

Young Children's Preference for Mental State versus Behavioral Descriptions of Human Action

Angeline S. Lillard and John H. Flavell

Stanford University

LILLARD, ANGELINE S., and FLAVELL, JOHN H. *Young Children's Preference for Mental State versus Behavioral Descriptions of Human Action*. CHILD DEVELOPMENT, 1990, 61, 731-741. Young children have traditionally been conceived of as little behaviorists who focus on the external and lack knowledge of internal states. In contrast, some recent research suggests that they do have a fundamentally correct understanding of mental life. Children may often focus on the external, not because they are unaware of the internal but because in test situations the external has been more cognitively available to them. Our studies asked whether 3-year-olds prefer to describe human action in behavioral terms when a mental state description is made equally available and salient. 3-year-olds were presented with 3 differently colored photocopies of the same picture. The first copy was described with reference to the mental state of the person in the picture, and the second copy was described with reference to the person's behavior, or vice versa. Then the third copy was presented, and the child was asked to tell a puppet about this picture—effectively, to choose between the mental state description and the behavioral description. In each of 2 studies, 20 3-year-olds made 12 such choices. In both studies, children tended to choose mentalistic descriptions significantly more often than behavioral ones, even when there was better pictorial support for the behavioral ones. These findings suggest that, given equally available options, young children may prefer to describe people in terms of their mental states rather than their behaviors.

There has been considerable controversy over the years as to how much young children know about mental states and how readily they attribute them to others (Astington, Harris, & Olson, 1988). The traditional view has been that they are, in effect, behaviorists, who either misconstrue mental events as behaviors or do not recognize the existence of mental processes at all. In Shantz's words, "If one were to view the 'child as a psychologist' who subscribes to certain positions or theories, the developmental changes, broadly put, suggest the following: prior to 7 or 8 years, the child conceives of persons largely as one who is both a demographer and a behaviorist would, defining the person in terms of her environmental circumstances and observable behavior" (Shantz, 1983, p. 506). There is a variety of evidence consistent with this view. First, there is a line of evidence showing that young children may externalize the mental, interpreting what adults consider internal processes and parts as external. For example, in his early work, Piaget (1929) observed that

young children sometimes described thinking as talking, and dreams as pictures that everyone can see. More recently, Selman (1980) reported similar findings, for example, children claiming that they thought with their mouths and that emotions are always expressed by external features (see also Broughton, 1978). Similarly, Harris (1985) described a young child explaining that you can't be happy and sad at once because your mouth can't go up and down at the same time. Thus, young children sometimes appear to equate mental states with concurrent external events and behaviors. Second, some studies show children defining mental verbs in terms of ensuing external events. For example, in a study by Misciones, Marvin, O'Brien, and Greenberg (1978), 4-year-olds used the term *know* whenever a subject made a correct choice, and *guess* whenever the subject chose incorrectly, regardless of the subject's prior knowledge state. Wellman and Johnson (1979) obtained similar results using the terms *remember* and *forget*. Similarly, in Piaget's

This research was supported in part by a Stanford University Fellowship to the first author, and NIMH grant MH 40687 to the second author. We are grateful to the children, parents, and teachers of Bing School whose cooperation made these studies possible. We also thank Eleanor Flavell, Frances Green, Lou Moses, and Kim Powlishta for their help on an earlier draft of this paper, and Carla Herrera for help with coding. Authors' address: Department of Psychology, Jordan Hall, Stanford University, Stanford, CA 94305-2130.

732 Child Development

morality studies (1932) children based their judgments on outcome, not intention, until around age 9. A third line of evidence for the behaviorist view stems from person perception research, which has shown that young children frequently describe people in physicalistic terms (Livesley & Bromley, 1973; Peevers & Secord, 1973). Finally, young children seldom ascribe mental states to others in their dreams (Foulkes, 1987). The fact that they do not seem to represent their dream characters as possessing internal states lends support to the possibility that they may not generally represent actual people as having mental states either. Thus there is evidence indicating that young children externalize the mental and may even lack an understanding of the internal nature of mental states.

On the other hand, there is also a growing body of research indicating that they do know something about mental life, and that they may even prefer psychological characterizations to physical ones when the psychological information is made salient. Several recent studies show that young children can clearly differentiate between mental and external entities (Estes, Wellman, & Woolley, in press; Wellman & Estes, 1986). In these studies, 3-year-olds distinguished several aspects of real versus mental entities, including the fact that the former but not the latter could be seen by others, could be touched, and could exist over time. Other studies portray young children as oriented toward mentalistic explanations of events. For example, Bartsch and Wellman (1989) show 3-year-olds using belief and desire to explain human action. Miller and Aloise's (1989) recent review of causal attribution studies concludes that preschoolers prefer and even seek out nonphysical, psychological causes of events under certain conditions, such as when psychological causes are salient. Natural language studies also indicate that young children use mental state language, and may have a beginning grasp of what mental life entails (Bretherton & Beeghly, 1982; Bretherton, Fritz, Zahn-Waxler, & Ridgeway, 1986; Dunn, Bretherton, & Munn, 1987). Of course, one cannot always be certain that children are referring to mental states when they use mental state language. They may use terms like *think* to refer to behaviors such as staring into space. Similarly, Shatz, Wellman, and Silber (1983) suggest that some uses of mental verbs are conversational; that is, the verbs are used merely to mitigate commands or to fill pauses. For example, one might have no understanding of

