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ABSTRACT

In a study investigating the hypothesis that verbal paraphrase and explanation tasks account for part of the difficulty that young children have with tests of metaphor comprehension, 32 six-year-old children were read short stories that ended with metaphorical sentences. Half of the children were asked to paraphrase the metaphorical sentences while the other half were asked to act them out with toys in a real world environment. The children in the enactment group produced more correct interpretations of the sentences than did the children in the paraphrase group. These results confirm the hypothesis that a paraphrase task underestimates young children's understanding of metaphor. (Tables comparing children's responses in the two groups are appended.) (Author/MM)

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Technical Report No. 313

# TESTING THE METAPHORIC COMPETENCE OF THE YOUNG CHILD: PARAPHRASE VERSUS ENACTMENT

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## Abstract

This experiment investigated the hypothesis that verbal paraphrase and explanation tasks account for part of the difficulty that young children have with tests of metaphor comprehension. In this experiment first grade children were read short stories which ended with a metaphorical sentence. Half of the children were asked to paraphrase the metaphorical sentences while the other half was asked to act them out with toys in a real world environment. The children in the enactment group produced more correct interpretations of the metaphorical sentences than the children in the paraphrase group. These results confirm the hypothesis that a paraphrase task underestimates the young child's understanding of metaphor.

# Testing the Metaphoric Competence of the Young Child: Paraphrase versus Enactment

It has been a consistent finding in the developmental literature on metaphor comprehension that children below 10-12 years of age have great difficulty in explaining the meaning of metaphorical uses of language. Several studies have shown that children tend to provide mostly literal interpretations of metaphors when asked to explain or paraphrase them (e.g., Ash & Nerlove, 1965; Cometa & Eson, 1975; Winner, Rosenstiel & Gardner, 1976). This finding has reinforced the belief that young children cannot understand metaphorical uses of language.

Much of the developmental research on metaphor comprehension during the last several years has tried to identify the factors that make metaphor comprehension difficult for young children. Some investigators have focused on the nature of the nonliteral comparison implicated in the metaphorical statement. For example, Gentner and Stuart (1983) argue in their paper that children find it easier to understand nonliteral comparisons based on attributional similarity than to understand those based on relational similarity (see also, Billow, 1975). Dent and Ledbetter (1983) note that children do better when comparing literally dissimilar "events" than when comparing literally dissimilar objects. Gardner and Winner (1978), and Cicone, Gardner and Winner (1981) have argued that children find metaphors involving abstract psychological properties (e.g., The

lawyer was a bulldozer) harder to understand than metaphors based on physical similarity (e.g., The fat man was a balloon), and so on.

Our own research, on the other hand, has tended to focus on the nature of the metaphor comprehension task (Reynolds & Ortony, 1980; Vosniadou & Ortony, 1983; Vosniadou, Ortony, Reynolds, & Wilson, in press). Our results suggest that children's difficulties in comprehending metaphorical language often arise from factors unrelated to metaphor per se. Such factors are limited knowledge of the world, limited knowledge of the language, difficulty in creating an appropriate context for interpreting metaphorical language, and difficulty in providing verbal explanations of metaphors. It is on this last point, the difficulty of providing verbal explanations of metaphorical uses of language, that this paper focuses.

In a series of experiments which systematically manipulated both the complexity of metaphoric inputs and the contexts in which they occurred, Vosniadou et al. (in press) showed that there are some circumstances under which even 4-year-old children appear to be able to understand metaphorical uses of language. These experiments employed an "enactment" paradigm to test metaphor comprehension. In the enactment paradigm children received a series of short stories, each of which ended with a metaphorical sentence. The children acted out the stories using toys in a specially constructed "toy world." Metaphor comprehension was assessed on the basis of the children's

enactments. It was argued that the enactment task provides a better measure of metaphor comprehension than paraphrase and explanation tasks. The purpose of the present study was to test this claim.

