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ABSTRACT

The purpose of this study was to investigate children's acquisition of the non-comparative forms of spatial adjectives and to specifically test the following experimental questions: (1) Are positive-pole terms, or those such as "big," which indicate extent along a dimension, acquired earlier than negative-pole terms? (2) Does over-extension, or inappropriate over-generalization, occur in the child's acquisition of spatial adjectives? (3) What is the order of acquisition of spatial adjectives? The subjects were sixty preschool children ranging in age from 2 years 8 months to 4 years 1 month and were divided into six groups separated by three-month age intervals. The following pairs of spatial adjectives were presented to each subject and then used as test items: (1) big-little, (2) tall-short, (3) high-low, (4) long-short, (5) wide-narrow, (6) thick-thin, (7) deep-shallow, and (8) fat-skinny. All children were tested individually following a brief play period and instructions concerning the task. Responses were tabulated for each group and analyzed to determine the significance of the factors of age, polarity, and terms. Analyses were also performed to determine order of acquisition. Results indicated that acquisition of spatial adjectives proceeds according to semantic complexity. No differences were observed in the learning of positive- and negative-pole terms, and the children's acquisition of spatial adjectives did not seem to proceed according to an over-extension model. Both members of a pair of adjectives were acquired concurrently. (PMP)

OVER-EXTENSION PHENOMENA IN CHILDREN'S ACQUISITION OF SPATIAL ADJECTIVES

by

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With increasing emphasis on semantics in linguistic theory (e.g. McCawley, 1968) and renewed interest in "communicative competence" (Campbell and Wales, 1970; Slobin, 1970) and the function of child language (Bloom, 1970; Slobin, 1970), researchers in developmental psycholinguistics have begun to direct their attention to semantic development. Investigators are beginning to study the semantic intent of children's utterances (Bloom, 1970; Slobin, 1970), to systematically investigate the child's development of word meanings (e.g. Donaldson and Wales, 1970), and to place their findings within the context of contemporary linguistic theory.

E. Clark (1973) has recently proposed a referential theory of semantic development which is based on semantic feature theory. She assumes that, when a child first begins to use identifiable words, he does not know their full meaning and has only partial lexical entries for them. Acquisition of semantic knowledge consists of adding units of meaning, or semantic features, to a lexical entry until it corresponds to the standard adult entry.

Clark further assumes that the child's first semantic features are derived from encoding of his percepts. A similar notion is expressed by H. Clark (1973) in his thesis that, ". . . the child acquires English expressions for space and time by learning how to apply these expressions to the a priori knowledge he has about space and time" (1973, p. 206). According to H. Clark, this a priori knowledge is what the child knows about space, given that he lives on this planet, has a particular perceptual appartus, and moves about in a characteristic manner, e.g. he is born into a world with gravity, has two eyes, ears, etc., and walks in an upright position. Such factors lead him to develop a perceptual space, or P-space. The child must then learn to apply

spatial terms to this perceptual space. H. Clark hypothesizes that the structure of P-space will be preserved in L-space, or the child's linguistic system, and that the order of acquisition of spatial adjectives will be affected by the complexity of their rules of application, or conditions that must be met before a word can be applied to a perceptual event.

This is similar to E. Clark's prediction that more general features will be acquired earliest and that acquistion within a hierarchy of features will proceed from top to bottom. If the child uses only one or two features criterially in the application of a word, one should find evidence of over-extension, or inappropriate over-generalization, in the child's speech, e.g. use of the word dog to name all four-legged animals.

E. Clark's semantic feature theory of development has been supported by an analysis of the early diary studies and by recent investigation of the acquisition of relational terms, or word pairs which share a large number of semantic features and are closely related in meaning. The former group of studies indicate considerable over-extension at an early age based primarily on perceptually derived criterial features such as movement, shape, size, sound, taste, and texture.

The latter group of studies have dealt with acquisition of the relational pairs before-after (E. Clark, 1971), more-less (Donaldson and Balfour, 1968), same-different (Donaldson and Wales, 1970), and several pairs of spatial adjectives such as big-little and long-short (Donaldson and Wales, 1970; Wales and Campbell, 1970; Tashiro, 1971; E. Clark, 1972). Investigation of these relational pairs has demonstrated over-extension of two types, over-extension from one member of a pair to another, e.g. children respond to

less as though it were more, and over-extension from the general terms big and little to more specific terms such as long and short.