mental states and still say *I think it's time for lunch* to soften a request. Two studies have addressed the issue of when young children's mental state talk reflects a true understanding of mental states. Shatz et al. (1983) looked at contrastives (in which, e.g., a prior belief is contrasted with a currently known reality), and Smiley and Huttenlocher (1989) investigated mental verb use when situational cues varied. These studies found that sometime between the ages of 2½ and 4, children begin using mental state language to refer to mental states.

Some claim that young children have sometimes appeared behavioristic because testing methods have failed to tap their understanding of mental states. Wellman and Gelman (1987) claim that interview studies such as that of Piaget (1929) fail to uncover young children's knowledge because they ask only about mental entities, rather than about the difference between external and mental entities. Asking about both types of entities, Wellman and Estes (1986) found that 3-year-olds understand several essential differences between mental and physical objects. For example, they know that a real cookie can be eaten, but an imagined cookie cannot. Nelson (1980) found that 3-year-olds actually do rely on intention rather than outcome in making moral judgments, if intention is made explicit, available, and salient. Perhaps children base their judgments on outcome in some studies only because it is more salient, or more cognitively available to them, in the experimental situation. In a follow-up of their 1979 study, Johnson and Wellman (1980) included a trick condition in which the internal state of remembering was made especially salient. Results on this condition provided evidence that salience does play an important role in children's responses. Wellman (in press) interprets the person perception studies as confounding mentalistic conceptions with trait conceptions. While young children do not, he claims, appreciate stable personality traits, they do appreciate internal psychological states and their role in motivating behaviors (see also Wood, 1978). Feldman and Ruble (1988) go further, claiming that much of the reason for a lack of trait inference in the classic person perception studies is the lack of personal relevance. When 6-year-olds expected to interact with observed characters at a later time, they were much more likely to describe them in psychological terms. Perhaps personal relevance heightens for young children the importance and the salience of psychological characteristics. Ladd and Emer-



FIG. 1.—Illustration depicting boy wiping up/feeling sad about his spilled milk. Picture on left is from Study 1 (wiping behavior is not visible); picture on right is from Study 2.

son (1984) suggest that young children appear to be behavioristic because they have difficulty recalling psychological information. When recognition was used as an assessment, first graders gave as much psychological information about their friends as they did physical information. Such a method may also serve to increase the salience of psychological information (see also Furman & Bierman, 1984).

Differential salience may provide at least a partial explanation for children's tendency to describe the mental in external terms. Internal states are by their very nature less salient than external events: they cannot be seen or touched, and must be inferred. When asked to devise their own judgments, young children may simply be citing what is most salient to them—usually the external, perceptually accessible information. However, if a mental state description were made salient and legitimate, by being modeled, young children might show no preference for behavioral descriptions. In view of the fact that cognitive and affective information is generally perceived to be more informative than behavioral information (Anderson & Ross, 1984), they might even prefer mentalistic to behavioral descriptions of human action when both are presented as options. Our studies asked whether, given both a mental state description and a behavioral description, young children would prefer to describe other people in terms of mental states. We presented 3-year-olds with three differently colored photocopies of the same picture, and modeled two different descriptions—one mentalistic and one behavioral—for the first two. Then we asked children to describe the third. The measure of interest was whether children's

own descriptions focused on internal states or on behaviors. We predicted that under these conditions, with the mental state option equally available, young children would choose to describe the pictures using mental state terms as often or more often than they would choose to describe them using behavioral terms.

Study 1

Method

Subjects.—The subjects were 20 3-year-olds from a university nursery school (3-1 to 3-11; mean age 3-6). Equal numbers of boys and girls participated in the study.