The enactment paradigm was developed because paraphrase and explanation were considered to be poor indices of metaphor comprehension. Insofar as they require the ability to reflect on one's comprehension, these measures may impose cognitive demands in excess of those required for comprehension alone (Ortony, Reynolds, & Arter, 1978). Thus, although adequate paraphrase shows successful metaphor comprehension, inadequate paraphrase cannot be taken as evidence of failure to comprehend. Some investigators have used multiple choice tasks which reduce the metacognitive requirements of the comprehension task. Presumably for this reason, children have been found to do better in multiple choice tasks than in tasks in which they must explain the meaning of the metaphor (Winner, Engel, & Gardner, 1980). However, as with all multiple choice tasks, there is a general problem of validity in that the ease of the task is largely dependent on the choice of foils. In metaphor comprehension, as in other domains, there is no objective way to determine what the characteristics of the foils should be. A related problem is that multiple choice tasks afford little opportunity to discover what a child might be doing when he or she is attempting to

understand a metaphor because the child is not the initiator of an interpretation.

In addition, two aspects of the enactment paradigm may have facilitated metaphor comprehension relative to verbal comprehension tasks. The first has to do with the fact that in the enactment paradigm, children did not just act out the metaphorical sentence, but acted out the entire story in which it occurred. Acting out a story forces the child to process the story's content, making it more likely that this content will be used to understand the metaphor. Research in language comprehension has shown that young children often find it difficult to process verbal information in experimental settings (Markman, 1977; Paris & Lindauer, 1976). Having children act out the stories helps them process the content better. Second, the presence of a toy-world environment itself may have facilitated comprehension. The toy world created a situational context, in addition to the linguistic one provided by the story, which may have further restricted possible interpretations of the metaphors, albeit in a ecologically realistic way.

These were some of our reasons for supposing that the enactment paradigm provides a more accurate measure of metaphor comprehension than do scores on a paraphrase task for young children. In the present experiment this supposition was tested by asking 6-year-old children to demonstrate their comprehension of metaphorical sentences (which occurred in the context of a short story) either in an enactment task or in a paraphrase task.

Six-year-old children were selected to participate in this study because previous research (Vosniadou, et al., in press) and pilot studies indicated that testing six-year-olds would be unlikely to produce ceiling or floor effects with either task.

## Method

Subjects. The subjects were 32 six-year-old children, half boys and half girls (mean age 6.10), attending a rural elementary school.

Design and materials. The design was a 2 (task type: enactment vs. paraphrase) x 2 (sentence type: metaphor vs. simile) factorial design. The materials consisted of seven short stories each of which concluded with a metaphorical sentence describing an action. For half of the children the target sentences were expressed as metaphors and for the remaining half the same sentences were transformed into their corrdsponding similes. The stories were from 90 to 100 words in length and described situations intelligible to young children. The following is an example of one of the stories:

> Sally was worried about her first day at a new school. She was a very shy girl and was frightened about meeting a lot of new children and teachers. After breakfast, her mother took her to school in the car. When they got there, Sally got out of the car and stood outside the large schoolyard. She looked at the children playing inside. Then she looked

at the big school and she got very scared. Sally was (like) a bird flying to her nest.

Half of the children were randomly assigned to the paraphrase task and half to the enactment task. In the enactment task the children were asked to act out the stories using toys in a specially constructed "toy world" environment. The toys were set up on a 4' x 5' rectangular board. They consisted of seven miniature buildings placed on the long sides of the board, and one center piece placed in the center of the board, facing the child. Only the center piece changed from one story to the other. The seven side buildings were the same in all the stories. Some of these materials are shown in photograph 1. Literal toy referents for the words used metaphorically were not provided (i.e., there were no toy "birds" or "nests").

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Insert Photograph 1 about here.

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Procedure. All children were tested individually and all sessions were audio taped. In the enactment task the children heard the stories and were asked to use the available toys to act out what they thought the story's ending meant. If the children did not know how to enact the target sentence it was read for a second time. All enactments were recorded on a map that corresponded to the story in question, and all relevant verbalizations were noted.

