

Young Children's Understanding of Different Mental States

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There is considerable evidence in the recent literature on children's understanding of the mind that young children have difficulty understanding false beliefs. Even when presented very strong evidence that a person's belief conflicts with the reality to which it refers, they tend to assume that it coincides with reality. Two studies tested the extent to which 3-year-olds make this same mistake with other mental states. The results show that children of this age understand that desires can differ from reality before they understand that beliefs can, even when the exact same tasks are used to assess each understanding. The findings also indicate that young children understand pretense in this regard somewhat later than desire but earlier than belief and dream, particularly when the pretense is supported by actions. Three explanations for the results are discussed.

In attempting to understand others' behavior, adults appear to use a set of constructs and principles comprising a "folk psychology" (Churchland, 1986). At least one folk psychological construct, that of belief, appears to undergo an important development between the ages of 3 and 4 years. Specifically, older children apparently understand that beliefs can differ from their referent situations, whereas younger children do not. The nature of the 3-year-old's deficit has been the subject of a good deal of inquiry over the past several years. The initial impetus for this inquiry was a study reported in 1983 by Wimmer and Perner, in which children were presented with a doll (Maxi) who put some chocolate in a cupboard and who then left the scene. In his absence, Maxi's mother moved the chocolate to a different location. When asked where Maxi would look for the chocolate upon his return, 3-year-olds consistently claimed that he would look in the place where the chocolate really was rather than in the place where he had last seen it. These rather surprising results have been replicated in many studies under varied conditions (e.g., Flavell, Flavell, Green, & Moses, 1990; Gopnik & Astington, 1988; Hogrefe, Wimmer, & Perner, 1986; Johnson & Maratsos, 1977; Mitchell & Lacohee, 1991; Moses & Flavell, 1990; Perner, Leekman, & Wimmer, 1987; Russell,

Mauthner, Sharpe, & Tidswell, 1991; Sodian, Taylor, Harris, & Perner, 1991; Wellman & Bartsch, 1988. For alternate views, see Chandler, Fritz, & Hala, 1989; Lewis & Osborne, 1990; Siegal & Beattie, 1991).

The false-belief scenario can be seen as entailing two factors: a situation (in the case just discussed, a boy, some hidden chocolate, and so on) and a mental state (a belief). Although many studies have varied the situation in which children might tend to make the false-belief error, only two studies have varied the mental state and the situation (Gopnik & Slaughter, 1991; Wellman & Woolley, 1990), and no studies have varied the mental state while keeping the situation constant. By varying the mental state while controlling situational factors, one might obtain evidence pertinent to determining what aspects of the false-belief scenario make it so challenging for 3-year-olds.

The studies reported here test children's understanding of five different mental states—(*want*, *pretend*, *think*, *dream*, and *looks like* (to the person))—in a false-belief scenario. In a false-belief scenario, a character thinks that *X* is the case; the child learns that *Y* is really the case; and then the child is asked (in effect at least) what the character thinks is the case. The method used in these studies was to present the exact same scenarios with a range of mental states. For example, children were presented with someone who wanted something to be the case when it was not or who was pretending something was the case when it was not. Following the presentation (and the child's acknowledgment) of this information, children were given the test question: Did the person want (pretend and so on) *X* or *Y* to be the case? Note that, to answer this test question correctly, children needed only to repeat what they had just acknowledged.

Such tasks provide evidence bearing on three different possible explanations for the false-belief error. These three explanations are discussed later in theoretical terms, along with what pattern of results would support each; following this is a discussion of children's predicted performance based on past research. The first explanation is that children are simply driven to report reality (for similar suggestions, see Mitchell & Lacohee, 1991; Russell et al., 1991). In essence, they hear "where"

This research was supported by National Institutes of Health Training Grant IT32MH19114-01, a Stanford University Fellowship to Angeline S. Lillard, and National Institute of Mental Health Grant 40687 to John H. Flavell.

Portions of this research were presented at the 20th Anniversary Symposium of the Jean Piaget Society, Philadelphia, May 1990, and the Biennial Meeting of the Society for Research in Child Development, Seattle, April 1991.

We thank the children, parents, and teachers of Bing School for their participation and Blaine White and Lydia Lee for assistance in data collection. We also extend thanks to Frances Green, Lou Moses, Daniela O'Neill, Josef Perner, Henry Wellman, and two anonymous reviewers for their useful comments on an earlier draft of this article.

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and “chocolate” and point to the chocolate’s actual location, failing to consider the mental state information. If this explanation were right, then whenever children were asked what a person wanted (was pretending and so on), children would say that the person wanted (and so on) things to be as they really were. The pattern of results in the present study would be all or none, with each child performing at about the same level on all five mental states.

