DOCUMENT RESUME

ED 054 848 PS 004 841

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TITLE Language Development Variables Related to Young Children's Responses to Nonsense Syllables.

INSTITUTION California Univ., Los Angeles.
SPONS AGENCY Office of Economic Opportunity, Washington, D.C.; Office of Education (DHEW), Washington, D.C. Cooperative Research Program.
PUB DATE Jan 70
NOTE 28p.

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS *Age Differences; *Association (Psychological); Child Language; Cultural Differences; *Language Development; *Language Research; *Preschool Children; Tables (Data); Verbal Stimuli

ABSTRACT

The basic purpose of this study was to establish association values for nonsense words to be used in learning experiments with children from culturally-different backgrounds. Responses to 50 stimuli (44 nonsense and six real words) individually administered to 164 children from kindergarten, day care, and nursery school settings, representing two levels each sex, SES, and race (Black and Caucasian) and three age groups (4-, 5-, and 6-year-olds) were recorded. Association values for each word were calculated, providing a hierarchy with significant differences between the 10 high and 10 low terms, but little dependable difference between adjacent items. No significant difference in association value could be attributed to sex, SES, or race, but age-related differences were found. Data were also analyzed in terms of semantic, syntactic and phonological components. In the syntactic and phonological analyses, major differences were also age-related. Four-year-olds failed to respond significantly more frequently than 6-year-olds, and produced the lowest number of both verbs and abstract nouns. While advantaged children produced a significantly larger number of abstract nouns than disadvantaged children, there was no support for the Bernstein hypothesis that disadvantaged children demonstrate restricted use of adjectives and adverbs. (Author/WY)

LANGUAGE DEVELOPMENT VARIABLES RELATED TO YOUNG CHILDREN'S RESPONSES TO NONSENSE SYLLABLES[1]

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January 1970

[1]The work reported was initiated by the senior author under the United States Office of Education, Cooperative Research Project No. 1684, continued with some support from the UCLA Research and Development Center for the Study of Evaluation of Instructional Programs, and completed under the aegis of the UCLA Head Start Research Center, OEO CG9938.

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Problem

A great deal of time, thought, and money is being expended in the development of programs for preschool children, especially those from educationally disadvantaged homes. The great variety of approaches adopted in these programs is implicit evidence that there is no hard data as to the most promising path to pursue. This does not mean that programs are conducted without attention to evaluation; the problem lies rather in the lack of a sound theoretical basis for evaluation, and the paucity of instruments which are appropriate for use with young children.

In a very scholarly paper, Glick (1966) has pointed out some of the problems with the pre and posttest type of evaluation, especially those which cite increases in IQ points as indices of fundamental changes in cognitive structure. It is his contention that evaluations of preschool programs often equate performance with ability; the assumption is then made that improved performance is adequate evidence of improvement in underlying ability. However, Glick notes that Zigler, among others, has suggested that improved performance in a Binet test is closely related to motivational factors, as well as test-taking experience.

Another type of analysis which points up the inadequacy of the IQ gain as a basis for evaluation stresses the confusion generated by equating achievement and process. It is possible to demonstrate performance on a specific task, disregarding the procedure which was used in producing the performance. If, to use Glick's example, a criterion task is stated in terms of the length of time required to traverse a specific distance, then

the infant who is an adept crawler would score higher than the child who is just beginning to walk, thus ignoring the fact that the older child is using a higher level process and one which will ultimately produce far superior achievement.

Glick's paper exemplifies but one type of dissatisfaction with standard procedures for evaluating ability and achievement of young children who have taken part in intervention programs. A new approach to measurement with young children is that of assessing learning rate rather than already acquired knowledge or strategies for problem solving. With this method, all children would be given several days of instruction with completely unfamiliar material; the same material would then be given as a test. The problem here is that there is an implicit assumption that a limited number of training days would wash out important individual differences which might have existed among the children prior to the training program. In addition, the materials used are taken from the universe of items to which children from different types of homes have had different kinds of exposure.

To provide a true measure of learning rate, it would be desirable to use content which is equally unfamiliar to all children. The use of constructed or artificial materials seems to offer many advantages. Some of the more exciting possibilities of this approach are suggested by analogy from the area of Information Theory. For example, in addition to discovering habits related to verbal learning, we may use the same techniques to study those higher order structures which function to reduce uncertainty in a process called "filtering." Or, following the work of Miller (1956), and continued recently by such investigators as Fraunfelker & Spear (1969), one may wish to study the particular units of those materials which facilitate storage through encoding.

However, it has long been recognized that it is not safe to assume that all nonsense materials are equally meaningless. As early as 1910, Kent and Rosenoff had tackled the problem of differential associations to "real" words by establishing "norms" based on frequency of response or "association values." Other investigators (e.g. Glaze, 1928; Noble, 1952) applied the same technique to establishing association values for nonsense terms. Underwood and Schulz (1960) have summarized a great deal of research along these lines, and Jenkins, Russell, & Suci (1958) contributed valuable insights on the problem of meaningfulness of materials used in testing various hypotheses in the study of learning.

