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PAPER

Children's understanding of the mind's involvement in pretense: do words bend the truth?

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Abstract

Many have thought that children have an early appreciation of the role of the mind in pretense, fitting with the notion that pretend play is, in general, a 'zone of proximal development' (Vygotsky, 1978). Although results from several experiments are against this hypothesis, the evidence from that line of research has been questioned because the experiments thus far have always used the word 'pretend'. Young children might have a perfectly clear understanding that pretense involves the mind, but have mismapped the word 'pretend' onto non-mental correlates of pretending, like action and costume. Two experiments tested this possibility. Four-year-olds were shown videos of people engaging in real and pretend activities and asked questions regarding the role of mind; for half the children the word 'pretend' was used to describe the activity, and for half it was not. Contrary to the hypothesis, even when the word 'pretend' was not used, roughly half of the 4-year-olds failed to designate pretense as involving mental activity. Consistent with prior work, more children of this age were cognizant of the mind's involvement in pretense than were cognizant of the mind's involvement in physical actions.

In recent years there has been a tremendous surge in research aimed at discovering what children know about the mind (Astington, Harris & Olson, 1988; Lewis & Mitchell, 1994; Flavell & Miller, 1998). Much of this research has addressed children's understanding of mental representation. Many researchers have concluded that children develop this capacity sometime during their fourth or fifth year, evidenced by their success on the now classic 'false belief' task (Wimmer & Perner, 1983; Wellman, Cross & Watson, 1999).

Many have argued that pretend play is a domain in which children first understand the fact that minds represent the world (Flavell, Green & Flavell, 1986; Leslie, 1987; Moses & Chandler, 1992). The activity of pretending and understanding others' pretense has a representational structure similar to false belief: one represents reality one way, when in fact it is another (Leslie, 1987). Yet children engage in pretense 2 years earlier than they pass the standard theory of mind tasks (Piaget, 1962; Harris & Kavanaugh, 1993). From this, some have suggested that pretending is a 'zone of proximal development' for understanding mental representation (see Lillard, 1993a).

Correlational studies have supported this hypothesized relationship between understanding pretense and understanding mental representation. Children who score high on pretense measures also score high on theory of mind tasks (Astington & Jenkins, 1995; Lalonde & Chandler, 1995; Youngblade & Dunn, 1995; Schwebel, Rosen & Signer, 1997; Taylor & Carlson, 1997; Lillard, in press). Based on these and other findings, several researchers have suggested that, by the age of 4, children know (at least implicitly, see Leslie, 1988) that pretense involves mental representations and may use that understanding to guide their understanding of belief (Forguson & Gopnik, 1988; Custer, 1996; Hickling, Wellman & Gottfried, 1997; Bruell & Woolley, 1998).

Other researchers, however, have suggested an alternative viewpoint: that most young children do not have this representational knowledge about pretending (Harris, 1991; Perner, 1991; Lillard, 1993b, 1994, 1998; Harris, Lillard & Perner, 1994). In one paradigm (Lillard, 1993b, Experiment 3), children were presented with Moe, a troll from the faraway Land of the Trolls. Moe had never seen or heard of a kangaroo, and did not even know

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that they hopped, but he was nonetheless hopping like one. Since Moe knew nothing about kangaroos, he could not mentally represent himself as one. However, over several experiments, approximately 60%–70% of the 4-year-olds tested claimed that Moe was pretending to be a kangaroo (Lillard, 1993b, 2001). In contrast, the majority of these children passed the 'deceptive container' false belief task (Gopnik & Astington, 1988). Other researchers have pursued this line of research and obtained similar findings when using the same basic paradigm (Ruther & O'Reilly, 1995; Rosen, Schwebel & Singer, 1997; Joseph, 1998; Aronson & Golomb, 1999).

Using another procedure, Lillard (1996) investigated children's understanding of the role of the mind in pretense. Children were asked to categorize pretense actions with actions that require a mind only (i.e. thinking), a body only (i.e. sliding down a slippery hill) or both (i.e. talking). The method drew on findings by Johnson and Wellman (1982) that young children do not appreciate the role of the mind in bodily actions. Again, over several studies, approximately 60% of the 4-year-olds consistently categorized pretend actions with events that required only a body (Lillard, 1996, 2001).

There is a concern that arises for both of the lines of work discussed so far. Both lines of work have assessed children's understanding of the activity of pretense in tasks that use the word 'pretend'. This reliance on the word lays open the possibility that children's difficulty is semantic rather than conceptual. Children may not be misconstruing pretense as a concept, but rather only the word 'pretend' as primarily an indication of action (see for example Woolley, 1995, p. 181). As Mitchell (1996) has put it, passing the Moe task involves 'not just the understanding of a person's mental state, but the appropriate use of language to characterize that mental state' (p. 27).

