

## The Development of Children's Understanding of False Belief and the Appearance-Reality Distinction

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Recent research has shown parallels between the development of young children's understanding of false belief and their understanding of the appearance-reality distinction. First, both develop between 3 and 4-5 years of age and develop concurrently in individual children. Second, the younger children's difficulties with both concepts seem genuine and deep-seated. Finally, these difficulties are general, in the sense of being evident in a variety of types of beliefs and appearances. Most researchers in this area believe that these developments are mediated by an emerging representational conception of the mind.

Les résultats de recherches récentes suggèrent qu'il existe des parallèles notables entre le développement de la compréhension de fausses croyances et de la distinction entre apparence et réalité chez l'enfant. En premier lieu, tous deux apparaissent entre trois et quatre à cinq ans et se développent de manière simultanée chez chaque individu. En second lieu, les difficultés que présentent les sujets les plus jeunes avec ces deux concepts semblent réelles et tenaces. En troisième lieu, ces difficultés sont généralisées, dans le sens qu'elles se retrouvent dans toute une série de types de croyances et d'apparences. La plupart des personnes qui travaillent dans ce domaine pensent que ces deux acquisitions reflètent l'aube d'une nouvelle conception représentative de l'esprit.

### INTRODUCTION

The development of children's knowledge about the mind has recently become one of the most interesting and productive areas of theory and research in developmental psychology (Astington, Harris, & Olson, 1988; D'Andrade, 1987; Frye & Moore, 1991; Perner, 1991; Wellman, 1990; Whiten, 1991). Much of this research has examined the development of young children's understanding of false belief and the appearance-reality distinction. There are striking parallels between these two developments. First, both take place between 3 and 4-5 years of age and develop concurrently in individual children. Second, the difficulties that 3-years-olds—especially young 3-year-

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olds—have with both concepts are real and robust. Third, these difficulties are also quite general; that is, they are evident in a variety of types of beliefs and appearances. In this article I first cite evidence for these parallels and then propose an explanation of them.

## CONCURRENT AND INTERDEPENDENT DEVELOPMENT

A commonly-used test for young children's understanding of false belief is the following. Subjects are shown a candy box and asked what is in it. They, of course, say "candy". The box is then opened and shown to contain pencils rather than candy. They are then asked what one of their friends will think is in it, before looking inside. Most 4- and 5-year-olds will say "candy", amused at the deception. Most 3-year-olds will say "pencils", unaware of any deception. They will often say "pencils" even if asked to say what they themselves had originally thought was in the box. Thus, they will neither infer their friends' false belief nor remember their own.

When tested for understanding of the appearance-reality distinction, children are typically first given brief instructions on the distinction; for instance, the experimenter demonstrates and explains that although an illusory stimulus presently *looks* like an "X" to their eyes, it *really* is a "Y". They are then given a chance to explore, for example, a fake object such as a sponge that looks like a rock, and are asked both an appearance question (whether the object looks like a rock or a sponge), and a reality question (whether it really is a rock or a sponge). Here also, most 4- and 5-year-olds will correctly answer these questions, clearly distinguishing between the object's perceptual appearance and its objective reality. In contrast, 3-year-olds are likely to give the same response—either the appearance or the reality—to both questions, thus failing to distinguish between appearance and reality.

Not only is the mean age of transition about the same for both false belief and appearance-reality, it is also true that individual children tend to perform similarly on the two types of tasks. In three studies Gopnik and Astington (1988), and Moore, Pure, and Furrow (1990) have obtained significant positive correlations (with age partialled out) between performance on the two types of tasks. Moreover, these correlations were rather substantial, ranging from 0.44 to 0.74. Thus, the two developments are both concurrent and interdependent.

## ROBUSTNESS

There is considerable evidence that young 3-year-olds' difficulties with false belief and appearance-reality are real and robust. That is, these difficulties appear to be deep-seated, genuinely conceptual ones that are not easily

overcome by providing training or by making the task demands simpler and clearer. It is true that not all investigators believe them to be as robust as I am claiming: see, for example, Chandler, Fritz, and Hala (1989); Freeman, Lewis, and Doherty (1991); Hala, Chandler, and Fritz (1991); Lewis and Osborne (1990); Siegal, Share, and Robinson (1989); Woolley and Wellman (1990); and other studies cited in Flavell, Mumme, Green, and Flavell (1992b). However, I think that most experts in this area do consider them to be genuine, hard-to-overcome difficulties. The following is some evidence for this view.

