

QUANTITY AND QUALITY OF TEACHERS' VOCABULARIES ADDRESSED TO
DEVELOPMENTALLY DISABLED AND NONDISABLED PRESCHOOL CHILDREN

by

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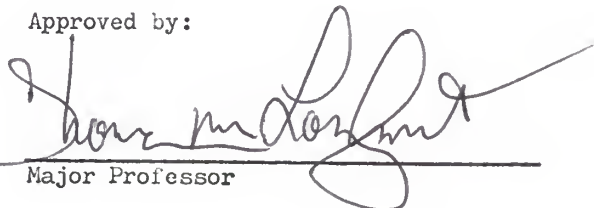
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INTRODUCTION

One approach to the acquisition of language by a child regards language as developing from innate universal capacities. McNeill (1970) and Lenneberg (1967) have suggested that because the child's acquisition of language is innate, only a minimum of exposure to the environment is necessary for normal language development. They concluded that it does not matter, to a great extent, what kind of linguistic input the child receives, because acquisition was attributed to this innate language acquisition device (LAD). Chomsky (1967) and McNeill (1970) have suggested that the speech a child hears from adults has little or no influence on the child's language development, since the speech is often ungrammatical and difficult for the child to understand. These arguments, that adult speech has a minimal effect upon child language development, appear to be based on reports of adult speech addressed to another adult.

Other authors (Broen, 1972; Granowsky & Krossner, 1970; Phillips, 1973; Snow, 1972; and many others) who have discussed the relationship between adult speech addressed to children, and their subsequent language development have come to an opposing conclusion. These authors have produced ample evidence that suggests that speech which is directly addressed to children differs from adult-adult interactions in a number of ways, including the content of the message and its phonological, syntactic, and semantic characteristics.

It appears that in acquiring his first language, the child forms hypotheses about the adult language to which he is exposed, and this adult language becomes the "target" for the child's development of language (Buium, Rynders, & Turnure, 1974). Adult speech addressed to children,

therefore, is of crucial importance in the study of child language acquisition. It is important to acquire as much information as possible about the characteristics of the child's linguistic environment.

The characteristics of mothers' speech to normal children have been extensively investigated. The results of these investigations demonstrate that mothers do adjust their speech as they address young children. Even further, it has been demonstrated that mothers modify their speech according to the linguistic level of the child to whom they are speaking (Baldwin & Baldwin, 1973; Broen, 1972; Buium et. al., 1974; Fraser & Roberts, 1975; Longhurst & Stepanich, 1975; Moerk, 1974; Phillips, 1973; Seitz & Marcus, 1976; Snow, 1972). In general, mothers' speech to children is simpler and uses a more redundant vocabulary than their speech to another adult.

Although there have been relatively few studies conducted to determine the occurrence of these same adjustments in the verbal behaviors of fathers to their normal children, it appears that fathers do adjust their speech patterns to children (Giattino & Hogan, 1975; Vedros, Note 4). While there were some differences in the specific way that mothers and fathers adjusted their speech, these investigations revealed that fathers did adjust their language to the level of the child they were addressing.

In addition to the research involving parents and their normal language learning children, there have also been investigations of the behavior of mothers interacting with their handicapped children (Buium et. al., 1974; Dolley, 1974; Kogan, Wimberger, & Bobbitt, 1969; Marshall, Hegrens, & Goldstein, 1973; Mitchell, 1976). These investigators concluded that mothers of mentally handicapped children do adjust their

speech directed to their children, although the nature of these adjustments are quite different from those made by parents of non-handicapped children of similar chronological age. In general, it was found that mothers of handicapped children used a higher frequency of imperative sentences, and more controlling behaviors such as ordering, restraining, and manding. Additionally, they found a higher frequency of grammatically incomplete sentences and single word responses, and a larger number of utterances, but a lower mean length of utterance. The mothers of the handicapped children also used fewer conjunctions, indefinite pronouns, and wh-questions, and a higher frequency of questions in which they supplied the correct answer, or to which they already knew the answer. These studies make it clear that the handicapped child's linguistic environment may be quite different from that of a non-handicapped child of the same chronological age.