By this line of reasoning, young children might think the word 'pretend' applies only to the activity portion of pretense, but still be aware when they watch people pretend that minds and mental representations are involved. So, in Lillard (1996), when children are asked to categorize 'pretend to be a king' as involving their mind or their body, children answer as though one were only asking about the demonstratives of raising a scepter and wearing a crown, when in fact they know full well that when someone is pretending to be a king the person's mind is involved. Likewise, in Lillard (1993b), when asked if Moe is pretending to be a kangaroo, children might think the experimenter is asking only about Moe's action, even though they are well aware that he is not mentally engaged as would be someone who intentionally acted like (i.e. pretended to be) a kangaroo. In one experiment in Lillard (1996, Experiment 5), children categorized phrases like 'decide how to pretend you're a king' as involving the mind significantly more often than 'actually pretend you're a king'. One hypothesis for this difference in performance is children's failure to recognize the word 'pretend' as involving mental activity, but their correctly characterizing the word 'decide' as mental.

Certainly children's initial word meanings are not always correct and Lillard (1993b) admits that mismapping of the word pretend is an issue in her studies. Keil (1989) has shown that young children initially associate words like 'island' with characteristic features like sand and palm trees, but not with the defining one: a land mass surrounded by water. Only later in development do children make this switch. A similar transition might occur with the word 'pretend'. Action is a characteristic, but not a defining feature, of pretense (Lillard, 1993a). In contrast, mental activity is a defining feature. To engage in pretense, children must use their minds, in that they must always mentally represent the pretense world, but they might not be performing an action at any given moment in the pretense episode. In fact, pretenders need never act, as long as they are mentally projecting a mental representation onto reality. For example, children can pretend to be a statue, a pretense that explicitly requires the absence of action. More importantly, when children's pretense involves an object substitution (e.g. that the chair they are sitting on is a spaceship), the defining characteristic of that pretense is that they hold the substitution in mind. They do not have to be actually engaged in an action related to the substitution at all times (Lillard, 1994). There is some evidence for this shift from characteristic to defining features. In a study of natural language, Hall, Frank and Ellison (1995) found that children's early use of the word 'pretend' is in fact consistent with the interpretation that the word refers only to action.

Even if children have mismapped the word 'pretend', do they still know that the mind itself is necessary to engage in pretense? Lillard's studies have shown that when the word 'pretend' is used, children tend to deny the mind is involved. An alternative strategy would be to avoid using the word 'pretend' and see if children still deny the mind's involvement. In other words, it is necessary to ask children about pretense episodes without describing those episodes using the word 'pretend'. By this reasoning, without the mismapped word leading children to mistakenly focus on actions, children should indicate awareness of the mind's involvement in pretense acts. This strategy was employed in the two experiments presented here. Children were presented with videos depicting actors engaging in real and pretend actions. Those actions were either described with a linguistic tag or not and children were asked to categorize whether or not the actions involved mental activity.

Experiment 1

Two groups of children were shown videos of people engaged in pretense and non-pretense activities. For one group, the linguistic group, the acts were verbally described, whereas for the other, nonlinguistic group, those same videos were simply shown with no verbal description. Following each video, children were asked if the person was thinking about something, and was using her brain, following Johnson and Wellman (1982), along with several control questions. To ensure children would interpret the videos as displaying pretend actions, children were also familiarized with the contents of the videos. Finally, a group of adults was also tested to consider whether they would generate ceiling performance.

Method

Participants

Participants in the final group were 32 4-year-olds recruited from two different university preschools and 24 college-age adults from a public university's psychology subject pool. The children ranged in age from 4;0 to 5;3 with a mean age of 4;8 (SD = 6.3 months). The children were from middle-class families in a metropolitan area of the USA, spoke English as or as if it were their native language (as judged by the experimenter) and were mostly white, although a range of ethnic backgrounds was represented. Five additional children were replaced for failing control questions (see below).

Materials

Eight videos of approximately 12 s each were produced. Four showed an actor performing a common act. Two of these concerned play (painting and blowing bubbles) and two concerned nurture (eating a banana and drinking juice). Four other videos showed the same person pretending to perform each of those same four acts. For the pretend videos, to accentuate the pretense, the following fake props were used: an empty bottle (juice), a yellow block (banana), a wooden spoon (paintbrush) and a pencil (bubble wand). For the real videos, the real objects (cup, paintbrush etc.) were used as props, as well as real juice, real paint and so on. Each video began with a close up of the object that was used in that video, then zoomed out to the person who performed the action. The objects that were used in the real videos were also presented to the children in a warm-up session, to prime children to the activities. A television and a VCR were also used.