The two other explanations hinge on the fact that belief is a representational mental state (Flavell, Green, & Flavell, 1990; Ferguson & Gopnik, 1988; Mitchell & Lacohee, 1991; Perner, 1991; Wellman, 1990). A belief is, in effect, a mental model (Johnson-Laird, 1983) of the world. Many theorists believe that children fail false-belief tasks because they do not understand that mental models or representations can differ from reality. However, the exact nature of this difficulty has proven difficult to pin down. Work by Wellman and his colleagues indicates that young children do know something about mental models, for example, that thoughts and images are in the head and are not the same as things in the world (Estes, Wellman, & Woolley, 1989; Wellman & Estes, 1986; Woolley, 1990). On one level, the fact that children know this and yet fail false-belief tasks is puzzling. However, beliefs (of the kind focused on here) are a particular kind of mental model. They are about things in the world as opposed to beliefs about imagined entities or abstractions. It may be this particular aspect of false-belief tasks that confuses children (Wellman has made a similar point; personal communication, November 1990). Children may mistakenly think that all mental representations about real-world entities perfectly match those real-world entities (e.g., Maxi’s belief about the chocolate’s location must match the chocolate’s actual location). Implicit in such a mistaken understanding is the belief that false representations—false beliefs—are not possible. If this is true, then children fail the false-belief task because they do not understand that mental models of particular referents can be different from those referents. Furthermore, if this is true, then children would be expected to fail the tasks issued here for all mental representational states.

Four of the mental states used here—*pretend*, *think*, *dream*, and *looks like* (to the person)—are deemed to be representational mental states in that they entail a mental model. In pretending a block is a comb, for example, one has a mental model of a comb. In dreaming of a cow in a boat, a person has a mental model of a cow in a boat. If a sponge looks like a rock to someone, then that someone has a mental model of a rock when he or she looks at the sponge. Furthermore, in the present studies, the mental models entailed for each of these mental states is about something in the real world. For example, children were told that someone was pretending an *X* was in a real box on the table; the box actually contained a *Y*. Therefore, the mental models involved for all the mental states were of the same type as are involved in false-belief studies: they are about specific things in the world. If children failed to acknowledge that the contents of *pretend*, *think*, *dream*, and *looks like* differed from reality, it would be taken to indicate that 3-year-olds do not understand that a mental representation of a specific referent can differ from that referent.

The case for *want* is less clear in this regard. It seems that desires can be understood either as mental models of how one

wants things to be or as pro attitudes (Davidson, 1980) toward states of affairs that are not necessarily conceived of as mental models. As an example, a nonrepresentational understanding of someone wanting an apple can be thought of as a person reaching or being disposed to search for a real, external apple (Wellman, 1990). A representational account of wanting an apple, on the other hand, can be thought of as a person with an image of an apple inside his or her head and that image being marked “positive” (Wellman, 1990). Although the issue of whether desires are representational is far from resolution in the philosophical and psychological literatures, many believe that a nonrepresentational understanding is possible and indeed is probable in young children (e.g., Astington & Gopnik, 1991; Flavell, 1988; Ferguson & Gopnik, 1988; Perner, 1991; Wellman, 1990). For example, if someone says, “I want *x*,” the child need only conceptualize the person and the object; she or he need not see the person as representing the object. For this reason, we take the position that early understanding of desire is nonrepresentational. Therefore, if children did well on *want* but poorly on all the other mental states, we would take it to support the explanation that children have an incorrect understanding of mental representations and do not understand that any mental representation can differ from its referent. Note that this explanation is “broad” in the sense that it views all mental representational states as being of equal difficulty.

The final explanation is more narrow in that it specifies that only some mental representational states should be difficult. This explanation arises from the fact that pretense seems to be an exception to the explanation sketched previously here. Pretending is a mental representational state, and yet children seem to understand it quite early. Some theorists, therefore, have drawn the reasonable conclusion that only representational mental states that are deemed serious, like beliefs, are problematic for children (Flavell, Green, & Flavell, 1990; Ferguson & Gopnik, 1988; Wellman, 1990). Beliefs are serious because the believer takes them to accurately reflect the way the world is. However, according to this “narrow representations” explanation, mental states that do not purport to reflect reality accurately, like *pretense*, could be understood early. Although pretending and dreaming involve mental models, these models are generally not taken to seriously reflect reality. (In the case of dreaming, once the dreamer is awake, she or he generally does not take the dream as an accurate, literal representation of reality.) Support for this explanation would be had if children performed well on the nonrepresentational and nonserious mental states (*want*, *pretend*, and *dream*) but poorly on the mental states that are both representational and serious (*think* and *looks like*).