Materials.—Stimuli were 12 sets of pictures of children involved in various actions. Each set contained three differently colored photocopies of a picture. As indicated previously, one of these three photocopies was described by the experimenter in terms of the depicted person's mental state, another was described in terms of the person's behavior, and the third photocopy was left to be described by the subject. Since mental states cannot actually be depicted, we tried to equate for perceptual salience in our pictures by not depicting behaviors either. Behaviors were hidden behind natural barriers, like bodies and tables. Both behaviors and mental states were suggested in our pictures, but neither was shown. For example, one picture (presented on the left in Fig. 1) shows a boy from behind, crouching over spilled liquid. Neither his hands nor his face are visible. The descriptions we used for this picture were "He's wiping up his spilled milk" and "He's feeling sad about his spilled milk." Both descriptions were plausible, but neither was

734 Child Development

mandated by the pictorial evidence. Because children often apply emotion terms on the basis of facial expression (Harris, 1985), there was the danger that children would use emotion terms in a behavioristic fashion to refer to facial expressions rather than mental states. For this reason, faces were not depicted in the emotion items, as in the foregoing example.

The 12 mentalistic descriptions fell into three categories: Perception, Emotion, and Other Mental States. The descriptions are the first 12 items listed in Table 1. The distinction between "mentalistic" and "behavioral" descriptions cannot be absolutely clear cut here, inasmuch as the descriptions refer to human actions. The behaviors described were generally intended acts, thus accompanied by the mental state of intending, and the mental state in some instances implied an associated behavior. For example, "hitting a drum" suggests an underlying intention, and "wants to get a cupcake" would usually imply some cupcake-directed body movements. However, it is the case that in each pair, one description focused on a mental state, while the other referred to a behavior.

Certainly one could sway children's choices by using descriptions that are differentially unlikely, exciting, dull, and so on. To avoid such spurious effects, we tried to develop description pairs that were equally valid for each picture. We also made every effort to equate items with respect to word order, sentence length and complexity, and inclusion of words that might be especially attractive to children. In a further attempt to equate items, we colored in the pictures such that the third picture in each set did not, in our judgment, more closely resemble either of the previous two, and we assigned descriptions to the first two pictures at random. In these ways we tried to insure that the only relevant difference between the descriptions was the measure of interest: whether the description referred to a mental state, or to a behavior. Finally, to control for possible effects of sex of the child in the picture, half the pictures in each category showed boys, and half showed girls.

Procedure.—A female experimenter brought each child singly into the game room and introduced him or her to George, a puppet. She explained that she was going to show some pictures to the child. Some pictures she would describe, and other pictures the child could describe to George. She held up the first picture from a set and described it using either its mentalistic or its behavioral descrip-

tion. Then she showed the second picture—identical to the first except in coloring—and gave the alternate description. Each picture was placed face down following presentation. The two descriptions were delivered in as parallel a manner as possible, keeping intonation pattern constant.

The third picture of the set was then shown (again, identical save for the color), and the child was asked to "tell George about this girl/boy." If the child said "I don't know," did not answer, or otherwise failed to indicate a preference for mental or behavioral descriptions, the experimenter prompted with "Is s/he [mental description] or is s/he [behavioral description]?" (The order in which the child first heard any two descriptions was always preserved in promptings. Children usually required prompting on their first few trials, but seldom required it thereafter.) Of course, the child did not have to repeat the experimenter's exact wording to indicate a definite preference for mentalistic or behavioral descriptions. For example, "She wants a book" was scored as a mentalistic description, even when the modeled descriptions were "She's choosing a book that she likes" and "She's taking a book off the shelf." A truncated version like "taking a book" was sufficient as well, if it clearly referred to just one of our descriptions. However, in the rare cases in which the child's description choice was ambiguous, the experimenter continued prompting until the child showed a clear preference for a mentalistic or behavioral description. For example, if the child said, "She's playing with the drum," the experimenter said, "Oh, she's playing with the drum. But which of those two—is she hitting the drum, or is she listening to the drum?" After the child answered satisfactorily, the experimenter added the third picture to the pile and presented the next set of pictures. The same procedure was followed for each of the 12 sets of pictures.

The 12 picture sets were presented in 10 different random orders, each order being assigned to a pair of children. Each child heard a mentalistic description first for half the picture sets, and a behavioral description for the other six picture sets. The other child receiving the same random order heard descriptions in opposing orders, so that for any given picture set, one child heard the behavior first, and another child (who was presented the pictures in the same random order) heard the mental state first. In this way, presentation order of each description pair (mental state or behavioral first) was counterbalanced within and across subjects, while order of picture set

