

Can children
understand false
belief before the age
of four?



**ASSIGN
BUSTER**

In this paper, I shall argue that empirical evidence from implicit false belief is used to show false belief understanding in children. I will examine the paper from Onishi & Baillargeon (2005) in favour of implicit false belief tasks; in the later section, I will examine the paper from Ruffman, and Perner (2005) alternative interpretation against false belief tasks. All the evidence in this paper focuses on the concept of false belief in children. The key issue here is that Ruffman and Perner argue that children do not ascribe false belief to an agent, they use search rule hypothesis.

The structure of this paper is as follows; in the first section, I will define false belief and introduce false belief tasks. In the second section, I will explain false belief tasks and distinguish non-verbal false belief tasks and an alternative interpretation. Third, I will give Ruffman and Perner evidence against a false belief, before dismissing it as it does not have the evidence to show false belief understanding in children. Finally, I examine Rose M. Scott, Renée Baillargeon, and Hyun-joo Song, Alan M. Leslie (2010) for implicit false belief tasks.

I argue that the empirical evidence shows that children can understand false belief before the age of four. I conclude that children can understand false belief before the age of four.

1. False belief:

False belief tasks are used to show the concept of false belief in a person. For example, Sam would have kept his chocolate in the box, went out to pick up another box. By the time, he returns the chocolate would have been moved to the fridge. If the child predicts that Sam will look in the box where

<https://assignbuster.com/can-children-understand-false-belief-before-the-age-of-four/>

he last saw the chocolate, then the child is attributing to Sam the FALSE BELIEF that the chocolate is in the box.

False belief tasks are split into two families: verbal false belief tasks and non-verbal false belief tasks. Verbal false belief tasks were used to test false belief understanding in children, however as the tasks were quite demanding on children, most of the pre-schoolers and infants failed in these tasks, as they did not have the cognitive abilities needed to pass the tasks. Now we turn to non-verbal false belief, which has undergone a lot of research in the last ten years.

Our ability to make sense of agent's action rests in large part of our ability to understand their mental states. One of the milestones of the theory of mind is the understanding of false belief (Jessica et al 2012).

Developmental psychologists have been interested in finding the age at which children understand false belief. From the last thirty years, it was believed that children could not understand false belief until the age of four. Children were tested with the Sally-Ann tasks, in which children are told a story using some props. Sally hides a marble in a basket and leaves. During her absence, Ann moves the marble to a box. Children are asked where Sally will look for the marbles. Children older than four years answer the question correctly, whereas children prior to that age give the wrong answer (Cohen et al 1985). Clement and Perner(1994) tested children using alternate looking tasks, not until recently it was shown by Onishi & Baillargeon (2005) that children false belief can be understood by using spontaneous response

tasks as opposed to elicited tasks, as spontaneous tasks don't impose cognitive demands on children.

They used the violation of expectation tasks to test false belief understanding in infants. The result from Surian et al (2007) also provides converging evidence for violation of exception tasks. Zijing He, Matthias Bolz and Renee Baillargeon(2011) extended this by providing evidence from violation of exception change of location and unexpected content tasks and Rose M. Scott, Renée Baillargeon, Hyun-joo Song, Alan M. Leslie (2010) provided evidence by attributing to non-obvious properties of an object. These results from implicit false belief suggest that children can attribute false belief to an agent.

2. The debate:

Until 2005, the main method for ascertaining the possession of the concept FALSE BELIEF was the explicit, or verbal, false belief task. Results from this task seemed to indicate that children younger than 4 years do not possess such a concept, and thus do not possess a fully-fledged Theory of Mind.

Our ability to make sense of agent's action rests in large part of our ability to understand their mental states. However, Onishi and Baillargeon found that infants can pass implicit, or non-verbal, false belief tasks and these findings have been replicated in many labs. On this basis, Baillargeon has concluded that infants already possess the concept of FALSE BELIEF and that such competence is masked by the task demands imposed by explicit tasks.

This conclusion, however, have been challenged by many scholars, who have instead argued that the results of implicit false belief tasks can be explained without imputing infants with the possession of the concept of FALSE BELIEF. For example, Perner has argued that these results can be interpreted in terms of infants' possessing a search-rule, which does not require the possession of the concept of FALSE BELIEF.