Although over-extension from one member of a pair to another has been hypothesized to occur in a three-stage model for acquisition of spatial adjectives (H. Clark, 1970), it has not yet been demonstrated for this group of relational terms. Within the framework of such a model, positive-pole terms, or those such as big which indicate extent along a dimension, are acquired earlier than corresponding negative-pole terms such as little which indicate lack of extent along a dimension. At Stage 1 both members of a pair of spatial adjectives are used in a nominative sense to refer to the dimension under consideration, e.g. both tall and short are understood as "having tallness." Over-extension is predicted to occur at Stage 2 with children responding to negative-pole terms as though they were the corresponding positive-pole terms. Finally, children in Stage 3 understand the contrastive nature of a pair of terms and respond correctly to both positive- and negative- pole terms.

The purpose of this study was to further investigate children's acquisition of the non-comparative forms of spatial adjectives and to specifically test the following experimental questions:

1. Are positive-pole terms acquired earlier than negative-pole terms?
2. Does over-extension occur in the child's acquisition of spatial adjectives?
3. What is the order of acquisition of spatial adjectives?

The Ss were 60 preschool children ranging in age from 2-8 to 4-1 and divided into six groups separated by three-month age intervals. The age range for each group was two months with no S less than one month below nor more than one month above the mean age for a particular group. The mean age for Group 1 was 2-9; Group 2, 3-0; Group 3, 3-3; Group 4, 3-6; Group 5, 3-0; and

Group 6, 4-0.

The following pairs of spatial adjectives were presented to each S: big-little, tall-short, high-low, long-short, far-near, wide-narrow, thick-thin, deep-shallow, and fat-skinny. Either big or little was always presented first, and two lists were constructed from the remaining eight pairs of terms. The two halves of each list were constructed so that half of the positive and half of the negative terms appeared in each half and so that the positive and negative members of the same pair never occurred within the same half. The order of the two halves was reversed to form List 2. The words within each half were randomized, and presentation of the two lists was counterbalanced across Ss within each age group.

Stimulus materials consisted of pairs of objects representing the polar extremes of each pair of spatial adjectives. All children were tested individually following a brief play period and instructions concerning the task.

Responses to the experimental items were recorded as correct or incorrect and tabulated for each group. Tabulated responses were analyzed to determine the significance of the factors of Age, Polarity, and Terms. In addition, analyses were performed to determine order of acquisition of spatial adjectives.

Mean scores by age group are shown in the first slide.

SHOW SLIDE 1

As this slide illustrates, the mean for Group 3 was lower than that for Group 2, and the difference between the means for Groups 5 and 6 was negligible. The discreteness of the age units, i.e. three-month intervals, and the small number of subjects at each age level, i.e. n=10, are viewed as factors contributing to the discrepancies between Groups 2 and 3 and 5 and 6. As slide 2 indicates, combining age groups, i.e. Groups 1 and 2, 3 and 4, and 5 and 6, served to minimize these discrepancies and suggested a need to view the data in less

discrete age units.

SHOW SLIDE 2

In the next slide, means for the three combined groups are plotted against the means for six age groups.

SHOW SLIDE 3

The tabulated results were subjected to three-way analysis of variance, repeated measures, for both the six original groups and the three combined groups. The ANOVA tables with computed F ratios and significance levels are shown in the next slide.

SHOW SLIDE 4

The main effect of Age is significant in analyses for both three age groups and six age groups.

The main effect of Terms (Polarity) was also significant for both age groupings. The significance of this factor would be predicted on the basis of semantic complexity of the terms, and the data indicate the big-little are acquired first, followed by the pairs long-short, tall-short, and far-near, then high-low and deep-shallow, and finally wide-narrow and thick-thin for which responses were still near chance for Group III. This order of acquisition, with the exception of high-low and deep-shallow, follows that predicted by linguistic analysis of spatial adjectives, and one can conclude that acquisition generally proceeds according to semantic complexity.

Although it was predicted that differences would occur between acquisition of positive- and negative-pole terms with earlier acquisition of the former, this prediction was not supported by the data, for the factor of Polarity was not significant. Similarly, the hypothesized sequence of developmental stages, which presupposes differences between acquisition of positive- and negative-pole terms, was not supported.

