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ABSTRACT

To assess young children's understanding of false belief, investigators often show them a familiar container, then demonstrate that it holds an object different from the one the children expected. The children are then asked what they originally thought the container held, and what another container will hold. Three-year-old children typically answer with the name of the unexpected object. This behavior is usually interpreted to mean that children cannot comprehend false belief. To test this interpretation, two experiments were conducted. In the first experiment, 3-year-old children's answers to belief questions did not differ between conditions in which the questions employed the word "think" and conditions in which a nonsense word replaced "think." The second experiment found that, unlike 3-year-olds, 4-year-old children responded differently to belief questions containing "think" than to questions in which a nonsense word was substituted. Results from these experiments seem to demonstrate that 3-year-old children may not understand the relevant sense of the word "think," and therefore, that the common version of the paradigm of the familiar container and the unexpected object is not suitable for assessing their understanding of false belief. Contains 21 references. (Author/MM)

Assessing False Belief Attribution in Preschool Children: The Validity of the Unexpected-Object/Familiar-Container Paradigm

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Abstract

To assess young children's understanding of false belief, investigators often show them a familiar container, then demonstrate that it holds an object different from the one the children had expected it to hold. They then ask the children what they had originally thought the container held, and what another will think. Three-year-olds typically answer with the name of the unexpected object. This behavior is usually taken to suggest that the children cannot comprehend false belief. Lewis and Osborne (1990) reported, however, that when the temporal reference of the belief questions is emphasized, 3-year-olds answer them as if they did understand false belief. In Experiment 1, we found that 3-year-olds' answers to the belief questions do not differ between conditions in which the questions employ the word, "think," and conditions in which a nonsense word replaces "think." Moreover, we were unable to replicate Lewis and Osborne's finding that emphasizing temporal reference alters children's pattern of responding. In Experiment 2 we found that, unlike 3-year-olds, 4-year-olds respond differently to belief questions containing "think" than to questions in which a nonsense word is substituted for "think." We argue that because our method is capable of detecting response differences where they are known to exist, it ought also to have detected such differences among 3-year-olds, had those differences been present. Since it did not, we concluded that 3-year-olds may not understand the relevant sense of the word, "think," and that therefore the common version of the familiar-container/unexpected-object paradigm is not suitable for assessing their understanding of false belief. We also concluded that since the procedure itself appears to be invalid, the effects upon it, if any, of variations in temporal reference are moot.

Assessing False Belief Attribution in Preschool Children: The Validity of the Unexpected-Object/Familiar-Container Paradigm

Presently there is some disagreement as to when and how children's knowledge about belief develops. By age 2 they know quite a lot about mental states; they employ internal-state language (Bretherton, McNew, & Beeghly-Smith, 1981); they distinguish "real" from "pretend" (Leslie, 1982, 1988); and they know a good bit about how physical circumstances affect others' perception of objects (Flavell, Everett, Croft, & Flavell, 1981; Yaniv & Shatz, 1988). Except for two lines of research, however, most reports suggest that it is not until late in the fourth or early in the fifth year that children understand belief well enough to use their knowledge of an actor's false belief(s) to predict his or her behavior (Wellman, 1985; 1991; Wimmer & Perner, 1983). Those who think this kind of knowledge exists in the form of something like a scientific theory therefore often date the emergence of a fully-articulated theory of mind relatively late in the preschool years -- sometime in the fifth year (Forguson & Gopnik, 1988; Moses, in press; Moses & Flavell, 1990; Wellman, 1991).

One line of research that challenges this "late onset" view of the acquisition of a theory of mind emerges from Chandler's laboratory. Chandler, Fritz, and Hala (1989) found that even 2 1/2-year-olds appear to know how to manipulate the behavior of others by engendering false beliefs. In a hide-and-seek game, their children, apparently intending to mislead a competitor, destroyed true evidence and fabricated false evidence as to the hiding place of a target object. Subsequently, in a better controlled replication, Hala, Chandler, & Fritz (1991) reported that 3-year-olds display deceptive-seeming behaviors more frequently when the task is to deceive than when it is to cooperate, just as they should if they know how their deceptive acts influence the beliefs and behaviors of others.

