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Five-year-old children's difficulty with false belief when the sought entity is a person

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Abstract

A total of 153 children (excluding those who erred on control questions), mainly 5 and 7 years of age, participated in two experiments that involved tests of false belief. In the task, the sought entity was first at Location 1 and then, unknown to the searching protagonist, it moved to Location 2. In Experiment 1, performance was well below ceiling in 5-year-olds when the sought entity was a person, and this contrasted with a task in which the sought entity was a physical object. Performance was especially inaccurate when the sought person moved of his or her own volition rather than when the sought person was requested to move by a third party. Interestingly, 5-year-olds were more likely to nominate Location 1 when asked where the searching protagonist would look first than when asked what he or she would do next. In Experiment 2, however, 5-year-olds also tended to nominate Location 1 following a question that included the word “first” even in a test of true belief—a patently incorrect response. Altogether, the results suggest that 5-year-old children have considerable difficulty with a test of false belief when the sought entity is a person acting under his or her own volition. This suggests that 5-year-olds' handle on states of belief is surprisingly fragile in this kind of task.

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Introduction

A considerable body of research conducted over the past two decades suggests that children begin to acknowledge false belief in an unexpected transfer task around the time of their fourth birthday (Wellman, Cross, & Watson, 2001). In the task, a sought entity is first in Location 1 and then moves to Location 2 without a searching protagonist's knowledge. Children age 4 years or above typically judge correctly that a searching protagonist will vainly search in Location 1, whereas younger children tend to judge that the searching protagonist will search in Location 2. Effectively, younger children seem to confuse their own knowledge (that the sought entity is in Location 2) with the searching protagonist's knowledge, thereby demonstrably failing to acknowledge false belief. The developmental progression toward making correct judgments has seemed so robust that some (e.g., Gopnik, 1993; Perner, 1991; Wellman et al., 2001) have proposed that children undergo a radical conceptual shift around the time of their fourth birthday. Indeed, Perner and Davies (1991) even suggested that at around 4 years of age, children acquire a theory of mind that is similar in form, if not content, to that of adults.

An alternative view proposes gradual change (e.g., Carpendale & Lewis, *in press*; Hala & Chandler, 1996; Mitchell, 1996). This is based on two kinds of evidence. One kind demonstrates success in acknowledging false belief before what we might have anticipated in the light of children's poor performance on a traditional test (e.g., Freeman & Lacohee, 1995; Lewis & Osborne, 1990; Mitchell & Lacohee, 1991; Robinson & Mitchell, 1995; Saltmarsh & Mitchell, 1998; Saltmarsh, Mitchell, & Robinson, 1995; Siegal & Beattie, 1991). Another kind of evidence demonstrates lingering difficulties with false belief well beyond 4 years of age. This phenomenon is the focus of the current study.

Most demonstrations of difficulty with false belief beyond 4 years of age use tasks that differ in form from the traditional test. For example, Mitchell, Robinson, Isaacs, and Nye (1996) revealed that even adults sometimes confuse their own knowledge with that of another person (see also Keysar, Lin, & Barr, 2003). In the study, participants were told about a protagonist, Kevin, who saw juice in a jug. He left the room and returned later with Rebecca, who announced that the jug contained milk. Observing participants were asked at this point whether Kevin believed the jug contained juice (as he saw) or milk (as he was told). The large majority judged that Kevin believed the jug contained juice, and perhaps this is not altogether surprising. However, in a comparison condition, a majority judged the opposite, that is, that Kevin believed the jug contained milk. In this condition, participants (but not the protagonist Kevin) were supplied with privileged information indicating that Rebecca poured away the juice and replaced it with milk. In other words, participants' judgments of what Kevin believed were profoundly affected by their own knowledge that the jug contained juice.