In summary, the three possible explanations for the false-belief error are that young children make the error because they (a) are driven to report reality, (b) cannot comprehend that any mental representation could be different from that which it represents; and (c) cannot comprehend that any serious mental representation could be different from that which it represents.

Prior research led to some expectations about children’s performance on the different tasks. Children were expected to perform well on the tasks concerning desires, because children use desire terms earlier than cognitive terms (Bretherton & Beeghly, 1982) and seem to understand desire-related emotions (like happiness) earlier than belief-related emotions (like sur-

prise; Hadwin & Perner, 1989; Stein & Levine, 1986; Wellman & Woolley, 1990; Yuill, 1984). Two studies that set out to compare children's understanding of different mental states have also shown that desires are understood relatively early (Gopnik & Slaughter, 1991; Wellman & Woolley, 1990). However, the results from these studies are not fully compelling, because situational factors could explain the results. For example, Wellman and Woolley (1990) required that children reason about activities on their desire tasks and about the locations of missing items on their belief tasks. Children's memory for actions has been shown to be better than their memory for descriptive information (Cole & Loftus, 1987), and this could have influenced results as much as the mental states in question. In addition, their belief tasks explicitly discussed desires and beliefs, but their desire tasks discussed desires only, making their desire tasks simpler in terms of how many mental states the child had to reason about. Gopnik and Slaughter (1991) used different items and different kinds of activities for each of their tasks, and it is conceivable that children's performance may have been affected by these situational factors. More important, however, their studies tested children's ability to report their own past desire while experiencing a conflicting desire. In contrast, the present studies test children's ability to report another person's desire when what is desired is known to be different from reality. The fact that these studies differ both in terms of who is experiencing the mental state (self/other) and in terms of what might be considered the competing response (reality/personal history) could affect results in undeterminable ways. For example, children may have performed poorly on the Gopnik and Slaughter (1991) desire tasks because it was difficult to lay claim to a desire—albeit a past one—for something they currently did not want. In sum, there are several reasons to expect children to perform relatively well on desire tasks in these studies, but the available evidence is not conclusive; no tightly controlled experimental studies of this phenomenon have been conducted.

Children were also expected to perform well on *pretend* tasks, because they appear to understand pretending quite early, before they pass false-belief tasks. In addition, children understand the pretend–reality distinction earlier than the appearance–reality distinction (Flavell, Flavell, & Green, 1987; Woolley & Wellman, 1990b). Furthermore, children performed well on pretend tasks in the aforementioned Gopnik and Slaughter (1991) study. However, except for Flavell et al. (1987; especially see Experiment 3), these studies did not tightly control the relevant variables; furthermore, the results of the Flavell et al. (1987) study could also be explained by other factors (see Lillard, 1991). In sum, no prior experimental studies provided a good indication of how children would perform on *pretend*, but because children engage in pretend and use the word *pretend* at a young age (Bretherton & Beeghly, 1982), we expected they would do fairly well on *pretend* tasks.

Because very little work has addressed children's understanding of dreams, we had no definite expectations regarding children's performance on that mental state, although work by Woolley and Wellman (1990a) indicates that young children do understand that dreams are fictional. Finally, *looks like* was expected to be as hard as *think*, because it implies representing reality differently from how it actually is and because appear-

ance–reality and false-belief tasks seem to be equally difficult for young children (Gopnik & Astington, 1988).

As stated, two alternative strategies could be used to compare children's understanding of the five different mental states. One strategy is to use different situations or tasks to assess each understanding, with each task tailored to suit a certain mental state. This appears to be the strategy chosen by Gopnik and Slaughter (1991) and Wellman and Woolley (1990). As noted, the problem with this approach is that results could be influenced by factors other than the one of interest. The alternative approach is to use the same tasks for each mental state. This strategy poses other problems, because any given context might be more suited to one mental state than to another. In addition, the implications of a given situation may differ for different mental states, for example, "She thinks there's an *X* in the box" implies that she does not know what is in the box, whereas "She wants there to be an *X* in the box" has no implications regarding her knowledge state. However, similar issues should arise in the different-task approach as well and are, in fact, unavoidable in any test comparing understanding of different mental states. In Study 1 both approaches were used: Each mental state was first presented in a customized, appropriate context (a story task) and then in a standard task that was exactly the same for each mental state (a test box task). Study 2, on the other hand, relied solely on the same-task approach.

Study 1

In Study 1, each of five mental states (*want*, *pretend*, *dream*, *looks like*, and *think*) was presented in a story task and two box tasks (one control and one test).

Method

Subjects. Twenty-eight 3-year-olds (age range 2 years and 11 months to 4 years; mean age = 3 years and 5 months) from a university nursery school participated in the study. Ten subjects were girls, and 18 were boys.

