (Fig. 1). In the task, 15-month-olds first received familiarization trials in which an agent hid a toy in a green as opposed to a yellow box. Next, infants received one of four different belief-induction trials that resulted in the agent believing, truly or falsely, that the toy was in the green or the yellow box: In the true-belief-green condition, the agent watched as the yellow box moved a short distance and then returned to its original position; in the false-belief-green condition, the agent was absent when the toy moved from the green box into the yellow box; in the true-belief-yellow condition, the agent saw the toy move into the yellow box; finally, in the false-belief-yellow condition, the agent watched as the toy moved into the yellow box, but was absent when it returned to the green box. In the test trial, the agent reached into either the green or the yellow box and then paused. In each condition, infants expected the agent to act on the information available to her, whether it was true or false. Thus, infants in the true-belief-green and false-belief-green conditions expected the agent to reach into the green box, whereas infants in the true-belief-yellow and false-belief-yellow conditions expected her to reach into the yellow box; in each case, infants detected a violation (as indexed by longer looking times) when the agent searched the other box.

These results suggested that infants can already attribute false beliefs to agents. Subsequent investigations extended these results in many different directions.

Different Spontaneous Responses

Evidence of early false-belief understanding has been obtained not only in violation-of-expectation tasks such as that of Onishi and Baillargeon (2005) but also in other types of spontaneous-response tasks. In *anticipatory-looking* tasks, 17- to 25-month-olds visually anticipated that an agent who falsely believed an object was in location-A (when it was in fact in location-B or had been removed from the scene) would search location-A for the object (Southgate et al. 2007; Surian and Geraci 2012). In *anticipatory-pointing* tasks, 18-month-olds spontaneously pointed to inform an agent who falsely believed an object was in location-A that the object had been moved to a new location (Knudsen and Liszkowski



False Beliefs, Fig. 1 In the task of Onishi and Baillargeon (2005), 15-month-olds first received familiarization trials in which an agent hid a toy in a green box (trial 1) and then reached into the box as though to grasp her toy (trials 2 and 3). In the belief-induction trial, infants saw one of four events: While the agent watched, the yellow box moved toward the green box and then returned to its starting position (true-belief-green condition); in the agent's absence, the toy moved from the green to the yellow box (false-belief-green condition); the toy moved to the yellow box in the agent's presence (true-belief-yellow condition); the toy again moved to the yellow box in the agent's presence but then returned to the green box after she left (false-belief-yellow condition). In the test trials, the agent reached into either the yellow box (yellow-box trial) or the green box (green-box trial) and then paused

2012). In *preferential-looking* tasks, 2.5-year-old toddlers who were told a false-belief story accompanied by pictures looked preferentially at the final picture that correctly, as opposed to incorrectly, completed the story (Scott et al. 2012). In *affective-response* tasks, 2.5-year-olds expressed more tension in their facial expressions when an agent who was approaching a container was mistaken, as opposed to ignorant, about some aspect of its contents (Moll et al. 2017).

