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ABSTRACT

This paper reports a study carried out with 14 children (ranging in age from 2.8 to 3.5 years) which investigated children's concepts of difference. Pairs of small objects differing on a number of dimensions were presented to the children. As each pair of objects was presented, children were asked to select the object that was "big," "little," "fat," "thin," "tall," "short." They were also asked to pick one of two index cards with "more" or "less" buttons painted on it and to choose one of a pair of identical objects "before" or "after" a transformation had been performed on it (such as a pair of sneakers, one of which had been tied). The overall performance of the younger and older children was not very different. They were fairly successful with all concepts except "thin," "less," and "before." In follow-up questions with the choice object it came out that the children appear to make more choices in terms of big or little. The data on size adjectives suggest that the children were answering all of the questions with reference to some sort of general or undifferentiated size dimension that they marked as "big" to "little." (MS)

Size is Big or Little:

An Approach to the Dimensionality of Children's Concepts.

by

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In a paper that appeared in a recent edition of Child Development, (Webb, Oliveri, & O'Keeffe, 1974) my associates and I reported a series of studies on the meaning of "different" in the language of young children. In a sample that ranged from just under three to about four years of age, we found four reasonably distinct stages in the meaning of "different." The most interesting of the four from my point of view was the third in which children acted as if "different" were undefined without some visible basis of comparison: that is, two things that were completely different were not "different" at all.

Notions of similarity and difference are very instructive because as adults use them they are completely abstract: they are defined either by stimulus context - if you are stimulus minded - or by the subject's interests and intentions - if you are more functionally inclined as I am. The young child who is presumably unable to

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[1]Read at the meeting of the Society for Research in Child Development, Denver, Colorado. 1975.

deal with such undeterminism, may be forced to change the problem into something concrete--or at least to find some concrete referent for the abstract problem.

While a referential theory of meaning is clearly inadequate for adults - or even for children older than about five - many of the anomalies in the language of young children may well be best understood as resulting from the child's need for concrete representations of his concepts. In the report to follow, I would like to present some data that is consistent with this theory as well as report on a novel technique that may be useful for investigating the underlying dimensions of children's semantic networks.

Procedure: Subjects for the first study were 14 children ranging in age from 2;0 to 3;5. A collection of small objects (toys, blocks, etc.) that differed on a number of dimensions were presented to the children in pairs. We were not particularly interested in the stimulus characteristics that determined the child's reaction and only insisted that the object differed on the dimension that the child would be questioned about. In other words, we used what Harry Harlow has always affectionately called "junk." As each pair of objects was presented the child was asked to select the object that was "big", "little", "fat", "thin", "tall", or "short." Pairs of index cards were used with a small number of buttons painted on them and the child was asked for the card that had "more" or "less" buttons. Finally, some pairs of identical objects were presented on which some transformation had or had not been performed. One such item

was a pair of sneakers, one of which had been tied. The child was asked for the object "before" or "after" the transformation had been performed. These questions added up to a total of 10 paired terms. They might be considered positive or negative and, with the exception of "before" and "after" that are included because of Eve Clark's excellent study, marked or unmarked. In testing we went through one random order presentation of the objectives and then attempted to get a second run with a second set of objects. Our subjects were very young and many of them stopped performing before we completed the replication series. The reliability data we did get was by and large consistent with the data from the first trials, though in the presentation to follow I shall only cite data from the first ten trials.

In terms of the choice data nothing terribly surprising happened. The positive or "unmarked" adjectives were easier than the negative or "marked" adjectives--if you do an analysis of variance it is significant ($p<.005$)--all terms were responded to correctly at above chance levels except for three. Responding to "thin" was within the chance range so the children could have been guessing and to "less" and "before" at a level significantly below chance - that is, the children were systematically wrong in their comprehension of "less" and "before."

The overall performance of the younger and older children within the group was not very different. The difference was statistically significant at a marginal level ($p<.05$) and the magnitude of difference was small. This point is important only as a way of noting that the group was relatively homogeneous with respect to this task.