A study by Hulme, Mitchell, and Wood (2003; see also Robinson, 2003) also demonstrated difficulty in individuating between beliefs in children around 6 years of age. Children listened to a false belief story in which a thief stole George's watch while he was asleep. When George awoke, he set out to look for the thief, and observing 6-

year-old participants were asked to select a picture to show what George was thinking. The children themselves had privileged knowledge that the thief was a man with curly red hair, and they correctly acknowledged that George did not know this because he had been asleep. Nevertheless, they tended to select a picture of the actual thief in preference to a person who looked like a prototypical thief or an outline of a man containing a question mark. As with the adults in Mitchell et al.'s (1996) study, these children seemed to have difficulty in separating their own knowledge from George's knowledge (see also Apperly & Robinson, 1998; Russell, 1987).

Although these studies are noteworthy in demonstrating lingering difficulties in reasoning about beliefs, the form of the tasks differs from that of traditional tests of false belief. Therefore, it might be necessary to deviate from the form of a traditional task to reveal lingering difficulties. However, a study by Symons, McLaughlin, Moore, and Morine (1997) demonstrated difficulty on a test of false belief that had similar form to a traditional test, albeit with different content. In these authors' "animate" task, the sought entity was not an object that transferred from Location 1 to Location 2 but rather a person. Children around 5 years of age frequently nominated Location 2 as if they confused their own knowledge with that of the searching protagonist. This was significantly more common than in a task of similar form but where an inanimate object moved from Location 1 to Location 2. Interestingly, these authors proceeded to demonstrate that it was not animacy per se that counted. In a further condition called the "animate-external" condition, the sought entity was also a person, but this person moved from Location 1 to Location 2 under instruction from a third party. As with an object transfer, it was common for children to nominate Location 1. In other words, a tendency to nominate Location 2 was largely confined to a condition in which the sought person *decided* to move from Location 1 to Location 2.

Symons et al. (1997) explained the tendency to nominate Location 2 in the animate condition by saying that the volition of the sought entity somehow led children to underperform. Hence, these authors viewed the tendency to nominate Location 2 as an *error*. If they were right, this would undermine claims made about neat developmental trends in a false belief task of this particular form (e.g., Wellman et al., 2001). Given the apparent robustness of this trend, it is worth considering an alternative possibility. Perhaps nominating Location 2 did not signal failure or that children had made an error but rather that children were engaging in rational and sophisticated reasoning that merely gave a misleading impression of incompetence. Perhaps children credited the searching protagonist with sufficient understanding and familiarity with the sought person to *infer* that the sought person would move from Location 1 to Location 2. Indeed, Symons and colleagues unwittingly may have included a cue in their false belief story where it mentioned that Mother's search "takes quite a while" (p. 443). Children might have taken this as a clue available to the searching protagonist that Mother was unlikely to still be at Location 1. In that context, it would seem reasonable for the searching protagonist to think that Mother had gone to Location 2. If children did make this kind of attribution of inferential knowledge, it would seem remarkable in view of research suggesting that an ability to make such attributions is difficult to identify prior to 6 or 7 years of age (e.g., Sodian & Wimmer, 1987). In summary, then, either Wellman et al. (2001) over-

stated the robustness of 5-year-olds' accurate performance on a test of false belief or Sodian and Wimmer (1987) were wrong to deny that 5-year-old children are able to attribute inferential knowledge. There might also be other tenable explanations for distinctive performance on the animate task, but we highlight these two as standing in contradiction to each other.

The starting point for our research was to investigate the replicability of the tendency to nominate Location 2 in the animate test of false belief. We also examined whether the effect is robust with respect to variations in question wording. Symons et al. (1997) asked participants what the searching protagonist would do next. If their performance in the animate task is fragile and unstable, as Symons and colleagues suggested, performance might improve with a question that is known to help children on this form of false belief test; namely, we asked children in another condition where the searching protagonist would look first (Siegal & Beattie, 1991; Surian & Leslie, 1999). Would they be more likely to nominate Location 1 in that condition? If, in contrast, children rationally nominate Location 2 on attributing inferential knowledge to the searching protagonist, there is no reason to suppose that a test question including the word "first" would lead them to nominate Location 1; these children would think that nominating Location 1 is an incorrect response.