TABLE 1
MODELED DESCRIPTIONS

	MENTALISTIC DESCRIPTION	BEHAVIORAL DESCRIPTION	MEAN DIFFERENCE SCORE	
			Study 1	Study 2
Perception (Study 1 only):				
1.	He's smelling a flower.	He's cutting a flower.	0	...
2.	She's feeling how cold the ice is.	She's holding ice in her hands.	0	...
3.	He's tasting bread.	He's chewing bread.	-6	...
4.	She's listening to the drum.	She's hitting the drum.	-2	...
Emotion:				
5.	He's scared of the dog.	He's holding his mommy's hand.	10	6
6.	She's happy with the puppy.	She's patting the puppy.	0	6
7.	She's mad about the drawing.	She's talking about the drawing.	8	10
8.	He's feeling sad about his spilled milk.	He's wiping up his spilled milk.	2	-6
Other Mental States:				
9.	She's choosing a book that she likes.	She's taking a book off the shelf.	2	6
10.	He wants to get a cupcake.	He's on tiptoes by the cupcakes.	18	10
11.	He's thinking about what to paint.	He's holding a paintbrush.	4	10
12.	She's looking for a toy.	She's opening the toy box.	4	0
Unsuggested Mental States (Study 2 only):				
13.	She's thinking about her big sister.	She's wearing her black shoes.	...	-2
14.	He's wondering what game to play.	He's standing still.	...	-2
15.	She's having a dream.	She's got her eyes closed.	...	4
16.	He's hoping his teacher will read a story.	He's sitting on the floor with his legs crossed.	...	-4

NOTE.—The mean difference score is the total number of mentalistic responses minus the total number of behavioral responses for each child, averaged across children.

736 Child Development

presentation was randomized. In addition, presentation order within categories (Perception, Emotion, and Other Mental States) was counterbalanced, so each child received two mentalistic descriptions first, and two behavioral descriptions first.

Results and Discussion

The measure of interest in this study was whether children preferred to use behavioral or mentalistic descriptions of human action. Consistent with our hypothesis, 140 of the 240 choices children made were mentalistic and 100 were behavioral. Interjudge agreement on 96 responses from eight randomly chosen subjects was 99%. (The second judge was blind to the hypothesis.) To analyze the data, we assigned a score to each child and each item. Children and items were scored +1 for each mentalistic response and -1 for each behavioral response. Unsystematic responding would therefore give a mean at or near 0, while a child who chose the mentalistic description for every item would have a score of 12. The overall mean of children's scores was 2.0, indicating that on the average children chose five (42%) behavioral descriptions and seven (58%) mentalistic ones. The range of their scores was from -6 to 8; the standard deviation was 4.1. A *t* test comparing children's total scores against 0 indicated that the response pattern was significantly different from what might have been obtained by chance, $t(19) = 2.21, p < .05$. (This and all other *t* tests reported here are two-tailed.) Of the 20 subjects, 11 chose more mental state descriptions than behavioral ones, three chose equal numbers of each, and six chose more behavioral descriptions. The Wilcoxon signed rank test indicated that this difference was significant, $W(17) = 122, p < .05$. We then asked how many children could be called strong mentalists or strong behaviorists. The binomial distribution indicates that there is a less than .02 probability of a child choosing 10 or more of the same description type by chance. According to this criterion, one child was a strong mentalist, but no child was a strong behaviorist. Using a less strict criterion, the probability of a child choosing nine or more of the same description type is less than .08. According to this less strict criterion, six children were strong mentalists, while only one was a strong behaviorist. Of the six children who chose more behavioral responses than mentalistic ones, two were younger than the mean age (3-6) and four were older.

A 2 (sex) \times 3 (category) repeated-measures ANOVA indicated that there was

no significant difference between male and female responses. We analyzed the data for presentation order effects, and found that children's choices were independent of whether the mentalistic or behavioral description was presented first. Likewise, we found that the sex of the subject relative to the sex of the pictured child had no effect.

Next we conducted item analyses. The possible range of item scores was -20 to +20; the actual range was -6 to 18. The mean item score was 3.3, and the standard deviation was 6.2, $t(11) = 1.84, p = .09, N.S.$ On seven of the 12 items, children tended to prefer the mental state description, while on only two (both Perception items) did they prefer the behavioral description (see Table 1). On the remaining three items, both descriptions were chosen equally often, $W(9) = 37, p = .10, N.S.$ Referring to the binomial distribution, the probability of obtaining 14 of one description type for any item is less than .02. According to this criterion, there were two items on which children were strongly mentalistic, and none on which they were strongly behavioral. Although these items were carefully constructed such that neither description was more suited to the picture, children tended to choose the mentalistic descriptions.

Figure 2 shows children's responses by category. Within each category, a child's score could range from -4.0 to 4.0, with 4.0 indicating that a child chose the mentalistic response for every item within that category. The ANOVA indicated a significant category effect, $F(2,36) = 4.92, p = .01$. Repeated-measures *t* tests revealed that children's performance on Perception items was significantly different than their performance on Emotion items, $t(19) = 2.10, p < .05$, and on Other Mental State items, $t(19) = 3.76, p < .01$. The overall mean for the Emotion category was 1.0 (SD = 2.1), $t(19) = 2.13, p < .05$. On Other Mental State items, children's mean was 1.4 (SD = 1.8), $t(19) = 3.39, p < .01$. On the Perception items, however, children's scores were not significantly different from zero ($M = -0.4, SD = 2.2, N.S.$).