The most interesting portion of the study occured subsequent to the child's choice. After the child had selected his object, the investigator asked him: "If that one (pointing to the child's choice) is the _____ one, (repeating the term from the question) what is that one (pointing to the object still on the table)?" Two things can be said about the response to the question: First the children responded: of 140 questions (14 subjects times 10 questions), only 20 elicited no response or something we could not decipher into English. Second, the answers were very consistent: To the six size terms: big, little, tall, fat, short, and thin, the children answered either "big" or "little" regardless of what the question had been. So if the question had been "big" and the large object chosen the remaining object was still "little"; but if the question had been "fat" the remaining object was still "little." The number of "big" or "little" responses was variable, ranging from 13 of 14 "big's"--contrast to "little" down to 5 of 14 "little's" in contrast to "fat"--but there was no systematic second choice to any question. A few subjects responded with the correct contrast but the more common responses were some specific characteristic or name of the remaining object. I should note that given the question "what is that" you can not really say that naming the object is incorrect. Before describing the responses to the other terms let me mention that we subsequently replicated the data on size adjectives with a larger sample (124) of inner-city children. Using "big", "tall", "fat", and "heavy", we found a minimum of 50% and a maximum of 84% of our subjects giving the modal "big" or "little" responses to our contrast questions.

These data on size adjectives suggest that the child is answering all of our questions with reference to some sort of general, or undifferentiated, size dimension that he marks as "big" to "little." (A suggestion other investigators have made). The next question is whether discreet quantity is also part of an undifferentiated size concept at this time - the answer is apparently no. Children generally picked the card with the greater number of buttons to both 'more' and 'less' questions. The answer to the contrast question, however, was generally to give the specific number of buttons on the remaining card. (The way the task was designed this could only be "one" or "two" larger numbers might have produced different responses). Thus at this point in time children appear to realize that "more" or "less" when referred to objects of discreet quantity refer to number and not to some spatial indicator (length, density, etc.). Let me state here, that there is good reason to believe that discreet quantity at some later time may very well be referred to a spatial dimension - that is, if length becomes the indicator of number as the studies of conservation suggest. The response to the "before"/"after" question was interesting, but not terribly informative without further work. The modal response was to name the transformation + or - "not" - i.e. the shoe that is "not tied."

These data suggest that the dimensions the child imposes on these problems are not the same as those adults use, but are related. When a child in our study responds to any of the size terms he seems to have some "big" - "little" dimension in mind A post hoc examination of our stimuli suggested that overall size seemed to be the determining factor and not height or elevation as we might expect from Maratsos's

work - again let me note that our subjects are younger than those generally appearing in such studies and it is very possible that the systematic use of some spatial indicator property - length for number, elevation for size - well may appear in a later stage. Second, let me note, that without the contrast question data, the child's systems work reasonably well compared to adult standards of performances. He really does pick the 'fat' object when asked for one, even though how he apparently does it on the basis of something other than fatness. Thus, I believe that the technique I use here of asking a child for the other end of a dimension might be generally useful in studying conceptual networks.

Let me just mention in passing that we have collected more data with the contrast question technique. None of this has been done very systematically to date and I will not comment on it at any length except for one point I will mention below. Briefly, as children get older we see more "correct" answers, and it appears that the basic phenomenon is going to hold up longer with "non-realistic" objects--blocks and sticks for example, longer than it will with "realistic" objects--toys animals, for example. Whether some concepts will differentiate in a fixed order from the more general concept remains to be seen though I would certainly expect such a result. Clearly, the data I do have suggest that discreet versus continuous quantity differentiated prior to various continuous concepts. So far it appears the amount of individual variation between subjects will increase as the subjects get older.

But let me return to my original idea. What if my earlier suggestion were correct and the confusions I see here are due to the child over generalizing from specific, concrete, referents he uses for his concepts.

If that were true, the confusions should go far beyond undifferentiated size concepts. Here is one example: After we finished the study I described above, we questioned some subjects with other terms. On one set of items we presented was a small toy jet airplane and a large bi-plane and we asked for the "fast" one. I make no assumptions about the 3-year-olds ideas of aerodynamics, but the consistent choice was of the larger plane--the remaining plane was the "little" one for most subjects. Similar results have been obtained with pairs of animals and requests for the "strong", "brave", and "fast" ones; the larger object is selected and the remaining object is the "little" one. Perhaps you call this a "response bias" and perhaps it only shows some undifferentiated evaluative dimension confounded with size--as someone like Osgood would suggest--I can not prove otherwise. However, perhaps a giraffe is 'braver' than a hippo because in the child's experience bigger people are also "older", "braver", "stronger", "faster", etc. The data are at least consistent with such a belief.

Let me end on a cryptic note: perhaps Bruner's notion of ikonic representation that has never gotten the attention I think it deserves will prove to be more useful than it has appeared to date.

Reference

Webb, R. A., Oliveri, M. E. & O'Keeffe, L., Investigations of the meaning of "different" in the language of young children. Child Development, 1974, 45, 984-991.