The lack of differences between acquisition of positive- and negative-pole terms and the lack of well-defined developmental stages indicate that acquisition of spatial adjectives does not proceed according to the hypothesized over-extension model. An alternative might be a three-stage model in which children initially learn that both big and little, for example, refer to differences in size rather than color, or have some meaning for both comparable to the adult nominative meaning for big. Children in this stage would interpret the instruction Give me the big block as Give me the block that has "bigness" and, therefore, randomly respond to a task such as that presented in this study.

The child then learns that big refers to a certain class of objects and little to a certain class, i.e. he begins to make a two-valued contrast between the polar extremes. When presented with two identical objects, varying only along the relevant dimension, he will be able to apply this two-valued contrast, interpret the instruction as Give me the block that is big in contrast to the other block, and thus respond appropriately. If this is the case, he has some primitive notion of the contrastive nature of the terms but does not yet have the concept of implicit relationality hypothesized to underlie adult usage of non-comparative forms. Later, the child acquires the true relational sense implied by noncomparative forms and is able to compare an object to some implied standard and respond appropriately in situations where direct comparison is not possible.

This suggested developmental sequence includes a stage in which both members of a pair of spatial adjectives have some meaning comparable to the adult nominative useage. However, one can speculate that, in the process of differentiating instances representing extremes of the relevant dimension of size, the child is also in the process of differentiating instances representing

extremes of the relevant dimension. Thus, differentiation of a particular dimension and points on that dimension may be inherently related and proceed in a parallel rather than sequential manner.

Although one may question the comparability of association and comprehension data, results from a study by E. Clark (1972) can be interpreted as an indication that semantic features may not be acquired in a sequential, heirarchical fashion, beginning with the most general feature. In her study, children between the ages of 4-0 and 5-5 were asked to give antonymic responses to non-comparative forms of spatial adjectives. Incorrect responses consisted of substitutions based on common features and not polarity, e.g. when short was presented, some children responded with high but not low. This finding leads one to question a theory of semantic development which assumes that features are, in all cases, acquired in a hierarchical fashion, beginning with the most general feature. Otherwise, the children in Clark's study would have made errors which reflected confusion with polarity rather than with common features which have been hypothesized to occur above polarity in a hierarchy of semantic features specifying spatial adjectives. Children comprehend and appropriately use big and little, for example, for quite some time prior to responding paradigmatically to an association task. Therefore, they may acquire the concept of polarity before they are able to demonstrate it on such a task. If this is the case, it seems reasonable to conclude that children at some point acquire the concept of polarity and are then able to apply this to newly acquired concepts. It follows then that children, in the early developmental stages, do understand that big and little, for example, are not only related relative to a common dimension "bigness" but also that

this relationship is polar in nature. This conclusion is consistent with concurrent acquisition of both members of a pair of spatial adjectives, as indicated by the results of this study.

Acquisition of the non comparative forms of spatial adjectives may then proceed according to an "opposite concept model" which assumes that comparison must be made between two opposites in order to acquire the concept of either opposite. Within the framework of such a model, both members of a pair of spatial adjectives would be acquired concurrently, as indicated by the results of this study. Assuming that linguistic development is somehow mapped onto existing cognitive-perceptual structures, early over-extensions based on size and the observation that matching precedes comprehension would seem to support an "opposite concept model." The idea that one opposite would not exist without the other also supports such a model, and one can speculate that acquisition of terms denoting opposite concepts occurs as some "aha" phenomenon in which the child, in all-or-nothing manner, sorts out which label refers to which polar extreme.

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SLIDE 1

MEAN NUMBER OF CORRECT RESPONSES
FOR EACH AGE GROUP

Age Group	Mean	s.d.
1	10.6	3.13
2	12.5	3.27
3	11.5	3.75
4	13.5	2.60
5	14.4	1.51
6	14.3	2.06

SLIDE 2

MEAN NUMBER OF CORRECT RESPONSES FOR THREE AGE GROUPS
AND MEAN AGES AND STANDARD DEVIATIONS

	Age		Task	
Age Group	Mean	s.d.	Mean	s.d.
I	2.10.9	21 days	11.55	3.27
II	3.4.14	16 days	12.50	3.36
III	3.10.12	18 days	14.35	1.76