We explain children's comparatively behavioristic conceptions of our Perception items as follows: on three of our Perception items, if one engaged in the behavior, one would automatically have the described mental state. For example, if one holds ice in one's hands, one automatically feels how cold it is. These three items received the three lowest (i.e., most behavioristic) scores in our study

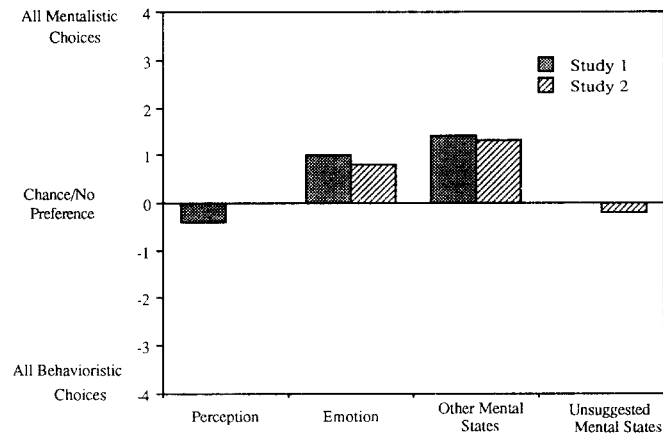


FIG. 2.—Description choices within categories. Bars indicate the average of children's scores. Each score is the number of behavioral choices subtracted from the number of mentalistic choices.

(-6, -2, and 0). (One Emotion item also received a zero.) Two children highlighted this by protesting making a choice between the items, stating, for example, "If you don't hit the drum you can't listen, can you?" Children did not complain about having to choose between the items elsewhere in this study, consistent with the claim that children of this age generally prefer to characterize things in only one way (Flavell, 1988). The data from the Emotion and Other Mental State items suggest that children may actually tend to prefer mental state descriptions when they are made as available as behavioral descriptions and when the described behavior is not visible. However, this study may lack ecological validity: in real life the behaviors we describe in pictures are generally visible. We conducted a second study to test if these results would replicate even when the described behavior was fully visible in the picture.

Study 2

Our second study was a partial replication of the first, but instituted two changes. Because the main purpose of this study was to find out whether children would still prefer mental state descriptions even when behaviors were visible, our first change was to alter the pictures to that end. Behavior was therefore visually more salient than mental state. For example, in the spilled milk picture, one could now see the boy's hand holding a sponge over the spilled milk (see Fig. 1). Second, because of the problem described above, we deleted the Perception category. We also added a new category in which the mental state was not suggested by the picture, thereby giving even less pictorial support for the mental state. To illustrate, one picture

simply showed a boy sitting cross-legged in an empty corner; its descriptions were "He's hoping his teacher will read him a story" and "He's sitting on the floor with his legs crossed." This added category is referred to as Unsuggested Mental States.

Method

Subjects.—The same female experimenter tested an additional 20 children, 10 boys and 10 girls, from the same university nursery school. The mean age was 3-5; the age range was 3-1 to 3-11.

Materials and procedure.—The four Emotion and four Other Mental State items used in the previous study were employed, but with the pictures altered to make the described behaviors visible. We added four new items (Unsuggested Mental States) in which behaviors were also visible, but mental states were not suggested by the picture. The descriptions that accompanied these new items are descriptions 13-16 in Table 1. The procedure was identical to that of Study 1.

Results and Discussion

The results of this study were remarkably similar to those of Study 1, with children choosing a total of 101 behavioral descriptions and 139 mentalistic ones (interjudge agreement on 96 responses from eight randomly chosen subjects was 100%). As in the first study, children's mean score was 2.0, meaning that on average each child chose five behavioral and seven mental state descriptions. The range was -4.0 to 10.0, and the standard deviation was 3.9. The children showed a significant tendency to prefer mental state descriptions, $t(19) = 2.17, p < .05$. Again, we found no effects for sex, presentation order, or sex relative to the sex of the pictured child.

738 Child Development

Eleven children gave more mental state descriptions than behavioral ones, five gave more behavioral descriptions, and four gave equal numbers of each, $W(16) = 108, p < .05$. Two of the five children who chose more behavioral descriptions were younger than the mean age, and one was older. The binomial distribution, in which there is a less than .02 probability of a child choosing 10 or more of the same description type, indicated that one child was a strong mentalist and none were strong behaviorists. Using the less strict criterion ($p < .08$ of a child choosing nine or more of one description type), four children were strong mentalists, whereas none were strong behaviorists. Hence, even when behaviors are fully visible, children show a significant preference for describing others in terms of mental states rather than behaviors.