This adjustment found in adults' speech to handicapped and non-handicapped children does not appear to be restricted to parents. Some researchers have found that in adult-child interactions, non-parents also make similar adjustments in their speech (Siegel, 1963; Siegel, 1967; Siegel & Harkins, 1963; Spradlin & Rosenberg, 1964). Additionally, being an adult is not even a prerequisite to making these modifications in speech addressed to young children. In a study by Shatz and Gelman (1973) it was noted that four-year-old subjects gave some indication of adjusting their speech as a function of the age of the listener.

As is apparent from the literature reviewed, there are a number of areas of interest in adult-child interactions. The focus of the current investigation involved vocabulary or semantic measures. Within this area, investigations may focus upon total word counts, redundancy or diversity of

vocabulary, frequency of particular words, as well as many other factors.

Counts of the total number of words spoken to a particular child establish a general picture of the quantity of speech directed to that child, or to groups of children. Siegel (1963), found that when adults were paired with high and low level retarded children, there were significant quantitative differences in the verbal responses of the adults. It appeared that the more retarded a child was perceived to be, the less he was talked to.

Many studies have included a reference to the diversity of the adults vocabulary, as measured by the type-token ratio (TTR). Type-token ratio has been described as a measure of vocabulary flexibility, diversity, or richness (Carroll, 1938, 1964; Johnson, 1944). This measure is a ratio of the number of different words (types) to the number of total words (tokens) in a given sample. If in a sample of 100 words (tokens) a speaker used 68 different words (types), his type-token ratio would be .68. Of two samples of equal length, the one of low diversity (low TTR) has fewer different words; the sample of higher diversity (high TTR) contains a greater number of different words, so that each word has a lower frequency of occurrence.

In adult-retarded child interaction studies, a direct relationship between a child's verbal level, and the adult's TTR has been established (Siegel, 1963; Siegel & Harkins, 1963; Spradlin & Rosenberg, 1964). In a review article Siegel (1967) suggested that the verbal behavior of adults is influenced by the characteristics of the specific retarded child with whom they are interacting. This relationship has been found with both male and female subjects, and in a variety of situations. He also noted

that adults appear to have their greatest amount of verbal output during a structured type of situation.

Guralnick and Paul-Brown (1977) investigated the verbal interactions among handicapped and non-handicapped preschool children, to determine whether any adjustments were made according to the developmental level of the listener. They found that in an instruction-teaching situation, the diversity of the speech of non-handicapped children tended to remain in proportion to the developmental level of each child they addressed, as indicated by the TTR measures. These results were based on 15-minute samples of speech, with no reference to the size of the word sample used. Analysis of the data in a free-play setting showed that as the developmental level of the listener decreased, the non-handicapped speakers used fewer words, and tended to repeat their utterances. Although no statement of sample size in words was given (other than 100 utterances), measures of TTR were again included. The investigators stated that most of the TTR's did not vary across developmental levels. They explained that more and different parts of speech were used with the more advanced listeners, which again suggests that the extent of new information remained proportional to the total number of words used. The authors suggested that the linguistic environment of these handicapped children, provided by their non-handicapped peers, varied directly with the severity of the developmental delay. Some question arises as to the impact of these environmental differences on the development of the language learning child. The authors felt these were appropriate adjustments of positive value. Their support came from the finding that although a greater and more diverse vocabulary was directed to the more advanced children, there was a large amount of similarity among the TTR measures. They suggest that the handicapped children were

provided with an opportunity to hear advanced and diverse linguistic information, but in proportion to their developmental levels.

Because a child typically spends a great amount of time in a school setting, investigation of the characteristics of teachers' speech to language learning children seems to be the next logical step in the study of adult-child interactions. A number of studies have been conducted on this topic (Cherry, 1975; Conn & Richardson, 1976; Granowsky & Krossner, 1970; Riedl, Note 2; Schraeder, Note 3). An additional vocabulary measure has been used by several of these investigators (Granowsky & Krossner, 1970; Longhurst & Stepanich, 1975; Riedl, Note 2) to describe the "ordinariness" of a speakers vocabulary. Such a procedure involves comparing the words in a sample of speech with a list of frequently used words, such as the Thorndike-Lorge list of 1,000 most frequent words. This comparison gives an indication of the concreteness of a speaker's vocabulary, since in general, the most frequent words are also the most concrete.