As a result of studies on association value there are now available a number of lists of nonsense syllables of rated meaningfulness. These have been prepared using primarily college students as the subject population. Until quite recently, when most investigations of learning were carried out in psychology laboratories with college students, these lists provided appropriate materials. For several reasons the norms obtained with this population cannot be used to evaluate the effects of various types of interventions with young children. First, the values have usually been established on the basis of visual stimuli, assuming the ability to read; secondly, even if presented orally, the associations which young children bring to the nonsense terms cannot defensibly be equated with those of sophisticated learners. Furthermore, while children from middle class homes usually have good language skills, those of similar age from disadvantaged homes have comparatively limited verbal facility.

The need for appropriate materials for use with young children has become increasingly apparent, especially now that many investigators have

come to realize the importance of studying learning processes. Thus the primary objective of the present study was to establish association values for nonsense materials with young children so as to identify groups of high or low association terms to be used in learning studies with young children. The experimental aspect of the present investigation was to test the implicit hypothesis that response patterns among groups will be significantly different, since there is a body of literature which suggests that variety and creativity of response is a function of age, SES, race, and sex differences. The relationship of associations to each of these variables was also investigated.

The advent of current psycholinguistic language models suggests a tripartite analysis based on three levels of language functioning (cf. Chomsky, 1966). These three hypothesized components are semantic, syntactic, and phonological. It is proposed that a measure of the amount of association value a particular nonsense word "contains" should consider the effect of each of these levels. The normative data to be presented is based on the semantic component which involves the evaluation of the subjective choice of a response within the child's language repertoire. In other words, some terms should occur more frequently than others regardless of phonetic or syntactic etiological factors which are presumably influenced by the individual's internal set. Creativity and variety will be analyzed via the other two levels: phonological (how closely does the response resemble the stimulus word phonetically) and syntactic (how frequently are various parts of speech generated as responses).

Method

Subjects

A total of 164 children, drawn from elementary schools, day care centers, and nursery schools, participated in the study. As far as possible there was an equal representation of boys and girls from two levels of socioeconomic status and ethnicity, across four, five, and six-year-old age groups. Table 1 reports the number of subjects in each category.

Materials

The list of 50 monosyllabic stimulus words, 44 nonsense terms and six real words randomly interspersed among the nonsense terms, is presented in Table 2. All words, both real and nonsense, were within the range of three to five phonemes in length.

The final steps in material preparation involved tape recording this list to standardize delivery of the stimuli. A Wollensak tape recorder, Model 1500 SS (recording speed 3 3/4 IPS), was used by a female speaker who had been previously briefed on the exact phonemic pronunciations desired.

Procedure

It was felt that several persons using copies of the taped presentation would serve to reduce the confounding effect of a particular examiner during the data collection process. Hence, five different examiners presented the stimulus tapes in individual sessions with children. The following is a transcript of the tape-recorded instructions which preceded and introduced the nonsense words:

"Hello! Today we're going to have some fun with words. I'll tell you a word and you tell me a word it makes you think of. Now

Listen. Here's the first word: Banana. What word does banana make you think of?

The next word is red. What word does red make you think of?

Now I'm going to say a silly word, but you tell me a real word. Listen: Gorp. What word does gorp make you think of?

The next silly word is Blup.

The next silly word is Baze."

After each stimulus word was given, the tape recorder was stopped and the child's response was recorded by the examiner. If no response was given this was also noted. The same procedure was continued until all nonsense words had been presented.

Results

The results were analyzed in terms of the semantic, syntactic, and phonological components. A fourth type of analysis was concerned with the possible relationships of response words to a particular stimulus. A "first order" association could be obtained only with real words and indicated a logical association with the stimulus, e.g. bed--sleep. A "second order" association was obtained only with nonsense stimuli. For example, with the stimulus fipe, an intervening or mediating term, fight, was assumed when the response was given as hit. In order to be counted as a second-order response, the word had to be given by at least 12% of the population. Responses which were neither first nor second order associations were coded "no logical association."

Analysis on the Semantic Criterion

The value for a specific word could be influenced by two factors: 1) the number of times the same word was given as a response, and 2) by

the number of children who did not respond to the particular stimulus. The number of children responding to a stimulus decreased as the number of same-word responses to that stimulus decreased. In general, the first 25 words may be considered high and the last 25 words low in association value. The rank ordering of this list was not significantly altered when the nonsense words were viewed from the perspective of the demographic variables: sex, SES, and race. High and low association values are increasingly assured as nonsense stimuli are chosen from the extremes of the list. It should be noted, however, that any two adjacent words are not significantly different from each other.