The mean item score was 3.2, $t(11) = 1.91, p = .08, SD = 5.7$. The range of item scores was from -6.0 to 10.0 (see the right-most column of Table 1). For seven of the 12 items, children tended to choose the mental state description, for one they chose both equally often, and for four they tended to choose the behavioral description, $W(11) = 53, p = .08$. Three of the four items for which behavioral descriptions were preferred were from the Unsuggested Mental States category. Using the binomial distribution, on three items children showed significantly strong mentalistic preferences (15 or more children described an item mentalistically, $p < .02$), whereas on no item did children have significantly strong behavioristic preferences.

Within categories, children's responses were also similar to those of the first study (see Fig. 2). Again, an ANOVA (sex \times category) revealed a significant effect of category, $F(2,36) = 3.9, p < .05$. The mean on Emotion items was 0.8 ($SD = 1.5$), $t(19) = 2.37, p < .05$. Children's mean score on the four Other Mental State items ($M = 1.3, SD = 1.6$) was also significant, $t(19) = 3.58, p < .01$. Children responded unsystematically on the added category (Unsuggested Mental States), $M = -0.2, SD = 2.6$. Repeated-measures t tests indicated that the Other Mental State items were described mentalistically significantly more often than the Unsuggested Mental State items, $t(19) = 2.59, p < .05$, and there was a trend toward describing Emotion items mentalistically more often than Unsuggested Mental State items, $t(19) = 1.70, p = .1, N.S.$ Children's use of mental state descriptions was thus partly contingent upon visual evidence suggesting the inferred mental state.

In sum, Study 2 showed that children clearly do not prefer behavioral descriptions of human action when given a mentalistic alternative. Even when behaviors were fully visible and mental states were merely suggested, they showed a significant preference for mental state descriptions. More striking yet, perhaps, is the finding that even when behaviors were fully visible and mental states were not even suggested by the picture, children did not significantly prefer behavioral descriptions.

General Discussion

In both of these studies, subjects tended to prefer mental state descriptions of human action to behavioral descriptions. We interpret this to mean that, given two equally valid alternatives that are legitimated by being modeled, young children prefer to characterize human action in terms of mental state rather than behavior. This is consistent with Miller and Aloise's (1989) conclusion that under certain conditions young children prefer psychological over physical explanations for human events, and suggests that they are not as behavioristic as has traditionally been supposed.

However, one might argue that children in these studies could be using mental state terms behavioristically, externalizing the mental as Piaget and others have claimed. Children might think "wants to get a cupcake" means "is about to eat a cupcake," and "thinking about what to paint" means "is holding a paintbrush." Although Wellman and Estes (1986) found that young children can contrast mental and physical *entities*, they submit that their studies did not provide evidence as to whether young children understand the mentalistic nature of mentalistic *activities*, as described by mental verbs (p. 920; but see Shatz et al., 1983, and Smiley and Huttenlocher, 1989, for suggestive evidence that children do). The possibility remains that children misinterpreted several of our mental verbs as referring to behaviors. If this is so, then this study only shows that children are apt to use mental state terms, not that they truly prefer a mentalistic conceptualization of human action.

Children's paraphrases and embellishments of the modeled descriptions provide some evidence that they do understand that mental verbs refer to internal, psychological states. On approximately one-third of their 480 responses, children gave descriptions that differed by one or more important words from

TABLE 2
 PARTIAL LIST OF CHILDREN'S MORE CERTAIN MENTALISTIC SUBSTITUTIONS

Experimenter's Words	Child's Substituted Words
5. Scared of the dog	Doesn't like this dog Loves his dog Afraid Not scared of the dog
11. Thinking about what to paint	Trying to paint something that he doesn't know how to paint Wondering what to paint Wants to paint Thinking about what he wants to paint
12. Looking for a toy	Trying to get a toy Finding a toy to think about Hiding her special things Picking that toy
13. Thinking about her big sister	Thinking about what to do Waiting for her big sister to come home
16. Hoping his teacher will read a story	Wants a story Wants the teacher to read the book Is sad because a friend didn't come over Wanting to be with his mother

the modeled ones. We looked at these modifications for evidence of children's understanding of mental verbs. If children misinterpret mental verbs as behaviors, then their paraphrasings should reflect that fact. A child with such a confusion might, for example, paraphrase "He wants to get a cupcake" as "He's going to eat a cupcake" or "She's mad about the drawing" as "She's shouting about the drawing." Given the intended similarity of each description pair, one could never be certain which description a child was modifying. However, in sentence pairs 5, 11, 12, 13, 14, 15, and 16 (Table 1), the two descriptions were quite different, with each containing key words that the other did not contain. If a child mentioned a key word that was present in only one description, we judged that the child was embellishing or paraphrasing that description. For example, if a child had said "He's running away from the dog" on item 5, we would have assumed the child had focused on the mentalistic description, because the key word *dog* appeared only in the mentalistic description. Such a child might have been expressing the belief that "scared" means "running away"—that a mental state term refers to a behavior. Not a single paraphrased description showed evidence of this sort of confusion. Table 2 is a partial list of children's paraphrasings of the mentalistic descriptions.