In this essay, I will argue that Ruffman and Perner proposal is defective and that experimental results favour the hypothesis that infants possess the concept of FALSE BELIEF over search rule hypothesis.

3. Predictions for false belief:

Having described false belief in the earlier section, let us examine whether we have good evidence for false belief understanding in children. As mentioned earlier I will indicate that children can understand false belief before the age of four. Many scholars say that children cannot understand false belief. Some have even gone lengths to say abandon false belief testing in children. However, Rose M. Scott, Renée Baillargeon, and Hyun-joo Song, Alan M. Leslie (2010) showed false belief understanding in children using non-search criteria. These experiments were introduced to eliminate the search-rule hypothesis proposed by Ruffman and Perner (2005). First, I will look at the evidence presented by Ruffman and Perner against implicit false belief tasks.

Empirical evidence against implicit false belief:

First, I will look at the evidence presented against implicit false belief tasks, whether this can show false belief understanding in children. Ruffman and Perner (2005) introduced alternative interpretation tasks to show that children do not understand false belief instead, they use search rule to attribute false belief to an agent. I will focus on two cases cited by Ruffman and Perner (2005), first is the three-way association and second is the search rule hypothesis.

To show alternative interpretation they first took into account the data from Onishi and Baillargeon based on neuronal activation and showed how babies process the information of non-verbal false belief tasks. They suggested that infants would form a three-way association. First in the trail test infants watched as the agent saw the object in the yellow box (two conditions) and the green box (two conditions). Neuron remembers this information in two ways. First in an active manner (firing through the prefrontal cortex) and in the latent manner (altered firing threshold in frontal regions). If the association (actor-object-yellow box) is still stored in the frontal cortex then, when the babies are tested for the trial it takes less time for the information to process and shorter looking time. The alternate interpretation is when the babies are exposed to new association it takes more time to process the information and longer looking time. The looking time may increase with the changes to the latent activation in the non-frontal region where neuron codes for recency of exposure and increase their firing rate when a non-recent stimulus is presented. New association (actor-object-location yellow box versus green) is formed, so the looking time is increased and different activation of neuron code for the recency of the stimuli. Both of this

explanation has a different prediction based on understanding belief. The actors intentional searching in the box is not crucial. The actor may do something different in either of the box, but the looking pattern is the same in infants.

The second interpretation of Onishi and Baillargeon findings suggest that infants expect the agent to act in a particular way. However, Ruffman and Perner (2005) suggested that infants would use search rule. Infants would expect the agent to search for the object where they last saw it, but not where the actual object is placed. Such a rule has to do something implicit with the mind. Only then, the rule applies as the mind mediates between seeing and acting. However, infants can use this rule even without knowing the exact significance of it.

Ruffman and Perner present evidence from O'Neil (1996). O'Neil found that when gesturing to an object child would point to the correct location taking into account the knowledge of the parent. This result is compatible with the parent's need for knowledge. It is also compatible with which link to the behaviour of two-year-old of not looking at the object in its new location and the likely action of looking in the wrong place.

Ruffman and Perner claim that just giving positive results in the verbal false belief tasks does not determine that children can understand the concept of false belief.

Comments on Ruffman and Perner:

Ruffman and Perner have cited two cases in their paper one is the search rule hypothesis and second is the three-way association. I will focus on the search rule hypothesis.

Ruffman and Perner proposed that children use the search rule hypothesis to attribute the false belief to an agent. However, this does not seem to be a good idea as there is no evidence available to claim that children use the search rule hypothesis. The violation of expectation and alternative looking tasks measure the eye gaze and attribute belief about the belief of the agent.

In the next section, I will look at the evidence from Rose M. Scott, Renée Baillargeon, Hyun-joo Song, Alan M. Leslie (2010) implicit false belief tasks. In which they argue against the search rule hypothesis, which is presented by Ruffman and Perner.

Empirical evidence for implicit false belief tasks:

In their 2010 experiment, Rose M. Scott, Renée Baillargeon, Hyun-Joo Song, Alan M. Leslie presented three experiments, which constituted a good evidence in favour of nonverbal false belief tasks. They show that children false belief can be understood by using non-search criteria. To see whether this can show and extend the results provided by Onishi & Baillargeon (2005) to non-search criteria. I will look at two cases provided by them. They showed the limitations of earlier false belief tasks and provided alternative interpretations. In these experiments, they used 36 infants in the age range of 18 to 19 months.

