Children's Understanding of the Animacy Constraint on Pretense

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There is controversy over how well children understand pretense. One possibility is that for young children, pretense is not a mental state but is merely an external manifestation. If so, young children would think inanimates can pretend, because inanimates can be like other entities. Four experiments tested this. When shown pictured items, 4-year-olds understood that only animates pretend, but 3-year-olds sometimes claimed that inanimates pretend. However, when shown the actual items, even 4-year-olds sometimes claimed that inanimates pretend. This was particularly the case when adults explicitly pointed out that the objects looked or acted like something else. Children's errors were fairly specific to pretend in that they did not tend to attribute thinking to inanimates.
In recent years, a wealth of research has examined children’s understanding of the mind. Central to the debate has been the question of when children come to understand that minds represent reality. Children’s performance on the most used metric of understanding that minds represent, the false belief task, suggests that children lack this understanding until about the fifth year of age (Wimmer & Perner, 1983). In one version of a false belief task, young children are shown a Band-Aid box and asked what is inside. In keeping with the usual contents, they generally say “Band-Aid.” Yet when the contents are revealed to be crayons, and young children are asked what they had thought was inside when they first saw the box, they often change their answer to “crayons.” Many researchers believe that children make this and other similar errors because they do not understand that minds represent reality (Aston, Harris, & Olson, 1988; Flavell & Miller, 1998; but see Carlson, Moses, & Hix, 1998; Frye, Zelazo, & Barr, 1998).

This misunderstanding is puzzling in light of pretend play. The very essence of pretending is to mentally represent one object or situation as another (Fein, 1979; Lillard, 1993a). Therefore, it would seem that children should understand mental representation as soon as they can engage in pretend play (Leslie, 1987). One solution to this conundrum has been to consider pretense a special case in which children understand mental representation early (Flavell, Flavell, & Green, 1967; Ferguson & Copnik, 1988; Moses & Chandler, 1992). Against this, Lillard (1993a) published a series of experiments showing that even children who passed false belief tasks did not appear to understand mental representation in pretend.

In Lillard’s studies, children were presented with a troll doll that was described as not knowing that kangaroos hop but that was hopping just like a kangaroo. Most 4-year-olds claimed the doll was pretending to be a kangaroo, even though his knowledge state would prevent him from mentally representing one. Later studies addressed mental representation more directly, stating that the troll (or even a child) was not thinking about kangaroos, or not thinking that he was being like a kangaroo, and obtained the same result (Lillard, 1993b, 1998a). Other experiments have suggested that young children do not understand that pretense involves trying (Lillard, 1998a; but see Joseph, 1998), or even that it requires a mind (Lillard, 1996).

These experiments suggest that until 6 or 7 years of age, children do not appreciate the mental underpinnings of pretense but instead view it primarily as its external features: if someone is acting like something, then they are pretending to be it (Harris, 1991; Lillard, 1998b; Lillard & Flavell, 1992; Perner, Bailer, & Hutton, 1994). One extreme interpretation of this is that pretending is purely external for children, and anything that is like
something else could be said to be pretending to be it. However, pretense actually has an animacy constraint: only something that is alive could possibly pretend. The present studies tested whether children appreciate that to pretend to be something one must at least be animate. There is not consensus among adults as to whether animals can pretend. In one experiment in our laboratory, adults attributed pretense to animals on 66% of trials. Therefore, the present experiments are focused on people, the prototypical animate for children (Carey, 1985), as compared with objects and vehicles.

An alternative to limiting pretense to animates would be to extend it to anything that can manifest something else. Two ways that something can manifest something else are to act like it (movement) or to look like it (costume). Regarding movement, at least six types lead to genuine pretense (see Figure 1). At the lowest, most inclusive level (represented as the largest circle in the figure), movement always occurs due to some force. For example, when something is blown over by the wind, an external force is operating. Within this set is the set of internally generated forces.

Figure 1. Six types of movement leading to genuine pretense.
Trains, for example, move when internal forces propel them. Within the set of movements created by internal force are those stemming from internal biological factors, as when parts of a flower move during blooming. Within the set of biological internal forces are mental ones, which exist only in animates. When a frog hops, that movement is driven by its brain. Within the set of mentally propelled movements are those which have a specific purpose, as when a horse runs back to its stable (perhaps) with the intention of returning home. Within this are those whose purpose is imitation: One might try to dance like Fred Astaire. However, in so doing one would not necessarily be pretending to be that other person; one might simply be showing someone else the style in which Fred Astaire dances, without actually trying to come across as Fred Astaire himself. On the other hand, if engaged in pretense, one might really be trying to see oneself (and to be seen by others) as Fred Astaire, in which case the movements could be classified as genuine pretense. This is the smallest subset of movements in Figure 1. Probably only people engage in pretense, although dolphins and some higher apes appear to engage in genuine imitation (Miles, Mitchell, & Harper, 1996; Mitchell, 1993; Tomasello, Kruger, & Ratner, 1993).

It seems that for young children, pretense may extend to the entire set of movements that stem from internal, mental force: Lillard's (1998a) studies found that for young children, a troll who was hopping like a kangaroo was pretending to be one, even though he was not trying to hop like a kangaroo. The question addressed here is whether pretense could even be attributed to entities whose movement stems from any internal force (as with vehicles, in the second largest circle), or even of externally imposed forces (as can occur with any object, represented by the largest circle).