When investigating teachers' speech to children, Granowsky & Krossner (1970) found that significant differences were demonstrated on several measures. In comparison to their speech to adults, teachers' speech to children included shorter sentences, more simple sentences and fragments, and fewer compound, complex, compound-complex, and elaborated sentences. In interactions with children, the teachers also had a lower TTR and a larger percentage of usage of words found in the first 1,000 most frequently used words in the Thorndike-Lorge list.

Another investigation of teachers' speech that included vocabulary measures was conducted by Riedl (Note 2). She concluded that teachers

tended to use more questions and more common words in their speech to normal children of low linguistic level. However, they also used significantly more information questions, and greater TTR's when interacting with high linguistic level children.

Although there does appear to be an increase in the availability of information regarding teachers' speech to normal children, relatively little research has been done on teachers' speech to developmentally disabled, handicapped children. At the present time, very little is known about how teachers actually talk to handicapped children. As mentioned previously, some studies have shown how adults restrict the diversity of their vocabulary when talking to retarded children, and others have shown that the more retarded a child is perceived to be, the less people talk to him.

A study by Conn and Richardson (1976) is one of the few investigations done in a class containing developmentally disabled and non-disabled preschool children. Although no specific vocabulary measures were reported, some interesting information was obtained. Of the eight children in the classroom, one child received 35.8% of the teachers' text, and another received 6.1%. The proportion received by this first child was significantly larger than that received by the seven other children. It was further reported that this first child received 80 words that no other child as an individual received, while the second child received only 3 words that no other child did. This may indicate the first child was receiving a more diverse vocabulary from the teachers than were the other members of the class.

The study of teachers' speech to high and low level children allows

for a very broad area of discussion, all of which may hopefully allow an individual teacher to evaluate his or her own teaching, the kind of language used with the children, and the ways in which the language environment that is provided helps the children to learn. The area of semantic or vocabulary adjustments utilized by teachers to high and low level children is an important part of this broad area of adjustments in adults' speech to children, and the one which was addressed in the present investigation. Vocabulary diversity, as indicated by the type-token ratio, has often been referred to as an important aspect of the adequacy of language. If teachers utilize a diverse vocabulary when conversing with their students, the students are then exposed to a richer verbal environment.

With this in mind, the purpose of the present investigation was to analyze the vocabulary of two preschool teachers in interaction with their disabled and non-disabled students. It was hypothesized that teacher speech to the non-disabled children would be greater in quantity and quality than that addressed to the children in the disabled group.

The experimenter attempted to find evidence to answer the following specific questions: 1) Is there a difference in the quantity and diversity or richness of the vocabulary of teachers to high level non-disabled children, as compared to the language addressed to the disabled low level children? 2) Are there specific adjustments in the teachers' vocabulary that are typical of varying classroom situations? 3) Does the proportion of the total vocabulary addressed to individual children differ?

Investigation of the vocabulary characteristics of these teachers may reveal certain patterns that could be exploited in order to improve the language development of disabled children.

METHOD

Adult Subjects

Two native English speaking female teachers of a preschool for the developmentally disabled served as the adult subjects. Both had educational backgrounds in early childhood education, and both were full-time teachers at the preschool in which the data were collected.