### False Belief<sup>1</sup>

Researchers have tried unsuccessfully to help children perform correctly on false belief tasks by providing stronger, more explicit clues to the other person's false belief. Experimenters have shown the person behaving in accordance with the false belief rather than reality, and acting very surprised on discovering the real state of affairs (Flavell, Flavell, Green, & Moses, 1990; Hartl & Wimmer, 1989; Moses & Flavell, 1990). As already noted, investigators have also tried to make the false belief more salient by causing the children themselves to have that same false belief initially (Gopnik & Astington, 1988; Gopnik & Slaughter, 1991; Wimmer & Hartl, 1991); the children could then solve the task simply by recalling their own initial belief. These intended aids did not prove very helpful to 3-year-olds.

Researchers have gone even further by actually *telling* the children what the person's false belief is, and then asking them either to say how the person will act (Flavell et al., 1990; Harris, Johnson, Hutton, Andrews, & Cooke, 1989; Wellman & Bartsch, 1988) or—easiest of all—to simply restate the person's belief (Flavell et al., 1990; Flavell et al., 1992b; Lillard & Flavell, 1990). Even these extreme forms of assistance have not proven very helpful. The following study (Flavell et al., 1990) will illustrate their lack of efficacy.

The subjects were 20 young 3-year-olds. The experimenter and the subject first agreed that a particular cup was not white. It was then positioned so that they could see it but another adult (Ellie), who just entered the room, could not. The experimenter then asked Ellie whether she thought the hidden cup was white. Ellie replied: "I can't see the cup. Hmm. I *think* you have a white cup over there. I *think* you have a cup that *is* white." The experimenter then asked the child two questions in a whisper: first: "Do *you think* we have a white cup over here?" and then: "How about Ellie? She can't see this cup. Does *she think* we have a white cup over here?" Of the 20 subjects, 19 correctly said they thought it was not white; but of this 19, only 5 then went on to say that Ellie thought it was white, despite the fact that she had just stated precisely that belief a moment ago (see also Flavell et al., 1992b).

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<sup>1</sup> I am indebted to Lou Moses (1990) for most of the ideas presented in this section.

Researchers have also tried to make the false belief tasks easier for young children by making them more engaging or more meaningful. Moses and Flavell (1990) presented false belief tasks in a movie format with real people involved in plots designed to be of great interest to young children. Although 3-year-olds did indeed find these tasks very interesting and easily remembered all the critical events, they were still largely unsuccessful in attributing false beliefs to the people. Investigators have also tried to situate the false belief task in a meaningful social context—that of deception. The question then becomes whether 3-year-olds understand that deceptive acts achieve their effects by engendering false beliefs in the deceived person's mind. There is no clear answer to this question as yet: some researchers find evidence that they do (Chandler, Fritz, & Hala, 1989; Hala, Chandler, & Fritz, 1991; Lewis, Stanger, & Sullivan, 1989); and others find evidence that they do not (Peskin, 1991; Russell, Mauthner, Sharpe, & Tidswell, 1991; Sodian, Taylor, Harris, & Perner, 1991).

Researchers have also tested the possibility that the linguistic demands of the task are responsible for young children's failures. Perhaps they simply do not know the meaning of the word *think*, for example. Moses (1990, pp. 11–12) has recently summarised the evidence against this possibility as follows:

Against this, however, if instead of asking them what the protagonist thinks, they are simply asked where the protagonist will look or go, what the protagonist will do, say, or want, how the protagonist will feel, or whether the protagonist will be surprised on discovering the truth, their performance does not improve (Astington & Gopnik, 1991; Hadwin & Perner, 1991; Harris et al., 1989; Hogrefe, Wimmer, & Perner, 1986; Perner, Leekam, & Wimmer, 1987; Wimmer & Perner, 1983).

Moses (1990) also cites evidence showing that the overall linguistic complexity of false belief tasks cannot account for task failures. Finally, there is also evidence for robustness in the finding that 3-year-olds from different countries—Cameroon, Canada, Great Britain, Germany, United States, and Austria, and perhaps others—all have difficulty attributing false beliefs.

