DOCUMENT RESUME

ED 171 893 PS 010 598

AUTHOR Winner, Ellen; And Others
TITLE Misunderstanding Metaphor: Cognitive Problem or Pragmatic Problem?
SPONS AGENCY National Inst. of Education (DHEW), Washington, D.C.; National Science Foundation, Washington, D.C.
PUB DATE Dec 78
GRANT NIE-G-78-0031; NSF-BNS-77-13099
NOTE 19p.; Portions of this paper were presented at the meeting of the New England Child Language Association (December 1978)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Children; *Cognitive Processes; *Comprehension Development; Language Skills; Linguistic Competence; *Metaphors; Psychological Studies

ABSTRACT

Two tasks were used to choose between two rival accounts--cognitive vs. pragmatic--of children's failure to comprehend metaphors. A total of 120 children, in three age groups (6, 7, and 9 years) were given either an explication or a multiple choice task to assess comprehension of 15 novel comparisons expressed in five alternative forms varying in pragmatic difficulty: predicative metaphors; topicless metaphors; similes; quasi-analogies; and riddles. The form in which a comparison was expressed affected the ease with which it was comprehended: predictive metaphors and similes were the most difficult; topicless metaphors were intermediate; and analogies and riddles were the easiest. The order of difficulty remained constant across age. Results support the hypothesis that, at least for metaphors grounded in physical resemblance, the ability to perceive a resemblance between elements ordinarily classified apart (a cognitive skill) is not sufficient for metaphor comprehension and that additional pragmatic skills are necessary. These results are discussed in detail. (Author/SS)

Misunderstanding Metaphor:

Cognitive Problem or Pragmatic Problem?

Ellen Winner

Department of Psychology, Boston College and Project Zero,
Graduate School of Education, Harvard University

Matthew Engel and Howard Gardner

Project Zero, Graduate School of Education, Harvard University
and Boston Veterans Administration Hospital

Short Title: Misunderstanding Metaphor

This research was supported by the National Science Foundation (BNS 77-13099) and the National Institute of Education (G-78-0031). Portions of this paper were presented at the New England Child Language Association, December 1978. We thank the following people of the Brookline Public School System for their help in the conduct of this study: Mr. J. Passalacqua, Principal, Baker School; Ms. H. Herzog, Principal, Runkle School; Mr. G. Cote, Principal, Lincoln and Sewall Schools; Ms. D. Shein, Sewall School; and the teachers at the Sewall, Runkle, and Baker Schools. We also thank Wendy Wapner and Lisa Silberstein, of Project Zero, for their help in scoring and data analysis.

Requests for reprints should be sent to Ellen Winner, Department of Psychology, Boston College, Chestnut Hill, Mass. 02167.

Abstract

Two tasks were used to choose between two rival accounts--cognitive vs. pragmatic--of children's failure to comprehend metaphors. Six, seven and nine year olds were given either an explication or a multiple choice task to assess comprehension of 15 novel comparisons expressed in 5 alternative forms varying in pragmatic difficulty: predicative metaphors; topicless metaphors; similes; quasi-analogies; and riddles. The form in which a comparison was expressed affected the ease with which it was comprehended, and the order of difficulty remained constant across age. Results support the hypothesis that the ability to perceive a resemblance between elements ordinarily classified apart (a cognitive skill) is not sufficient for metaphor comprehension and that additional pragmatic skills are necessary as well.

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The ability to process metaphorical language is a central aspect of linguistic competence, necessary in order to carry on an ordinary conversation ("Don't you think he's brittle?"); to make sense of the evening news ("Yesterday the agreement was cemented"); and to appreciate literature ranging from a fairy tale ("A king with a heart made out of ice...") to Macbeth ("Oh, full of scorpions is my mind..."). Adults readily process and make sense of the kinds of metaphors encountered in daily usage (Glucksberg, Hartman, & Stack, Note 2) and there is reason to predict that children, too, would find such language easy to process: metaphorical usage is frequent, metaphorical perception has been argued to be a primary way of knowing the world (Arnheim, 1974; Verbrugge & McCarrell, 1977), and rudimentary metaphorical capacities have been demonstrated in preschool children (Gardner, 1974; Gentner, 1977; Winner, in press).

Contrary to expectation, however, children have difficulty understanding, and are often stymied by, linguistic metaphors (Billow, 1975; Winner, Rosenstiel, & Gardner, 1976; Coffman & Cirillo, Note 1). Moreover, asked to paraphrase metaphorical sentences, children below the age of 10 offer predictable kinds of erroneous explanations. However, why metaphors pose a difficulty for children is not known. It is the nature of the obstacle that prevents children from understanding metaphorical sentences that is the focus of the investigation reported here.