Experiment 1

Method

Participants

A younger group of 52 children (the "5-year-olds") were between 60 and 71 months of age ($M = 66$ months), and an older group of 51 children (the "7-year-olds") were between 84 and 95 months of age ($M = 89$ months). The participants were recruited from five schools and one summer playgroup in the East Midlands, United Kingdom. Two of the schools had a mainly working-class enrollment, whereas the remaining three schools and the playgroup had mainly middle-class enrollments. In terms of gender, 57 participants were male and 46 were female.

Design and procedure

The stories were based on Symons et al.'s (1997) "object," "animate," and "animate-external" vignettes. The object story was a regular unexpected transfer task (Wimmer & Perner, 1983). The animate story had a similar form except that the false belief centered on a person who decided to move from Location 1 to Location 2 (see Appendix B). The animate-external story was similar except that the person did not decide to move but rather was *instructed* to move from Location 1 to Location 2 (see Appendix A).

Lego and Playmobil figures were used to act out the stories. Two Playmobil drawers (one attached to a Playmobil television) were used as hiding locations in the object false belief stories. The animate story was based around a Lego house. The mother/father first visited the side of the house (Location 1) and then the back of

the house (Location 2) when looking for a watering can. The garden of the house had strategically placed Lego walls to make distinctive and separate areas: the front of the house (the starting location), the side of the house (Location 1), and the back of the house (Location 2). From any one of the areas, characters would not be able to see any of the other areas. The animate–external stories had two Lego changing rooms with a material front. These changing rooms were big enough to completely hide characters.

Children were asked questions to assess their comprehension, and these were followed by test questions. The comprehension questions asked about the initial location of the sought object/person and the final location. The test questions had two forms:

1. Show me what X [the searching protagonist] will do next.
2. Show me where X will look first.

Each child was presented with the three kinds of story in counterbalanced order. Half of the children received animate stories with female characters, and the rest received them with male characters. Half of the children were asked the test question in Form 1 (“Show me what X will do next”) following all three stories based on Symons et al. (1997), and the rest were asked the question in Form 2 (“Show me where X will look first”) following all three stories based on Siegal and Beattie (1991). The variation in the gender of the protagonists and the variation in form of the test question were factorially combined with the six levels of counterbalancing, generating 24 between-groups cells. The first participant was assigned to the first cell, the second participant to the second cell, and so on. The hierarchical organization of the cells ensured that the form of the question cycled most quickly, followed by the gender of the protagonists, followed by the order of the stories. In other words, for example, the first participant had a test question in Form 1, the second participant had the test question in Form 2, and so on.

Results

Five-year-olds

A total of 8 children failed one or more of the control questions, and after these were excluded from the sample, there remained 21 who had the “next” wording and 22 who had the “first” wording. Because the children who failed control questions might have had basic difficulties with comprehension of the stories, the ensuing analyses were performed exclusively on those who passed.

The comparisons of focal interest are among the three kinds of false belief story and between the two kinds of test question. The primary issue surrounds the replicability of Symons et al.’s (1997) finding that children around 5 years of age are less likely to nominate Location 1 when the sought item is actually a person who decided to move from Location 1 to Location 2. The right-most column in the top half of Table 1 displays a pattern that is consistent with these authors’ findings, based on combined data from the first and next wordings. Namely, children were significantly more likely to nominate Location 1 in the object task than in the animate task. A total of 16 children nominated Location 1 only in the object task, but 2 nominated

Table 1

Percentages and numbers of correct responses in three kinds of false belief task for the “next” and “first” test phrases in Experiment 1

Age and task	Phrasing of test question		
	Next ($n = 21$)	First ($n = 22$)	Combined ($n = 43$)
5-year-olds			
Object	95 (20)	91 (20)	93 (40)
Animate	43 (9)	77 (17)	60 (26)
Animate–external	67 (14)	95 (21)	81 (35)
	Next ($n = 26$)	First ($n = 25$)	Combined ($n = 51$)
7-year-olds			
Object	100 (26)	96 (24)	98 (50)
Animate	73 (19)	100 (25)	86 (44)
Animate–external	88 (23)	100 (25)	94 (48)

Note. Numbers of correct responses are in parentheses.