In the paraphrase task the children heard each story twice (in the absence of the toy world environment) and were then asked to retell it. After retelling each story, the target (metaphorical) sentence was read again and the children were asked to explain what that sentence meant.

Scoring. Paraphrases and enactments were scored by two independent judges on the basis of the experimenters' notes and the transcripts of the audio taped sessions. There was 98% agreement on the enactments and 94% agreement on the paraphrases. All instances of disagreement were resolved after a brief discussion.

Two scoring systems were developed, one to score the children's spontaneous recalls of the metaphorical sentences in the paraphrase task, and another to score the children's solicited paraphrases and enactments in the paraphrase and enactment tasks respectively. The following target response categories were used to score the children's spontaneous recalls of the metaphorical sentences in the paraphrase task:

(1) No mention of the metaphorical sentence covered those cases where children ignored the metaphorical sentence completely.

(2) Complete or partial repetition of the metaphorical sentence covered those cases where a metaphorical sentence was fully or partially repeated without changes.

(3) Incomplete or inappropriate paraphrase of the metaphorical sentence covered those cases where an attempt was made to spontaneously paraphrase the sentence but that attempt was either incomplete or incorrect.

(4) Correct paraphrase of the metaphorical sentence covered the cases where the children provided correct spontaneous paraphrases of the metaphorical sentences.

The enactments and the post-recall (solicited) paraphrases of the metaphorical sentences in the enactment and paraphrase tasks were scored using the following categories:

(1) No response covered those cases in which the child failed to respond.

(2) Inappropriate responses covered those cases in which children performed actions or provided explanations unrelated to the meaning of the metaphorical sentence. For example, if, given the sentence, Sally was a bird flying to her nest the child made Sally walk to the toy store or said that Sally went to buy a toy, the response was coded as an inappropriate one.

(3) Literal responses covered those cases in which children enacted or paraphrased a metaphorical sentence in a literal way. For example, if given the sentence "Sally was a bird flying to her nest," children made Sally fly to a pretend nest somewhere, or explained it to mean that Sally flew to a nest, the response was coded as

literal. This category was also used to code magical-literal responses, as when, for example, a child asserted that Sally had turned into a bird. Such magical-literal responses will be discussed in more detail later.

(4) Composite responses covered the cases where enactments or paraphrases were partially correct, as when, for example, children made Sally fly (instead of run) to her mother in the car, or said that the sentence meant that "Sally flew to the car" or "ran to the nest." These cases were scored as composite responses because they represented only partially correct interpretations.

(5) Correct responses were those actions or explanations which were consistent with the meaning of the nonliteral sentences. Thus, if a child made Sally run to the car or said that the sentence meant that "Sally ran to the car or back to her house," their response was coded as correct.

## Results

The children's elicited responses in the paraphrase and enactment tasks were compared first. The proportions of responses in the various response categories for the paraphrase and enactment tasks appear in Table 1. A 2 (task type: enactment vs. paraphrase) x 2 (sentence type: metaphor vs.

simile) analysis of variance was performed on the proportions of correct responses. Because the data were of a proportional

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Insert Table 1 about here.

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nature an arc sine transformation was applied in this analysis and in subsequent ones. The analysis showed a main effect for task type, $F(1,28) = 5.49$, $p < .02$, which was due to the fact that there were more correct responses in the enactment task than in the paraphrase task. The main effect for sentence type was not significant. The difference between the two tasks in all other response categories was mainly in the literal responses. There were more literal responses in the paraphrase task than in the enactment task, both for metaphors and for similes.

The effect for task type was further explored using a loglinear analysis (Feinberg, 1980). This analysis showed that a model which included only the main effect for task type did not fit the data as well as a model which included an interaction between task type (enactment vs. paraphrase) and two levels of the response variable (correct vs. literal responses). As can be seen in Table 1, correct responses decrease but literal responses increase when the enactment and paraphrase tasks are compared. A model which included this hypothesized interaction fitted the data very well, $x2 \geq 10.28$, with $df = 1$, $p > .10$ (tested against lack of fit). The fit of this model was tested against the

responses for each individual story. The model fitted all but two stories.