### Appearance-Reality

As with false belief, young children's problems with appearance-reality tasks have proven very robust. We have tried to elicit appearance-reality understanding in 3-year-olds by using less demanding, easier-seeming appearance-reality tasks (Flavell, 1986; Flavell, Green, & Flavell, 1986; Flavell, Green, Wahl, & Flavell, 1987). Most of these attempts have failed, however. In one study, for instance, the device that changed an object's apparent colour was a familiar one known by children to change how things look rather than how they actually are—namely, sunglasses. We also tried to help subjects realise that an object's true colour remains unchanged when one views it through a

colour filter by using something whose enduring true colour children know very well—namely, milk. In both tasks 3-year-olds still tended to err by saying that the stimulus really was whatever colour the sunglasses or filter momentarily made it look.

Similarly with attempts to reduce the linguistic demands of the task. For example, we tried to ask 3-year-olds for an object's real colour in a colour appearance-reality task without using a "really and truly" question—arguably too difficult a question for young children (Flavell et al., 1987). With the child watching all proceedings, the experimenter placed, say, a white card under a blue colour filter so the card looked blue. Then, with the card still under the filter, he detached a precut piece from the card, put the piece into his closed hand, removed the closed hand from behind the filter, placed on the table that white piece and a blue piece of the same size and shape, and then simply asked the child: "Which is the piece I just took out of the card?" This question is similar to the standard reality question ("Is this card really and truly blue or really and truly white?"), but does not require understanding of the possibly troublesome expression "really and truly" and does not require a verbal response. Nevertheless, our young subjects did not find it any easier than the standard question (in fact, in one study they actually found it significantly *harder*). That is, they frequently responded by pointing to the blue piece, the one that matched the card's present apparent colour rather than its real colour, just as they frequently responded to the standard reality question by saying "blue".

We have also found that young children of the same age from different countries perform similarly poorly on the same appearance-reality tasks: children from the United States and the People's Republic of China in the case of real *vs.* apparent colour, size, and object identity (Flavell, Zhang, Zhou, Qi, & Dong, 1983); children from Great Britain, United States, and Japan in the case of real *vs.* apparent emotions (Harris & Gross, 1988). These results suggest that their difficulties with the distinctions are robust and substantial enough to survive major differences in language, culture, and child-rearing practices. Finally, Flavell et al. (1986) and Taylor and Hort (1990) tried to teach the distinction between real and apparent colour to 3-year-olds who performed poorly on standard colour appearance-reality tasks. Braine and Shanks (1965) attempted to do the same with the distinction between real and apparent size. None of these attempts was successful. The fact that many young children cannot easily be taught to make the appearance-reality distinction is strong evidence that they basically do not understand it.

## GENERALITY

The deep-seated nature of young children's lack of understanding is also attested to by the wide range of false belief and appearance-reality tasks with

which they have difficulty. The evidence shows that their lack of understanding here tends to be broad and general rather than narrow and task- or content-specific.

## False Belief

In the case of false belief, there is first of all considerable generality across potential holders of such beliefs. That is, young children seem about equally unable to attribute false beliefs to dolls, story or movie characters, themselves, and other “live” children and adults (Flavell et al., 1990; Gopnik & Astington, 1988; Johnson & Maratsos, 1977; Moses & Flavell, 1990; Perner et al., 1987; Wimmer & Perner, 1983). The same is true for different beliefs regarding physical objects: for example, concerning what objects are present, where they are located, and what properties they have.

Flavell et al. (1992b) recently tested young children’s ability to imagine diversity of belief regarding previously unstudied contents, including property ownership and the moral acceptability-unacceptability of actions. In one of their studies, 3- and 5-year-olds saw a boy doll and a girl doll vigorously struggling for possession of an object, each character repeatedly claiming it was his or hers. The subjects were then asked who each character thought the object belonged to—to that character or the other one. These were ownership belief questions. The task then continued with one of the characters—the boy, say—taking the object and saying that he had to take it home because it was his. The other character protested that he couldn’t take it home because it belonged to her. The subjects were then asked whether each character thought it was okay or not okay for the boy to take it home. These were the moral belief questions. Despite the abundant evidence for each character’s beliefs, 3-year-olds were only correct on 60% of the ownership belief question pairs and 46% of the moral belief question pairs. In contrast, the 5-year-olds were correct on 99% of the ownership pairs and 82% of the morality pairs. These results are similar to what one sees with traditional belief tasks concerning matters of fact.