Location 1 only in the animate task: sign test, $\chi^2(1, n = 18) = 10.89, p < .01$. Children were also significantly more likely to nominate Location 1 in the animate–external task than in the animate task. A total of 11 children nominated Location 1 only in the animate–external task, but 2 nominated Location 1 only in the animate task: sign test, $\chi^2(1, n = 13) = 6.23, p < .05$. There was no significant difference between the object and animate–external tasks.

Turning to the other factor of focal interest, the wording of the test question, the top half of Table 1 suggests that this had an impact on the two animate tasks but not on the object task. A chi-square analysis was unable to detect an association between the question wording and the type of response children gave following the object story. In contrast, children were significantly more likely to nominate Location 1 when the question included “first” in the animate task, $\chi^2(1, n = 43) = 5.32, p < .05$, and in the animate–external task, $\chi^2(1, n = 43) = 5.88, p < .05$.

Comparison between the two age groups

A summary of data from the 7-year-olds appears in the bottom half of Table 1; no children failed control questions. Clearly, participants were at ceiling when the test question included the word “first.” When the question included “next,” children were at ceiling in the object task and were approaching ceiling in the animate and animate–external tasks. With this wording, children were significantly more likely to give a correct judgment in the object task than in the animate task. Seven nominated Location 1 only in the object task, whereas none nominated Location 1 only in the animate task: sign test, $\chi^2(1, n = 7) = 7.00, p < .01$. There was no significant difference between the object and animate–external tasks or between the animate and animate–external tasks.

Although the pattern of performance was similar for 5- and 7-year-olds, at least when the test question included the word “next,” 7-year-olds generally made fewer errors. Specifically with this question wording, the contrast between age groups was significant in the animate task, $\chi^2(1, n = 47) = 4.38, p < .05$, but not in the other two tasks.

Additional sample

Because some 7-year-olds nominated Location 2 in the animate task, it remained unclear whether there is a gradual developmental trend toward reaching full ceiling performance or whether some members of a sample of any age would nominate Location 2. To find out, we recruited an additional sample composed of 20 children (10 boys and 10 girls) between 96 and 112 months of age ($M = 103$ months). We presented only the animate task with the “next” wording given that it seemed reasonable to assume that these children would not have difficulty with any of the other conditions. All children passed the control questions, and all but 1 nominated Location 1 in response to the test question. Hence, the sample was at ceiling, but with a single exception.

Discussion

The results of Experiment 1 demonstrated the replicability of the effect reported by Symons et al. (1997). In general, 5-year-old children were significantly less likely to nominate Location 1 in the animate story than in the other two stories, and they were significantly less likely to nominate Location 1 than were 7-year-olds when presented with the animate story, at least when the test question included the word “next.” There are two competing explanations for this effect. The one that might be preferred by Symons and colleagues maintains that the animate task is especially difficult for children around 5 years of age and that they perform at a less sophisticated level in this task than in the other false belief tasks. An alternative explanation maintains that, on the contrary, children perform in a very sophisticated way in the animate task. It says that they effectively attribute the searching protagonist with the capacity to *infer* that Mother/Father moved from Location 1 to Location 2. So, when children judge that the searching protagonist will go to Location 2, they are not actually failing to handle false belief; rather, they are impressively attributing inferential knowledge to the searching protagonist.