Analysis of how costumes can result in pretense is less involved: a costume is either on or off. If it is on, and there is an intent to convey what the costume represents, then pretense is occurring. Without that intent, the entity is not pretending; it is simply wearing the costume. (See Lillard, 1994, for further discussion of what pretending entails.) A survey of adults in our laboratory recently confirmed this: 11 of 12 adults specified that to pretend, one must be mentally involved in projecting the entity. Costume alone does not constitute pretense. The question, though, is whether for children, anything with a costume on is pretending to be what that costume portrays.

Prior to addressing the question of whether children limit pretense to animates is the question of whether children make an animate-inanimate distinction at all. Although in his early work, Piaget found evidence that young children did not discriminate animate from inanimate objects (Piaget, 1930, 1951; see also Laurendeau & Pinard, 1962), more recent
experiments have used more sensitive methods and suggest that they do. Preschoolers know that animates differ from inanimates, for example, in that animates have brains and would run from fire (Bullock, 1985; Dolgin & Behrend, 1984; Gelman, Durgin, & Kaufman, 1995). Regarding specific mental states, Gelman and her colleagues (Gelman, Spelke, & Meck, 1983) found that even 3-year-olds understand that objects (like rocks) do not think, whereas people do, a finding reiterated by Carey (1985) for the youngest children she tested (4-year-olds). Given that preschool children understand that only animates can engage in thinking, the issue at hand is whether pretending is also limited to animates, or whether pretending is any movement or costume that resembles some other entity.

Four experiments were conducted, in each of which 4-year-olds were compared with adults or younger children (or both). In the first two experiments, participants were presented pictures of undressed objects, and were asked what the objects could do (pretend, think, and possibly other acts). In the last two experiments, actual objects were used, some of which wore costumes or moved like other objects, and participants again were asked about what the objects could do.

**EXPERIMENT 1**

In this experiment children judged whether a variety of entities could engage in various acts, including pretense. The comparison acts ranged from internally originating, purely cognitive (e.g., think, probably limited to animates or even humans) to internally originating, biological acts (breathe, limited to animates), to internally originating, physical acts (move, limited to animates and vehicles), to externally originating physical ones (get wet, which can happen to anything). These activities roughly correspond to ever-larger sets of movements in Figure 1, in terms of the entities to which the activities can be attributed. The entities in this experiment, which included adults, children, animals, vehicles, and small objects, were presented in pictures. Whether animals can think or pretend is controversial; they were included for speculative interest only, and results were not analyzed.

**Method**

**Participants.** The sample was 16 3-year-olds (M = 3.8; range = 3.2–3.11; 9 girls and 7 boys), 16 4-year-olds (M = 4.6; range = 4.2–4.10; 10 girls and 6 boys), and 16 adults (M = 36 years; range = 20–65 years; 8 of each gender). The children were recruited from a university preschool, and the adults were recruited from a university common area. In
this and the subsequent experiments, a range of ethnic backgrounds was represented, and most participants were from middle-income families.

Procedure. Children were tested individually in a quiet room in their preschool. They were shown, one at a time, 10 pictures, including 2 from each of five categories: human adult (man, woman), human child (girl, boy), animal (cow, dog), vehicle (car, bike), and nonmoving object (hairbrush, watch). Initially, children were simply asked to tell what was shown in each picture. Then, for each picture, they were asked whether the pictured entity could pretend, think, move, breathe, and get wet. The pictures were presented in a fixed random order, and the questions were asked in four different random orders (four participants per group). Adults were given a paper and pencil version of the task.

Results and Discussion

Responses concerning adults and children were almost identical so only the child data were used. Interpretation of two verbs was not always as intended. For “move,” 69% of adult responses indicated that the objects could move, perhaps meaning they could be moved or referring to the moving hands of the watch. On the other hand, only 78% of adult responses indicated vehicles could move, suggesting that some adults interpreted the question as “move by itself.” The other unexpected interpretations were for “get wet”; many children apparently treated “could get wet” as “would be okay to get wet.” Due to the apparent lack of validity, these data were not analyzed.

Correct responses were scored 1. Table 1 shows the percentage of correct responses for each category. A repeated measures analysis of variance (ANOVA) was performed, with a between-factor of age (3, 4, adult) and two nested within-factors: entity (person, vehicle, and object) and act (think, pretend, breathe, move). There was a main effect for age group, \( F(2, 45) = 13.32, p < .001 \). The overall mean correct was 82% for 3-year-olds, 98% for 4-year-olds, and 99% for adults. Post hoc Scheffé’s tests showed the differences between 3-year-olds and both other groups to be significant (mean differences of .31 and .33, respectively, \( p < .001 \)). The second main effect was for entity, \( F(2, 45) = 4.76, p = .01 \). Mean correct was 98% for people, 91% for objects, and 90% for vehicles. Contrast analyses (Rosenthal & Rosnow, 1985) indicated the differences between people and vehicles and between people and objects were significant, \( p < .05 \). A third main effect, for verb, approached significance, \( F(2, 45) = 3.0, p = .06 \). Participants performed best on breathe (97% correct), slightly lower on think (93% correct), and lowest on pretend (89% correct). Post hoc tests were not conducted because this was a trend.
Table 1. Experiment 1: Percentage Correct Responses for Three Age Groups

