

When do children develop a theory of mind



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Interest into the understanding of mind in children can be recorded back to Piaget's early research (Piaget, 1928). The term theory of mind was first introduced to psychology in 1978 by Premack and Woodruff when they studied whether chimpanzees had a theory of mind. Theory of mind is used to describe how we take into account the feelings, pretence, desires and beliefs of others when we interact with the people around us. To have a theory of mind you have to be able to have the ability to make inferences about others' representational states and to predict behaviour accordingly (Lewis and Mitchell, 1994). For a child to have a theory of mind, they must be able to utilise one of the three fundamental assumptions about the mind; the understanding of existence, component and causality (Lee and Homer, 1999). Theory of mind development in children has and is presently an extensively researched area within developmental psychology and traditionally has suggested that children acquire a theory of mind at approximately 4 years of age. However, more recent research has debated whether a theory of mind is present much earlier. The aim of this essay is to evaluate both of these claims and look at the evidence and theories that support and dismiss the claim. Contrary to traditional claims, the ability to attribute false beliefs to others is already present by the second year of life which has been shown using different methodological testing methods (Baillargeon, 2010). However, many questions about the development of false-belief understanding in infancy and early childhood still remain.

False belief tasks and appearance reality tasks support the claim that children do not develop a theory of mind until approximately 4 years old. The unexpected transfer test of false belief was originally carried out by Wimmer

and Perner (1983). This test involves a story book or a puppet show involving 2 characters, "A" and "B". Character "A" leaves a piece of candy in one location and in their absence character "B" moves that candy to a new location (Figure 1). The belief question is then asked to the child participant, "Where will "A" look for her candy when they return?" A control knowledge question is also asked to the child after the belief question, "Does "A" know that "B" moved her candy?".

Figure 1: Unexpected transfer test of false belief. Character "A" puts their candy in the box on the left and then leaves. Character "B" transfers the candy to the drawer on the right in character "A"' s absence. Observing children judge where character "A" will look for their candy when they return.

It was found that children who were over 4 years old accurately predicted that character "A" would mistakenly look for the object in the original location (Avis and Harris, 1991; Moses and Flavell, 1990; Wimmer and Perner, 1983). Children under 4 years old did not distinguish between the person's belief and objective reality and therefore did not show understanding of how mind causes action which is different from reality. However, subsequent research has shown that the knowledge question is nearly always correctly answered by 3 and 4 year olds and that the false belief question is nearly always failed by 3 year olds, compared to only a small portion of 4 year olds who do the same. A reality based response is nearly always given by the children that fail the false belief question. However, most of the children that give an answer like this tend to respond

correctly to the knowledge question, which is unlikely to be an egocentric response.

The deceptive box test also tests whether a child understands false belief. This experiment involves showing a child a distinctive candy box that actually contains pencils. It was found that if children over 4 years of age were shown the candy box they were correctly able to attribute to a naive viewer of the box the belief that it contains candy not pencils. In contrast, 3 year old children simply reported current reality. This showed how children who failed to anticipate another person's false belief tended not to report their own prior false belief and tended not to recognise a distinction between appearance and reality (Gopnik and Astington, 1988; Perner et al, 1987). Harris and Gross (1988) were also able to show this result in children using the rock sponge test, where children under 4 were unable to acknowledge that a sponge can look like a rock and were unable to make the distinction between real and apparent emotion.

False belief tests conducted across different cultures and language communities found that children achieved better than chance false belief performance at different average ages ranging from 4 to 6 or 7 years. (Avis and Harris, 1991) British, American, Japanese, and Chinese preschoolers similarly distinguish between real, inner emotions versus apparent, displayed emotions (Gross and Harris, 1988). It has also been proposed that the social and communicative deficits of autism reflect neurological impairment to the theory of mind module leading to deficits in the normally developing ability to construe persons in terms of mental states (Leslie, 1987). These sorts of deficits in psychological reasoning are not apparent in control groups of

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subjects with Down's syndrome, general retardation, or specific language delays. It was shown that mentally handicapped Down's syndrome children come to reason about persons in terms of their beliefs and false beliefs at about 4 to 5 years of mental.

Baillargeon et al (2010) have recently investigated theory of mind in children, and using spontaneous response tasks have suggested that this ability could be present much earlier. In these tasks, children's understanding of an agent's false belief is inferred from behaviours they spontaneously produce as they observe a scene unfold. Spontaneous-response tasks currently include violation-of-expectation (VOE) and anticipatory looking (AL) tasks. VOE tasks test whether children look reliably longer when agents act in a manner that is inconsistent, as opposed to consistent, with their false beliefs. AL tasks examine whether children visually anticipate where an agent with a false belief about the location of an object will search for the object. In a VOE experiment, Onishi and Baillargeon (2005) examined whether 15-month-olds could attribute to an agent a false belief about the location of an object. Surian et al (2007) also provided evidence that even 13-month-olds can attribute to an agent a false belief about the location of an object, and that this agent need not be human. Song et al (2008) showed that 18-month olds realize that an agent's false belief about an object's location can be corrected by an appropriate, although not an inappropriate, communication. Finally, building on prior AL results with 3-year-olds, Southgate et al (2007) showed in a non-verbal AL task that 25-month-olds can correctly anticipate where an agent with a false belief will search for an object. It has been shown that there may also be evidence to

show that children may acquire a theory of mind earlier than 4 years of age. Children are able to recognise a number of mental states such as knowledge, intention, wanting, emotions, seeing before 4 years old. It has been suggested that false belief could just be one of the developmental transitions leading up to full theory of mind.