Procedure

Participants were tested individually in a quiet room, and sessions were audio-taped for later transcription. Participants were seated at a table across from a male experimenter, behind whom was the television and VCR. After settling in, children (but not adults) were shown up to four actions and, for each, were asked whether the experimenter was using his arm. Two actions did use an arm (waving, clapping) and two did not (walking, whistling). This warm-up was stopped when a child answered two consecutive questions (one involving a positive response and the other a negative response) correctly. All children met this criterion. The mean number of questions asked was 2.3.

Next, children (but not adults) were familiarized with the real actions and objects depicted in the videos, with the aim of decreasing the chance that children would fail to recognize those activities and objects in their pretend forms when shown the videos. Children were forewarned that they would be watching videos later, and that some of the objects would be in those videos and others would not be. Then, for each object, there was a separate introduction, with both verbal and demonstration components. As an example, the banana introduction went as follows: 'What is this? That's right/actually, it's a banana. What do you do with a banana? That's right/actually you eat it. What do you do before you eat it? That's right/actually, you have to take the peel off.' The peeling action was then demonstrated. Similar introductions were provided for the bubble blower and solution, juice and glass, and paintbrush and paint. It seemed likely that having just seen these objects in real life, children would be more likely to interpret the actions on the block in the pretense video as pretend banana-peeling.

Following these introductions, the objects were removed from sight, and children were told that they were going to watch some videos of a woman named Margo. Children in the *linguistic* condition were given a description of what the person in the video was going to do ('Margo is going to pretend to eat a banana', for the pretend eating video, or simply 'Margo is going to eat a banana', for the real eating video). Those in the *nonlinguistic* condition were only told to 'watch what Margo does'. These descriptions were provided at the beginning of each video. After each video, the experimenter paused the VCR so that Margo was still visible on the screen.

Each child watched four videos in all, depicting four different activities. Two of these were 'real' and two were 'pretend'. Real videos were included to allow for examination of effects of linguistic information generally, so that analyses could be more precise for the effect

of describing pretense videos as pretense. Half of the children received their two real videos first and the other half received their two pretend videos first. Recall that there were two of each type of video (play and nurture). Participants were shown one of each type in their block of two real videos and the other of each type in their block of two pretend videos. For each child, within the blocks of real and pretend videos, the order of type of video was the same. Therefore, if the subject's first video was the real juice video (nurture), then the first pretend video the subject saw would be the pretend banana video (the other nurture video). Across children, the order of the two video types was systematically varied, with eight children receiving each of the four possible orders.

After each video, children were asked four focal questions: (1) if Margo was using her brain; (2) if Margo was thinking about something; (3) if Margo was using her hands; and (4) if Margo was talking about something. The first two questions were the test questions. The second two were control questions. On the test questions, ideal performance was to claim that Margo was always using her brain and thinking. On the control questions, ideal performance was to claim that Margo was always using her hands and never talking. Participants were only included in the sample if they got at least seven of the eight control questions correct. The questions were asked in a different quasi-random order after each video. The order used for any given video was the same for every participant in the experiment. As a final question after each video, children were asked, 'What was happening in the video?'

Adults were instructed as follows: 'We will watch four short scenes about a woman named Margo. After each scene, I will pause the video and ask you a set of very straightforward questions. I do not want you to think that I am trying to trick you. Instead, I just want you to answer the questions as honestly and as straightforwardly as you can. Okay?' Adults then watched the videos in one of the four random orders. Half the adults were given the linguistic tag, half were not. Adults were then asked the same questions in the same quasi-random order given to the children. After each video, adults were also asked 'What was happening in the video?'

Results and discussion

No adult failed to pass criterion on the control questions, but five children (16% of the original sample) did so and were replaced on this basis. Correct responses on each mind-oriented question ('using her brain' and 'thinking about something') were coded as a 1 and incorrect responses were coded 0. Initial *t* tests showed no differences in responses to the think and brain questions on either the real or pretend videos for either the children or the adults, nor to responses on the play and nurture videos, so these scores were combined for subsequent analyses (henceforth, mind scores). A second preliminary analysis to examine possible order effects was also conducted, comparing the mind scores on pretend tasks for both age groups who received the pretend block first versus last. Presentation order was found to make no difference for either age group. Adults basically always claimed that brain and thinking were involved in both pretend and real activities, across both linguistic groups. Because they were at ceiling, adult data were not further analyzed.