Other reports, however, have not been so sanguine about the deceptive abilities of 2- and 3-year-olds. Sodian (1991), for example, asked young children either to help another find an object by pointing out its location, or to hinder another's finding attempt by pointing to an incorrect location. Sodian found that children under 3 1/2 years "...consistently [failed] to deceive the competitor under even very conducive conditions" (p. 173). In addition, Speer, Sullivan, and Smith (1992) conducted a study that contrasted the hiding game of Chandler et al. with a similar, cooperative situation in which no deception was called for, and in which the target object was always visible to the child. Their 2 1/2-year-olds exhibited as much seemingly deceptive behavior in the cooperative as in the hiding situation, whereas their 4-year-olds reserved deceptive acts for the situation where they were appropriate.

The second line of research that challenges the "late onset" view was reported by Lewis and Osborne (1990). As had Chandler et al. (1989), these investigators argued that the linguistic complexity inherent in previous assessments of young children's knowledge of false belief and its consequences resulted in an underestimate of their capabilities. Much research on false belief attribution has employed a "familiar-container/unexpected-object" paradigm (e.g., Perner, Leekham, & Wimmer, 1987; Moses & Flavell, 1990; Moses, in press). In this procedure children are first shown a familiar container and are asked what they think it contains; they almost invariably answer that it contains what such containers usually hold -- candy in a candy box, crayons in a crayon box, and so on. Then they are shown that it contains an unexpected object, and they are asked what they had thought it contained, and what a naive observer will think it contains. If they answer with the name of the expected object -- candy or crayons, for example -- they are credited with understanding false belief. If they answer with the name of the actual, unexpected contents, however, they are assumed to lack the ability to attribute false belief. Most such studies have found that children under about 4 years of age have great difficulty reporting their own previously-held false belief, and even greater difficulty reporting another's likely false belief. Lewis and Osborne argued, however, that their difficulty is with interpreting

the temporal reference of the belief questions, not with understanding the nature and consequences of false belief.

To test their hypothesis, Lewis and Osborne (1990) manipulated temporal reference in the crucial questions. In their "Standard" condition they asked, "What (did you/will another) think is in the box?" In two variant conditions they added temporal reference phrases to the ends of the questions. In one condition they appended the phrase, "...when the top was still on it?"; in the second condition they added the phrase, "...before I took the top off?" Consistent with their hypothesis, Lewis and Osborne found that the majority of children under 4 answered the "Before" questions correctly, whereas young children in the other two groups performed as poorly as had children in most previous research.

We believed, however, that other factors might have accounted for Lewis and Osborne's (1990) result. Consistent with Perner's (1991) suggestion, we thought that 3-year-olds may not understand the word, "think," in the sense of "reporting a misconception about reality." Instead, as young children have often been found to do (cf. Carey, 1978; Shatz, 1977; Speer, 1984), they may have ignored the problematic word and created for themselves a comprehensible question they could answer: "What was in the box?" In the "Standard" and "When" conditions of Lewis and Osborne's study they may have answered this question by naming the unexpected item they had just seen in the box, thus appearing unable to report false belief. The "Before" condition," however, may have focussed the children's attention on the origins of the box, causing them to report its original contents, and thus to seem to be reporting false belief.

To evaluate our alternative hypothesis, we tested four groups of 3-year-olds. Two groups received the Lewis and Osborne (1990) "Standard" and "Before" questions, respectively. The remaining two groups received the same questions, but with a nonsense word substituted for the word, "think." If our hypothesis were correct, we expected the children to name the actual, unexpected contents of the container in both the original and nonsense versions of the "Standard" condition, and to name the original, expected contents of the container in both the original and nonsense versions of the "Before" condition.