In the overall analysis, the following pattern of responses was obtained:

1. Each stimulus elicited between 62 and 105 different responses.

2. There were 48 stimulus words to which the same word was given as a response more than 10 times;

3. For 27 stimulus words the same word was given as a response more than 20 times;

4. 17 stimulus words elicited the same response more than 30 times; and

5. Nine stimulus words elicited the same response more than 40 times.

Table 2 provides a list of the responses which were given to each stimulus by four or more children, the total number of different responses, as well as the frequency of first and second order responses. Table 3 presents the association values for the list of 50 stimulus words. These values represent the ratio of total number of responses to number of responses given four or more times.

Syntactic and Phonological Analyses

Phonological and Syntactic criteria used for coding responses are listed below and provide the bases of the between-group comparisons.

Syntactic Criteria

1. Noun or noun phrase (concrete)
2. Nour or noun phrase (abstract)
3. Verb or verb phrase
4. Conjunction, interjection, article
5. Adjective or adjective phrase
6. Adverb or adverb phrase
7. Preposition or preposition phrase
8. Pronoun
9. Nonsense response

Phonological Criteria

1. Initial consonant sound
2. Initial consonant sound + vowel
3. Final consonant sound
4. Vowel + final consonant sound
5. Initial and final consonants
6. Vowel only
7. Echo
8. Echo-plus (linguistic transformations of the stimulus word)
9. No parallel sound

Each child was given a score for each of the 18 categories. This score represents the percentage of that type of response given by the child and is referred to as the summary score. Table 4 presents the means and standard deviations of these scores by sub-groups, as well as for the entire sample. These means were subjected to separate analyses of variance, one for the syntactic (Table 5) and one for the phonological (Table 6) component. Categories in which there was found to be significant differences and the direction of these differences are discussed below.

I. No response. Failure to respond was found significantly more frequently with four-year-olds compared to six-year-old children.

II. Syntactic criteria showing significant differences:

2. Abstract nouns. Again, a linear relationship was found, with four-year-olds producing the lowest number of abstract nouns. There was also a significant effect for SES, with the advantaged children producing this syntactic form far more often than did disadvantaged children.

3. Verb. Four-year-old children gave significantly fewer verb responses than five- and six-year-olds. Race was also significant, with black children responding with more verbs than white children.

5. Adjective. Age, as well as an age x SES interaction, was significant for this category. Four-year-old high and low SES children generated this type of response least often. The largest number of adjective responses were given by six-year-old low SES and five-year-old high SES children

6. Adverb. Significance was found across age, SES, and sex, with interaction effects for age x SES and SES x race. Figure 1 graphically portrays these differences. In general, the largest discrepancy is between four-year-old white boys of high vs low SES, with the low SES group having the highest mean performance in this category.

8. Pronoun. Both age x SES and age x sex interactions were found to be significant. Pronouns were given most often by low SES six-year-old girls and least often by high and low SES four-year-old boys and girls and five-year-old girls.

III. Phonological Criteria

12. Initial consonant sound. Responses which imitated the stimulus word in this manner were given most often by six-year-olds, followed by five- and then four-year-olds. An age x sex interaction was found, with six-year-old girls being the highest respondents.

13. Initial consonant sound + vowel. Age, age x SES, and age x race produced significant interactions. In general, the older high SES children tended toward imitation of the initial consonant + vowel of the stimulus word.

14. Vowel + final consonant sound. This style of responding is traditional rhyming in English phonology, e.g., baze--haze. The five- and six-year-old children produced this response significantly more often than the four-year-olds.

17. Vowel only Six-year-olds imitated the vowel alone most often and four year-olds least often. There was a significant difference at the .01 level for an SES x sex interaction and the direction appears to be as follows: Highest respondents were high SES girls and lowest were low SES girls. High and low SES boys were approximately equal and were only moderately prone to this type of response.

18. Echo Age x race and SES x race differences were found. Figure 2 graphically portrays the details of these interactions. The major interactions are at age four in the low SES group, where black boys and girls did significantly less echoing than white boys and girls.

19. Echo-plus. An age x sex interaction was found to be significant. Low SES girls produced the most linguistic transformations of the stimulus word, although high SES boys performed in this manner almost as often. Low SES boys and high SES girls produced the lowest number of echo-plus responses.

IV. Association Criteria

The only association category to show significance was "No logical association," with six-year-old children producing responses with no perceptible association to the stimulus more frequently than four- or five-year-olds.

Discussion

The two variables which showed significant differences in most coding categories were age and SES. Age differences, when verbal materials are involved in the task, are generally related to language development in children, while SES differences suggest the need for a closer look at the actual learning environment.