<table>
<thead>
<tr>
<th></th>
<th>Person</th>
<th>Vehicle</th>
<th>Object</th>
<th>Total</th>
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<tbody>
<tr>
<td>3-year-olds</td>
<td>Pretend</td>
<td>84</td>
<td>59</td>
<td>72</td>
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<tr>
<td></td>
<td>Think</td>
<td>94</td>
<td>75</td>
<td>75</td>
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<tr>
<td></td>
<td>Breathe</td>
<td>100</td>
<td>91</td>
<td>91</td>
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<tr>
<td></td>
<td>Move</td>
<td>100</td>
<td>94</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Get wet</td>
<td>78</td>
<td>72</td>
<td>41</td>
</tr>
<tr>
<td>4-year-olds</td>
<td>Pretend</td>
<td>100</td>
<td>94</td>
<td>94</td>
</tr>
<tr>
<td></td>
<td>Think</td>
<td>100</td>
<td>94</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Breathe</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Move</td>
<td>100</td>
<td>97</td>
<td>72</td>
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<tr>
<td></td>
<td>Get wet</td>
<td>94</td>
<td>53</td>
<td>34</td>
</tr>
<tr>
<td>Adults</td>
<td>Pretend</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Think</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Breathe</td>
<td>100</td>
<td>100</td>
<td>88</td>
</tr>
<tr>
<td></td>
<td>Move</td>
<td>100</td>
<td>78</td>
<td>31</td>
</tr>
</tbody>
</table>

Most importantly, there was a significant verb by age group interaction, $F(4, 45) = 3.4, p = .01$. Although on breathe 3-year-olds performed about the same as 4-year-olds and adults (means of 1.9, 2.0, and 1.9, respectively), they performed somewhat worse on think (means of 1.6, 2.0, and 2.0, respectively) and even more poorly on pretend (1.4, 1.9, and 2.0, respectively). Post hoc comparisons were made using the Fisher's protected LSD procedure; no significant results were obtained, but the direction of effects was of enough interest to pursue in further experiments.

Another approach to the data is to examine how frequently children's judgments run together, in terms of whether children attribute pretend and move to the same entities more often than they do so for pretend and think. This is particularly of interest for vehicles, because they do move but do not think, pretend, or breathe. Four 3-year-olds always made the same judgments regarding pretend and move for vehicles, either always claiming they could both pretend and move, or never claiming they could do either. Eight 3-year-olds made the same judgments for pretend and think, as did eight for pretend and breathe. For 4-year-olds, these data are even more impressive: 1, 14, and 16, respectively. Thus, particularly at age 4, pretending appears to run much more with thinking and breathing than with moving. These data suggest that 4-year-olds respect the animacy constraint.
In sum, 3-year-olds showed some confusion about pretend, relative to other acts. Returning to Table 1, 3-year-olds incorrectly claimed vehicles could pretend on 41% of trials, as compared with 6% of trials for 4-year-olds and 0% for adults. Although 41% is not significantly different from a chance rate of 50%, chi-square goodness-of-fit tests showed that 3-year-olds were not responding randomly; $\chi^2 (2, N = 16) = 7.38, p < .05$. Eight 3-year-olds were at ceiling and five were at floor regarding whether vehicles pretend. So despite some confusion relative to adults and 4-year-olds, many 3-year-olds appear to respect the animacy constraint.

EXPERIMENT 2

The purpose of Experiment 2 was to replicate the first experiment using different (and more) items and more refined wording (given later). The category “furniture” was used as a subset of the category “objects,” because it is particularly clear that large items of furniture cannot move on their own.

Method

Participants. A total of 16 3-year-olds ($M = 3;6$; range = 3;0–4;0; 8 of each gender) and 16 4-year-olds ($M = 4;5$; range = 4;0–5;2; 8 of each gender) were tested. Adults were not tested because 4-year-olds had done as well as adults in the prior study. The children were recruited from preschools and day care centers serving working- to upper-middle-class families from a range of ethnic backgrounds in a small city.

Procedure. Children were tested individually in a quiet area of their school. They were shown 12 pictures, one at a time. Pictures from three categories were used: child (two boys and two girls), vehicle (car, airplane, truck, and train), and furniture (couch, table, chair, and bench). Children were asked first what was shown in each picture. Then they were given the first act (e.g., “Let’s talk about thinking”), and the experimenter went through each picture, asking whether the entity could perform the act (e.g., “Can a car think? Can a 4-year-old girl think?”).

The entities were presented in two different random orders (eight children each), and the questions were asked in four different random orders. The wording for move was “Can a ___ move because of something inside it [her/him]?” For breathe, children were asked if the entities could breathe “like we do.” For get wet, children were asked if the entities would get wet if they were left outside in the rain with no cover on. Ten justification questions were systematically dispersed across all items
to help keep children on task (e.g., "Why can't a couch pretend?" or "What can a truck pretend?").