Materials and procedure. Children were brought singly into the game room by a research assistant, where they were greeted by a confederate experimenter (Lydia). Before any tasks were presented, children were shown a set of ear covers. Lydia demonstrated that when she put on the covers, she could not hear. Children verified that this was true. Each of the five mental states was presented in a block of three tasks: first a story, then a control box, and finally a test box. The stories were each accompanied by a picture and were designed to introduce the mental state in an appropriate context. The *want* picture, for example, showed a girl running to a table on which her snack was placed. The line of vision from the girl to the table was blocked by a fence. The story went as follows: "This is Julie. She's running to get snack. She wants there to be juice on the table. What does she want?" During this first part of the story, the experimenter's thumb covered the part of the picture with which the character's desire was concerned (in this case, the tabletop). After the child answered the control question, the experimenter said, "Let's look!" and took his thumb off the picture. "Oh! It's really milk, but she wants it to be juice. (Child's name), what's really on the table, milk or juice? And what did Julie want to be on the table, milk or juice?" The reality questions always preceded the mental state questions. The scripts used for the other four mental states are shown in the Appendix.

For each mental state (except *looks like*; see later discussion), the story task was followed by a control box task and then a test box task.

Table 1
Number of Children (of 28) Scoring Zero, One, or Two Correct in Study 1

State	Number correct		
	Zero	One	Two
Want*	4	7	17
Pretend*	5	9	14
Think*	10	6	12
Dream	9	8	11
Looks like	8	10	10

* $p < .05$, chi-square goodness of fit.

The contents of the control box were the same as what Lydia had stated she wanted (and so on) to be in the box, whereas the contents of the test box were different. The *wants* version of the control box task went as follows. The experimenter put a closed box on the table and said, "Right now, Lydia is wanting something. Lydia, what are you wanting?" Lydia replied, "I'm wanting there to be a ball in that box." The experimenter then asked the child, "What's Lydia wanting?" After the child responded, Lydia was asked to cover her eyes and ears so she could not see nor hear. Exclaiming "Let's look!", the experimenter brought the box close to the child and secretly opened it so the child could look inside. The child was then asked, "What's really in the box?" and "What did Lydia want to be in the box?" For the control boxes, the correct answer to each of these questions was the same. (The purpose of the control box task was to ensure that the child did not regard the confederate as always deviant in her statements concerning the boxes.) The second box task was the test case in which the object of the mental state (the "represented" object) was different from what was actually in the box. The procedure was identical to that of the control box, except that the two questions were asked as a forced-choice between the real and the represented object; the order of the two choices was counterbalanced within and across children.

Eight boxes were used in all: a control and a test box for each of four of the mental states. For the fifth mental state, *looks like*, instead of boxes, a cup (that looked like a cup) was used for the control case, and a sponge that looked like a rock was used for the test case. The five mental states were presented in random order, whereas the four boxes were presented in a fixed order, in effect randomizing box-mental state pairings.

Results and Discussion

Children answered four relevant questions per mental state: two about the story and two about the test box. For each, one question concerned reality and the other concerned the mental state. Children were 100% correct about what was really in the boxes, and only 1 child wrongly claimed that the sponge was really a rock. For stories, children's error rate on the reality questions was 8%. Because the study's focus was on differences between mental states rather than overall performance, and these reality errors were fairly evenly distributed across mental states, all the data were retained.

Table 1 shows the number of children who were correct on zero, one, or two tasks for each mental state. A chi-square goodness-of-fit test was performed for each of these distributions. The obtained distributions for *want*, *pretend*, and *think* were

significantly different from what would have been expected were children responding randomly (all $ps < .05$).

Children were assigned a score of 0 for every item on which they gave a reality response and 1 for every item they answered correctly. Figure 1 shows the overall percentage correct for each mental state and task type based on these scores. A two-way analysis of variance (ANOVA; Task Type \times Mental State) was conducted on the 0-1 scores, and this yielded significant mental state differences, $F(2, 5) = 3.98, p < .005$, but no task differences. The story and box data were, therefore, combined into a 0-1-2 score, and planned comparisons were performed for the contrasts about which definite hypotheses were held. Performance on *want* was significantly better than on *think*, $t(27) = 3.03, p < .01$, and on *looks like*, $t(27) = 2.82, p < .01$. Performance on *pretend* was significantly better than on *looks like*, $t(27) = 2.26, p < .05$, but not than on *think*, $t(27) = 1.66, p = .11$. Although performance on *dream* was at the same absolute level as on *think* and *looks like*, it was not significantly different from performance on *want* or on *pretend* as indicated by a Scheffe's post hoc analysis.