Word Association and Language Development

Entwistle (1966) provided a set of normative data for children's associations with real word stimuli in which the responses were characterized as "syntagmatic" or "paradigmatic." However, these categories are inappropriate for the present investigation, where there were no valid cues for categorizing responses as either syntagmatic or paradigmatic. Since any one of the child's total repertoire could be considered acceptable, the child's response represents the result of a compromise in which the word produced is in a sense the winning contender. The highest number of syntactic responses were concrete nouns and verbs, the basic units of a linguistic statement. This is not particularly surprising in view of past evidence that early utterances by children are of the pivot noun-verb form. These are the most frequently used and the earliest acquired syntactic forms possessed by young children. As the child gets older and has generalized more of the rules of the language, his sophistication with other syntactic forms increases. This is clearly supported in the present study by significant differences in responding with abstract nouns, adverbs, pronouns, and adjectives. In some cases these responses increased steadily with age.

Age five seems to be an especially critical period in the child's language development. Many of the differences in responding observed at age four decreased to a non-significant level at age five (see Figures 1 and 2). This result is certainly due to many factors, but is probably most closely linked with commencement of school and the resulting increase in the social use of language.

It is interesting to note that four-year-old children were the most reluctant to respond ($F < .01$). Entwistle has also reported the difficulty of collecting responses from children four years old and younger.

Phonological categories also generated age differences. It was expected that younger children would echo the stimulus word much more often than was actually found. However the data show that younger children are more likely to remain silent rather than simply repeat the stimulus. Templin (1963), as well as other investigators, has found that the incorporation of the phonemes of Standard English into speech patterns is closely related to age. This relationship was supported, though there was only a weak correlation between high association words and their phonemic elements. The phonemes p, t, k, b, d, g, f, h, and w appear more often in these high association words, while the low association words contain the phonemes th, z, and j which are considered difficult for children until approximately eight years of age.

Since the only cues available for directing responses were phonological, variations in the echoic production of the stimulus word were expected. Older children seemed to prefer a response which phonologically paralleled the stimulus word to some degree over responses which did not. Six-year-old children produced a creative rhyming response more often than did four or five-year-olds ($P < .01$). Repetition of the first consonant, the first consonant-plus-vowel, and vowel only, proved to be more popular styles of responding among five- and six-year-olds. The repetition of the final consonant was not shown to be present at a significant level. This seems to be contrary to the findings in studies of short-term memory where the final items in a sequence have greater likelihood of being recalled than the other items.

SES, Race, and Association Value

Recently, Kochman (1968) has proposed that the linguistic environment of the ghetto, although obviously different from that of the middle-class

community, is not as deprived as previously thought. In fact, it was found that many "word games" and creative phraseology, e.g. "rapping" or "jiving," existed as an essential part of social survival. The results of the present study support this position for two reasons. First, the only syntactic response category which showed only a significant race difference was that of the verb or verb phrase, and black children rather than white children were the high scorers. Second, an SES x race interaction was found to be significant in only two categories, adverbs and echoing (see Figures 1 and 2), and even here the differences in adverb responses were primarily related to age. The most important point to notice here is that the low SES black children, as a group, gave adverbial responses at least as often as low SES white children and often exceeded both black and white high SES groups. The fact that the relative frequency of occurrence of adverbs in English is less than the occurrence of the more basic linguistic units (nouns and verbs) provides the basis for the assumption that adverbs are among those syntactic units which can be called more sophisticated responses. In essence, no support has been found for language deprivation on the basis of a syntactic criterion.

A second criterion, echoing the stimulus word, also supports the no-difference finding for SES. It has been hypothesized that the language of advantaged children is richer and more imaginative than that of the disadvantaged. While it is unclear what sort of responding would represent the most creative type of associative response to a nonsense stimulus, it was assumed that echoing, almost by definition, is non-creative in any situation. It was interesting to find much more imitating by white four-year-old, low-SES children as compared with black children of the same age and SES. The only two differences in responding found over race, adverbs

and echoing, favored the black children. These findings indicate the need for updated hypotheses and research in the area of linguistic environments and their relationship to verbal differences among ethnic groups.

Socioeconomic status has generally been found to be a consistent predictor of language differences. For example, Loban found a significant relationship between SES and language ability favoring the high SES group. Templin states that the most consistent differences in language skills found were between high and low SES children, again favoring the high SES group. However, in this study very few differences were found attributable to SES, and these did not consistently favor the high group. In fact only in the syntactic category of abstract nouns did the high SES group generate more responses, whereas low SES children gave significantly more adverbial and pronoun responses. The most consistent differences found were over age groups. Repetition of the initial consonant and vowel of the stimulus was found significantly more frequently with the high SES, four- and five-year-old children. This phonological category was the only one in which differences over SES were noted. Thus the hypothesis that there would be race and SES difference was not strongly supported.

This study has served to generate a table of nonsense terms with known association values which can be used in future studies of learning with young children. Additionally, it has provided some support to theories of sequence in the development of syntactic and phonological components of language of young children, and little support to differences based on racial or socioeconomic status factors.