Children's scores are shown in Table 1. Children's mind score on the pretend videos was 2.06 out of a possible 4 (52% correct) in the linguistic condition, and 1.88 out of a possible 4 (47% correct) in the nonlinguistic condition. Because overall correct response rates were close to 50% or what would be expected by chance, χ^2 goodness of fit tests were conducted on individual response patterns. Nine children had a perfect mind score for the pretend videos, whereas 10 children were at floor for the pretend videos. These patterns are significantly different from what one would expect were children responding haphazardly: $\chi^2(4) = 64.63$, $p < 0.001$. Although the children who performed at floor values tended to be younger than the children who performed at ceiling values (53.5 months (SD = 9.3) versus 56.4 months (SD = 4.4)), a regression analysis revealed no effect of age: $r^2(1, 30) = 0.04$, $F(1, 30) = 1.33$, ns.

A 2 (linguistic vs nonlinguistic group) × 2 (real videos vs pretend videos) repeated measures analysis of variance was performed with linguistic condition as a between-subjects factor and video type as a within-subjects factor. There were no significant main effects, but there was

Table 1 *Experiment 1: Mean mind scores (range 0–4)*

	Nonlinguistic	Linguistic	Mean
Pretend videos	1.88 [1.54] (47%)	2.06 [1.76] (52%)	1.97 [1.64] (49%)
Real videos	2.37 [1.50] (59%)	1.56 [1.59] (39%)	1.97 [1.58] (49%)

Note: Standard deviations are in brackets, and percentage correct is in parentheses.

a significant interaction of video type by linguistic condition, $F(1, 30) = 8.00$, $p < 0.01$. This effect is apparently due to children's performance on the real videos, which was better in the nonlinguistic condition (2.37, or 59% correct) than the linguistic condition (1.56, or 39% correct). However, a *post hoc t* test failed to attain significance. The linguistic condition had no impact on performance on pretense tasks.

A nonparametric Mann–Whitney *U* procedure was also conducted to examine the effect of linguistic information. For both the pretend ($U = 118$, ns) and real ($U = 91$, ns) trials, no significant differences were found between linguistic groups. In sum, the majority of children's responses were systematic, and differences in mind scores for the pretend videos across linguistic conditions were not significant either in terms of means or in terms of individual response patterns.

Responses on the 'What's happening?' question were examined. For the real videos, children's responses were essentially at ceiling. For the pretend videos, however, children did not always generate the word 'pretend' or a synonym in their description. Even in the linguistic condition, where the child simply had to parrot back the linguistic tag to the experimenter, children only did so 33% of the time. The majority of the remaining responses contained the meaning of the pretend act, but not the aspect (i.e. 'she's eating a banana' for the pretend banana video). This is consistent with the findings of Hall *et al*. (1995) who, in their study of natural language, found that children of this age rarely generate phrases like 'He's pretending that X is a Y'. Adult data are also of interest here. In the linguistic condition, adults only generated the word 'pretend' for 80% of the 'happening' questions, suggesting that even adults interpret the question as being about what the character was pretending to really be doing, rather than as asking them to focus on the fact that it was pretense. It was our sense that participants understood the pretense videos. The acts were obviously pretense: clearly a wooden spoon and no paint, rather than a paintbrush and real paint, were being manipulated. In follow-up questioning, most participants across both linguistic conditions and in each age group acknowledged that pretense was occurring.

In short, the first experiment asked children directly if a person who was pretending was using her brain and thinking. It has been suggested that children might understand that pretense is mental, but think the word 'pretend' refers only to the activity portion of pretense acts. If this were the case, then omitting the word 'pretend' should have led children to declare that the people who were pretending were using their brains and/or thinking. Instead, Experiment 1 showed that whether or not the activity was described with the word 'pretend' made no difference to children's performance. Further, only approximately half of the 4-year-olds tested reliably categorized pretense as involving mental activity, further suggesting that children of this age do not have a precocious understanding of the mental nature of pretense (Lillard, 2001).

One concern with this experiment lies in the nature of the question children were asked. Johnson and Wellman (1982), for example, showed that preschool children often failed to attribute the mind's involvement to acts of perception, like seeing. This is in contrast with young children's success on level-2 perspective taking tasks (Flavell, Everett, Croft & Flavell, 1981; Gopnik, Slaughter & Meltzoff, 1994) in which they clearly recognize visual perception as involving mental representation. It is possible that the method used in Experiment 1 underestimated children's understanding of the role of the mind in pretense. Therefore, Experiment 2 attempted to replicate the absence of a difference between the linguistic conditions using a different method. Importantly, though, even if it is the case that Experiment 1 underestimated children's understanding, the presence or absence of the word 'pretend' did not influence children's performance.