Individual children's response patterns were analyzed with sign tests. Significantly more children had higher scores on *want* than on *think* ($n = 8$) than the reverse ($n = 0, p < .01$), on *want* than on *dream* ($n = 11$) than the reverse ($n = 0, p < .01$), and on *want* than on *looks like* ($n = 11$) than the reverse ($n = 2, p < .05$). In addition, significantly more children had higher scores on *pretend* than on *dream* ($n = 8$) than the reverse ($n = 1, p < .05$). It is interesting to note that children performed better on tasks concerning desire and pretense than those concerning belief, even though the tasks are really better suited for belief. For example, to claim that one wants a pair of scissors to be in a box when there is no apparent reason for the desire is perhaps not as natural as to simply say one thinks there are scissors in a box (a claim that might be construed as part of a guessing game).

In sum, the results from Study 1 imply that children understand that the contents of desire states can be different from reality earlier than children understand this about belief states, even when the tasks used to assess the two cases are the same (e.g., the box tasks). In addition, 3-year-olds appear to understand this about pretense somewhat less well than about desire,

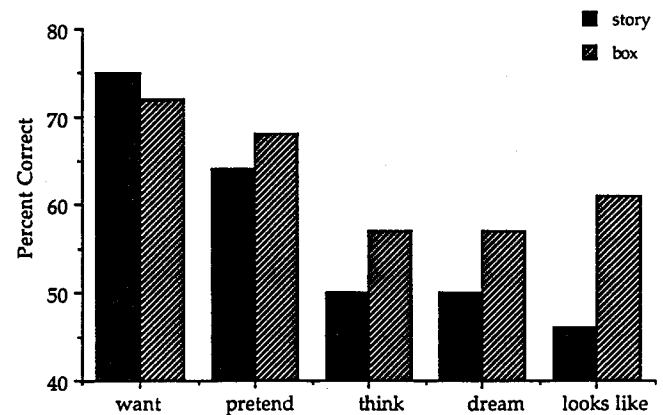


Figure 1. Percentage of correct responses in Study 1.

but somewhat better than about belief. Finally, they appear to find *dream* and *looks like* as difficult as *think* in this regard.

These results do not support the hypothesis that children fail false-belief tasks because of an overwhelming drive to report reality: Only 3 of 28 children consistently gave reality responses to all questions. Hence, the first hypothesis is not supported. Evidence is mixed, however, concerning the two representations' explanations. Children's good performance on pretense seems to support the possibility that children's difficulty is limited to serious representations, but their poor performance on dream does not. A second study was needed to provide further evidence.

In addition, there is a fourth, and less interesting, explanation for the pattern of results obtained in Study 1. The stories used for *want* and *pretend* portrayed characters as actively engaged in some behavior that was relevant to their mental state. In the *want* story, the girl was running to get snack and wanted it to be juice, and in the *pretend* story, the boy was holding a block in the air, pretending it was an airplane. The stories used for the other three mental states were static in comparison and perhaps not as interesting to young children. The identical box tasks should have revealed such effects, and yet it is conceivable that carryover effects from more interesting story tasks could have led to children's better performance on the *want* and *pretend* box tasks. Study 2 was designed to address these concerns.

Study 2

The main concern in Study 1 was that children may have performed better on the *want* and *pretend* tasks because their respective story tasks were easier. To determine if children perform better on tasks that accompany the mental state with a relevant action, Study 2 used the exact same tasks for all verbs (for different children). Half of those tasks included relevant actions and half did not. To determine if carryover effects had occurred, the action tasks were presented first to half the subjects, and the nonaction tasks were presented first to the remaining subjects. Using the exact same stories and providing actions posed certain constraints such that understanding of *dream* and *looks like* could not be tested in Study 2.

Method

Subjects. Thirty-six additional children from the same university nursery school participated. The group was composed of 21 girls and 15 boys, ranging in age from 2 years and 11 months to 3 years and 8 months (mean age = 3 years and 4 months). Nine additional children failed a control task (described later) and were omitted from the study.

Materials and procedure. The stimulus materials were a furnished two-room cardboard dollhouse equipped with various hiding places, three dolls, and 12 props. A memory control task was administered to ensure that children could correctly report about a past reality. For the control task, the experimenter made a doll place a hat on a bed and then walk into the other room. The experimenter carefully moved the hat to the dollhouse floor. Then she put a ball on the bed and asked, "What's on the bed now, a hat or a ball? And what did she (pointing to the doll) put on the bed before, a hat or a ball?"