Experiment 1:

Infants were assigned to either a false belief or a knowledge condition.

In the false belief, a female experimenter sat at a window at the right wall of the apparatus. She had a red cylinder object in front of her decorated with silver stars. In the back wall of the window, there were two objects one was identical to the experimenter's object (identical test object) and the other object was green with orange strips (different test object). In the first trial, the experimenter shook her object thrice and showed that the object made the sound when shaken, later she shook the other the different test object that made noise and the identical test object made no noise. As the experiment progressed, she shook all the objects until the trial ended. A female agent joined the experimenter. After demonstrations, the experimenter prompted the agent to try it. The agent shook either the different test object or an identical test object and then paused until the trial ended. The same trial was administered to infants in the knowledge condition and the agent was present during the trial and knew which object rattled.

In the knowledge condition, if they expected the agent to produce the same rattling noise as the experimenter as they knew that the agent was present throughout the experiment and she knew which object would rattle and which did not. Then they should expect her to reach for different test object and should look longer when she reaches for the identical test object.

Opposite looking pattern was expected in the false belief and knowledge condition.

The results of experiment one show that children can still attribute the false belief to an agent when tested with non-search tasks. This shows that children reason about which object would rattle instead of looking at the two objects which the agent will select.

Experiment 2:

The second experiment had two aims. One was to extend the results of experiment one and see whether 18 months infants could still attribute false belief when tested with non-search tasks. The second aim of the experiment is to test a possible alternative interpretation of the findings.

Children were assigned to a false belief or knowledge condition. The first trial was similar to that of the knowledge condition in experiment 1. the agent was present during the trial, the experimenter demonstrated the properties of her object and showed that the other two objects will rattle. The second familiarization differed in both the conditions. In the false belief condition, the agent was absent from the scene, her back window was closed. The experimenter opened the different test object, poured the marble into the identical test object, and replaced the lid on both the objects. The agent was present in the knowledge condition and knew the object rattled and which did not.

In infants in the knowledge, the condition should expect the agent to reach for the test object, which will rattle. In this case, it is the identical test object, infant expects the agent to reach for this object and should be surprised if the agent reached for the different test object. The infants looking time

should be reversed as observed from the knowledge condition of experiment 1.

For the infants in the false belief condition there existed two possibilities. That is if the infants in the false belief condition in experiment one predicted the agent to select an object, which is similar to the test object, then the infants in experiment two should also do the same.

According to these alternatives, the results of experiment two should be identical to that of experiment one. The second possibility is that, if the infants in experiment one, were reasoning about the belief of the non-obvious properties of the object than just applying the same object rule, then the infants in false belief condition of experiment 2 should expect the agent to reach for the different test object and should look longer when the agent reaches for the identical test object.

The results from the results are clear that children can attribute the false belief to an agent. This result was an extension that children in their second year of life can attribute false belief in a non-obvious object case.

Experiment 3:

Experiment three tested ignorance interpretation of experiments one and two. Infants were tested in a false belief control condition, which is similar to the false belief condition of experiment one. In this case, all the objects on the floor were identical. However, the change in this experiment was all the objects looked similar in condition compared to experiment 1 and 2. During the familiarization trial, the agent was absent from the scene, the

experimenter shook all the objects, demonstrating that the right test object rattled whereas the left test object did not make a sound. In the test trial the agent joined the experimenter, the experimenter again shook all of her object and it rattle, she asked the agent to do it, the agent intern choose the noisy object or the silent object.

If the infants in the false belief condition of experiment one and two expected the agent's ignorance to lead for error or uncertainty the infants in experiment three should also do the same. They should realise that the agent was ignorant which object would rattle when shaken; they should look longer when the agent reached for the noisy object or the silent object. The infants assigned to noisy condition should look longer than the infants in the silent condition.

In the second case, if the infants in experiment one and two expected the agent to search for the test object that she falsely believed would rattle when shaken. Then the infants in experiment three should also hold the same belief. As the two-test object were the same the agent should believe that both the object would shake when rattled? The infants should expect the agent to select the object randomly as the agent has no prior knowledge about the objects, they should look longer when the agent reach either for the noisy or the silent object.

Results from experiment three suggest that children remembered which object rattled and expected the agent to hold a false belief that both the object will rattle and did not have expectations about the object she would select.