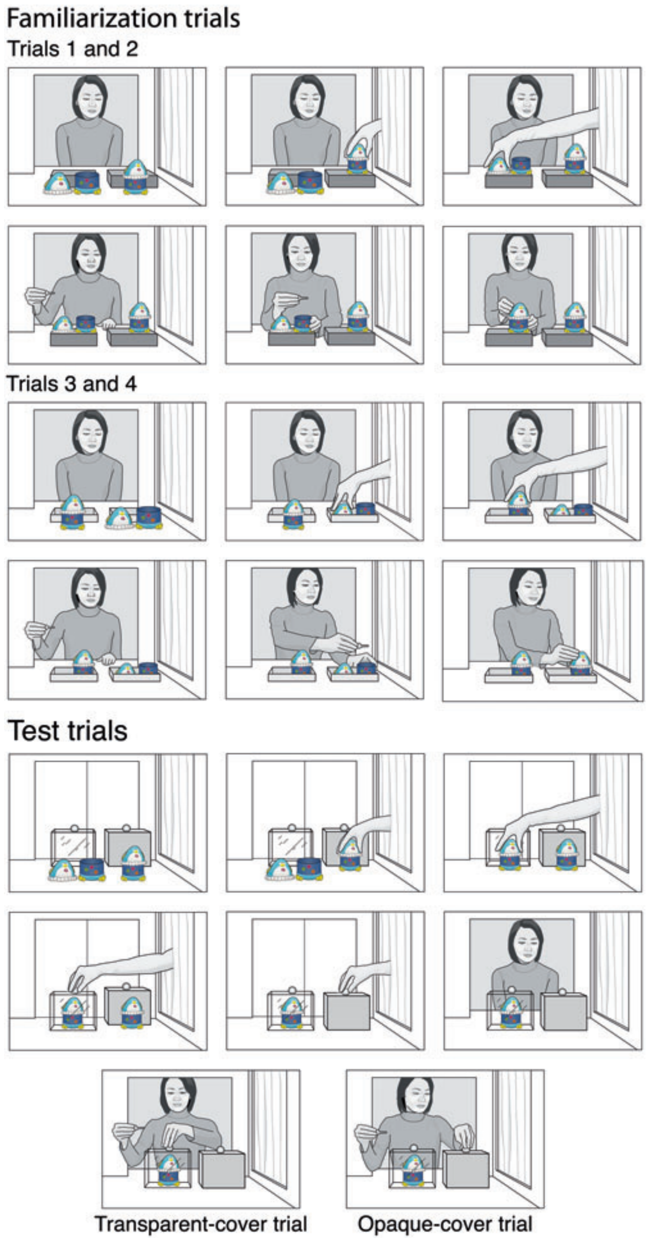
Researchers have also obtained evidence of early false-belief understanding in spontaneous-response tasks tapping neural (as opposed to behavioral) responses. In a *neural-prediction* task, 6-month-olds showed an increase in sensorimotor alpha-band suppression (an EEG correlate of action prediction) when an agent falsely believed a box contained a ball, but they showed no such increase when she falsely believed the box was empty. Infants thus anticipated that the agent would search for the ball when she falsely believed it was present, but not when she falsely believed it was absent (Southgate and Vernetti 2014). Finally, in a *neural-occlusion* task, 8-month-olds showed an increase in temporal gamma-band activation (an EEG correlate of sustained object representation during occlusion) when an agent falsely believed an object was behind an occluder (unbeknownst to the agent, the object disintegrated once occluded); infants showed no such increase when the agent witnessed the object's disintegration (Kampis et al. 2015).

Different False Beliefs

Infants and toddlers in spontaneous-response tasks have been found to represent false beliefs about the *location* (Onishi and Baillargeon 2005), *presence* (Southgate and Vernetti 2014), *identity* (Scott and Baillargeon 2009), and *nonobvious properties* (Scott et al. 2010) of objects. In a task on identity (Scott and Baillargeon 2009), for example, 18-month-olds first received familiarization trials in which an agent faced a one-piece penguin that did not come apart and a disassembled two-piece penguin (Fig. 2). In each trial, the agent hid a small key in the bottom piece of the two-piece penguin and then assembled it; once assembled, the two-piece penguin was identical to the one-piece penguin. In the test trials, while the agent was absent, an experimenter assembled the two-piece penguin, placed it under a transparent cover, and then placed the one-piece penguin under an opaque cover. The agent then returned with her key, reached for either the transparent or the opaque cover, and then paused. Infants expected the agent to reach for the opaque cover and looked longer when she reached for the transparent cover instead (this looking pattern reversed if the agent witnessed the experimenter's actions). These results indicated that infants attributed to the agent two interlocking false beliefs: They expected her (a) to mistake the penguin visible under the transparent cover for the one-piece penguin (because the two-piece penguin had always been disassembled at the start of the familiarization trials) and hence (b) to falsely conclude that the disassembled two-piece penguin was hidden under the opaque cover (because both penguins were always present in the familiarization trials). Additional findings confirmed that infants could distinguish between false belief and ignorance: When both covers were opaque, infants held no particular expectation about which cover the agent would reach for.