There have been two contrasting theories that contest when the development of theory of mind in children actually is. The first proposition of theory of mind development that supports the claim is called theory of mind module account (ToMM). These theorists dismiss all the earlier developments of mind as just precursors, and believe that the big major conceptual change in a child happens at approximately 4 years old (Leslie, 1985). These psychologists are called modular theorist and believe that a theory of mind is achieved by the computations of an innate mental module. This theory was initially described by Fodor in 1983 where theory of mind has a specific innate basis, in that the processes that determine the essential character of theory of mind, do not apply to other cognitive domains, and can be selectively impaired. Fodor (1992) and Leslie (1987, 1994) propose there is a distinct theory of mind module that produces representations of human activity in terms of a person's mental attitudes toward events such as beliefs, desires and emotions. The theory of mind module enables the child to represent not just actions, but also representational states themselves (Leslie, 1994). The rapid development of person-understandings apparent in normal children, such as the acquisition of an understanding of false belief, depends on this specialized mental module "coming on line" in the

preschool years. Leslie (1994) and Baron-Cohen (1995) propose a developmental sequence of three or four mental modules.

There are also theorists that dismiss the claim that children do not develop a theory of mind until approximately 4 years of age. The theory-theory account (Carey, 1985; Wellman, 1990; ToM) suggests that there is a sequence of development, with some aspects of theory of mind understanding that develops before 4 years old. This theory is a constructivist account and claims that everyday theoretical constructs enable children to achieve a coherent understanding of people. This account states that children at first do not understand the concept of belief, unlike desires and emotions. The understanding of belief is then developed and a child acquires a theory of mind. However, theory theorists also say that there is a watershed at age 4, when false belief is understood, which is defined as the acquisition of adult like theory of mind. It appears that the theory theorists believe that theory of mind develops at 4 years old. However, it is hard to see how the theorists are defining the theory of mind-like abilities in children such as pretence that develops before 4. If theory theorists count this as theory of mind development then it would be incorrect for them to suggest that there is a watershed at 4 years old. If this is not the case then do we dismiss them as “proto-theory of mind” abilities? This is where the theory theorists do not give a strong response as to whether they think the early abilities are acknowledged when age of acquisition is defined.

There has been some debate on the overall accuracy and validity of the experimental design of the false belief studies that have been used to test the development of theory of mind in children. It has been argued that there

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has been an over reliance on false belief tasks to demonstrate whether a child has a theory of mind or not. Chandler et al (1989) have suggested that perhaps 3 year olds fail the false belief tasks because of immature understanding in other non focal cognitive skills. They suggested that a demanding or confusing test situation could show inaccurate results because developmental change is confined to only a few standard tasks that are unusually demanding. The difficulty of the test question has also been suggested as a reason as to why children under 4 fail the false belief questions (Siegal and Beattie, 1991). Those children who were asked the test question suffixed with ' first of all' were much more likely to predict that character " A" would look in the place where he last saw the object and not where it was currently located. Lewis and Osborne (1990) found that by clarifying the test question made more children aged 3 years succeeded in acknowledging another person's false belief compared to those who were asked the more vague words in Perner et als (1987) original experiment. There has also been debate on whether the story comprehension is too difficult for children to understand and subsequently fail the test because they are unable to integrate key elements of the story into their understanding. It has been suggested whether a picture book format would be easier for young children to understand (Lewis et al, 1994).

Mitchell et al (1996) confirmed that knowledge of reality contaminates judgments of belief by presenting scenarios in which a protagonist was subjected to conflicting information. He saw " A" but subsequently was told " B", and had no independent information indicating which was actually true. Observing participants, however, were privy to whether " A" or " B" was

true, and they were asked to judge what the protagonist would believe. It was found that these participants were very heavily influenced by what they themselves knew to be true. If they knew “ A” was true, then they tended to judge that the protagonist would discount the conflicting message and retain his prior belief based on what he saw. In contrast, if they knew “ B” was true, they tended to judge that the protagonist would update his belief according to the message. Hence, their privileged knowledge of reality contaminated their judgment of what another person would believe. There seems to be a similarity between the realist bias in adults’ judgments of belief and that observed in children aged around three years.

Wellman et al (2001) conducted a meta-analysis to test whether false belief tasks were flawed using 77 articles, 178 studies and 591 conditions. They looked at 6 factors that influenced false belief task performance which were; age, deception, salience, own versus others, false belief and community identity. They found that several task manipulations help children performance in these false belief tasks such as framing task in terms of trickery, involving the child in actively making the key transformations and highlighting salience of protagonist’s mental state. However the task manipulations may help the children succeed earlier but do not alter the shape of the general developmental trajectory. It was concluded that such findings clearly support the initial claims of substantial development during these preschool years and contradict recent suspicion that developmental change is nonexistent.

Conclusion

Most researchers in this area of developmental psychology now believe that there are elements of modulist and theory-theory accounts that shape the course of theory of mind development. This represents an important consensus that theory of mind knowledge is rapidly acquired in the normal case and is acquired in an extended series of developmental accomplishments. These theorists also consent that a theory of mind encompasses several basic insights that are acquired world-wide on a roughly similar trajectory, requires considerable learning and development based on an infantile set of prepared abilities to attend to and represent persons and manifests an important fusion of first- and third-person perspective that allows us to use our own experiences to consider the nature of others' minds. Finally theory of mind in children is severely impaired in autism. The new research into testing theory of mind has suggested that theory of mind development is earlier than 4 years old; however, further research is needed to support this claim. Developments in understanding the psychological world, therefore, are not only important to us as individuals; they are of focal importance to contemporary research on cognition.

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