Children substituted for the other sentences as well (descriptions 1–4 and 6–10 in

Table 1). Because most key words in these sentences were the same for both description pairs, we are less certain of which sentence children were paraphrasing. However, the fact remains that there were many mentalistic synonyms, and it seems doubtful that our children were substituting for the behavioral sentence in these cases. For sentence 7, for example, children said *She's cross, angry, real real mad*, and *happy*, among other mentalistic synonyms. We think it is far more likely that they were substituting these words for *mad* than for *talking*. Adding strength to this claim is the fact that behavioral synonyms were very rare—for example, children did not use any common synonyms for *talking* (such as *saying*) in reference to this picture. Although one cannot be as certain of which description children were substituting for as one can be for those sentences in which key words were different, we think it is most likely that it was the mentalistic description in these cases as well. We list some of these less certain substitutions in Table 3.

Other supporting evidence that these children know mental state terms refer to internal states came from their spontaneous remarks during testing. These spontaneous remarks often showed that these children had an appropriate causal-explanatory understanding (Wellman, in press) of mental states—a framework in which mental states or behaviors were interdependent in a variety of ways. One girl, discussing the picture of the

TABLE 3
 PARTIAL LIST OF CHILDREN'S LESS CERTAIN MENTALISTIC SUBSTITUTIONS

Experimenter's Words	Child's Substituted Words
6. Happy with the puppy	Sad about the puppy Sad with the puppy
7. She's mad	She's angry She's cross She didn't like it She's real real mad She's happy She got mad and she didn't like it She told him she's being angry at him
8. He's feeling sad about his spilled milk	He's not happy He's really sad about hitting and pushing
9. Choosing a book that she likes	Picking out a book that she wants Wanting a book Taking her favorite book Picked out a book and she wanted to read it Looking at books to see what her favorite is
10. Wants to get a cupcake	Is trying to get a cupcake Likes to get cupcakes Is trying to reach one Yeah—and he's trying to eat them Doesn't want to get a cupcake

mother who was mad/talking about the drawing of the wall, said, "She's happy. It's okay if she draws on the wall, 'cause she doesn't know." The appropriate relationship between doing something bad, not knowing it is bad, and therefore being happy appears to be understood. It seems inconceivable that this girl could have been interpreting the mental states as behaviors. One child asked the experimenter why the girl was choosing a book that she likes. The experimenter asked, "Why do you think?" and the child said, "'Cause she likes to read something." Here the relationship between behavior and desire was mentioned spontaneously. Similarly, another child looked at the picture of the boy holding a paintbrush and, before the experimenter had modeled the mentalistic description, said, "Why? He wants to paint?" Showing an understanding of the interplay between emotions and desires, one child described the boy who was sad about/wiping up his spilled milk as, "He's very sad and he wants to tell his sister about the spilled milk." Once a child combined our two descriptions for item 10 as follows: "He wants some cupcakes so he's on his tiptoes, but he can't reach it cause it's far away." The word *want* here seems definitely to refer to a mental state, because the tiptoe behavior is stated as caused by, not analogous to, the want.

This sample of children's paraphrases of our modeled descriptions and spontaneous

remarks during testing adds support to the contention that young children understand that mental state terms refer to mental states, not behaviors. In no instance did a child rephrase a mentalistic description behaviorally, as if interpreting mental verbs to mean behaviors. In contrast, children often used alternative mentalistic terms to replace our mentalistic terms. While not constituting definitive evidence that young children understand the internal nature of the mental, these studies, together with those of Smiley and Huttenlocher (1989) and Shatz et al. (1983), do strongly suggest that conclusion.

References

- Anderson, S. M., & Ross, L. (1984). Self-knowledge and social inference: I. The impact of cognitive/affective, and behavioral data. *Journal of Personality and Social Psychology*, *46*, 280-293.
- Astington, J. W., Harris, P. L., & Olson, D. R. (1988). *Developing theories of mind*. New York: Cambridge University Press.
- Bartsch, K., & Wellman, H. M. (1989). Young children's attribution of action to beliefs and desires. *Child Development*, *60*, 946-964.
- Bretherton, I., & Beeghly, M. (1982). Talking about internal states: The acquisition of an explicit theory of mind. *Developmental Psychology*, *18*, 906-921.
- Bretherton, I., Fritz, J., Zahn-Waxler, C., & Ridgeway, D. (1986). Learning to talk about emo-