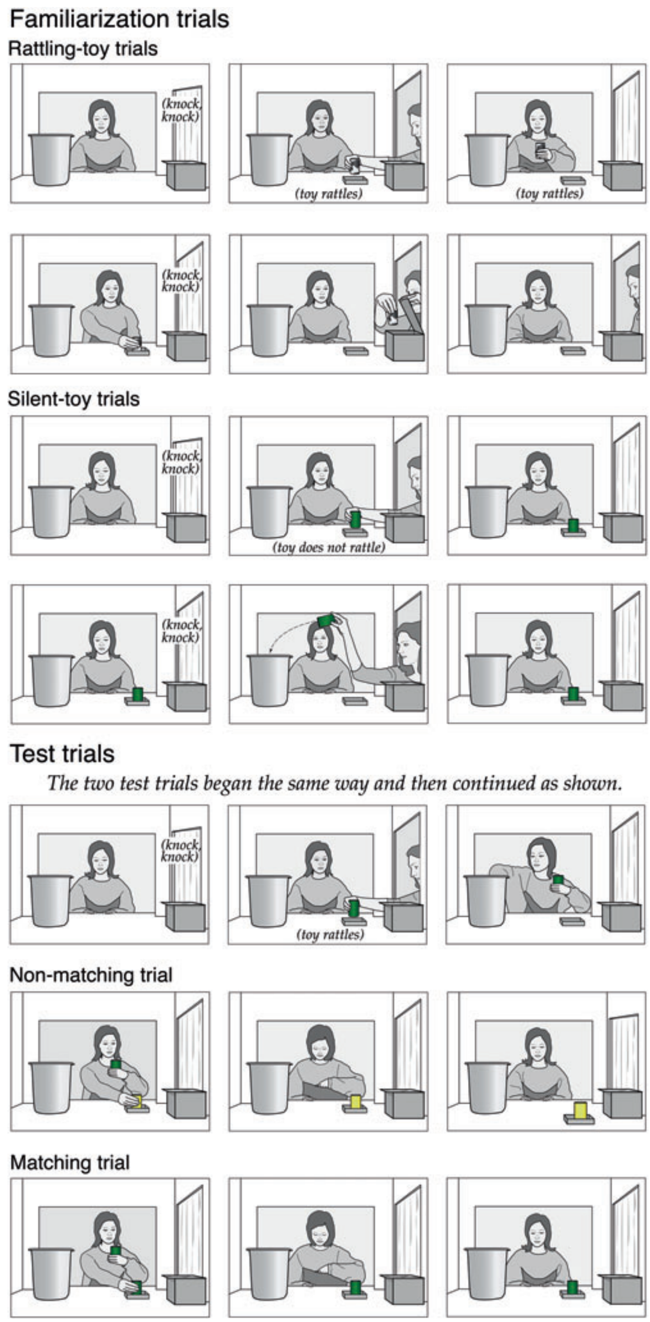
Implanting False Beliefs

Infants and toddlers in spontaneous-response tasks have been shown to reason correctly not only about the actions of agents who *hold* false beliefs (e.g., where they will search for a hidden object or which object they will select to produce a desired effect) but also about the actions of deceptive agents who seek to *implant* false beliefs in others. In a task with 17-month-olds (Scott et al. 2015), a thief attempted to secretly steal a desirable rattling toy during its owner's absence by substituting a less desirable silent toy (Fig. 3). Infants first watched a series of rattling-toy and silent-toy familiarization trials. In each rattling-toy trial, the owner entered with a toy on a tray; she shook the toy, which rattled, placed it back on the tray, and then left. In her absence, the thief picked up the toy, shook it, and then replaced it on the tray. When the owner returned, she stored the