As a warm-up task, before each mental state children were asked, for example, "Do you know what pretending is? Have you ever pretended you had a special toy?" The specific items (e.g., a special toy) were counterbalanced across mental states. Next, the child was given either

two action cases and then two nonaction cases or vice versa for that mental state. Half the subjects always heard action cases first, and the other half always heard nonaction cases first. Table 2 shows the action versions of the 12 items; the nonaction versions are the same except for the first sentence, which in the nonaction version is replaced by a statement about the doll's location. (Table 2 also shows the overall score obtained for each item.) In one nonaction case, for example, the experimenter walked the doll onto a rug and said, "She's on the rug. She's pretending there's juice in that cupboard." The experimenter pointed to a cupboard in the other room and then asked a control question: "What's she pretending?" After the child repeated the pretense, the cupboard was opened, revealing a teddy bear, and the child was asked the forced-choice questions concerning reality ("What's really in the cupboard, a teddy bear or juice?") and then mental state ("What's she pretending is in the cupboard, a teddy bear or juice?"). Order of the two objects (teddy bear or juice) was counterbalanced among subjects and alternated between items. When asking these two questions, the experimenter pointed in an exaggerated manner at the relevant location: the hiding place for the reality question or the doll for the mental state question. The action case for this scenario was identical except that "She's on the rug" was replaced with "She's getting a cup," and the doll was moved to the same location on the rug, and a cup was placed in her hand.

The same stories and actions were used for all three mental states for different children (e.g., some children heard "She wants there to be juice in the cupboard," and others heard "She thinks there's juice in the cupboard"). There were six possible orders of the three mental states; 6 children were given each of the orders. Items were presented in two different orders. Every combination of item, mental state, and type occurred equally often in action-first and nonaction-first groups and for both item orders. In addition, every item was used an equal number of times with each mental state both as an action item and as a nonaction item.

Results and Discussion

No child was ever incorrect on the reality question in this study. Table 3 shows the number of children who were correct on zero, one, or two tasks of a given type. All of these distributions were significantly different than what would have been obtained were children responding randomly (all $ps < .005$, chi-square goodness of fit).

The percentage of correct answers (based on 0-1 scoring) are presented in Figure 2. A multi-factor ANOVA was run on the 0-1-2 scores (there were two items of each type) with two within factors—mental state (*want*, *pretend*, or *think*) and type (*action* or *nonaction*)—and three between factors—item order, type order (*action first* or *nonaction first*), and first mental state (*want*, *pretend*, or *think*). This analysis yielded several significant effects.

There was a significant main effect for mental state, $F(2, 23) = 14.63$, $p < .0001$. Follow-up t tests yielded significant differences between children's performance on *want* versus *think*, $p < .0001$, *want* versus *pretend*, $p < .05$, and *pretend* versus *think*, $p < .005$. The ANOVA also yielded a significant Mental State \times Type interaction, $F(2, 48) = 6.35$, $p < .05$. Simple effects analysis of the Mental State \times Type interaction indicated that the only mental state for which the action condition was significantly easier than the nonaction condition was *pretend*, $F(1, 24) = 5.44$, $p < .05$; for *want* and *think*, the action and prop did not significantly affect performance. These results suggest that, when *pretend* is accompanied by an action, 3-year-

Table 2
Items Used in Study 2 and Item Score for Each Mental State

Item	Want	Pretend	Think
1. She/he's getting some pet food. She/he _ a kitty in that box. (Play-doh)	8	6	1
2. She/he's getting her/his toys. She/he's _ her/his little friend's at the door. (mail carrier)	9	5	3
3. She/he's getting the watering can. She/he _ a plant in this room. (piano)	7	6	4
4. She/he's getting her/his crayons. She/he _ a coloring book under this couch. (shoes)	9	9	4
5. She/he's getting a plate. She/he _ raisins in that jar. (string)	8	7	9
6. She/he's getting her/his umbrella. She/he _ there's rain outside. (sun)	9	7	9
7. She/he's getting her/his toothbrush. She/he _ there's a bathroom behind this door. (closet)	10	3	9
8. She/he's getting the mop. She/he _ dirt under this rug. (key)	8	4	8
9. She/he's getting a cup. She/he _ juice in this cupboard. (teddy bear)	9	10	3
10. She/he's getting a cage. She/he _ a rabbit under the bed. (brother)	7	9	4
11. She/he's getting her flashlight. She/he _ it's nighttime outside. (daytime)	8	10	4
12. She/he's getting a bone. She/he _ a dog under the table. (flower)	9	8	2

Note. Object in parentheses corresponds to reality. Item score refers to the number of children (of a possible 12) who were correct on that item for that mental state.

olds understand that its contents can be different from reality; but when *pretend* is presented without an action, they treat it more like *think*, making its contents conform to reality. Indeed, children's performance on pretend-nonaction items was not significantly different from their performance on think-nonaction items.