Finally, the children's spontaneous recall of the metaphorical sentences (i.e., the targets) in the paraphrase condition was examined. The proportion of responses in the various target recall categories for the metaphorical sentences in the paraphrase task is shown in Table 2. A one way analysis

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Insert Table 2 about here.

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of variance was performed on two of the four dependent measures: the proportions of spontaneous correct paraphrases and the proportions of complete or partial repetitions of the metaphorical sentences. These two dependent measures were selected because they represented the most dramatic differences. The analysis of variance showed an overall main effect for sentence type (metaphors versus similes) $F(2,14) = 7.19$, $p < .01$. This effect was significant only in the case of complete or partial repetitions, $F(1,14) = 14.88$, $p < .01$, but not in the case of spontaneous paraphrases, $F(1,14) = 3.00$, $p < .07$. As can be seen in Table 2, similes were more frequently repeated without change than were metaphors whereas metaphors were more frequently spontaneously paraphrased than were similes.

## Discussion

The results of this experiment are consistent with the hypothesis that young (six-year-old) children find it easier to

interpret metaphorical sentences in an enactment task than in a paraphrase task. As mentioned in the Introduction, there are three possible reasons why the enactment task might be easier than the paraphrase task. First, acting out the metaphorical sentences does not impose additional metacognitive requirements on the comprehension task. Second, acting out the stories makes it more likely that the children will process the information contained in these stories and thus that they will use this information to form appropriate hypotheses about the meaning of the metaphorical concluding sentence. Finally, the "toy-world environment" provides a situational context which further restricts the range of possible interpretations of the metaphorical sentences, making it more likely that the children will interpret those sentences correctly. More research would be needed to distinguish the possible differential effects of these factors on the comprehension process.

An example that illustrates some of the difficulties children had with the paraphrase task is the following. One of the stories was about an ill-behaved circus elephant, Jack. The story ended with the metaphor "Jack was a child being carried to his room." In the enactment condition the elephant's cage was included as part of the circus setup (together with a few other cages), and although several houses were also present, none of the children failed to put the elephant in his cage. However, this was not the case in the paraphrase condition, in which

children rarely spontaneously produced a paraphrase of "room" or of "carried." Even when they were further questioned and asked to explain the sentence, few were able to say that the elephant was taken to his cage (or something similar). Most became more perplexed upon further questioning, some to the extent of doubting whether Jack was an elephant at all (as opposed to a child). This example shows some of the problems involved in using paraphrase as a measure of comprehension. Presumably, six-year-old children realize that circus elephants do not live in real rooms. However, perhaps because they did not know where elephants do live, or if they did, because they found it hard to bring this knowledge to bear on the task at hand, or to express this knowledge verbally (they did not know or did not think of words like "cage," "tent," etc.), the children found it difficult to paraphrase this sentence. In the enactment task, an appropriate situational context was always present and the children only needed to identify suitable elements in it. It might be argued here that the enactment situation oversimplifies the comprehension task, particularly in the absence of literal toy referents for the words used figuratively. However, we believe that the enactment situation is a more accurate representation of comprehension as it occurs in ordinary communicative situations, where there is not only a linguistic context but also a situational context, a context which normally includes the implied but not the literal referents of the terms used metaphorically. Such findings, however, do raise the issue

of how dependent the young child's comprehension of metaphor (and of language in general) is on the situational context.