The effect associated with the wording of the test question lends support to the first of these two explanations, as does the age trend. If the animate task was hard for children and they performed in a less sophisticated way than in the other false belief tasks, perhaps they could be assisted by something that is widely known to boost performance. A test question that contains the word “first” satisfies this purpose in a powerful way (e.g., Surian & Leslie, 1999), and accordingly, we found that children were more likely to nominate Location 1 in that condition. If, in contrast, children were sophisticatedly attributing inferential knowledge in the animate task, providing an aid to acknowledging false belief would be superfluous, and presumably any such intervention would have no effect. However, our results show strongly that there was an effect in both the animate and animate-external conditions; in other words, the effect occurred in conditions in which children were below ceiling in nominating Location 1.

Furthermore, if 5-year-olds nominated Location 2 because they were doing something sophisticated, it seems rather surprising to find that a large proportion of 7-year-olds nominated Location 1. This would suggest that 7-year-olds were being less

sophisticated than 5-year-olds, a rather unlikely possibility. The more plausible explanation, then, seems to be that the animate task is especially difficult for 5-year-olds. In summary, the findings associated with the wording of the test question and the findings associated with the age trend combine to offer compelling support for the interpretation preferred by Symons et al. (1997).

Experiment 2

The purpose of Experiment 2 was to seek further evidence relating to Symons et al.'s (1997) explanation for the tendency to nominate Location 2 in animate tasks by investigating the basis of the effect associated with test question wording. We pursued this goal by adding a true belief condition in Experiment 2. In this, the searching protagonist saw Mother/Father at Location 2 through a window. Because the searching protagonist had direct visual access, it would be *inappropriate* to attribute a false belief or inferential knowledge. Rather, on the basis of the searching protagonist's direct visual access, it is unequivocally correct to nominate Location 2 in a test of true belief. In that context, if children still nominated Location 1 in response to a test question that included the word "first," it would seem that this question is not promoting more sophisticated reasoning; rather, the question would seem like an artifact that leads or misleads children to point to the first location that Mother/Father visited, perhaps irrespective of any beliefs that might be at stake. By implication, this would raise the possibility that children nominated Location 1 in a test of *false belief* in the absence of mentalistic reasoning: They might have given the right answer for the wrong reason.

Method

Participants

We recruited 42 children between 60 and 71 months of age ($M = 65$ months) from two schools in the East Midlands. Both schools had mainly working-class enrollments. The mean age of the children was 65 months. In terms of gender, 17 participants were male and 25 were female.

Design and procedure

Children were presented with the animate (house) and animate-external (store) stories from Experiment 1. One of the stories was presented in a false belief version (as in the previous experiment), and one was presented in a new true belief version that was developed for the current experiment (see Appendix C). In the house story, the searching protagonist looked through windows to the back of the house and saw Mother/Father at Location 2. In the store story, the searching protagonist looked through a window in the changing room and saw Mother/Father in Location 2. Whether the animate story was presented first or second varied between participants. Likewise, whether the first story was in the version of false belief or true belief also varied between participants. The ordering of the story theme (animate or animate-external) and story version (true belief or false belief) were factorially crossed with each other.

Following each story, children were presented with the same questions used in Experiment 1 along with an additional check question:

Can X see Mother/Father in/at [Location 2]?

For half of the children, the test question employed the “next” phrasing, as in Symons et al.’s (1997) study, whereas the rest of the children had the “first” phrasing. In addition, half of the children had stories with female characters, whereas the rest had stories with male characters. The gender of the protagonists and the wording of the test question were factorially crossed with the other between-groups variables.

Results

After 3 children failed at least one of the control questions, their exclusion resulted in a sample of 19 children who were presented with a “next” test question and 20 who were presented with a “first” test question. As stated previously, the main purpose of this experiment was to investigate the basis of the effect associated with the wording of the test question. To begin, however, we confirmed that in the false belief condition, children were significantly more likely to give a “correct” judgment (Location 1) with the “first” wording than with the “next” wording. There was a significant effect associated with question wording when combining data from animate and animate–external stories: $\chi^2(1, n = 39) = 7.56, p < .01$. We then conducted an analogous analysis based on the true belief stories and also found a significant effect, *but in the opposite direction*: $\chi^2(1, n = 39) = 13.75, p < .001$. That is, children were significantly more likely to give a “correct” judgment (Location 2 this time) with the “next” wording than with the “first” wording.