Experiment 2

Experiment 2 sought convergent evidence regarding whether the word 'pretend' diminishes children's performance on questions concerning whether mental activity is involved during pretense. Following Lillard (1996, Experiments 2–4; Lillard & Sobel, 1999), children were asked to place videos of different actions into different categories: those portraying activities that (1) require a mind, (2) require only a body or (3) require both a mind and a body. Young children know that thinking is a mindful activity, but they apparently believe that physical acts do not require a mind (Johnson & Wellman, 1982; Flavell, Green & Flavell, 1995; Lillard, 1996). This method, in effect, tests whether 4-year-olds categorize pretending with thinking, as mind-based, or with other activities, as merely physical. The crucial extension from Lillard (1996) was to see if children's responses improved when the word 'pretend' was not employed.

Method

Participants

Participants in the final group were 24 children between the ages of 4;0 and 5;2 (mean age 4;5, SD = 3.6 months) recruited from two preschools in a metropolitan area.

Approximately equal numbers of boys and girls participated. Subjects were from middle-class families, spoke English as or as if it were their native language (as judged by the experimenter) and were mostly white, although a range of ethnic backgrounds was represented. Five additional children were replaced for failing control questions (see below). No child was a participant in Experiment 1.

Materials

In addition to new videotapes (see below), 12 index cards and three boxes into which the cards and videotapes could be placed were used in this experiment. The boxes were $30 \times 25 \times 25$ cm and each opened at the top. On the top of each box was a picture and a label. One box was labeled 'Mind' and had a picture of a light bulb. Another was labeled 'Body' and had a picture of a body. The third (the 'both' box) was labeled 'Mind and Body' and had both pictures. The index cards were 7×12 cm, and on each was written a short phrase.

A new set of four pretense and four real videos was created. The actions in Experiment 1 were reshot with modifications to accentuate the pretense. In the eating videotape, the actor ate a candy bar and used a brown rectangular wooden block in the pretense situation. Instead of using a pencil to blow bubbles in the pretend bubbles videotape, the actor used a candy cane. The actor drew a picture with crayons instead of painting, and pretended to draw with a metal fork. At the beginning of every video, the actor referred to what she was going to do, but did not use the word 'pretend'. For example, in the eating videotapes, before picking up the candy bar or the block, the actor would say, 'mmm . . . candy'. Likewise, the actor said, 'I like drinking juice', 'I like blowing bubbles' and 'I like to draw' before each of these respective actions.

Six other videos were shot. Two videos depicted the actor thinking about an object. In these, the video showed the actor sitting in Rodin's 'The Thinker's' pose, staring at an object (either a toy giraffe or a flower). In Flavell *et al*. (1995, Experiment 9), 95% of 4-year-olds described an actor in this pose as thinking. The actor did not talk in these videos, which served as controls to see if children understood the procedure and would always place these in the 'Mind' box. It is worth noting that despite involving a body in a thinking pose, because there was some movement on the part of the actor, the 'think' videos were placed in the both box on only two of the 48 trials.

Likewise, two videos were controls for the body box. One showed the actor sitting at a table with a fan on her right. The fan was then turned on and the actor was blown from her chair. The second showed the actor sitting at a table when, from the top of the screen, a large amount of confetti fell on her head. The actor was silent in these videotapes. Two other videotapes were shot that were intended for the both box. In one, the actor counted to 10 aloud and on her fingers, and in the other she read the first page of a story book.

Procedure

Children were brought into a private game room. They were given the same introduction to the boxes as children in Lillard (1996, Experiment 4). Children were first asked if they knew where their mind and body were. These questions were asked to warm up the children and to focus them that the game was going to be about mental states. Next they were told that there were some things you needed your mind for, but that you did not have to use your body. Examples were given, like dreaming and remembering. They were also told that there were some things you needed your body for, but that you did not have to use your mind, like being under a bed or wearing clothes. Finally, children were told there were some things they need both for, like talking. Examples and explanations of each were given.

Children were then told that the game was about choosing about what went inside each of the boxes that were in front of them. The 'Mind' box was described as being for things that you can do with your mind, things that do not require a body at all, and the 'Body' box as being for things that you can do with just your body and that do not require a mind at all. The 'Both' box was described as being for things that absolutely needed both your mind and your body.

Children then received up to 12 training phrases, one on each index card, and were asked in which box each card belonged. As examples, two phrases were 'Imagine an ice cream cone' and 'Slide down a slippery hill'. During the training phase, if children chose the wrong box, they were given feedback on which was the right box. Words like 'think' and 'pretend', that were crucial to the test phase, were not used in the training phase. The training phase ended when children chose five correct answers in a row or when all 12 cards had been used. On average, children made 2.7 errors during the training phase; most children were given all 12 cards, with a range of 8–12 and a mean of 11. Performance on control trials (thinking and body videotapes) during testing suggested that children did understand the purpose of the boxes by the end of training.