Child Subjects

Eight children served as the child subjects for this study. Four were developmentally disabled and four were non-disabled, and all their parents spoke English as their native language. The developmentally disabled group was comprised of three males and one female, ranging in age from two years to four years seven months, with a mean age of three years. The developmental language level of each child in this group was determined by their performance on the Receptive-Expressive Emergent Language Inventory (Bzoch & League, 1971) or the Verbal Language Development Scale (Mecham, 1959). As a group, the disabled children scored equivalents ranging from nine months to one year six months. Mean length of utterance scores for this group did not exceed 1.5 morphemes. The group of non-disabled children was composed of two males and two females. The age range of this group was from two years to five years eight months, with a mean chronological age of three years three months. According to their scores on the Peabody Picture Vocabulary Test (Dunn, 1959) and the judgements of the parents and teachers, the children in this group were normal or slightly advanced in their language development. Mean length of utterance scores were also computed for this group, with results indicating a range from 2.9 to 4.3 morphemes, and a mean score of 3.6. An initial

attempt was made to obtain language measures on some standardized tests that could be considered as appropriate to both groups of children. Beyond obtaining language samples and computing the children's mean length of utterance, such measures could not be determined. The primary concern at this stage was to establish the fact that the two groups of children involved did represent two distinct linguistic levels, the disabled group being language deficient and the non-disabled group being normal or slightly advanced in their language development. There was no attempt made in this study to control for sex, age, or number of siblings of the subjects.

Setting

All observational recordings and data collection were done at a preschool for developmentally disabled children. The facility was composed of an entrance area, a therapy room, a kitchen, and an open play area located adjacent to an area with tables used for pre-academic teaching.

Procedures

Throughout this study, consistent effort was made to avoid altering the environment that existed in the preschool. Prior to the collection of data, the teachers were informed that they would be participating in a study that dealt with adult speech to children. They were also informed that their verbal interaction with the children would be observed and recorded, and were asked to continue with their daily routines just as they had done prior to the onset of the study. The specific details and purposes of the study were not disclosed to the teachers, so that they would perform as naturally as possible. The four disabled children and one non-disabled child were in regular attendance at the preschool. Prior to the onset of

the study, written consent was obtained for three additional non-disabled children to attend the preschool for a five week period. The first week of this five week period was provided for the children to become acquainted with the teachers and the setting. During the four remaining weeks, observations and recordings were collected.

Teacher speech was monitored and recorded by the use of an FM telemetry system. A dual channel cassette tape recorder (Wollensak, Model 2516 AV) and two receivers (Vega, Model 58) were operated from the entrance area of the preschool. The data collector and each teacher being observed wore vests that were equipped with concealed condenser microphones (Sony, ECM-16) and transmitters (Vega, Model 77). The teachers' speech was recorded on channel one of the stereo system. Contextual cues from the environment and any non-verbal responses from the children were recorded on the second channel of the system. For example, in addition to observing the interactions of the teachers, it was possible to record to which child the teacher was speaking if this was not clear by her speech. Each teacher was observed and recorded individually one hour each day, four days per week, for four weeks. The observations were made during the first two hours of each three hour morning session of the preschool. Each day, the order in which the teachers were recorded was reversed. When this hour of recording had begun it was not interrupted, regardless of the activities in which the teacher engaged. There were four specific classroom activities in which each child had the opportunity to be involved in daily. One of these was an unstructured, free-play situation which typically included a morning greeting, as well as various play activities. In this unstructured situation the children could be interacted with individually, or in small

groups. The second classroom activity was called circle. This was a group discussion time in which all of the children participated. Tablework was the third classroom activity and involved one teacher interacting with one child in the teaching of specific pre-academic skills. The final classroom activity in the preschool was a snack time, in which all adults and children were seated around a table for the purpose of eating a snack.

Protocol Preparation

The experimenter made a verbatim, typewritten transcription of the teacher's and the children's speech from channel one of the tape recordings, according to a modification of the instructions described by Siegel (1963). Separate notations about contextual cues, from channel two of the recordings, were written adjacent to the teachers' utterances. These notations included to which individual child the utterance was addressed, and from which of the teachers it came. These protocols were then retyped into transcripts of speech directed to each of the eight children by each of the two teachers. As a result, there were two sets of daily transcripts addressed to each child, one from each of the teachers. Reliability for transcript preparation was established by having a second experienced graduate student retype four of the hour long tapes. Percentage of agreement for protocol preparation ranged between 90 and 97 percent.