Not only did the children produce fewer correct responses in the paraphrase task, they also produced more literal interpretations of the metaphorical sentences including more magical-literal responses. These are responses in which, given, for example, the sentence "Sally was a bird flying to her nest" children claimed that a bird flew to its nest, either forgetting about Sally, or maintaining that she had inexplicably turned into a bird. Thirteen out of the twenty responses in the metaphor paraphrase condition were of this kind. Yet, these responses all came from the metaphor condition in the paraphrase task. In previous enactment experiments some children produced magical-literal interpretations of metaphorical sentences when asked to explain their enactments verbally, but these were rare. Apparently, the fact that human-like figures were provided in the enactment task made the literal enactments of the first part of the sentence, "Sally was a bird," unlikely. In the case of the similes, the "like" made it explicit that a comparison rather than a predication was intended, again rendering the magical-literal response unlikely.

One question that the data cannot answer concerns the finding that the expected increase in the number of correct responses from the paraphrase to the enactment task did not occur in two of the seven items. It is interesting to note that in

both cases the metaphorical sentences with which the stories concluded were the ones that represented the most improbable outcomes of their stories. In previous experiments (Vosniadou et al., in press), the probability of deriving the meaning of the metaphorical sentence from contextual information alone had been calculated by asking the children to act out their endings to the stories prior to hearing the metaphorical sentence. It is possible that the absence of the "toy-world environment" in the paraphrase condition increased the predictability of the less probable metaphorical sentences. Since the children were not asked to provide their own endings to the stories in the paraphrase task, we do not know how predictable the ideas expressed by the metaphorical sentences were in the absence of the situational context provided by the "toy world." Another possibility is that the children felt more compelled to provide explicit explanations of the less probable than the more probable metaphorical sentences because their meaning was so different from what they expected. Children often seemed to take the meaning of the metaphorical sentence for granted, particularly when it was a simile. This proposal, however, does not explain why the less probable metaphors were found harder to enact than to paraphrase, except if we want to argue that the children found it difficult to perform actions not invited by the context. Perhaps the paraphrase task encourages explanation of relatively improbable events while the enactment task discourages their

enactments. Clearly, more research would be needed to sort all this out.

Finally we should comment on some of the differences between metaphors and similes. While the number of correct responses was greater for similes than for metaphors in the enactment task, this increase was not statistically significant. In other enactment experiments, with more subjects, similes were found to be significantly easier to enact than metaphors. However, in the case of the paraphrase task, the simile-metaphor manipulation did not appear to affect the number of correct responses (although it did affect the number of literal responses). It is possible that the children considered the similes as self explanatory, and did not attempt to paraphrase them. An explanation along these lines is compatible with the recall data which showed fewer spontaneous paraphrases of similes than of metaphors.

In general, the results of this experiment demonstrate that the enactment task is a more sensitive measure of metaphor comprehension than the paraphrase task, and that paraphrase probably underestimates the young child's metaphoric abilities (and perhaps his/her language comprehension abilities in general). However, we presume that the severity of this underestimation decreases with age. These results confirm the assumption that we set out to test, thus vindicating our use of enactments to examine children's metaphoric abilities.

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Table 1

Frequency of Responses in Each Response Category of Solicited Paraphrases and Enactments

| Metaphorical Sentence Type | Response Category | | | | |
|---|---|---|---|---|---|
| | No Response | Inappropriate | Literal | Composite | Correct |
| | | | Enactments | | |
| Metaphors | - | 7 | 11 | 10 | 28 |
| Similes | 1 | 5 | 2 | 14 | 34 |
| Total | 1 | 12 | 13 | 24 | 62 |
| | | | Paraphrases | | |
| Metaphors | 2 | 5 | 20 | 10 | 19 |
| Similes | 7 | 13 | 11 | 8 | 17 |
| Total | 9 | 18 | 31 | 18 | 36 |

Table 2

Frequency of Responses in Each Target Recall Category

| Metaphorical Sentence Type | Recall Category | | | |
|---|---|---|---|---|
| | No Mention | Complete or Repetition | Incomplete or Inappropriate Spontaneous Paraphrase | Correct Spontaneous Paraphrase |
| Metaphors | 14 | 16 | 12 | 14 |
| Similes | 10 | 35 | 9 | 3 |

## Figure Caption

Figure 1. Photograph of materials.