The overall ANOVA also yielded a significant effect for first mental state, $F(2, 24) = 5.14, p = .01$. The 12 subjects who heard the *want* tasks first were 65% correct overall (i.e., on all three mental states), the 12 who heard the *pretend* task first were 75% correct, and the 12 who heard the *think* tasks first were 32% correct. Perhaps first answering questions about mental states

that they understood could differ from reality freed children to respond with reality-discrepant answers to the *think* questions that came later. This suggests that a between-subjects study might yield even greater differences between the various mental states. The overall ANOVA also yielded a Mental State \times Item Order \times Type Order interaction ($p < .05$) for which our explanation is not sufficiently interesting to warrant discussion.

Combining data across action and nonaction conditions, sign tests showed that significantly more children performed better on *want* tasks than on *think* tasks ($n = 22$) than the reverse ($n = 0, p < .0001$); and significantly more children performed better

Table 3
Number of Children (of 36) Scoring Zero, One, or Two Correct in Study 2

State	Number correct		
	Zero	One	Two
Want			
Action*	7	4	25
Nonaction*	9	7	20
Pretend			
Action*	8	8	20
Nonaction*	14	8	14
Think			
Action*	21	3	12
Nonaction*	16	7	13

* $p < .005$, chi-square goodness of fit.

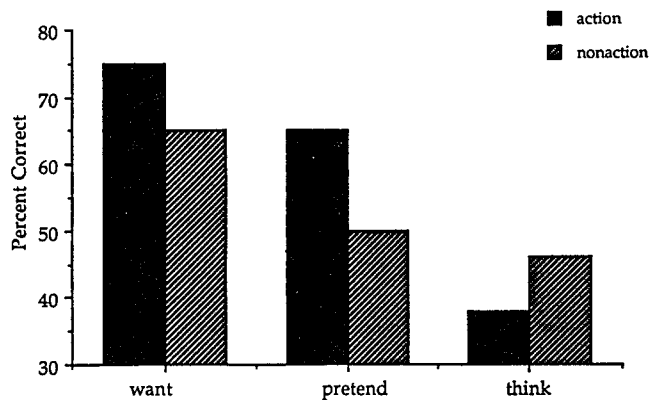


Figure 2. Percentage of correct responses in Study 2.

on *pretend* tasks than on *think* tasks ($n = 16$) than the reverse ($n = 2$, $p < .005$); but the number of children performing better on *want* than *pretend* tasks ($n = 12$) was not significantly different than the number of children obtaining the reverse pattern ($n = 6$). On the action tasks alone, these same patterns held, but on the nonaction tasks alone, *pretend* was not significantly different than *think*. In addition, *pretend* was the only mental state for which significantly more children performed better in the action condition than the nonaction condition ($n = 13$) than the reverse ($n = 3$, $p < .01$).

A comparison of the *want* and *pretend* data in Figures 1 and 2 (action corresponds to story and nonaction to box) shows that children's performance was comparable across the two studies, with the exception of the nonaction *pretend* tasks. This discrepancy can be explained by carryover effects. Recall that in Study 1, the box task—a nonaction task—was always preceded by an action-based story task. In Study 2, half of all children received similar tasks in this order: the action task followed by the nonaction task. These children were 65% correct on the *pretend* tasks in Study 2, similar to the 66% correct level on *pretend* tasks in Study 1.

General Discussion

In each of the two studies, children performed significantly better on the exact same tasks when they concerned desires than when they concerned beliefs. When the tasks concerned pretense, performance was at an intermediate level. Although several theorists have speculated that young children probably understand desires earlier than beliefs, these are the first studies to conduct a direct comparison using identical test conditions such that no extraneous factors could account for the results. If anything, the actions shown made more sense in the context of beliefs than desires. For example, someone is more likely to get pet food because they think there is a cat in a box than because they want there to be a cat there (Study 2, Item 1). Despite this, children were consistently better at reporting desire states that differ from reality than at reporting discrepant beliefs. These studies, therefore, provide strong evidence that children understand that desires can differ from reality before they understand that beliefs can. These studies also indicate that children understand pretense in this respect somewhat better than belief but not as well as desire. In addition, these studies may suggest that children understand pretense with an action before they understand nonaction pretense.

Of the three explanations proposed for the false-belief error, the first—an overriding tendency to report reality—was not well supported by these studies. In Study 1, only 3 of 28 children reported reality for every mental state question, and in Study 2, only 2 of 36 children did so. The vast majority of children did not show an across-the-board tendency to report reality.