EXPERIMENT 1

Method

Subjects

Ninety-nine 3-year-olds (range: 3;0 to 3;11; mean: 3;7) participated in the study, including 53 girls and 46 boys. All the children attended day care centers or preschools in one of two small towns in eastern Texas. An additional 51 children were dropped from the study, 29 because of their failure to answer one or both control questions correctly (see below), 11 because of experimenter error, 9 because of refusal to continue participation, and 2 because of failure to provide interpretable answers to the test questions.

Materials

Materials included a child's toothbrush and a large Crayon box.

Procedure

The children were tested individually by the second author in a quiet corner of their respective center or school. They were first asked to examine the closed Crayon box briefly. Then they were asked the first control question: "What do you think is in the box?" After they had answered, the experimenter showed them that the box actually contained a toothbrush, returned the tocthbrush to the box, and closed the lid. She then asked the second control question, "Can you remember what's inside the box?" As noted above, children were excused from further testing if they answered either of these control questions incorrectly.

The children were then randomly assigned to one of four groups. Children in the Standard/Think group were asked, "What did you think was in the box? Upon answering, they were told that the experimenter was going to show the box to one of their friends, and they were asked, "What will your friend think is in the box." Children in the other three groups were treated identically, except that the phrasing of the questions was changed as follows:

Standard/Lart group -- the nonsense word "lart" (pretested among 3-year-olds for phonetic discriminability from "think") was substituted for "think;"

Before/Think group -- the phrase, "...before I (took/take) the top off?" was appended to each question;

Before/Lart group -- the phrase, "...before I (took/take) the top off?" was appended AND "lart" was substituted for "think."

The two test questions were always presented in the same order, with the self-attribution question preceding the other-attribution question. If children answered either of the questions, "I don't know," they were given a forced choice of answers. In these cases the order of the forced-choice alternatives was varied at random.

Results and Discussion

Children's responses to the two questions are shown in Table 1. Inspection of this table reveals that the great majority of all four groups named the unexpected object (the toothbrush) in answer to both questions. Log-linear analyses of the responses to each question confirmed this interpretation. For both questions, the most parsimonious model included only an effect of "response," confirming the significance of children's tendency to name the unexpected object in all conditions. Results for this effect are as follows: Self-Attribution Question: $\chi^2(1) = 26.59$, $p < .001$; Other-Attribution Question: $\chi^2(1) = 36.60$, $p < .001$. No other main or higher-order effects were significant.

Insert Table 1 about here

These results are consistent with our hypothesis about children's failure to understand the relevant sense of "think." The children's responses did not differ between conditions in which "think" was included in the questions, and those in which it was replaced by a nonsense word. They are not consistent with our expectations about the effect of temporal emphasis, however. Children in the two "Before" groups responded no differently from children in the "Standard" groups. As a consequence, the data exhibit no significant differences in children's patterns of response between any of the experimental groups. Before further interpreting the data, therefore, we wished to be sure that our method was capable of detecting between-group differences where they are known to exist. For this reason, we next replicated the Standard/Think and Standard/Lart conditions among groups of 4-year-olds.

EXPERIMENT 2

Method

Subjects

Forty-six 4-year-olds (range: 4;0 to 4;11; mean: 4;8) participated in the study, including 25 girls and 21 boys. All the children attended day care centers or preschools in one of two small towns in eastern Texas. An additional 4 children were dropped from the study, 2 because they had previously participated in Experiment 1, and 2 because they failed to answer one or both of the control questions correctly.

Materials

Materials again included a child's toothbrush and a large Crayon box.

Procedure

The children were randomly assigned to two groups, the Standard/Think group and the Standard/Lart group. The procedure was identical to that followed with the equivalent groups in Experiment 1.