False Beliefs, Fig. 2 In the task of Scott and Baillargeon (2009), 18-month-olds first received familiarization trials involving two toy penguins that were identical except that one could come apart (two-piece penguin) and one could not (one-piece penguin). In each trial, as an agent watched, an experimenter's gloved hand placed the disassembled two-piece penguin and the one-piece penguin on platforms (trials 1 and 2) or in shallow boxes (trials 3 and 4); next, the agent hid a small key in the bottom piece of the two-piece penguin and then assembled it. During the test trials, while the agent was absent, the gloved hand assembled the two-piece penguin, covered it with a transparent cover, and then covered the one-piece penguin with an opaque cover. The agent then returned, reached for either the transparent cover (transparent-cover trial) or the opaque cover (opaque-cover trial), and then paused

rattling toy in a treasure box. The silent-toy trials were similar except that the toy was silent, the thief did not play with it, and the owner discarded it in a trash can when she returned. In the test trial, the owner brought in a rattling test toy that was visually identical to a silent toy she had previously discarded in the trash can. As before, she shook the toy and then left. In her absence, the thief picked up the rattling toy, peered into the trash can, and selected either the matching silent toy (matching trial) or a nonmatching silent toy (nonmatching trial). The thief placed the silent toy on the owner's tray, hid the rattling test toy in a pocket, and then paused. Infants looked



False Beliefs, Fig. 3 In the task of Scott et al. (2015), 17-month-olds saw three rattling-toy and three silent-toy familiarization trials; a different toy was used in each trial, and the six toys differed in color and pattern. In the rattling-toy trials, the owner entered with a toy on a tray; she shook the toy, which rattled, returned it to the tray, and then left (the toy rattled only when briskly shaken). In her absence, the thief shook the toy and then replaced it on the tray. When the owner returned, she stored the toy in a treasure box. In the silent-toy trials, the toy was silent, the thief did not shake it, and the owner discarded it in a trash can. In both test trials, the owner first brought in a rattling test toy that was visually identical to a silent toy she had previously discarded in the trash can; as before, she shook the toy and left. The thief then picked up the rattling test toy, looked into the trash can, and selected either the matching silent toy (matching trial) or a nonmatching silent toy (nonmatching trial). The thief placed the silent toy on the owner's tray, hid the rattling test toy in a pocket, and then paused

significantly longer if they received the non-matching as opposed to the matching trial, suggesting that they realized that (a) the thief sought to steal the rattling test toy without the owner's knowledge by substituting a discarded silent toy the owner could mistake for the rattling test toy, and (b) the thief could achieve this deceptive goal only by substituting the matching silent toy. In a control experiment, the owner always shook her toy again when she returned in the familiarization trials, before storing or discarding it. Infants now looked equally during the matching and nonmatching trials, suggesting that they realized that the owner could not be deceived by the substitution of either the nonmatching silent toy (she would detect the substitution as soon as she saw the toy) or the matching silent toy (she would detect the substitution as soon as she shook the toy).

Different Linguistic Demands

Toddlers have been shown to succeed at spontaneous-response tasks with no linguistic demands (Southgate et al. 2007) as well as spontaneous-response tasks with high linguistic demands comparable to those of elicited-prediction tasks (Barrett et al. 2013; Scott et al. 2012). In a preferential-looking task (Scott et al. 2012), for example, 2.5-year-olds listened to a false-belief story, accompanied by a picture book, about a character named Emily and her apple. In the final double page of the book, one picture showed Emily searching for her apple where she falsely believed it to be (original-location picture), and the other picture showed Emily searching for her apple in its current location (current-location picture). Upon hearing the final line of the story, which stated that Emily was looking for her apple, children looked preferentially at the original-location picture, suggesting that they represented Emily's false belief and understood how it would guide her actions. Similar results were obtained in three traditional non-Western societies: a Salar community in China, a Shuar community in Ecuador, and a Yasawan community in Fiji (Barrett et al. 2013). These results make clear that the reason why young children fail at elicited-prediction tasks but succeed at spontaneous-response tasks cannot be that the former are highly verbal whereas the latter are not: Young children can succeed at highly verbal spontaneous-response tasks.

Elicited-Intervention Tasks

In an elicited-intervention task, children watch a scene in which an agent comes to hold a false belief, and then they are prompted to perform some action for the agent; for children to succeed, their actions must be guided by an understanding of the agent's false belief. Positive results have been obtained with infants and toddlers using a variety of prompts, including helping the agent retrieve an object and selecting one of two objects for the agent (Buttelmann et al. 2009, 2015; Southgate et al. 2010).