Another proposed explanation was that young children may have a better grasp of nonserious mental representations than of serious ones, ones that are seriously believed (by the holder) to be true. In other words, young children can allow for known or intentional inaccuracies, like jokes and pretenses, but not unintentional inaccuracies like false beliefs. If this explanation were correct, one would have expected children to perform well

on the *want* task because it is not representational at all and well on the *pretend* and *dream* tasks because they are not serious representations. The action–nonaction manipulation would have no predicted effect. In fact, however, children performed at about the same level on two of the nonserious mental representational states—*dream* and nonaction *pretend*—as on the serious ones—*think* and *looks like*. One might argue that young children think dreams are serious, accurate reflections of reality, but studies by Woolley and Wellman (1990a) indicate that young children know dreams are fictional. One might also argue that nonaction pretense was simply strange to children and that this explains their poor performance on those tasks. However, if one truly understands pretending as a mental representational state, as mental stipulation of some alternate reality, then to report what one had already acknowledged was being pretended (in response to the first control question) does not seem unduly difficult. Indeed, if one understands pretend as a mental representational state, then the manipulation of the character getting a cup should not significantly affect performance, and yet it did. Finally, it does not seem likely that children would interpret the word *pretend* as a serious representation of reality when not accompanied by an action and a nonserious one when so accompanied. In sum, the results reported here do not support the interpretation that children's difficulty understanding mental states is confined to mental states that are taken to be serious representations of reality.

The results may best support the third explanation: that children's difficulty does not lie only with mental representational states that purport to accurately represent reality but extends even to those that do not so purport, when the representation has a specific real-world referent (see Wellman, 1990; Woolley, 1990, for a similar view). It is the fact that that particular cupboard actually contains a teddy bear that makes it hard for young children to report that someone thought, or was pretending, that that particular cupboard contained juice. Young children may not understand that any mental representation—be it a pretense, a dream, or a belief—of a specific referent can be different from that referent. On the other hand, if no specific referent is involved—imagining a purple frog, for example—children can correctly attribute a mental representation (Woolley, 1990). Only when a specific referent is involved, for example, imagining or thinking that some particular green frog was purple, do children have trouble.

This explains why children performed well on desire (a nonrepresentational mental state) but poorly on belief, dream, and nonaction pretense (all of which entailed mental models that were discrepant from reality). However, it leaves open the question of why children performed well on action pretense. One possibility is that children understand pretending as its common external manifestations, like actions and costumes, rather than as a mental representational state (for similar suggestions, see Harris, 1991; Lillard, 1991; Perner, 1991). If this is the case, then the questions concerning action pretenses could be construed as referring to actions. For example, “pretending there's juice in the cupboard” could have been parsed by the children as the action of getting a cup rather than as mentally representing juice in that location. Work currently in progress is investigating whether young children do construe pretending

only as an action and fail to appreciate that it also—and crucially—entails a mental representation.

In sum, we believe the best explanation for these results may be that desires and action pretense are easier to contrast with reality than beliefs, dreams, and nonaction pretense because they are understood nonrepresentationally. Desire may be construed as a desirer impelled toward some external object. Pretense may be interpreted as the pretense behavior rather than the pretense representation that undergirds that behavior. On the other hand, nonaction *pretense*, *dream*, *looks like*, and *belief* tasks were difficult because they required children to report that a mental representation of what was in a given location was different from what actually was there, and young children have great difficulty conceiving of such representations.

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(Appendix follows on next page)

Appendix

Story Scripts Used in Study 1

For the *want* script, see the text.

Pretend

(Picture is of a boy holding a block in the air): This is Steve. He's playing with his toys. He's pretending there's an airplane in his hand. What's he pretending? Let's look—Oh! It's really a block, but he's pretending it's an airplane.

Think

(Picture is of a girl standing on a porch under which a rabbit is sitting): This is Suzy. She's standing on her porch. She thinks there's a turtle under the porch. What does she think? Let's look—Oh! It's really a rabbit, but she thinks it's a turtle.

Dream

(Picture is of a boy asleep in a bed; underneath the bed is a cat): This is Danny. He's sleeping on his bed. He's dreaming there's a fish under the bed. What's he dreaming? Let's look—Oh! It's really a cat, but he's dreaming it's a fish.

Looks Like

(Picture is of a boy standing by a tree on one side of a fence; on the other side of the fence is a girl wearing a bear mask; the fence blocks the girl's body, so the boy can only see the bear mask): This is Joey. He's standing by a tree. This looks like a bear to Joey. What's this look like to Joey? Let's look—Oh! It's really a girl, but it looks like a bear to Joey.

Received November 29, 1990

Revision received November 15, 1991

Accepted October 20, 1991 ■