Analysis of the empirical evidence for false belief:

The evidence obtained by Rose M. Scott, Renée Baillargeon, Hyun-Joo Song, Alan M. Leslie (2010) has shown that children can still attribute the false belief to an agent even when non-search criteria are used to test false belief.

These experiments by Rose et al (2010) were introduced to test the concept of false belief in children. Ruffman and Perner (2005) interpreted that children use search rule hypothesis to attribute the false belief to an agent, however, the results from rose et al have provided the results that children can attribute the false belief to an agent when tested with the non-search method. This cast a doubt on the interpretation from Ruffman and perner.

Experiment one shows that the interpretation made by Ruffman and perner is wrong. As shown in the experiment children reason and then attribute false belief, which shows that children do have a false belief. The first advantage of this theory is that experiments used which are not robust and do not impose cognitive demands on children.

The first experiment was the demonstration of the issues raised by other alternative interpretations that children do not use rules without knowing them. The issue is dealt in the first experiment which clearly stated that children will attribute the false belief to an agent by reasoning about the belief of the agent, rather than just using search where they last saw criteria.

Advantage 1: The main advantage of these experiments is that children can understand false belief before the age of four. Firstly, the experiments used are simple yet challenging for children as they expect children to attribute

the false belief to an agent when even used non-search criteria to test children false belief. In the experiment, one child had to remember which test object would rattle or not and keep in mind the belief of the agent that she too had the belief that different test object rattled and attribute the false belief to an agent. But past false belief experiments showed that children just anticipate and looking time is measured, which is not true in this case as children in this experiment understand and reason about the false belief of an agent.

The experiment's by rose et al has three distinct version. In the first experiment, they showed that children could attribute the false belief to an agent in the second experiment they improvised on the first experiment and in the final experiment; they used the same condition to prove it. The experiments used very simple structure the apparatus was simple and there was only one agent which did not stress children to keep in mind many agents and apparatus as in verbal false belief tasks.

As the experiments expected the children to attribute the false belief to an agent, they used reasoning to understand the belief of the agent and reason about his belief. The second interpretation of this the results from Southgate et al 2007 used ignorance leads to error but experiments one and two show that children will not expect the agent to be ignorant as they already reason about his belief. This and the other results from the first three experiments prove that children can understand false belief.

Advantage 2: The second advantage of the experiment is it shows that the theory proposed by apply and butterfly (2009), an account of children have

<https://assignbuster.com/can-children-understand-false-belief-before-the-age-of-four/>

two mind-reading system is not right. As the results from these experiments show that children have one mind-reading system, which will develop as the children grow, for example, is the reasoning ability, which children have demonstrated in the recent experiments. The behavioural rule interpretations have been tested in these experiments and it has been showed that children should keep in mind two to three rules in order to attribute the false belief to an agent. Nevertheless, this is quite demanding on children so it is quite tough for children to remember this behavioural rule; instead, they remember the objects, which they need to in order to show false belief to an agent.

Thus the second interpretation by scot et al(2010) is disproved from the experiment by Ruffman and Perner (2005) as the evidence suggests that it is still not clear that children will use the behavioural rule to attribute the false belief to an agent. The experiments by Luo shows that children will fail to use the behavioural rule as the rules are taught just before the start of the experiment. in that case children should overcome their own belief to remember the new behavioural rule.

The third and main advantage of the experiments by Rose et al (2010) is that they have tested the ignorance interpretation, which was proposed by Southgate (2007). The results from the experiments show that children do not use ignorance to the agent, as they do not know whether the agent has ignorance because the children do not know where the object is placed.

In the preceding situation, I will look at the evidence from Ruffman and Perner (2005) against implicit false belief tasks, as they have introduced the search rule hypothesis to attribute the false belief to an agent.

Conclusion:

I have argued that children can understand false belief before the age of four. The evidence presented above by using theories from Onishi, K. H., Baillargeon (2005) and Rose M. Scott, Renée Baillargeon, Hyun-joo Song, Alan M. Leslie (2010) suggest that children can understand false belief. They have used a violation of exception and alternate interpretations to test false belief understanding in children. However, it said that false belief is a complex issue experiment in future should keep in mind the robustness of the issue and develop experiments that will test the false belief children in a better way.