In the helping task of Buttelmann et al. (2009), for example, an experimenter first showed 18-month-olds how to lock and unlock two lidded boxes; the boxes were left unlocked. Next, a male agent entered the room, hid a toy in one of the boxes, and then left. While he was gone, the experimenter moved the toy to the other box and locked both boxes. When the agent returned, he tried vainly to open the box where he had hidden his toy. When prompted to help him ("Go on, help him!"), most infants approached the box the agent had not acted on, suggesting that they understood he wanted his toy and falsely believed it was still in its original location (when the agent witnessed the toy's transfer, infants inferred that he wanted to open the empty box, and they approached that box instead). Southgate et al. (2010) tested 17-month-olds with a similar task. An agent hid two distinct objects in two lidded boxes and then left; in her absence, an experimenter switched the objects. When the agent returned, she pointed to one of the boxes, said she wanted to play with the object in it, and asked the infants, "Can you get it for me?" Most infants approached the box the agent had not pointed to, suggesting that they understood she held a false belief about which object was in which box.

In addition to false beliefs about location, elicited-intervention tasks have been used to examine infants' understanding of false beliefs about contents and identity. In a task on identity (Buttelmann et al. 2015), for example, 18-month-olds and an agent encountered a deceptive object, such as an object that appeared to be a toy duck, in each of four trials. The agent then left the room, and in her absence, infants learned the object's true identity (e.g., the duck was in fact a brush). The deceptive object was then placed on a high shelf. When the agent returned and reached vainly for the deceptive object, infants were shown two test objects, one that matched the deceptive object's appearance (e.g., a toy duck) and one that matched its true identity (e.g., a brush), and they were asked to give the agent what she wanted. Infants tended to choose the test object that matched the deceptive object's appearance rather than the test object that matched its identity (this pattern reversed if the agent was present when the object's true identity was revealed). Buttelmann et al. concluded that infants understood that the agent held a false belief about the identity of the deceptive object (e.g., she thought it was a toy duck) and used this belief to decide which test object to select for her.

Elicited-Prediction Tasks Revisited

How can we explain the discrepancy between the negative findings of elicited-prediction tasks and the positive findings of spontaneous-response and elicited-intervention tasks? At present, there are two main views on this question.

Two-system view

According to some researchers, two different psychological-reasoning systems underlie performance in elicited-prediction tasks, on the one hand, and in spontaneous-response and elicited-intervention tasks, on the other (Butterfill and Apperly 2013; Low and Watts 2013). In the two-system account of Butterfill and Apperly (2013), for example, the (conscious, non-automatic, slow, flexible) *late-developing* system emerges around 4 years of age as a result of linguistic, executive-function, and meta-representational advances; this advanced system is capable of representing false beliefs and other counterfactual states, and it makes possible correct responses in elicited-prediction tasks. The (unconscious, automatic, fast, inflexible) *early-developing* system is already present in infancy; although it cannot represent false beliefs per se, it can track simpler, belief-like "registrations" that are sufficient to allow success at spontaneous-response and elicited-intervention tasks. Upon encountering an object, an agent registers its location and properties; by tracking this registration – even if it becomes outdated in the agent's absence – the early-developing system can predict the agent's actions (e.g., an agent will search for her toy where she last registered it).

However, there are reasons to doubt that two systems with distinct neurological substrates and computational capacities underlie false-belief understanding in different tasks. First, neuroscientific investigations with adults indicate that elicited-prediction and spontaneous-response tasks engage anatomically similar regions within the temporal-parietal junction (Bardi et al. in press). Second, claims about the early-developing system's signature limits (e.g., an inability to track false beliefs about identity or complex interactions among mental states) have been overturned (Buttelmann et al. 2015; Scott and Baillargeon 2009; Scott et al. 2015). More generally, the sophistication of the false-belief understanding that has been revealed in many spontaneous-response and elicited-intervention tasks casts doubt on the view that infants and toddlers are capable of only a minimal form of false-belief understanding (for discussion, see Carruthers 2016; Scott et al. 2015).