**Results and Discussion**

Correct responses were again scored 1, and the percentage correct was computed for each entity-act category (see Table 2). It appeared that the new wording for move and get wet was effective. As can be seen from the table, children again performed very well on people, and there was some confusion, especially for 3-year-olds, regarding vehicles and (to a lesser extent) furniture, particularly for pretense.

A repeated measures ANOVA was performed, with age as the between-factor and entity (person, vehicle, furniture) and verb (think, pretend, get wet, move, and breathe) as nested within-factors. The ANOVA revealed a significant effect for age group, $F(1, 30) = 4.7, p < .05$, with 4-year-olds averaging 93% correct, and 3-year-olds averaging 84% correct. A second significant main effect was for entity, $F(2, 30) = 8.3, p < .001$. Because the difference between people and vehicles was expected from Experiment 1, unprotected t-tests were used and revealed significant differences between people (95% correct) and vehicles (84% correct), $t(31) = 3.4, p < .005$, and between people and furniture (87% correct), $t(31) = 2.5, p < .05$. There was also a significant main effect for verb, $F(4, 30) = 5.6, p < .001$, also predicted from the prior experiment. This was due to children performing worse on pretend (78% correct) than on think (94% correct), $t(31) = 3.9, p < .001$, and breathe (93% correct), $t(31) = 3.2, p < .005$. A post hoc test (Fisher’s PLSD) revealed that the difference between pretend and move (93% correct) was not significant.

| Table 2. Experiment 2: Percentage Correct Responses for Two Age Groups |
|-------------------------|---------|---------|---------|-------|
|                        | People  | Vehicle | Furniture | Total |
| 3-year-olds            |         |         |          |       |
| Pretend                | 95      | 53      | 63       | 70    |
| Think                  | 97      | 60      | 94       | 90    |
| Breathe                | 95      | 63      | 84       | 87    |
| Move                   | 92      | 69      | 81       | 87    |
| Get wet                | 92      | 60      | 78       | 83    |
| 4-year-olds            |         |         |          |       |
| Pretend                | 98      | 77      | 83       | 85    |
| Think                  | 100     | 97      | 95       | 97    |
| Breathe                | 98      | 97      | 100      | 98    |
| Move                   | 100     | 100     | 98       | 99    |
| Get wet                | 83      | 83      | 89       | 85    |
The ANOVA also revealed a significant entity by verb interaction, $F(8, 30) = 4.6$, $p < .001$. This is mainly due to children's particularly poor performance on pretense for vehicles and furniture. Significant differences, for pretend, were between people and furniture, $t(31) = 3.3$, $p < .005$, and between people and vehicles, $t(31) = 3.3$, $p < .005$. Also, for vehicles and furniture only, there were significant differences between pretend and breathe, $t(31) = 3.0$ and 2.7, respectively, $p < = .01$ and between pretend and think ($t(31) = 3.3$ and 3.2, respectively, $p < = .005$). Post hoc Fisher's PLSD tests revealed no differences with move.

Again looking at how the data run, for vehicles, pretending and thinking were paired by 11 3-year-olds, pretending and breathing by 10, and pretending and moving by 8. For 4-year-olds, the comparable numbers are 12, 10, and 5. This suggests some confusion by some children, but the majority children are on target with how they view the possibility that vehicles pretend. It is important to note that the 3-year-olds' less apt performance on vehicles and pretense, at 53% correct, is not random, as indicated by a chi-square goodness-of-fit test, $\chi^2 (2, N = 16) = 12.25$, $p < .01$. Seven 3-year-olds performed at floor and seven performed at ceiling on the questions about whether vehicles can pretend.

Children's responses to the open-ended questions were of interest in indicating how children reasoned about various items. Two children who claimed people would not get wet in the rain explained that they would stay dry because they would get an umbrella, and a child who denied that a table would get wet explained that tables stay inside. A child who claimed that vehicles breathe like we do explained that the smoke that comes out of them is their breath, and one who claimed vehicles could not breathe explained that they do not have mouths. This latter sort of answer, relying on the presence or absence of parts in attributing properties, was frequent: children claimed furniture could not think due to its lacking a brain, could not move due to its lacking legs (perhaps meaning animal-like ones), and could not breathe due to its lacking a nose. One child even claimed that airplanes cannot pretend because they lack the necessary clothes. This sort of external-parts analysis is reminiscent of Carey's (1985) findings. With regard to pretend, it fits the characterization of children as externalistic, and it could be viewed as contrary to essentialist characterizations of children's thinking (Gelman, Coley, & Gottfried, 1994).

To summarize Experiments 1 and 2, young children, particularly at age 3, show some confusion regarding whether vehicles and, to a lesser extent, objects like furniture can pretend. They are relatively clear about the fact that such entities cannot think. This may suggest that pretend is, for some 3-year-olds, simply movement or costume. As such, for some 3-year-olds, pretend is at the outermost circle of Figure 1 in terms of
movement. But pretending more often occurs with animate properties like thinking and breathing, particularly by age 4.

One possible objection to these studies is that children may simply be responding according to what objects usually do, rather than what they can do. To examine whether children are willing to extend pretense to inanimates, Experiments 3 and 4 gave children suggestive instances of objects manifesting other objects and investigated their willingness to confer pretense.