- tions: A functionalist perspective. *Child Development*, **57**, 529–548.
- Broughton, J. (1978). Development of concepts of self, mind, reality, and knowledge. In W. Damon (Ed.), *Social cognition* (pp. 75–100). San Francisco: Jossey-Bass.
- Dunn, J., Bretherton, I., & Munn, P. (1987). Conversations about feeling states between mothers and their young children. *Developmental Psychology*, **23**, 132–139.
- Estes, D., Wellman, H. M., & Woolley, J. D. (in press). Children's understanding of mental phenomena. In H. Reese (Ed.), *Advances in child development and behavior*. New York: Academic Press.
- Feldman, N. S., & Ruble, D. N. (1988). The effect of personal relevance on psychological inference: A developmental analysis. *Child Development*, **59**, 1339–1352.
- Flavell, J. H. (1988). The development of children's knowledge about the mind: From cognitive connections to mental representations. In J. W. Astington, P. L. Harris, & D. R. Olson (Eds.), *Developing theories of mind* (pp. 244–271). Cambridge: Cambridge University Press.
- Foulkes, D. (1987). Dreaming and cognitive development. In J. Montangero, A. Tryphon, & S. Dionnet (Eds.), *Symbolism and knowledge* (pp. 265–283). Geneva: University of Geneva.
- Furman, W., & Bierman, K. L. (1984). Children's conceptions of friendship: A multimethod study of developmental changes. *Developmental Psychology*, **20**, 925–931.
- Harris, P. L. (1985). What children know about situations that provoke emotion. In M. Lewis & C. Saarni (Eds.), *The socialization of emotions* (pp. 161–185). New York: Plenum.
- Johnson, C. N., & Wellman, H. M. (1980). Children's developing understanding of mental verbs: "Remember," "know," and "guess." *Child Development*, **51**, 1095–1102.
- Johnson, C. N., & Wellman, H. M. (1982). Children's developing conceptions of the mind and the brain. *Child Development*, **52**, 222–234.
- Ladd, G. W., & Emerson, E. S. (1984). Shared knowledge in children's friendships. *Developmental Psychology*, **20**, 932–940.
- Livesley, W. J., & Bromley, D. B. (1973). *Person perception in childhood and adolescence*. London: Wiley.
- Miller, P. H., & Aloise, P. A. (1989). Young children's understanding of the psychological causes of behavior. *Child Development*, **60**, 257–285.
- Misciones, J. L., Marvin, R. S., O'Brien, R. G., & Greenberg, M. T. (1978). A developmental study of preschool children's understanding of the words "know" and "guess." *Child Development*, **48**, 1107–1113.
- Nelson, S. A. (1980). Factors influencing young children's use of motives and outcomes as moral criteria. *Child Development*, **51**, 823–829.
- Peevers, B. H., & Secord, P. F. (1973). Developmental changes in attribution of descriptive concepts to persons. *Journal of Personality and Social Psychology*, **27**, 120–128.
- Piaget, J. (1929). *The child's conception of the world*. London: Routledge & Kegan Paul.
- Piaget, J. (1932). *The moral judgement of the child*. New York: Harcourt, Brace.
- Selman, R. L. (1980). *The growth of interpersonal understanding*. New York: Academic Press.
- Shantz, C. U. (1983). Social cognition. In J. H. Flavell & E. M. Markman (Eds.), P. H. Mussen (Series Ed.), *Handbook of child psychology: Vol. 3. Cognitive development* (pp. 495–555). New York: Wiley.
- Shatz, M., Wellman, H., & Silber, S. (1983). The acquisition of mental verbs: A systematic investigation of the first reference to mental states. *Cognition*, **14**, 301–321.
- Smiley, P., & Huttenlocher, J. (1989). Young children's acquisition of emotion concepts. In C. I. Saarni & P. L. Harris (Eds.), *Children's understanding of emotions* (pp. 27–49). New York: Cambridge University Press.
- Wellman, H. M. (in press). *Children's theories of mind*. Cambridge, MA: Bradford Books/MIT Press.
- Wellman, H. M., & Estes, D. (1986). Early understanding of mental entities: A reexamination of childhood realism. *Child Development*, **57**, 910–923.
- Wellman, H. M., & Gelman, S. A. (1987). Children's understanding of the nonobvious. In R. J. Sternberg (Ed.), *Advances in the psychology of human intelligence* (Vol. 4, pp. 99–135). Hillsdale, NJ: Erlbaum.
- Wellman, H. M., & Johnson, C. N. (1979). Understanding of mental processes: A developmental study of remember and forget. *Child Development*, **50**, 79–88.
- Wood, M. E. (1978). Children's developing understanding of other people's motives for behavior. *Developmental Psychology*, **14**, 561–562.

This document is a scanned copy of a printed document. No warranty is given about the accuracy of the copy. Users should refer to the original published version of the material.