One-system view

According to other researchers, a single psychological-reasoning system underlies performance in elicited-prediction, spontaneous-response, and elicited-intervention tasks (Baillargeon et al. 2016; Carruthers 2013; Leslie et al. 2004). In this view, young children's difficulties with elicited-prediction tasks stem from their heavy processing demands. Among these, two separate lines of research have highlighted the importance of executive-function and more specifically *inhibitory-control* demands. First, in their computational model of elicited-prediction tasks, Leslie and his colleagues proposed that an inhibitory process plays a key role in allowing children to express their false-belief understanding (Leslie et al. 2004). When children are asked the test question "Where will Sally look for her marble?", an inappropriate prepotent response focused on the marble's actual location is triggered (exactly why this is so is currently widely debated among developmental researchers). This prepotent response must then be inhibited for children to select an alternative response consistent with their representation of Sally's false belief. Because young children's inhibitory control is immature, however, they cannot effectively suppress this prepotent response and thus mistakenly point to the marble's current location.

Second, many correlational studies with 3- to 6-year-olds have reported a significant association between performance in elicited-prediction tasks and performance in tasks that tap inhibitory control and especially conflict inhibition, the ability to suppress a prepotent response while activating a conflicting response (e.g., saying "day" when shown a picture of the moon and saying "night" when shown a picture of the sun; Carlson and Moses 2001; for a meta-analysis, see Devine and Hughes 2014). This association typically persists even when potentially confounding factors such as age and verbal ability are statistically controlled. These correlational findings are often taken to indicate that inhibitory-control advances are necessary for the *emergence* of false-belief understanding (Carlson and Moses 2001). In light of the positive results of spontaneous-response and elicited-intervention tasks, however, it seems likely that inhibitory-control advances contribute more to the *expression* of this understanding, as suggested by Leslie et al. (2004).

Predictions of the One-System View

If processing demands are the cause of early difficulties with elicited-prediction tasks, as the one-system view claims, then reducing these demands should enable young children to succeed at these tasks. In line with this prediction, many researchers found that when inhibitory-control demands were reduced by various means, 3.5- to 4-year-olds now succeeded at the tasks. However, children age 3 and younger performed only at chance. In an experiment by Setoh et al. (2016), for example, 2.5-year-old toddlers heard a low-inhibition story accompanied by a picture book: Emma found an apple in one of two containers, moved it to the other container, and then went outside to play with her ball; in her absence, her brother Ethan found the apple and took it away. Emma then returned to look for her apple. In the test trial, children were shown pictures of the two containers and were asked the test question, "Where will Emma look for her apple?" Because toddlers did not know the apple's actual location, the prepotent response triggered by the test question should have been weaker and hence easier to suppress. Nevertheless, toddlers performed only at chance.

The negative findings obtained with young children in low-inhibition elicited-prediction tasks were generally taken to constitute an important challenge for the one-system view (Devine and Hughes 2014; Wellman et al. 2001). Why was a reduction in inhibitory-control demands not sufficient to lead young children to express their false-belief understanding and perform above chance levels? Proponents of the two-system view suggested that perhaps such a reduction could help only transitional children who were nearly 4 years of age and whose late-developing system was already beginning to emerge.

To address this challenge to the one-system view, Setoh et al. (2016) hypothesized that toddlers might have performed at chance in the low-inhibition Emma task described above because the *total amount of concurrent processing demands* in the tasks exceeded their limited information-processing resources, leading to random or confused responding. The task involved at least three processes: (a) *false-belief representation* (as the story unfolded, toddlers had to build and maintain a representation of Emma's false belief), (b) *response generation* (when asked the test question, children had to interpret it, hold it in mind, and generate a response), and (c) *inhibitory control* (toddlers had to inhibit the weak incorrect prepotent response triggered by the test question in order to tap their representation of Emma's false belief and generate the correct response). If toddlers failed because they were overwhelmed by the total amount of processing demands in the task, then they might succeed if this amount were lowered by *also* reducing response-generation demands via practice trials.