**EXPERIMENT 3**

Experiment 3 examined the stability of young children’s judgments about pretending being limited to animates. Children viewed objects that moved or were costumed like other objects, and the experimenter explicitly pointed out the mimesis. If children truly understand that pretending stems from qualities limited to animates, they should still deny that pretending is occurring. However, if they are less certain, they could be easily swayed by misleading appearances and suggestions. As a further change, real objects were used instead of pictures, so that we could make the objects move and wear costumes. Because we were particularly interested in comparing attributions of thinking versus pretending, for objects and vehicles, only these factors were included in this study.

There were two types of scripts, described fully in the Method section. Subjective scripts, which made the experimenter pretend (or thinking) something, asked if the objects about which the experimenter was pretending (or thinking) were also pretending (or thinking) themselves. It was expected that such cases might be very easy, because obviously the inanimate objects lacked the qualities of the experimenter that enabled her to pretend (or think). On the other hand, perhaps children would be prone to making an inference from the experimenter to the object. The second type of script was an objective one. For objective scripts, the child was told what an object looked or moved like and was asked if it was pretending. It was thought that these might be slightly more difficult for pretense, because the similarity in appearance was made explicit. On the other hand, if children were truly clear on the requirements of pretense, neither type of script would be difficult.

**Method**

*Participants.* A sample of 24 3-year-olds (M = 3;7, range = 3;2–3;11; 13 girls and 11 boys), and 24 4-year-olds (M = 4;6, range = 4;0–4;11; 13 girls and 11 boys) was tested at a university preschool.
Procedure. Children were shown eight objects and were asked whether each object could pretend (four objects) or think (four objects). The eight objects were in two fixed sets, as shown in Table 3. Each set contained two vehicles and two objects. Of each pair, one item was assigned a movement and the other a costume portraying some other entity. Each child was given one set of objects for think questions and the other for pretend questions; half of the children had Set I for think and the other half had Set II for think. The two verbs (with their corresponding item sets) were blocked, and within each block children heard two costume then two movement items, or the reverse, counterbalanced across children.

Half the children at each age level were given each type of script. In objective scripts, the experimenter stated something as a fact ("It looks like . . ."), and for subjective scripts, the experimenter stated something as an opinion ("I think it looks like . . ."). A subjective script for pretend went as follows. The experimenter made a top spin and said, "See this top? I'm pretending it's a ballerina. See, it moves just like a ballerina. So I'm pretending it's a ballerina. Well, what about the top—is it pretending?" We did not specifically say "to be a ballerina" because the intent was to keep the question similar to that used in the prior experiments. For the objective case (given to different children), the experimenter said, "See this top? It looks like a ballerina. See, it moves just like a ballerina. Tell me, is the top pretending?" For a subjective-think case (this one involving a costume), the experimenter placed a tiny clown mask on a cocktail umbrella and said, "See this umbrella? I think it looks like a clown. See, it has a clown mask on. So, I think it looks like a clown. Well, what about the umbrella—does it think?" For the objective-think case, she said, "See this umbrella. It looks like a clown. See, it has a clown mask on. Tell me, does the umbrella think?" This wording was used instead of "Is it thinking?" because children

<table>
<thead>
<tr>
<th>Object Set</th>
<th>Item</th>
<th>Likeness</th>
<th>Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>train</td>
<td>worm</td>
<td>movement</td>
</tr>
<tr>
<td></td>
<td>top</td>
<td>ballerina</td>
<td>movement</td>
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<td></td>
<td>bus</td>
<td>horse</td>
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<td></td>
<td>candle</td>
<td>duck</td>
<td>costume</td>
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of this age might interpret such a question as being about problem solving (Flavell, Green, & Flavell, 1995).

Results and Discussion

Children's answers were scored 1 each if the child correctly responded that an object did not think or pretend. The mean percentage correct scores of interest are shown in Table 4. First we examined whether script type made a difference in responses, by conducting a repeated measures ANOVA with script (subjective, objective) as the between-subjects factor and verb (think, pretend) and form (movement, costume) as nested within-subjects factors. This revealed a significant main effect for verb, \(F(1, 46) = 17.6, p < .001\), with children doing better on think (65% correct) than on pretend (39% correct). There was a trend toward a main effect for script, \(F(1, 46) = 3.7, p = .06\), apparently due to a trend toward an interaction between script type and verb, \(F(1, 46) = 3.3, p = .07\). Children did particularly poorly with the objective script for pretend (15% correct); the other script-verb combinations were 59% correct for objective, think; 50% correct for subjective, pretend; and 67% correct for subjective, think. Confirming our expectations, it was particularly difficult for children to deny pretense to an object when the experimenter explicitly pointed out that an object looked like something else.

A second repeated measures ANOVA was carried out using age group and verb order as between-subjects factors, and verb and form (costume or movement) as within-subjects factors. This revealed a significant main effect for verb only, as discussed previously, and a trend toward a verb by age group interaction, \(F(1, 46) = 2.8, p = .10\). The latter trend was apparently carried by 4-year-olds' better performance on think (see Table 4).