Results and Discussion

The data are shown in Table 2. Inspection of this table reveals that the majority of children in the Standard/Think group correctly chose the original, expected object (crayons) in answer to the self-attribution question, and many of these children also chose that answer for the other-attribution question. In contrast, like the 3-year-olds in Experiment 1, the large majority of children in the Standard/Lart nonsense word condition chose the actual, unexpected object (toothbrush) in answer to both questions. Separate log-linear analyses of the data from the self- and other-attribution questions confirms the existence of a significant difference in response patterns between the Standard/Think and Standard/Lart groups. For the self-attribution question the analysis produced $\chi^2(1) = 4.44$, $p < .05$; for the other-attribution question, $\chi^2(1) = 3.89$, $p < .05$.

Insert Table 2 about here

The results of this experiment thus confirm that our experimental method is capable of detecting a difference in response patterns between groups where such a difference is known to exist. It also confirms that even the older and more sophisticated 4-year-olds are prone to respond with the name of the unexpected object when the question includes a nonsense word.

General Discussion

Given that our experimental method can detect between-group differences in response patterns where they are known to exist, it seems reasonable to suppose that it might have detected such differences in Experiment 1, had such differences existed among the 3-year-olds. Evidently they did not. The 3-year-olds thus appear not to discriminate between questions containing the word "think," and questions containing the nonsense word, "lart." In contrast with Lewis and Osborne's (1990) result, neither do they appear to discriminate between the "standard" question, and the temporally emphasized "before" question.

The former finding urges the conclusion that the common version of the unexpected-object/familiar-container paradigm is not suitable for assessing what 3-year-olds know about belief. Since they respond to belief questions no differently from the way they respond to nonsense questions, we cannot be sure they understand the belief questions. It is possible that, like the 4-year-olds of Experiment 2, the younger children do understand what it means to ask, "What did you think was in the box?," but unlike the older children, they respond incorrectly because they genuinely misunderstand false belief. It is equally possible, though, that, as Perner (1990) has argued, they simply don't know the refers-to-a-previously-held-but-incorrect-belief sense of "think," and are assimilating the unknown word to a comprehensible question schema, as both the 3-year-olds and the 4-year-olds in the nonsense word condition seem to have done.

We do not know why we failed to replicate Lewis and Osborne's (1990) finding that emphasized temporal reference tends to cause 3-year-olds to respond with the name of the original, rather than the unexpected, object. Undetected variations in subject population or procedure may have had an unexpected influence upon our respective outcomes. We note, however, that

other attempts to emphasize temporal reference (e.g., Gopnik & Astington, 1988; Moses, in press; Moses & Flavell, 1990) have been no more successful than was our own procedure in varying children's response patterns. We note further, moreover, that since our results call into question the validity of the paradigm, response variations due to wording changes cannot be interpreted as Lewis and Osborne suggested. Even if the 3-year-olds in Experiment 1 had more often responded with the name of the original contents of the container in the temporally emphasized conditions, their equation of "think" questions with nonsense questions would have rendered that elevated performance level uninterpretable.

Astington & Gopnik (1991) have suggested that one productive direction for theory of mind research would be to explore the environmental conditions that may facilitate or retard the emergence of a theory of mind in young children. In order to do so, one needs to know when in development the greatest variation in possession of mind-theoretic abilities occurs. Based on our reading of the prior research, and on the present study, we believe that crucial period extends from about the third birthday until about age 4;3. Our explorations of environmental factors related to theory of mind emergence are thus spanning those ages.

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TABLE 1

Experiment 1: Number of Children Naming Unexpected, Original, or Other Object.

Group	Self-Attribution			Other-Attribution		
	Unexpected	Original	Other	Unexpected	Original	Other
Standard/ Think	20	4	0	21	3	0
Standard/ Lart	18	7	0	20	5	0
Before/ Think	20	4	1	23	2	0
Before/ Lart	17	7	1	18	6	1

TABLE 2

Experiment 2: Number of Children Naming Unexpected, Original, or Other Object.

Group	Self-Attribution			Other-Attribution		
	Unexpected	Original	Other	Unexpected	Original	Other
Standard/ Think	7	16	0	11	11	1
Standard/ Lart	15	8	0	16	4	3

Author Notes

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