The test phase consisted of presenting the 10 videotapes (two controls depicting 'thinking', two controls depicting 'body actions', two controls depicting actions

that required both mind and body, two tests depicting pretend actions and two tests depicting real actions) to the child. Children were told that they were going to watch some videos of a girl named Sarah and would have to tell the experimenter which box each video went in. Children in the linguistic group were then given short tag phrases describing the videotape, such as 'Sarah is going to pretend to blow bubbles' or 'Sarah is going to eat some candy'. Those in the nonlinguistic group were only told to watch the videos. Half the children were in each group. After the child saw each video, the experimenter paused it, leaving the still image of Sarah on the screen, and asked the child to pick the box into which the videotape should go. The videotape was then given to the child to place in the box of their choice.

Half of the children in each linguistic group received the two pretend videos before the two real videos and the other half received the real videos before the pretend videos. In each of these groups, half of the children received a 'thinking' video before a 'body' video, whereas this was reversed for the other half. The control videotapes were systematically interspersed with the test videotapes with the aim of breaking response sets. Only those children who indicated an understanding of the boxes, by correctly placing at least three of the four thinking and body control items in the appropriate boxes (the 'thinking' videos specifically in the mind or both box and the 'body' videos in the body box), were included in the data analyses.

Results and discussion

Five children (21% of the original sample) failed to pass criterion on the control questions and were replaced for this reason. One did not respond at all to the videos, two placed all the items into the body box, and two alternated their choices between the mind and body box on each video. For the two pretense and two real videos, children were given a score of 1 for each pretense videotape placed in the mind or the both box (since that also entailed a mind). All body box choices were scored 0. Children's scores are shown in Table 2. On the pretend videos, children scored 1.25 out of a possible 2 (63% correct) in the linguistic condition and 0.83 out of a possible 2 (42% correct) in the nonlinguistic condition. As in Experiment 1, since overall correct response rates were close to chance performance, a χ^2 goodness of fit test was conducted on individual response patterns for the pretend videos. Eight children put both pretend videotapes into one of the mind boxes, whereas nine children put both in the body box. These patterns are significantly different from what one would expect were children responding haphazardly: $\chi^2(2) = 12.19$, $p < 0.005$. There was no age difference between the children who performed at floor and the children who performed at ceiling (53.3 months (SD = 4.8) versus 51.1 months (SD = 1.4)). This was confirmed by a regression between performance on the pretend videos and age: $r^2(1, 22) = 0.01$, $F(1, 22) = 0.1$, ns. A preliminary analysis was also run to determine if presentation order affected results, and it did not: $t(1, 22) = 0.23$, ns.

A 2 (linguistic group: linguistic vs nonlinguistic) × 2 (video type: pretend vs real) repeated measures analysis of variance was conducted with linguistic group as the between-subjects factor and video type as the within-subjects factor. There was a significant main effect for video type: $F(1, 22) = 4.23$, $p = 0.05$. Regardless of linguistic group, children placed pretend videos into the mind box (1.04 out of a possible 2, or 52%) more often than the real videos (0.63 out of a possible 2, or 32%). There were no other significant main effects or significant interactions. The lack of significant differences in the linguistic conditions was reiterated by a nonparametric analysis. Mann–Whitney U tests confirmed that there was no difference between the linguistic groups in their responding to either the real ($U = 60.0$, ns) or pretense ($U = 52.5$, ns) videos.

This experiment tested whether children would be more apt to align pretense activities with mental ones (thinking), or at least with ones that they see as requiring a mind and a body, when the word 'pretend' was not used to describe those activities. On roughly half of the trials, children placed pretense items in the body box, confirming prior findings that many children conceive of pretense as primarily a physical activity. Important for this study, this response was obtained equally often across the linguistic conditions.

In this experiment, children did show a slight improvement in their decision to include the pretend videos with

Table 2 Experiment 2: Mean mind scores (range 0–2)

	Nonlinguistic	Linguistic	Mean
Pretend videos	0.83 [0.83] (42%)	1.25 [0.87] (63%)	1.04 [0.86] (52%)
Real videos	0.50 [0.80] (25%)	0.75 [0.87] (38%)	0.63 [0.82] (32%)

Note: Both box choices were scored 1, since the child was claiming the mind was needed. Standard deviations are in brackets, and percentage correct is in parentheses.