Also notable here is the percentage of 4-year-olds who claimed that the items were pretending: 63%, or 15 of 24, made this claim on three or four trials. In contrast, only 21%, or 5 children, incorrectly attributed

| Table 4. Experiment 3: Percentage Correct Responses for Two Age Groups |
|-----------------------------|-----|-----|-----|
|                             | Vehicles |     | Objects |
| 3-year-olds                 | Pretend | 40  | 40    |
|                             | Think   | 54  | 54    |
| 4-year-olds                 | Pretend | 35  | 40    |
|                             | Think   | 75  | 75    |
think on three or four trials. In other studies, about 40% of 4-year-olds appeared to understand pretending, in that 40% did not attribute pretense to characters that were not able to mentally represent the animal that the entities were serendipitously conveying (Lillard, 1993a), nor to entities that were not trying to be like such an animal (Lillard, 1998a). The fact that in these past studies the experimenter also had explicitly pointed out the resemblance to other entities (“He’s hopping like a kangaroo”) might lead some to wonder if that explicit demarcation was the sole cause of poor performance. However, other studies without such demarcation show similar misunderstanding. For example, about 40% of 4-year-olds claimed that one needed a mind or a brain to pretend even when no character was described as acting like something else (Lillard, 1996; Lillard & Sobel, 1999).

Children’s open-ended responses were revealing. For think, several children commented that although the object (bus, candle, etc.) would not think, the real entity it resembled would. For example, one child who claimed that the candle did not think pointed out, “a duck [which is what the candle looked like] thinks,” suggesting solid understanding of what kinds of entities can think. In contrast, for pretend, children would make comments like “Yes, the bus is pretending to be a horse” or “Yes, the koosh is pretending to be a spider,” failing to limit the mental state to the pretense entity. Pretense seemed to be about what the items “come off” as. A few children definitely understood pretending and were unmoved by the costumes and explicit statements. One girl, on being asked if the bus was pretending, told the experimenter, “No, that’s silly.”

In all, then, when entities were made to resemble other entities by their costumes or movements, many children claimed the objects were pretending. This effect was especially pronounced if the experimenter had objectively pointed out that the object looked like some other object (as opposed to simply saying that she was pretending it was something else). Such suggestive features had much less effect regarding judgments about whether the entities think, so children were not indiscriminately conferring cognitive properties on the objects. Indeed, the very same items that some children claimed pretend, other children claimed think.

One concern with this study is that children may have interpreted the pretense question not as being about whether an object could pretend but as being about whether the object was a pretend something. A second concern was that the question wording differed across verbs: Does it think, versus is it pretending. Experiment 4 was conducted to address these concerns, and to extend the methods of Experiment 3 to people and uncostumed entities.
EXPERIMENT 4

The concern addressed by Experiment 3 was that some children might have claimed in Experiments 1 and 2 that objects and vehicles do not pretend, not because they are unwilling to confer pretending on them but because they cannot easily think of how they would pretend. To examine this, in Experiment 3 costumes and movements were added to vehicles and objects, and the experimenter explicitly pointed out that they looked like something else, or claimed to herself be pretending they were something else. Performance disintegrated, with about 60% of children claiming the objects and vehicles were themselves pretending.

The main purpose of Experiment 4 was to tease apart the influence of the costume (or “external manifestation”) from the influence of the experimenter’s leading statement about pretense. People, vehicles, and objects were used, to allow comparison of inanimate with animate targets. Because there was no effect of form (movement or costume) in Experiment 3, costume was the sole method of an object manifesting something else in this experiment. Because 4-year-olds had performed poorly with suggestive instances, particularly on pretense, they were the only child group assessed. An adult group was added to examine how adults perform on suggestive instances. Finally, to ensure that children correctly understood the pretense questions to be about whether the entities engage in pretend, two training items were added, and to ensure that sentence form had not carried the prior result, the same form was used for all verbs: “Can the [item] think/[pretend]?"

Method

Participants. In total, 24 4-year-olds (M = 4; 5; range = 3; 9–5; 2; 17 boys and 7 girls) and 24 adults (M = age 20; range = 18–26; 19 females and 5 males) were tested. The children were recruited from local preschools in a small city, and the adults were recruited from the university participant pool in that city.

Materials. For training, materials were a cloth, and four pairs of pictures (each pair showing an uncostumed child and a toy stuffed animal). For the test phase, 24 stimulus items were used: 4 small objects, 4 toy vehicles, and 4 photographs of people, each in a costumed and an uncostumed state. A man appeared with or without a pencil costume; a woman with or without a rabbit mask; a boy with or without a Cheerios box costume; and a girl with or without a jaguar costume. Four costumes could go on either an object or a vehicle: a monkey costume on a soda bottle or
truck; pig costume on a tiny basket or airplane; a Band-Aid box costume on a miniature chair or car; and a tennis ball costume on a crayon or train. Costumes never completely covered the stimuli so the identity of each stimulus could be readily discerned.

Procedure. Children were tested individually in a quiet room at their preschool, and adults were tested in groups in a laboratory at the university. Participants were trained on two topics. First, they were trained on the fact that anything could be wiped with a cloth. The experimenter demonstrated wiping several things (like her own face and the tape recorder) with the cloth, and participants were allowed to wipe their hands and a small book with the cloth.