In another of their studies with 3-year-old subjects the experimenter first elicited the subject’s own view that an aggressive or socially unconventional act was *not* okay, then twice stated that a depicted child believed that it *was* okay, and immediately afterwards asked the subject whether that depicted child did or did not think the act was okay. Examples of such acts were breaking another child’s toy (moral violation), and wearing pyjamas to school (social convention violation). The results were striking. The older 3-year-olds correctly repeated the depicted child’s deviant moral and social-conventional belief only 43–47% of the time, and the younger 3-year-olds did so only 25% of the time. On the last task we corrected children’s incorrect belief attributions and then repeated the question. If the children were wrong a second time we

repeated the corrective feedback and the question once again. A number of the subjects simply could not be gotten to attribute a deviant belief to the depicted child; rather, they just kept saying "not okay" again and again. It seemed clear that they were characterising what to them was the intrinsic wrongness of the act itself rather than the depicted child's belief about its rightness or wrongness. As in standard false belief tasks they simply reported what they believed to be the case when asked what another person believed to be the case (but without thinking of it *as* a belief at all, of course). These studies also provided evidence suggesting that children's understanding of different types of beliefs develops concurrently and interdependently.

### Appearance-Reality

In the case of appearance-reality, young children have been shown to have difficulties not only with real *vs.* apparent object identity (for example, the sponge that looks like a rock), but also with real *vs.* apparent actions, and with real *vs.* apparent properties such as colour, size, and shape (Flavell, 1986; Flavell et al., 1986). Analogously, we have recently shown that 3-year-olds have trouble distinguishing conceptually between television images and their referents, that is, the real objects outside the television set that the images depict (Flavell, Flavell, Green, & Korfmacher, 1990). For example, even after pretraining they would often say that what they saw on the screen was a real object rather than a picture of one, and that the object would fall out if one took the television set's top off and turned the set upside down. In contrast, 4-year-olds had little difficulty in making this distinction.

Young children also have trouble distinguishing conceptually between how *people* seem or appear to be and how they really are. Paul Harris and his co-workers have demonstrated this in the case of real *vs.* apparent emotions (Harris, 1989; Harris & Gross, 1988). Subjects were first told a story about, for example, a girl who really feels bad but does not want others to realise it. Then they were asked how she really feels, and how she looks like she feels on her face. They found that children acquire the distinction between real and apparent emotions between 4 and 6 years of age, thus not much later than the distinction between real and apparent physical objects or object properties.

Flavell, Lindberg, Green, and Flavell (1992a) recently found a similar developmental trend with respect to the distinction between a person's real and apparent moral character. Children of 3–5 years of age were shown a photograph of a child with a neutral facial expression while hearing a story about his (or her) chronic mean behaviour. Then they were told that this child had an operation that temporarily made him look very nice, like this (new photograph shown), and that: "Now he *looks* like a very nice kid because of his operation. He still does really mean things like he always did, but now his face

looks nice." They were then asked whether he looks like a nice kid or a mean kid, and whether he really and truly is a nice kid or a mean kid. Consistent with all the previous developmental research on the appearance-reality distinction, the percentages of subjects correctly answering both questions on such tasks increased significantly over this age range: from only 55% correct pairs of answers for 3-year-olds to 87% correct pairs for 5-year-olds.

## IMPLICATIONS

The evidence suggests that children's understanding of false factual beliefs (as well as other types of deviant beliefs) and their understanding of appearance-reality undergo concurrent and interdependent developments, and that young children's lack of understanding of both is quite robust and general. What do these facts imply about the development of children's knowledge about the mind? Most of us who work in this area believe that these and other related acquisitions reflect the dawning, around age 4, of a qualitatively new conception of the mind—namely, that the mind mentally represents, models, or interprets reality (e.g., Flavell, 1988; Ferguson, 1989; Gopnik, 1990; Perner, 1991; Wellman, 1990). In other words these acquisitions are symptoms of the child's new *representational* conception of the mind. The argument is as follows. In order to conceptually distinguish either a false belief or a perceptual appearance from reality, children need to understand that things can *seem* to a person (be *believed* to be, perceptually *appear* to be) other than how they actually *are*. They must understand that people can mentally represent things in more than one way, and that one person's mental representation of something can differ both from another person's representation of it and from the way it is in reality. Most 4- to 5-year-olds give evidence on false belief, appearance-reality, and other tasks of grasping this fundamental fact about the mind, whereas most 3-year-olds do not. The acquisition of this understanding is surely a momentous achievement, one of the most important in all of cognitive development.

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