other mental activities when the linguistic tag was used. In other studies, a similar improvement in performance was found when the contents of the pretense items were more fantasy oriented (Lillard & Sobel, 1999; Sobel & Lillard, 2001; see also Mitchell, 1999). Although the difference between the linguistic and nonlinguistic conditions was not significant, it was similar in magnitude to the improvement in performance children appreciated when fantasy was manipulated. It might be that the linguistic tag improves children's performance in understanding pretense and other domains of reasoning (much in the way fantasy does, see for example Dias & Harris, 1988, 1990). This seems unlikely for several reasons. First, the linguistic condition had no effect on performance in the first experiment, indicating that this improvement does not replicate over experiments. Second, Sobel and Lillard (2001) propose that the fantasy effect is motivated by children's observing that fantasy characters violate causal constraints in the world. Although this is as yet an untested hypothesis, the presence of a linguistic label has little relevance to the violation of causal constraints. Third, while the magnitude of effect between the two studies is similar, the fantasy findings were all within-subject effects, while the present findings are between-subjects. Finally, important to the goal of this paper, this difference is contrary to the hypothesis that children have mismapped the meaning of 'pretend' onto nonmentalistic action. According to this hypothesis, children's understanding of the role of the mind in pretense should improve when the word 'pretend' is eliminated, not when it is present.

One immediate concern with both this and the previous experiment is that they base their findings on the failure to reject a null hypothesis, in particular, that there would be no difference in children's performance on the pretense videos between the linguistic and nonlinguistic groups. Had there been significant differences between the linguistic groups across the two experiments, one would conclude support for the linguistic hypothesis. However, as discussed by Greenwald (1975), psychologists would do well to attend to null findings. In some cases, and we believe this is one of them, they are as useful as significant ones. Critical to the question is whether the experiments here were of sufficient power. The common assumption in developmental research is to assume effects large enough to be observed by a relatively small sample size. If we estimate the effect size of linguistic condition to be a strong effect ($\omega^2 = 0.80$), then a power analysis reveals that $n = 26$ would be sufficient (see Cohen, 1992). However, if we estimate effect size from the results of Experiment 1, the means and standard deviations of performance on the pretense videos across the two conditions suggest that there is an effect size of $\omega^2 = 0.03$.[1] Assuming both α and β levels are 0.05, we estimate $\varnothing = 2.55$ (Pearson & Hartley, 1972). This suggests that we would have to test 210 children per linguistic group to generate enough power to reject the null hypothesis. The effect size is tiny by the usual standards of cognitive development research. It provides no support for supposing that children understand the mental characteristics of pretense early on but have incorrectly mapped 'acting-as-if' or a similar nonmentalistic concept onto the meaning of the word 'pretend'. Instead, this effect seems to fall into the 'null range', in which we should treat it as equivalent to negligible (see Greenwald, 1975; Keppel, 1991). One piece of evidence that supports this decision is that children's performance on the present experiments was consistent with other studies; only a subset of 4-year-olds understood that the mind was involved in pretense (see Lillard, 2001).

General discussion

Two experiments were undertaken to address the concern that 4-year-olds might understand that the mind is involved in pretense but sometimes fail on experimental tasks (Lillard, 1993b, 1996, 1998) because they have misunderstood the meaning of the word 'pretend'. Lillard (1996) suggested that young children do not understand that pretending requires mental activity and that children's initial understanding of pretense is that of 'acting-as-if'. While pretending usually involves action as well as mental activity (Lillard, 1994), action is a characteristic feature of pretense and not a necessary component. In contrast, mental activity is a necessary component and a mature concept of pretense must include this knowledge. However, based on some experimental evidence, it is possible that young children do understand pretense as mental activity but have failed experimental tasks because they have mapped the word 'pretend' onto the concept of 'acting-as-if'. By this hypothesis, although children generally realize pretenders are using their minds, when asked questions like 'Do you need your mind to pretend?' children would think experimenters are asking only about the actions involved. Thus, they would answer in the negative, consistent with Johnson and Wellman (1982) who showed that children think that the mind is not necessarily involved in bodily actions.

[1] Note that this effect is opposite of what the hypothesis that children have mismapped the word 'pretend' would predict, given that children did slightly better on the linguistic condition than the nonlinguistic condition. We can think of no theoretical reason why this effect would exist.

To test this hypothesis, children were asked to observe videotapes of people pretending. For half of the children, the word 'pretend' was not used to describe what was happening in the videotape. Children were then asked, using two different methods, to indicate if pretending was a mental activity. Over the two experiments, the hypothesis that the word 'pretend' misleads children was not supported. Regardless of whether the word 'pretend' was used, most 4-year-olds usually failed to acknowledge the involvement of the mind in pretense, averaging approximately 51% correct across the two experiments. Because children were not responding haphazardly, these data suggest that the word 'pretend' is not blocking a true understanding that pretense involves the mind.