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Table 1

Description of the Total Population

(N = 164)

	Variable	N
Sex	Male	78
	Female	86
Socio-Economic Status	High	78
	Low	86
Race	Black	82
	White	82
C.A. in Years	Four	60
	Five	53
	Six	41

Table 2

Responses given four or more times to each stimulus, with number of first or second order associations[1]

Stimulus	Response Given								Number of Different Responses	Number of First or Second Order Associations
Baze	(10) Day	(6) Days	(4) Bath	(4) Base	(4) Base-ball	(4) Bathe	(4) Bay		101	0
Shoy	(12) Show	(11) Short	(11) Shore	(7) Toy	(6) Boy	(4) Bananas	(4) Water	(4) Joy	89	5
Thil	(17) Fill	(14) Bill	(5) Dill	(4) Ill	(4) Film	(4) Spill			82	4
Deesh	(54) Dish	(12) Fish	(7) Beach	(6) Dishes	(5) Leash	(4) Plate			72	11
Fipe	(40) Fight	(11) Bike	(11) Bite	(6) Pipe	(5) Bicycle	(4) Box	(4) Fighting		75	13
Gan	(11) Dad	(9) Dan	(7) Daddy	(5) Can	(5) Game	(4) Gas			98	3
Thege	(15) Day	(12) Beg	(11) Egg	(10) They	(4) Leg				94	5
Chaw	(21) Chalk	(8) Show	(7) Jaw	(6) Chuck	(6) Shawl	(4) Chaw			87	5
Name	(19) Name	(6) Mane							105	32
Ler	(33) Learn	(6) Blur	(5) Lurch	(5) Lunch	(4) Low	(4) Bird			90	6
Teef	(68) Teeth	(10) Tea	(4) Eat	(4) Toothbrush					77	14
Zos	(23) Sauce	(4) Zos							99	8

[1]First or second order associations include the total number of different response words which could be considered as associations.

Table 2 (cont'd.)

Stimulus	Response Given									
Hadge	(9) Hodge	(8) Hat	(8) Had	(8) Hatchet	(4) Badge	(4) Has	(4) Hedge	(4) Hatch	97	0
Pibe	(54) Pie	(13) Pipe	(11) High	(11) Eye	(10) Hide				65	13
Yim	(11) Yum	(10) Him	(7) You	(5) Jim	(5) Yim				100	0
Jatch	(31) Jacks	(24) Jack	(7) Judge	(4) Ball	(4) Hatch	(4) Jacket			71	6
Whid	(18) Quit	(7) Quid	(7) Quick	(6) Crib	(6) Squid	(4) Pig	(4) Wig		92	8
Coot	(11) Coat	(11) Coot	(9) Cook	(8) Boot	(6) Coop	(4) Coo-coo			83	0
Vare	(39) There	(25) Bear	(6) Dare	(5) Fair	(4) Wear				82	9
Quife	(37) Quite	(7) Wife	(7) Quiet	(5) Twice	(5) White				80	0
Sedge	(12) Said	(7) Edge	(7) Hedge	(6) Sedge					96	0
Vut	(41) But	(7) That	(6) Button	(6) The	(4) Book	(4) Thut			70	2
Rav	(26) Rug	(26) Rob	(6) Frog	(5) Rod	(4) Robbie				75	3
Sun	(32) Sun	(7) Moon	(4) Hum						83	16
Pume	(20) Coon	(14) Cool	(10) Pool	(6) Racoon	(5) Comb	(5) Moon	(4) Cold	(4) Whom	82	11
Thope	(51) Soap	(11) Boat	(7) Folk						70	9
Cheel	(11) Chair	(9) Shield	(8) Cheese	(6) Chill	(4) Peel	(4) Seal			85	0
Bed	(13) Bed (4) Sleeping	(11) Bad	(10) Sleep	(9) Said	(6) Head	(5) Dead	(4) Red	(4) Bug	79	14

Table 2 (cont'd.)

Stimulus	Response Given									
Fon	(10) Fun	(9) Fine	(5) Sun	(5) Farm	(4) Don				103	0
Zore	(32) Sore	(15) Sword	(11) Door	(8) Zore	(4) Bore	(4) Or	(4) Zoom		69	7
Gip	(23) Get	(14) Gift	(13) Skip	(9) Dip	(4) Present	(4) It			82	7
Lave	(28) Lay	(7) Leg	(5) Lady	(4) Slave	(4) Cave				78	4
Mobe	(20) Mow	(10) Mowed	(8) Move	(4) More	(4) Robe				84	1
Shoe	(33) Shoe	(8) Shoes	(6) School	(6) Shoot	(5) Boo	(5) Sock	(4) Who		71	15
Yoth	(16) Ya	(9) Yawn	(7) Yard	(6) Yes					81	0
Veek	(24) Beak	(19) Feet	(7) Think	(6) Neek					82	7
Hez	(16) Head	(11) Hay	(8) Heads	(8) Hands	(5) Hair	(4) Has	(4) Hose	(4) Hat	82	15
Whee	(48) Queen	(7) Quee	(7) We	(5) King	(4) He	(4) Cream			62	5
Tuke	(15) To	(11) High	(9) Toot	(6) Tooth	(6) Tuke	(4) Paper			90	0
Ruz	(52) Run	(14) Rug	(7) Runs	(4) Was					68	5
Mice	(23) Mice	(16) Mouse	(7) Nice	(6) Might	(6) Mud	(5) Ice			73	15
Geeb	(12) Geese	(6) Key	(6) Give	(4) Gee					93	0
Lish	(19) Dish	(8) Lish	(7) Fish	(6) List	(5) Leash	(4) Delicious			79	8
Nech	(19) Net	(9) Catch	(9) Neck	(7) Fish	(6) Match	(4) Nets	(4) Nest		77	4