We add to this picture by comparing between true belief and false belief, again combining over the two kinds of animate story. When presented with the “first” wording, 14 children gave a “correct” judgment only in a test of false belief, but none gave a “correct” judgment only in a test of true belief: sign test, $\chi^2(1, n = 14) = 14.00, p < .001$. Conversely, when presented with the “next” wording, 7 children gave a “correct” judgment only in a test of true belief, but 2 gave a “correct” judgment only in a test of false belief. The trend is in the direction of more “correct” judgments in true belief than in false belief, although the effect fell short of significance.

Altogether, the emerging picture from these analyses (Table 2) is that when asked where the searching protagonist would look first, children tended to nominate Location 1, which was deemed “correct” in the false belief condition but “incorrect” in the true belief condition. Conversely, when asked what the searching protagonist would do next, children tended to nominate Location 2, which was deemed “incorrect” in the false belief condition and “correct” in the true belief condition. Indeed, the tendency to nominate Location 1 following a “first” question in a false belief task (a “correct” judgment) was not significantly different from that in a true belief task (an “incorrect” judgment). A total of 5 children nominated Location 1 only in the false belief task, and 1 child nominated Location 1 only in the true belief task: sign test, $\chi^2(1, n = 6) = 2.67, ns$. Nevertheless, the tendency to nominate Location 2 following a “next” question in a true belief task (a “correct” judgment) was significantly more common than in a false belief task (an “incorrect” judgment). A total

Table 2

Percentages and numbers of correct responses in two kinds of true belief and false belief tasks for the “next” and “first” test phrases in Experiment 2

Task	Phrasing of test question	
	Next	First
False belief combined	57 (11), $n = 19$	95 (19), $n = 20$
Animate	40 (4), $n = 11$	90 (9), $n = 10$
Animate–external	75 (6), $n = 8$	100 (10), $n = 10$
True belief combined	84 (16), $n = 19$	25 (5), $n = 20$
Animate	88 (7), $n = 8$	30 (3), $n = 10$
Animate–external	82 (9), $n = 11$	20 (2), $n = 10$

Note. Numbers of correct responses are in parentheses.

of 9 children nominated Location 2 only in the true belief task, and 1 child nominated Location 2 only in the false belief task: sign test, $\chi^2(1, n = 10) = 6.4, p < .05$.

Although the main purpose of Experiment 2 was to investigate the basis of the effect associated with question wording, there was also an opportunity to further consider the replicability of the story theme effect (Table 2). We compared children whose false belief story was in the animate condition with children whose false belief story was in the animate–external condition, collapsing over all other factors. Data from the true belief condition were irrelevant in this case and, thus, were excluded from the analysis. It was more common for children to give a “correct” judgment in the animate–external condition than in the animate condition, but not significantly so. The failure to replicate Experiment 1 (and Symons et al., 1997) in this respect is probably due to the low power in the analysis, which is based on only half of the data in a between-groups contrast.

Discussion

The results from Experiment 2 strongly suggest that the test question with the “first” wording did not help children to reason about beliefs but rather in many cases merely led (or misled) them to nominate Location 1. This is consistent with the possibility that children’s reasoning in the animate tasks was unstable and vulnerable to interference from a leading question. Although the “first” test question strongly led children to nominate Location 1 and the “next” question led them to nominate Location 2, children were nevertheless demonstrably influenced by the status of the searching protagonist’s belief. For example, following a “next” question, children were even more likely to nominate Location 2 when the belief was true than when it was false.