A metaphor (e.g., "The skywriting was a scar marking the sky") asserts

for instance, the above predicative metaphor in which both topic and vehicle are explicitly linked, "The skywriting was a scar marking the sky," and compare this form to a simile in which the same connection is expressed, "The skywriting was like a scar marking the sky." In both cases, comprehension depends on the cognitive capacity to perceive a resemblance between skywriting and scar, and in both cases, adequate evidence of comprehension might entail stating the ground (e.g., both are long and thin, or both deface a surface). While the same cognitive ability is called on in both cases, however, the simile form confronts the listener with two fewer pragmatic demands: steps 1 and 2, described above, are not necessary since a simile is a literal statement and the relation of similarity is already stated. Indeed, it has been argued that, in the course of processing a metaphor, we first actually expand it into a simile (Miller, Note 3).

Consider an alternative, topicless form of this same metaphor, "A scar marked the sky," and compare this to two other forms: a question in the form of a riddle, "What is like a scar but marks the sky?"; and a "quasi-analogy," "A scar marks the skin and something marks the sky." In all three cases, comprehension depends on the capacity to perceive a resemblance between skywriting and scar, and evidence of comprehension might entail guessing the missing topic.[1] (Guessing the missing topic is made possible by a tacit knowledge of the ground, as opposed to the kind of explicit knowledge required for solution of the predicative metaphor and the simile.) Both the riddle and the quasi-analogy pose fewer pragmatic demands than the topicless metaphor. Hearing the analogy, the listener can omit step 1; hearing the riddle, the listener can omit steps 1, 2, and 3 and simply answer the question that has already been posed (step 4) (see Table 1).

Table 1 about here

If difficulty with metaphor reflects an inability to perceive a resemblance between disparate objects (the cognitive hypothesis), children should have approximately equal difficulty with all of the linguistic forms in which the link is expressed. Alternatively, if the difficulty also reflects a lack of awareness of what must be done to a metaphor, or an inability to carry out all or even some of the steps required (the pragmatic hypothesis), comprehension should vary depending on the form in which the link is captured.

Because of the two different kinds of answers required in explicating these five forms, a strict comparison is only possible between predicative metaphors and similes, on the one hand, and between topicless metaphors, quasi-analogies, and riddles on the other. The pragmatic hypothesis predicts, in a comparison between predicative metaphors and similes, that similes will be easier to comprehend; and, in a comparison of the remaining three forms, topicless metaphors should prove the most difficult, analogies should be intermediate; and riddles should prove easiest. These predictions follow directly from the number of pragmatic demands made by each form.

If a multiple choice version of the task is devised, it should prove possible to rank all five forms along one scale of difficulty. This is because in a multiple choice task, the extra difficulty of the kind of answer required by predicative metaphors and similes is reduced: selection (rather than production) of a ground requires only a tacit awareness of the ground, the same kind of knowledge that is needed to guess the topic in the remaining three forms. Thus, in a multiple choice condition, the pragmatic hypothesis predicts the following order of difficulty, listed from difficult to easy: 1) predicative and topicless metaphors; 2) quasi-analogies; 3) similes; 4) riddles.

Of course, it is recognized that the five forms under comparison differ in other ways besides in their number of pragmatic demands: the wording differs in both the question posed and in the two forms of responses required; and some forms, such as riddles and similes, may well be more familiar to children. However, closer equivalents to metaphors simply do not exist; moreover, if the cognitive hypothesis is correct, minor changes in wording or differing levels of familiarity should make no appreciable difference.

In brief, whether the capacity to perceive novel resemblances is a sufficient condition for metaphor comprehension, or whether other, more pragmatic skills are necessary as well, was the question motivating this study. And, in view of the finding that 10 year olds can readily explicate even predicative metaphors (Winner et al., 1976), the target group of interest was composed of younger subjects for whom the linguistic forms hypothesized to be more difficult might still pose some problem.

Method

Subjects

One hundred and twenty children, equally divided between boys and girls at each of three age levels (6, 7, and 9) participated in the study. Subjects, drawn primarily from middle-class backgrounds, were selected at random from their classrooms.