To test this prediction, Setoh et al. (2016) interspersed two practice trials among the story trials in the Emma task (Fig. 4). In one practice trial, children saw an apple and a banana and were

False Beliefs, Fig. 4 In the task of Setoh et al. (2016), 2.5-year-olds faced a large picture book and heard a low-inhibition false-belief story. The story introduced Emma (trial 1), who found an apple in one of two containers on a table: a bowl covered with a towel and a lidded box (trial 2). Emma moved her apple to the other container (trial 3), and then she went outside to play with her ball (trial 4). In her absence, her brother Ethan found the apple and took it away (trial 5). Emma then returned to look for her apple (trial 6). In the test trial, children saw pictures of the bowl and box and were asked, "Where will Emma look for her apple?" To reduce response-generation demands, two practice trials were interspersed among the story trials. In each practice trial, children saw two pictures and were asked a question that required them to point to one of them (i.e., "Where is Emma's apple/ball?")

asked, "Where is Emma's apple?"; in the other, they saw a ball and a Frisbee and were asked, "Where is Emma's ball?" In each case, toddlers were required to point to the matching picture. Note that these practice trials were not intended to support the false-belief-representation process: Pointing to the pictures of Emma's apple and ball was unlikely to help toddlers understand Emma's false belief about the apple's location. Rather, the practice trials were intended to support the response-generation process: They gave children practice interpreting a "where" question and producing a response by pointing to one of two pictures.

As predicted, toddlers now performed above chance in the test trial, pointing to the container Emma falsely believed held her apple. In additional experiments, toddlers responded at chance when they received fewer than two practice trials or when they received two practice trials that did not match the test trial as closely (e.g., only one picture was shown in each practice trial), rendering them less effective at reducing response-generation demands. Finally, toddlers performed below chance when the practice trials were embedded in a high-inhibition false-belief story, thereby increasing inhibitory-control demands.

Based on these results, Setoh et al. (2016) concluded that there are at least two reasons why young children may fail at an elicited-prediction task. On the one hand, they may lack sufficient skill at one of the processes involved in the task; for example, they may lack sufficient inhibitory-control skill to suppress their own knowledge or resist "the pull of the real." On the other hand, they may be able to execute each process separately but lack sufficient information-processing resources to handle the total processing demands of the task.

Together, the results reported in this section thus provide strong support for the one-system view and for the claim that early failures at elicited-prediction tasks stem from limitations in young children's ability to cope with these tasks' processing demands, rather than limitations in their ability to understand false beliefs.

Conclusion

The results reviewed in this article suggest two broad conclusions. First, false-belief understanding emerges early in life, as evidenced by the converging demonstrations from spontaneous-response tasks, elicited-intervention tasks, and elicited-prediction tasks with reduced processing demands. Second, it is only by considering the full range of processing demands associated with each false-belief task that researchers can make sense of divergent findings within and across types of tasks.

These conclusions do not support the long-standing view of false-belief understanding as a major milestone in the development of psychological reasoning, which is not attained until the preschool years. Nevertheless, it may still be the case that humans' capacity for reasoning about false beliefs and other counterfactual mental states plays an important role in everyday social cognition. Many years ago, Leslie (1987) argued that pretend beliefs and false beliefs are fundamentally similar and that as infants have no difficulty understanding the former (e.g., in pretend play activities), performance factors must limit their ability to understand the latter. Building on the notion that pretense and false-belief understanding are closely related, Baillargeon et al. (2013) suggested that one critical function of counterfactual-state reasoning in daily life may be that it allows humans to understand and produce *social acting*, the well-intentioned social pretense that helps maintain positivity within social groups. Of course, counterfactual-state reasoning also makes possible strategic deception in competitive interactions, which infants also understand (Scott et al. 2015). According to the social-acting hypothesis, however, it is in the routine, everyday practice of social acting in cooperative interactions that humans make the most use of their capacity for holding in mind distinct representations of reality. White lies, tactful omissions, feigned interest, shows of loyalty where individuals publicly endorse opinions that diverge from their own – all of these require individuals to decouple what they privately think or feel from what they choose to communicate to others. As investigations of early social cognition are now expanding to include sociomoral reasoning, future research will be able to shed light more broadly on the various ways in which infants' abstract and early-emerging capacity for understanding false beliefs and other counterfactual states contributes to their social world.

Cross-References

- ▶ Does the Chimpanzee Have a Theory of Mind?
- ▶ False-Belief Test
- ▶ Theory of Mind and Evidence of Brain Modularity
- ▶ Theory of Mind and Non-human Intelligence

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