Table 2 (cont'd.)

Stimulus	Response Given								
Rothe	(37) Road	(15) Rose	(8) Row	(6) Car	(4) Boat	(4) Robe	(4) Run	65	8
Dog	(32) Dog	(18) Cat	(8) Doll	(6) Car	(6) Log	(4) Fog	(4) Hog	74	30
Jove	(44) Joe							78	4
Kile	(14) Cow	(13) Kile	(9) Kite	(8) Coyote	(5) Pile	(5) Tile	(4) Water	81	0
Muth	(18) Muff	(14) Mud	(10) Muffin	(8) Mutt	(5) Mother	(4) Mug	(4) Puff	69	3
Quud	(5) Could	(4) Bud	(4) Quiet					100	0

Table 3

Nonsense Monosyllables

(Rank Ordered--High to Low)

Nonsense Monosyllable	Percent of Total Responses with Four-Plus Frequency	Nonsense Monosyllable	Percent of Total Responses with Four-Plus Frequency
Pibe	.623	Quife	.405
Rothe	.574	Ler	.404
Whee	.573	Lish	.402
Deesh	.571	Lave	.397
Zore	.557	Chaw	.391
Ruz	.546	Coot	.389
Fipe	.543	Thil	.387
Teef	.541	Whid	.380
Dog[a]	.538	Tuke	.378
Jatch	.532	Theyge	.369
Vut	.515	Mobe	.368
Shoe[a]	.511	Jove	.364
Thope	.507	Hadge	.355
Vare	.506	Sun[a]	.350
Muth	.504	Cheel	.347
Rav	.489	Yoth	.330
Bed[a]	.485	Name[b]	.328
Mice[a]	.485	Gan	.308
Pume	.479	Yim	.286
Gip	.469	Baze	.276
Nech	.453	Sedge	.258
Hez	.448	Fon	.252
Kile	.439	Geeb	.239
Shoy	.431	Zos	.218
Veek	.418	Quud	.118

[a]Real words

[b]Although "name" was considered a real word, it was low in association value since many children responded with their own names.

Table 4a

Mean Number of Responses by Syntactic Categories - Summary Scores

N = 164

Category	Total Sample		Race		SES		Age			Sex	
	Mean	S.D.	White	Black	High	Low	4	5	6	Boys	Girls
No Response	6.47	8.57	7.07	5.87	5.95	6.94	9.75	5.14	3.71	5.97	6.91
Noun (Concrete)	26.32	8.72	27.77	24.88	27.32	25.42	26.87	25.84	26.27	26.61	26.07
Noun (Abstract)	0.82	0.89	0.68	0.95	0.92	0.72	0.57	0.86	1.12	0.79	0.84
Verb	7.69	4.09	6.71	8.66	7.58	7.78	5.72	8.75	8.93	7.36	7.97
Conjunction, Article, Interjections	0.66	0.95	0.50	0.83	0.53	0.79	0.45	0.68	0.95	0.60	0.72
Adjective	2.58	1.99	2.44	2.73	2.59	2.58	1.97	2.76	3.22	2.60	2.57
Adverb	0.93	0.98	0.83	1.02	0.76	1.08	0.73	0.82	1.36	1.03	0.84
Preposition	0.16	0.40	0.11	0.22	0.19	0.14	0.08	0.25	0.15	0.21	0.13
Pronoun	0.56	0.97	0.45	0.67	0.37	0.73	0.25	0.56	1.02	0.57	0.55
Nonsense Word	3.80	4.38	3.44	4.17	3.79	3.81	3.62	4.33	3.27	4.26	3.40