Materials

Fifteen predicative metaphors were constructed in which the first term of the metaphor (the topic) was explicitly equated to the second term (the vehicle): E.g., "The skywriting was a scar marking the sky." For each sentence in this form, four corresponding items were constructed:

a topicless metaphor, a simile, a riddle, and an analogy (see Table 1). Five forms of the test, each containing 15 items, were constructed: each item appeared in one of the five linguistic forms on each test. Thus, all subjects received three items of each form, but no subject received the same item expressed in more than one form. All of the items were based upon a perceptual (visual) resemblance between topic and vehicle.

Half of the subjects were asked to explicate the items; half received a multiple choice version in which four choices were possible for each item. The four choices were appropriate, inappropriate, associate of the topic, and associate of the vehicle. Examples of these choices for the different forms are presented in Table 2. The erroneous choices were constructed on the basis of pilot data revealing the kinds of errors typically made on such tasks.[2]

Table 2 about here

Procedure

Each child was seen individually by one experimenter for about 20 minutes. Subjects in the explication group were told: "I'm going to read you some sentences. I want you to listen carefully and then I'm going to ask you some questions about each one." After hearing either form of metaphor or a simile, subjects were asked, "What do you think that means?" After hearing a quasi-analogy ("A scar marks someone's skin and something marks the sky"), subjects were asked, "What is that something?" No question followed the riddle since the riddle itself was posed as a question. When subjects' responses were too incomplete to be scoreable, a nondirective probe used was: "Can you tell me anything more?"

Subjects in the multiple choice group were given the same instructions and asked the same questions following each item type, but were asked to

choose the best answer from four possible choices. Subjects were not allowed to respond by saying "that one," or "the second one," but were required to repeat or paraphrase their choices.

Scoring

Responses on the explication task were categorized in the same way as the choices on the multiple choice task. To account exhaustively for all explications, however, it proved necessary to include four additional error categories.

One judge scored all of the responses on the explication task. Reliability with a second judge was computed on 270 of the responses. In judging whether a response was appropriate vs. any one of the categories of inappropriate, 92% agreement was obtained; in further subdividing the inappropriate responses, 84% agreement was obtained.

Results

Explication Condition

A 5 x 3 x 2 (Form x Age x Sex) analysis of variance of the total number of correct responses on the explication condition revealed significant effects of Form, $F(4,220)=9.25$, $p < .001$ and Age, $F(2,55)=5.87$, $p < .005$. Turning first to the effect of form, the same order of difficulty was found at all ages, as revealed by Newman Keuls post-hoc tests at $p < .05$. Comparing predicative metaphors and similes, the two forms proved of equal difficulty. Comparing the remaining three forms, both topicless metaphors and analogies were equivalent but were more difficult than riddles. Turning to the effect of age, 7 and 9 year olds performed equally well and at a higher level than did 6 year olds (Newman Keuls, $p < .05$).

Multiple Choice Condition

A parallel analysis of variance performed on the total number of appropriate responses selected on the multiple choice condition yielded a significant effect of form, $F(4,216)=8.84$, $p < .001$ and age, $F(2,54)=8.81$, $p < .001$. Newman Keuls tests revealed three levels of difficulty: predicative metaphors and similes were the most difficult; topicless metaphors were intermediate; and analogies and riddles were the easiest ($p < .05$). A comparison between the predicted order of difficulty and the order yielded by both conditions is presented in Table 3. With respect to age, 7 and 9 year olds again performed equally well and at a higher level than did 6 year olds (Newman Keuls, $p < .05$).

Table 3 about here

Other Findings

An additional 4-way analysis of variance was performed in which condition was included as a factor. This analysis confirmed the expectation that multiple choice would prove easier than explication. Condition did not interact with any of the other factors. In none of the analyses was there a significant effect of sex.

Discussion

At no age did children perform at an equivalent level on all forms, thus disconfirming the hypothesis that the perception of resemblance between disparate objects is a sufficient condition for the comprehension of metaphor. Moreover, results of both conditions confirmed some, but not all, of the predictions made by the pragmatic hypothesis.

In the explication condition, as predicted, both topicless metaphors and analogies proved more difficult than riddles. However, contrary to prediction, analogies were not intermediate in difficulty but equivalent to the topicless metaphors, suggesting that step 1, described above, is

either inconsequential or that this step automatically triggers step 2. Also contrary to prediction, predicative metaphors were not more difficult than similes but were equivalent to them. This finding suggests that steps 1 and 2 do not pose a problem for the listener and also casts doubt upon the assertion that metaphors are understood by transforming them into similes.