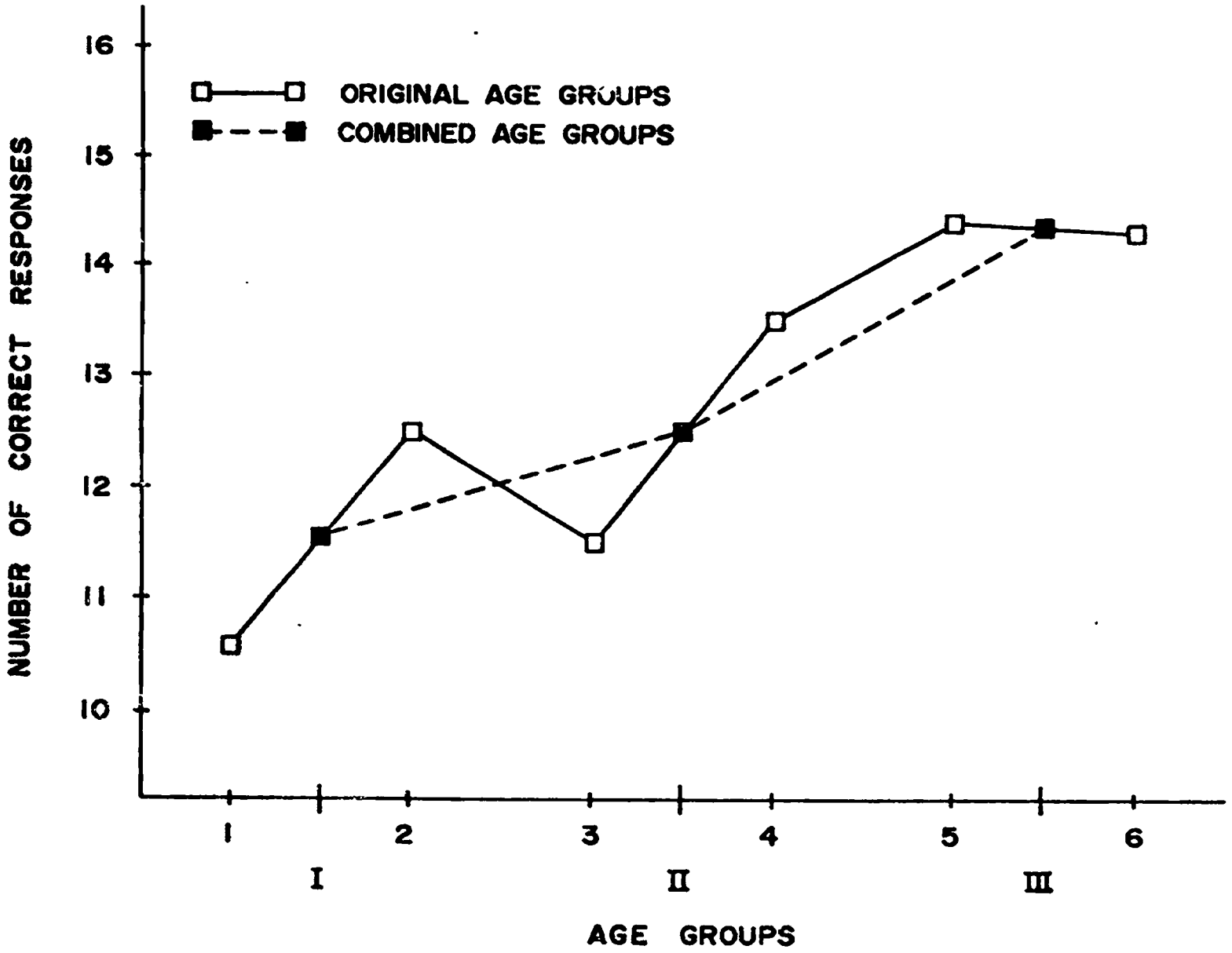

Figure 1. Number of correct responses for original and combined age groups.

SLIDE 4

ANOVA TABLE: SIX AGE GROUPS AND THREE AGE GROUPS

Source	df	F	p
Six Age Groups:			
Age	5,57	3.20*	.05
Polarity	1,54	3.00	
Terms(Polarity)	16,864	8.10**	.01
AgexPolarity	5,57	2.20	
AgexTerms(Polarity)	80,864	0.82	
Three Age Groups:			
Age	2,57	5.28**	.01
Polarity	1,57	2.78	
Terms(Polarity)	16,912	8.10**	.01
AgexPolarity	2,57	1.99	
AgexTerms(Polarity)	32,912	0.81	