Second, participants were trained on the difference between “a pretend” item and “pretending to be” item. Children were shown a pair of the training pictures (one showing a child, the other showing a stuffed dog) and were asked, “Can you tell me which of these can pretend to be a dog?” Regardless of their answer, the experimenter then said, “This one can pretend to be a dog (pointing at the picture of a child); this one is a pretend dog, it’s a stuffed animal and it isn’t real, so it cannot pretend.” The procedure was repeated with the second set of training pictures.

The test phase followed the training. Participants were tested on 12 stimuli, in blocks of 6 (costumed or uncostumed). The experimenter held up each item and said, “This is an [X].” For costumed items, she also said, “Look, it has a [Y, costume type] on.” This comment was not considered leading (as “It looks like” was); it was made because to not comment on the costume at all seemed unnatural. Participants were then asked three questions about each object, either “Can it pretend? Can it be wiped with a cloth? Can it think?” (for half the participants) or “Can it think? Can it be wiped with a cloth? Can it pretend?” (for the other half of the participants). The two questions were asked in counterbalanced orders within and across children. Half the children were asked “Which one is a pretend [X]?” first for the first pair, and “Which one could pretend to be an [X]?” first for the second pair, whereas the other half of children had the reverse order. Some probe questions concerning the reasons for children’s answers were asked at the very end.
Children responded verbally in individual interviews and were tape-recorded. Adults marked their answers on a score sheet.

Results and Discussion

Correct replies, scored 1, for 4-year-olds are shown in Table 5. Adults were 100% correct on all questions, stating that everything could be wiped with a cloth, but only people could pretend and think. Children responded variably on wipe and so wipe data were not analyzed. Some claimed that costumed items could not be wiped because they were covered, others claimed that people could not be wiped (perhaps a respect issue), and still others claimed that vehicles could not be wiped (one girl explained that this was because they were made of metal and would rust.)

A repeated measures ANOVA was performed with age group (4, adult) as the between-factor and item type (person, vehicle, object), verb (pretend, think), and costume status (costumed, uncostumed) as within-factors. This revealed a significant main effect for age, $F(1, 46) = 13.5$, $p < .001$. For 4-year-olds, the mean correct was 82%, versus 100% for adults. There was also a significant main effect for verb, $F(1, 46) = 5.4$, $p < .05$, due to performance on pretend (at 88% correct) being less apt than on think (93% correct). Needless to say, because the adults were at ceiling, there was an identical verb by age group interaction, $F(1, 46) = 5.4$, $p < .05$. Four-year-olds performed particularly poorly on pretend (76% correct) as compared with think (87% correct), $t(23) = 2.3$, $p < .05$. Indeed, on 26 occasions children claimed that an object could pretend but not think. This is against the notion that children know that pretending relies on thinking. On only 9 occasions did they claim the reverse: that an object could think but not pretend (and 7 of these responses were from a single child).

There was also a significant main effect for item, $F(2, 46) = 7.2$, $p = .001$, with performance on vehicles (86% correct) and objects (89% correct) being less apt than performance on people (98% correct). The expected differences were tested: $t(47) = 3.0$, $p < .01$ for the person-

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vehicle difference, and \( t(47) = 2.2, p < .05 \) for the person-object difference. This effect was due to the 4-year-olds and was reflected in an identical interaction. Four-year-olds were 71% correct on vehicles and 78% correct on small objects, in contrast to 95% correct on people; the significant differences within the age group resembled those of the entire sample.

Posttest questions were added to ensure that children correctly interpreted the pretense question as being about verb rather than description ("Is pretending \([X]\)?" versus "Is a pretend \([X]\)?"). Most pertinent is how many children respond incorrectly that the stuffed animal can pretend. This error was made on 10 of 48 or 20% of trials; 16 children were correct on both "can" questions. If the children who made errors were the same children who claimed that costumed vehicles and objects could pretend, this would be of real concern, because it would suggest that those children might be claiming the objects were pretend on the test trials (rather than that the objects could pretend). Close examination of the results were strongly against this interpretation.

Only one child was incorrect on both of the posttest "Which one can pretend to be an \([X]\)?" items and the pretense test items concerning costumed vehicles and objects; 12 children were correct on all of these. Of those children who scored equally, half did better on the pretense test questions, and half did better on the posttest questions. In sum, although children may at times have misinterpreted the question, it did not appear to be the central cause of poor performance on the test questions for costumed vehicles and objects.

Interestingly, covering objects in costumes made no difference to performance; this "suggestion" of pretense was not enough, in itself, to make children declare that inanimate objects were pretending. In contrast, Peskin and Olson (1997) found that simply covering sleeping characters (who were animate) with costumes led children to confer pretense on those characters. This suggests an appreciation of the animacy constraint. In the present study, for objects, there was even a trend for children to perform somewhat worse on uncostumed items when presented uncostumed items first (55% correct) than on costumed items when presented costumed items first (78% correct). This is against the notion that costumes alone are misleading. The poorer performance in Experiment 3 may have been heavily influenced by the experimenter explicitly pointing out that the objects looked like other things. (Recall that the group with the objective "It looks like" wording in Experiment 3 was only 15% correct.) However, as compared with the first two experiments, performance is low, so it appears that seeing the actual objects (as opposed to pictures) may make children more likely to claim they pretend.
In sum, in this experiment children performed worse than in Experiments 1 and 2, but better than in Experiment 3. It appears that seeing actual objects suggests pretense to children, particularly when likeness to other objects is explicitly pointed out. However, there was no decremental effect of external manifestation alone (without such explicit comments) with the real objects.