Table 4b

Mean Number of Responses by Phonological Categories - Summary Scores

N = 164

Category	Total Sample		Race		SES		Age			Sex	
	Mean	S.D.	White	Black	High	Low	4	5	6	Boys	Girls
C__	4.43	3.15	4.68	4.17	4.05	4.77	3.47	4.46	5.78	4.12	4.70
CV_	7.16	5.04	6.71	7.61	7.60	6.76	5.52	7.92	8.39	7.05	7.25
__C	1.23	1.17	1.28	1.18	1.15	1.30	1.23	1.33	1.07	1.30	1.17
_VC (Rhyme)	6.40	5.12	5.32	7.49	6.24	6.55	4.28	7.41	7.95	6.95	5.92
C_C	1.27	1.29	1.37	1.18	1.12	1.42	1.28	1.30	1.22	1.29	1.26
_V_	6.88	4.42	5.68	8.07	7.09	6.69	4.83	7.60	8.75	6.77	6.98
Echo	1.76	3.10	1.82	1.71	1.68	1.84	2.08	1.90	1.07	1.94	1.61
Echo +	0.86	1.10	0.82	0.90	0.95	0.78	0.62	0.90	1.15	0.71	0.99
No Parallel Sound	13.53	12.46	15.26	11.80	14.15	12.97	16.93	12.00	10.90	13.93	13.20

Table 5

Analysis of Variance for Response Criteria (Syntactic)

Source	df	No Response		Noun--Abstract		Verb		Adjective		Adverb		Pronoun	
		MS	F	MS	F	MS	F	MS	F	MS	F	MS	F
Age (A)	2	395.55	5.89**	5.20	7.37**	105.70	7.48**	13.21	3.53*	3.09	3.76*	4.60	6.13**
SES (S)	1	205.12	3.05	4.02	5.70*	0.02	0.00	0.61	0.16	3.45	4.19*	5.32	7.11**
Race (R)	1	20.83	0.31	0.20	0.28	56.89	4.02*	0.06	0.02	0.15	0.18	0.72	0.96
Sex (X)	1	8.34	0.12	0.03	0.04	12.74	0.90	1.50	0.40	6.32	7.68**	0.77	1.02
AS	2	1.01	0.01	2.02	2.86	22.58	1.59	12.57	3.36*	2.52	3.06*	2.51	3.35*
AR	2	120.08	1.78	0.94	1.34	0.32	0.02	8.08	2.16	2.13	2.59	0.96	1.27
AX	2	75.40	1.12	0.44	0.61	24.74	1.75	1.56	0.42	0.14	0.16	4.24	5.66**
SR	1	64.55	0.96	2.51	3.55	33.78	2.39	4.08	1.09	5.46	6.64*	2.05	2.74
SX	1	11.52	0.17	0.04	0.06	6.95	0.49	2.79	0.74	0.16	0.20	1.57	2.10
RX	1	16.25	0.24	0.27	0.38	4.41	0.31	4.60	1.23	0.49	0.60	0.20	0.26
ASR	2	136.78	2.04	1.12	1.59	11.62	0.82	5.72	1.53	0.86	1.04	1.77	2.36
ASX	2	28.42	0.42	0.27	0.38	4.89	0.35	0.28	0.07	1.54	1.87	0.04	0.04
ARX	2	34.18	0.51	1.12	1.59	18.88	1.33	0.95	0.25	1.34	1.62	1.09	1.45
SRX	1	1.55	0.02	0.00	0.00	43.04	3.04	0.97	0.26	4.26	5.18*	3.32	4.43*
ASRX	2	76.68	1.14	1.50	2.12	9.18	0.65	6.14	1.64	0.56	0.67	1.21	1.61
Error	142	67.15		0.71		14.13		3.74		0.82		0.75	

*p ≤ .05

**p ≤ .01

Table 6a

Analysis of Variance for Response Criteria (Phonological)

Source	df	C__		CV_		_VC		_V_	
		MS	F	MS	F	MS	F	MS	F
Age (A)	2	56.46	6.78**	86.08	3.85*	147.65	6.06**	102.81	6.43**
SES (S)	1	15.49	1.86	40.62	1.82	20.31	0.83	60.65	3.80
Race (R)	1	11.13	1.34	1.75	0.08	38.70	1.59	53.94	3.38
Sex (X)	1	26.37	3.17	9.21	0.41	94.33	3.87	2.96	0.19
AS	2	25.84	3.10	107.46	4.81**	25.36	1.04	24.79	1.55
AR	2	7.88	0.98	85.10	3.81*	14.84	0.61	18.76	1.17
AX	2	47.68	5.73**	14.51	0.65	27.64	1.13	15.36	0.96
SR	1	20.62	2.48	0.45	0.02	5.37	0.22	9.30	0.58
SX	1	7.50	0.90	2.33	0.10	52.54	2.16	13.85	7.12**
RX	1	0.47	0.06	0.01	0.00	30.86	1.27	29.49	1.84
ASR	2	19.12	2.30	25.18	1.13	7.04	2.89	12.74	0.80
ASX	2	2.95	0.36	29.77	1.33	14.55	0.60	10.80	0.68
ARX	2	16.28	1.96	8.58	0.38	4.20	0.17	38.97	2.44
SRX	1	1.79	0.22	138.25	6.19*	31.67	1.30	64.54	4.04
ASRX	2	12.36	1.48	0.44	0.02	1.68	0.07	17.19	1.11
Error	142	8.32		22.33		24.36		15.98	