General discussion

In replication of Symons et al. (1997), it seems that children were more likely to nominate Location 2 in an animate test of false belief than in a traditional object-

based test of false belief, as demonstrated in Experiment 1. They were also more likely to nominate Location 2 when the sought person in an animate task *decided* to move from Location 1 to Location 2 than when another person asked the sought person to move. This trend was apparent in both experiments, although it was significant only in Experiment 1; the statistical test in Experiment 2 had low power.

A novel finding from the current research is that children were more likely to nominate Location 1 in both kinds of animate false belief task when asked where the searching protagonist would look first (Experiments 1 and 2). However, children also tended to nominate Location 1 following such a question, even in a test of true belief, where the searching protagonist *saw* Mother/Father in Location 2. Does this suggest, contrary to two decades of research, that 5-year-old children generally lack an understanding of beliefs? Does it imply that they are merely cued by the question and give little consideration to the epistemic states of the protagonists? Clearly not, for children of this age are not led or misled by the question wording in an object-based test of false belief, as suggested by the results of Experiment 1 reported here as well as in Surian and Leslie (1999). Also, as mentioned previously, the epistemic state of the searching protagonist demonstrably had some effect, even in the animate tasks. Here, children were especially likely to nominate Location 2 in a test of true belief, more so than in a test of false belief, following a “next” test question.

The overall picture to emerge from our two experiments, then, is that 5-year-old children (and some 7-year-old children) have difficulty with the animate test of false belief. This difficulty was more severe in an object-based task than in an animate-external task, although performance was below ceiling in the latter. This interpretation seems preferable to one alternative, which maintains that children were not actually having difficulty with false belief; rather, they were doing something sophisticated that gave a misleading impression of incompetence. Specifically, children might have had a good reason to nominate Location 2. Perhaps they assumed that the searching protagonist had inferred that Mother/Father would decide to go to Location 2. In that case, presumably children would not be thrown by a question phrasing that is known to promote correct judgments, at least in a traditional test of false belief. The finding that children were strongly led by this question to nominate Location 1, irrespective of whether the task was about true belief or false belief, suggests that children’s handle on the beliefs at stake was unstable.

The results from this study are noteworthy in demonstrating the fragility of 5-year-old children’s fledgling grasp of beliefs. They belie the message conveyed by a meta-analysis of two decades of research into theory of mind (Wellman et al., 2001) that seems to convey that children acquire the concept of belief sometime around 4 years of age. We already knew that lingering difficulties can be demonstrated in special circumstances (e.g., Hulme et al., 2003; Keysar et al., 2003; Mitchell et al., 1996), but hitherto there has been scant evidence of difficulty when the form of the task is similar to that of a traditional test. Thus, even in a task that has the same form as the traditional task (Wimmer & Perner, 1983), it seems that children’s ability to apply mentalistic reasoning depends on the task content. Specifically, the scope of

application of belief attribution seems not to extend very well to circumstances where the sought entity is a person who moves of his or her own volition. Children might think that they lack sufficient information to make a belief attribution in this case and might even resort to guessing as a consequence.

The challenge now is to explain why a story about a person who decided to move from Location 1 to Location 2 is more difficult than when a person or an object moves from Location 1 to Location 2 as the result of the will of a third party. Symons et al. (1997) initially speculated that the effect depends on the sought person being the protagonist's caregiver, but they subsequently learned that a more general explanation was needed on finding that children also had difficulty when the sought entity was an anthropomorphized animal. Therefore, perhaps any explanation must focus on the sought entity being able to *decide* to move from Location 1 to Location 2. Intuitively, it seems that children might have attributed the searching protagonist with a level of sentience with respect to the sought character's decision. However, we have already argued against this kind of explanation that effectively credits child participants with an ability to attribute inferential knowledge to the searching protagonist.