In the multiple choice condition, looking at all five forms together, as predicted, predicative metaphors proved the most difficult and riddles the easiest. Three findings were contrary to prediction, however: similes were as difficult as predicative metaphors, again suggesting steps 1 and 2 to be inconsequential; both predicative metaphors and similes were more difficult than topicless metaphors, suggesting that it is cognitively more demanding to select the appropriate ground than to select the appropriate topic; and analogies were as easy as riddles.

Although the predicted order of difficulty in both conditions was only partially upheld, results clearly demonstrate that the form in which a novel comparison is expressed affects the ease with which it will be comprehended. And, most importantly, metaphors of both types consistently proved more difficult than the form posing the fewest pragmatic demands--the riddle.

It is important to note that the results reported here have been found true of only one kind of metaphor, one based on a physical resemblance between topic and vehicle. There are other, more difficult kinds of metaphors, ones based on a conceptual rather than a perceptual ground (e.g., to liken a dying person to a flickering candle). It is, of course, possible that if the cognitive demands of such "conceptual" or psychological

metaphors are greater than those of perceptual metaphors, meeting the cognitive demands may be sufficient for metaphor comprehension. The role of pragmatic skills in the comprehension of non-perceptual metaphors remains to be determined.

In conclusion, this study supports the argument that, at least for metaphors grounded in physical resemblance, meeting the cognitive demands of a metaphor is a necessary, but not a sufficient, condition for its comprehension. The fact that the same children can solve a riddle or an analogy before they can solve a corresponding metaphor suggests that it is not enough to perceive the novel link involved. It is also imperative that the child know how to "play the game" (cf. Goodnow, 1971). The problem is not a lack of concepts but rather knowing what it is that one must do when confronted with a metaphor. Quite possibly (and consistent with the present findings), if children are shown the rules of the game, the gap between the comprehension of metaphor and less demanding forms would disappear. Outside of an English class, however, the rules of this game are not ordinarily spelled out. And, if the clues are missed, the game is lost.

Reference Notes

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Footnotes

1. "Quasi-analogies" rather than those in the form of a:b::c:d were used in the present study because they have proven less difficult for children to carry out (Levinson & Carpenter, 1974).

2. In view of the fact that the error profiles were not revelatory, this manipulation will not be discussed in the results section.

Table 1

Pragmatic Demands Posed by Each of the Five Forms

	Predicative Metaphor	Simile	Topicless Metaphor	Quasi-Analogy	Riddle
	The skywriting was a scar marking the sky.	The skywriting was like a scar marking the sky.	A scar marked the sky.	A scar marks the skin and something marks the sky.	What is like a scar but marks the sky?
Question posed by Experimenter	What does this mean?	What does this mean?	What does this mean?	What is that something?	None
Answer Required	State ground: both long, thin marks on a surface.	State ground: both long, thin marks on a surface.	Guess topic: skywriting	Guess missing term: skywriting	Guess missing term: skywriting
Pragmatic Demands on Listener	1)Recognize statement to be nonliteral.	----------	1)Recognize statement to be nonliteral.	----------	----------
	2)Recognize relation between topic and vehicle to be similarity.	----------	2)Recognize that vehicle stands for something to which it bears a relation of similarity.	2)Recognize that the missing term is like a scar marking the skin.	----------
	3)Ask oneself how topic is like vehicle.	3)Ask oneself how topic is like vehicle.	3)Ask oneself what is like vehicle.	3)Ask oneself what marks the sky and is like a scar on the skin.	----------
	4)Answer question posed to self.	4)Answer question posed to self.	4)Answer question posed to self.	4)Answer question posed to self.	4)Answer question posed by riddle itself.

Table 2

Examples of the Four Choices Given

on the Multiple Choice Condition

	Appropriate	Inappropriate	Associate of Topic	Associate of Vehicle
Predicative Metaphors and Similes	They both make a line.	They both sit on a chair.	They both float in the air.	They both hurt you.
Topicless Metaphors, Riddles, and Quasi-analogies	skywriting	a chair	air	a band-aid

Table 3

Order of Difficulty of Forms*

Explication Condition

Order Predicted	Order Found
1. Predicative metaphors	1. Predicative metaphors, Similes
2. Similes	
1. Topicless metaphors	1. Topicless metaphors, Analogies
2. Analogies	
3. Riddles	2. Riddles

Multiple Choice Condition

Order Predicted	Order Found
1. Predicative Metaphors, Topicless Metaphors	1. Predicative Metaphors, Similes
2. Analogies	2. Topicless metaphors
3. Similes	3. Riddles, Analogies
4. Riddles	

* Listed from difficult to easy.