Several concerns emerge from these experiments. One is that the method might be inadequate to prevent the hypothesized blocking effects of the word 'pretend'. Although the experimenter did not use it, children might have generated the word 'pretend' themselves, internally, in response to the pretend videos. However, if this is the case with the videos, why should it not be in real life as well, so that, whenever children see someone pretending, they generate the word 'pretend'? If this is the case in real life, young children's access to mental aspects of pretending must always be blocked. Clearly, however, it is not.

Another concern stems from children's failure to recognize the mind's involvement on the real videos. Across the two experiments, children claimed that the mind was involved in real actions only 41% of the time. One might argue that this finding reveals a difficulty in the method; children should recognize mental activity on those real videos. This finding is consistent, however, with the results of Johnson and Wellman (1982). They showed that, on average, only 20% of the kindergarten children they interviewed recognized that you needed a brain to engage in simple motor activities like walking, talking and holding something. It should be unsurprising, then, that in the current experiments younger children failed to attribute mental activity to the real activities.

In addition, a third concern is that children might not have understood that the people in the videotapes were pretending. This possibility is unlikely. Clearly the actors were pretending in the pretend videos. Further, in pilot work to these experiments and in the current experiments, both child and adult participants acknowledged pretense in the videos in follow-up probes. However, neither children nor adults spontaneously volunteered such information. Instead, it seems the question 'What's happening in the video?' was taken by children and adults as a question about the meaning of the pretense act, rather than as a request to specify that it was a pretense act.

A fourth concern is that 4-year-olds have been shown to have immature ideas about thinking (Flavell *et al.*, 1995), so one might not expect them to do well on tasks like these anyway. Two related points should be noted. First, preschoolers do seem to know about several aspects of thinking: that it 'is an internal, mental activity', distinct from 'seeing, talking, touching, and knowing' (Flavell *et al.*, 1995, p. v; see also Estes, Wellman & Woolley, 1989). Lillard (1996, 1998) has suggested that many 4-year-olds do not know that pretending is an internal mental activity. But some have questioned whether Lillard's results have stemmed from the label 'pretend' misleading children to focus on action (e.g. Gerow, Taylor & Moses, 1998). These studies have suggested that children would show better understanding of this aspect of pretense when the label was not present. The present experiments are not consistent with this hypothesis: even when the word 'pretend' was absent, many children failed to indicate understanding that pretense requires mental activity.

Second, a common assumption is that children have a precocious understanding of the mental qualities of pretense, relative to those of other mental states like thinking and belief. The present experiments are inconsistent with this hypothesis. Regardless of whether the word 'pretend' is used, children's understanding of pretense does not appear to be precocious relative to these other mental states. Although children's performance on a standard false belief task (i.e. Wimmer & Perner, 1983) was not considered here, prior work (Lillard, 1993b) has suggested that children's understanding of the mental components of pretense emerges after their understanding of false belief. Further, a recent meta-analysis (Wellman *et al.*, 1999) suggests that the majority of children reported here certainly would have passed such a task. Future research should consider the relationship between children's understanding of mental representation and their understanding of mental activity as tested here, as these may develop independently of each other.

Finally, another important issue to consider here is that of children's implicit and explicit knowledge. Recently, some research has suggested that children may have an implicit understanding of false belief that precedes their explicit understanding, tested in standard 'false belief' tasks (Clements & Perner, 1994). In these experiments, young 3-year-olds were found to look to the correct location in a false belief task, although they verbally reported that Maxi would know the chocolate was in the incorrect location. Regarding pretense, children might implicitly understand, when they watch someone pretend, that the person is thinking about the pretense scenario, but simply cannot verbalize that knowledge (see Leslie

& Roth, 1993). Perhaps in a naturalistic playground context, children would reveal an understanding that only the people who know about the Lion King can pretend to be the Lion King, by never assigning an ignorant person that role. Further, perhaps similar eye gaze data can be taken from the box methodology used here. Perhaps children looked at the mind box when asked to categorize pretense phrases in Lillard (1996) or in Experiment 2 here, even though they placed the card or the videotape in the body box. Future studies would do well to use such implicit measures to see if children reveal better understanding of the mental components of pretense under such circumstances.

That being said, although not at ceiling, children's performance in this study was not at floor. A proportion of children at this age do realize that pretending involves the mind, and this proportion was significantly larger in the last experiment than the proportion realizing real activity involves the mind. Consistent with past work (reviewed in Lillard, 2001), some young children do understand that pretense is mental. Who these children are, and what leads to their relative precocity, is an important question for further research.

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