Perhaps children despair at the level of unpredictability in estimating the whereabouts of another person given that people have volition and mobility. Accordingly, children may think that the prospects of accurate prediction are rather low and project this sentiment onto the searching protagonist. The consequence might be the apparently strategy-less and ad hoc mode of responding that we witness in the current study as well as in Symons et al. (1997). However, this explanation does not discriminate between animate and animate-external tasks, and although performance was below ceiling in both kinds of task, we need to explain why errors are especially common in the animate task. Clearly, the volition of the sought character is more salient in the animate story than in the animate-external story given that the sought character *decided* to move from Location 1 to Location 2 in the former. Perhaps this was sufficient to highlight the volition of the sought character along with the implication that his or her movements are rather unpredictable.

If this explanation is correct, it is interesting when considering that young children perhaps spend a fair amount of time pondering the whereabouts of other people (e.g., "Where has Mommy gone?"). Intuitively, one might expect this experience to encourage reflection on beliefs about the location of people, with the consequence that an understanding of the mind at an especially young age would have been evident in this context. Thus, it is surprising to find that the opposite seems to be the case.

In general, the current research provides encouragement to those who perceive value in exploring the larger developmental scope of an understanding of the mind. There is still much to learn about developments that occur beyond 4 years of age. It is probably the case that even by 5 years of age, children's handle on beliefs remains fragile and possibly fleeting. This can be demonstrated not only by varying the form of the traditional test but also by varying the content, as in the current study.

Appendix A. Example of object location false belief task: Next condition (Experiment 1)

Cathy is a 4-year-old girl. She entered a room and began to look for some toys. She first looked in the drawer underneath the television, and there were no toys in there, and then went to discover a marble in the top drawer of a chest over by the dog. She put the marble back inside the drawer and left the room, saying that she would come back and play with all her marbles together. [Pause] Now Cathy is gone. While Cathy is gone, a clown entered through a side door, discovered the marble in the top drawer by the dog, hid the marble in the drawer under the television, and left. [Pause] Cathy came back in the room with her other marbles.

“Hey, here is Cathy again! She is going to play with her other marbles and new marble!”

Control questions: Where is Cathy’s marble now? Where was Cathy’s marble first?

Test question: Show me what Cathy will do next. [Prompt if the participant fails to initiate a search: Where will Cathy look for the marble?]

Appendix B. Example of animate false belief task: First condition (Experiment 1)

Julie is a 4-year-old girl. She is doing some gardening with her mother in front of the house, and no one else is at home. After a while, her mother tells her that she is going to the side of the house, where the water tap is, in order to get the watering can and that she will be right back. Her mother goes to the side of the house to get the watering can, and Julie keeps playing. [Pause] Julie’s mother finds that the watering can is missing and has to look for it. She goes around to the back of the house and ends up on the opposite side. This takes quite a while. Julie wants to talk to her mother.

Control questions: Where is Julie’s mother now? Where did Julie’s mother go first?

Test question: Show me where Julie will look first. [Prompt if the participant fails to initiate a search: Julie’s mother has been gone a long time. Show me where Julie will look first.]

Appendix C. Example of animate–external true belief task: Next condition (Experiment 2)

Jennifer is a 4-year-old girl. She is with her mother at the clothes shop. Jennifer goes with her mother into this changing room to try on a shirt. Jennifer decides that she wants to try on a different shirt and goes back to the clothing rack to get it, telling her mother she will be right back to show her the new color. [Pause] Now Jennifer is gone. While Jennifer is gone, a caretaker enters and asks Jennifer’s mother whether she could move to the changing room over here so that he can clean the mirror in this one. Jennifer’s mother moves from this changing room. The caretaker cleans the mirror and then leaves. Jennifer comes back with her new shirt. Jennifer can see her mother in the second changing room through a window.

Control question: Can Jennifer see her mother in the second changing room?

“Hey, here is Jennifer again! She is going to show her mother her new shirt!”

Control questions: Where is Jennifer’s mother now? Where did Jennifer’s mother go first?

Test question: Show me what Jennifer will do next. [Prompt if the participant fails to initiate a search: Show me where Jennifer will look for her mother.]

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