GENERAL DISCUSSION

The findings from these four experiments can be summarized as follows. First, in all four experiments, 3- and 4-year-olds tended to show better understanding of what kinds of entities can think than of what kinds of entities can pretend, and better understanding of what people can do than of what objects and vehicles can do. Young children know that people pretend and think, and they know vehicles and objects do not think. They are less certain about whether those latter items pretend.

When items were shown in pictures, 3-year-olds performed at about 60% correct in claiming that vehicles and objects do not pretend. Although this is reasonably good for young children, it is far from 100% correct. Four-year-olds understood quite well that objects and vehicles do not pretend when they were presented in pictures. However, when the actual objects were presented, 4-year-olds' performance dropped. This drop was not greater when the object wore a costume than when it did not. Finally, when the actual objects were presented in conjunction with suggestive wording, pointing out that the item "looked like" something else, 4-year-olds' performance dropped precipitously.

Perhaps the actual objects suggest pretense possibilities to children in a way that seeing pictured items does not. Children may readily imagine, for example, on seeing an actual bottle, how one might use it as an airplane. The objective distancing effect that pictures might provide is reminiscent of some of DeLoache's (in press) findings, in which children can better use an object as a symbol when it is behind a glass case or shown in a picture. Further experiments are needed to examine this.

One might question whether the experimental procedure is valid, in that asking children whether an entity can pretend might violate the Gricean maxim of quality ("Do not say what you believe to be false"). There are at least two reasons to doubt that the questions themselves are the cause of difficulty for children. First, when the same questions were asked across experiments, children's performance varied according to the type of stimulus and manner in which it was presented. If children were
simply misled by the question, they should not have performed as well in the first experiments. Second, children performed much better on think than on pretend, although it is subject to the same Gricean criticism. (For further discussion of such issues, see Lillard, 1999; Siegal, 1999.)

On another topic, recently several researchers have claimed to show that young children understand that pretending involves thoughts (Bruell & Woolley, 1998; Custer, 1996; Gerow, Taylor, & Moses, 1998; Hickling, Wellman, & Gottfried, 1997). This would seem to go against the present experiments, in which children attribute pretend to entities that they claim cannot think. In the preceding studies, researchers have usually examined whether pretending involves thoughts by showing children a person pretending, then asking the children which of two pictures shows what the person is thinking about. For example, in one such study, Custer (1996) showed children a picture of a person fishing and described him as pretending to fish. The person actually had a boot, not a fish, at the end of his fishing pole. She asked children to choose which of two pictures revealed what the character had in his head “right now, while he's pretending.” The choices were a picture of a person with a boot on his line, and a person with a fish on his line. Three-year-olds tended to choose the picture of the person with the fish on their line, leading Custer to claim they understand the thoughts underlying pretense. (An alternative interpretation is that young children know simply that pretend is not real.)

However, in the present study, entities that children claimed did not think were also claimed to pretend. This suggests that pretending does not crucially rest on thinking for young children. If it did, then to attribute pretend, children would have to attribute thinking as well. Perhaps, although children are able to judge thought content when the experimenter implies that a pretending entity has thoughts and gives them two choices of what that thought might be, they do not usually assume that thinking is involved in pretense (see discussion in Lillard, 1998a).

Most young children recognize that inanimates, even when costumed or moving like other objects, do not themselves pretend. Only when adults strongly suggest that entities are pretending, by overtly commenting on what the entities look like, do young children frequently confer pretense on inanimates. Returning to Figure 1, pretense appears to be at the level of biologically or mentally generated movement, by age 4. Although children are not as certain about what entities pretend as they are about what entities think, they do understand quite well that only animates pretend.

Although children can be credited with understanding that pretend is the province of animates, the extant body of literature on children's understanding of pretense is against the thesis that pretend is an area of
precocious understanding of mental representation. Yet the activity of pretending does seem to have something to do with understanding minds. Work from several laboratories has shown that children who are in some sense high on pretense tend to pass theory of mind tasks early (Aistonng & Jenkins, 1995; Lillard, in press; Taylor & Carlson, 1997; Youngblade & Dunn, 1995). Although one cannot tell what the direction of effects is, or even whether there is a third underlying variable mediating the relationship, there appears to be some link (Lillard, in press). Work in social development has repeatedly suggested that pretend play enhances social cognitive skills, and although some of those findings are tentative (Lillard, 1993a; Rubin, Fein, & Vandenberg, 1983), direct comparisons of the same children in pretense and nonpretense contexts show that children are more intensely involved in negotiations during pretense (de Lorimer, 1995; Howe, Petarakos, & Rinaldi, 1998). Further work should be done to explain these findings and illuminate exactly how pretending might help children understand others' minds.

REFERENCES