Contrary to traditional claims, the ability to attribute false beliefs to others is already present by the second year of life. When tested with VOE, AL, helping, and referential communication tasks, infants attribute to agent's false beliefs about location and identity as well as false perceptions. Many questions remain, however, about the development of false-belief understanding in infancy and early childhood. (Renee Baillargeon, Rose M. Scott and Zijing He 2010).

References:

- Baillargeon, R., R. Scott, and Z. He. 2010. False-belief understanding in infants. *Trends in Cognitive Sciences* 14: 110-118

- Buttelmann, D., Carpenter, M., & Tomasello, M. (2009). Eighteen-month-old infants show false-belief understanding in an active helping paradigm. *Cognition*, 112, 337–342
- Carpenter, M., Call, J., & Tomasello, M. (2002). A new false belief test for 36-month-olds. *British Journal of Developmental Psychology*, 20, 393–420.
- Csibra, G., & Southgate, V. (2006). Evidence for infants' understanding of false beliefs should not be dismissed. Response to Ruffman and Perner. *Trends in Cognitive Sciences*, 10, 4–5
- He, Z., Bolz, M., & Baillargeon, R. (2011). False-belief understanding in 2.5-year-olds: Evidence from change-of-location and unexpected-contents violation-of-expectation tasks. *Developmental Science*
- Onishi, K. H., Baillargeon, R., & Leslie, A. M. (2007). 15-Month-old infants detect violations in pretend scenarios. *Acta Psychologica*, 124, 106–128
- Onishi, K. H., & Baillargeon, R. (2005). Do 15-month-old infants understand false beliefs? *Science*, 308 (5719), 255–258.
- Knudsen, B., & Liszkowski, U. 2012a. Eighteen- and 24-month-old infants correct others in anticipation of action mistakes. *Developmental Science*, 15, 113–122
- Knudsen, B., & Liszkowski, U. (2012b). 18-month-olds predict specific action mistakes through attribution of false belief, not ignorance, and intervene accordingly. *Infancy*, 17, 672–69
- Luo, Y. (2011). Three-month-old infants attribute goals to a non-human agent. *Developmental Science*

- Luo, Y., & Baillargeon, R. (2005). Can a self-propelled box have a goal? Psychological reasoning in 5-month-old infants. *Psychological Science*, 16, 601–608
- Luo, Y., & Baillargeon, R. (2007). Do 12. 5-month-old infants consider what objects others can see when interpreting their actions? *Cognition*, 105, 489–512
- Attributing false beliefs about non-obvious properties at 18 months
Rose M. Scott a, Renée Baillargeon a, Hyun-joo Song b, Alan M. Leslie (2010).
- Ruffman, T., & Perner, J. (2005). Do infants really understand false belief? Response to Leslie. *Trends in Cognitive Sciences*, 9, 462–463
- Scott, R. M., & Baillargeon, R. (2009). Which penguin is this? Attributing false beliefs about identity at 18 months. *Child Development*, 80, 1172–1196.
- Scott, R. M., Baillargeon, R., Song, H., & Leslie, A. M. (2010). Attributing false beliefs about non-obvious properties at 18 months. *Cognitive Psychology*, 61, 366–395.
- Southgate, V., Senju, A., & Csibra, G. (2007). Action anticipation through attribution of false belief by 2-year-olds. *Psychological Science*, 18 (7), 587–592.
- Song, H., & Baillargeon, R. (2007). Can 9. 5-month-old infants attribute to an actor a disposition to perform a particular action on objects? *Acta Psychologica*, 124, 79–105.
- Song, H., Onishi, K., Baillargeon, R., & Fisher, C. (2008). Can an agent's false belief be corrected through an appropriate communication?

Psychological reasoning in 18-month-old infants. *Cognition*, 109, 295-315

- Sommer, M., Döhnel, K., Sodian, B., Meinhardt, J., Thoermer, C., & Hajak, G. (2007). Neural correlates of true and false belief reasoning. *Neuroimaging*, 35, 1378-1384
- Surian, L., Caldi, S., & Sperber, D. (2007). Attribution of beliefs to 13-month-old infants. *Psychological Science*, 18, 580-586.
- Garnham, W. A., & Ruffman, T. (2001). Doesn't see, doesn't know: Is anticipatory looking related to understanding of belief? *Developmental Science*, 4, 94-100