*$p \leq .05$

**$p \leq .01$

Table [illegible]

Analysis of Variance for Response Criteria (Association

Source	Echo		Echo +		Association	
	MS	F	MS	F	MS	F
Age (A)	15.59	1.71	3.62	3.35	286.22	4.46*
SES (S)	8.06	0.85	1.02	0.94	216.25	3.37
Race (R)	1.11	0.12	0.07	0.07	35.32	0.55
Sex (X)	7.45	0.78	2.83	2.62	33.56	0.52
AS	12.96	1.36	3.28	3.04	20.94	0.33
AR	49.86	5.25*	2.20	2.04	40.38	0.63
AX	1.23	0.13	3.30	3.02	55.78	0.87
SR	41.94	4.42*	1.08	1.01	123.31	1.92
SX	0.09	0.01	6.86	6.08*	7.44	0.12
RX	0.42	0.04	0.07	0.07	19.00	0.30
ASR	7.84	0.82	0.02	0.02	128.32	2.00
ASX	3.70	0.39	0.20	0.18	19.16	0.29
ARX	5.03	0.53	1.62	1.50	35.44	0.55
SRX	13.82	1.46	2.59	2.40	0.56	0.01
ASRX	1.01	0.11	0.32	0.30	68.78	1.07
Error	9.49		1.08		64.14	

*p $\leq$ .05

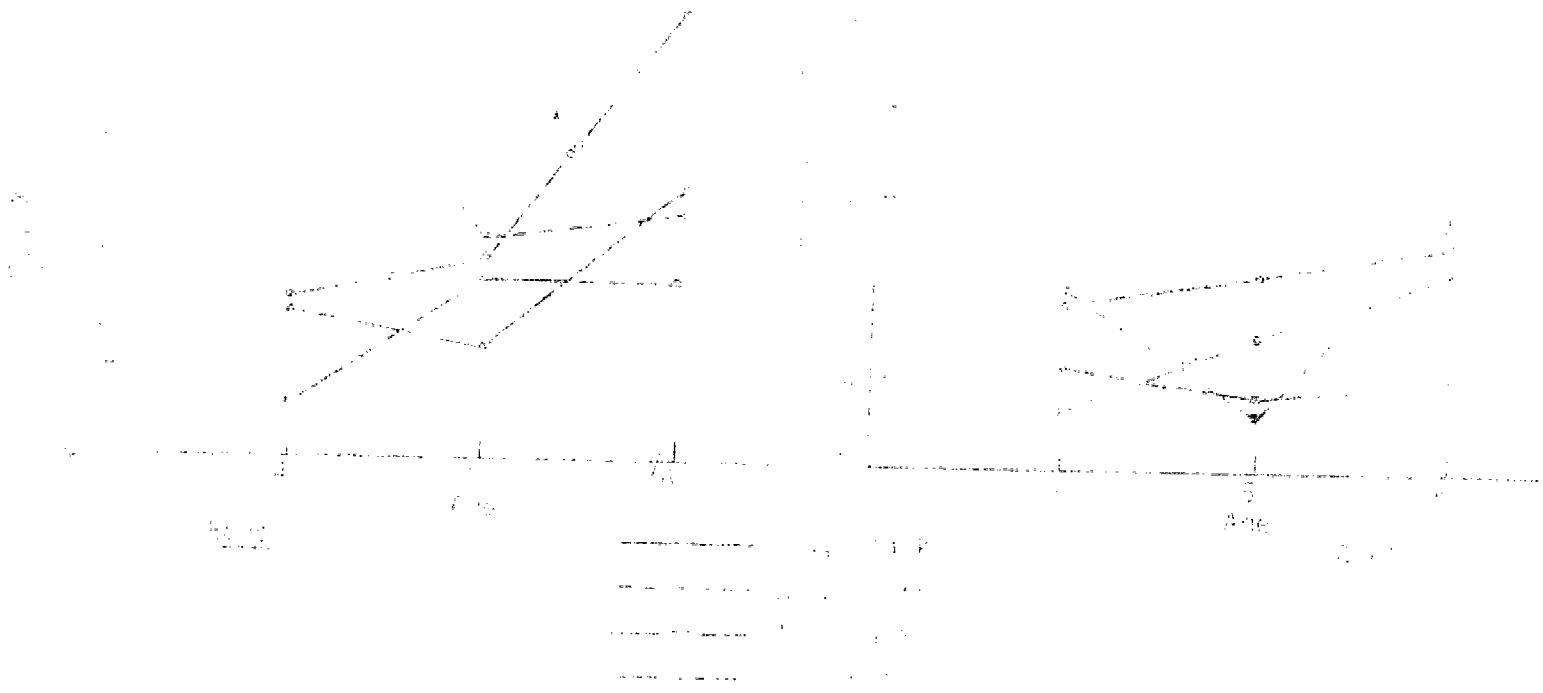

Figure 1. Differential [illegible]