Performance Measures

Analysis of the teachers' speech to each child included: 1) total number of words, 2) Carroll type-token ratio, and 3) comparison of unique words with the Thorndike-Lorge list of 1,000 most frequently occurring words.

A count of the total number of words to each child by each teacher,

in each of the four situations was tallied. In addition, the overall total number of words spoken by each teacher to each child was tallied in order to establish a rank order of the quantity of speech addressed to the high versus the low level children. This effort to compare the proportion of teachers' speech to each child has been emphasized in previous research (Conn & Richardson, 1976). This measure also determines which of the four situations, if any, appears to demand the largest quantity of speech from the teachers. (The total number of words in a sample were counted according to criteria described in Appendix A.)

Type-token ratio is a measure of vocabulary flexibility, diversity, or richness. It is computed as a ratio of the number of different words to the number of total words in a sample. For example, in a sample of 461 words, if a speaker used 392 different words, his type-token ratio would be .85. As previously explained, if two samples are of equal length, the sample with the lower TTR has fewer different words; the sample with the higher TTR has greater diversity and contains a greater number of different words, so that each word has a lower frequency of occurrence. However, this ratio tends to vary inversely with the size of the sample (the larger the sample size, the smaller the TTR). This is because fewer and fewer of the words will not have occurred in the samples already counted. For this reason, the number of tokens used in computing the TTR must be kept relatively constant in order to make the ratio comparable from one sample to another. TTR has been used frequently as a measure of vocabulary diversity (Chotlos, 1944; Broen, 1972; Fairbanks, 1944; Johnson, 1944; Mann, 1944; Phillips, 1973; Siegel, 1963; Spradlin & Rosenberg, 1964). While TTR has been described as being a sensitive measure of vocabulary diversity, it is

important to keep in mind that only samples of the same size (same number of tokens) are directly comparable. In addition, any reference to a specific ratio is of little value, without knowledge of the sample size used in determining that ratio.

Although TTR has been established as an accurate measure of vocabulary diversity, it has frequently been misused, by comparisons of TTR's from differing sample sizes. Because standard sample sizes are not always possible to obtain, a correction procedure can be used in order to make samples approximately comparable. Such a procedure is described by Carroll (1964) and has been called Carroll type-token ratio (CTTR) (Longhurst & Grubb, 1974; Riedl, Note 2). It has been described as being "approximately independent of sample size" (Carroll, 1964, Pg. 54), and is computed by dividing the number of different words (types) by the square root of twice the number of total words (tokens) in the sample. The formula is expressed as; $CTTR = \text{Types} / \sqrt{2 \times \text{Tokens}}$. When samples of different sizes are to be compared, as was the case in the present investigation, comparisons between samples cannot be regarded as meaningful unless a procedure such as CTTR is utilized. In the present investigation, each sample utilized for computing CTTR contained a minimum of 25 total words. Samples containing less than 25 total words were disregarded.

Finally, all unique words in each sample were compared with the Thorndike-Lorge (1944) list of the thousand most frequently used words, and the percentage of these words appearing on the list was computed. (The number of unique words in a sample were counted according to criteria described in Appendix B.) This procedure has been used as a measure of the "every-dayness" or "ordinariness" of vocabulary (Cannon, Note 1; Granowsky

& Krossner, 1970; Longhurst & Stepanich, 1975; Riedl, Note 2). Because words on the Thorndike-Lorge list tend to be simple and concrete, the percentage of words used that occur on this list gives an indication of the concreteness of vocabulary choice. Comparisons of samples with the Thorndike-Lorge list were made according to criteria described in Appendix C.)

RESULTS

Reliability

Reliability for application of all performance measures was established by having a graduate research assistant apply each of the measures. Of the total group of daily protocols, one was chosen randomly from each teacher to each child, across the four week period, so that a total of 16 protocols were utilized. Percentage of agreement for total number of words ranged from 95% to 100%, with a mean of 99%, and for the number of unique words in a sample, from 96% to 100%, with a mean of 98%. Agreement percentages for the number of unique words on the Thorndike-Lorge list ranged from 94% to 100% with a mean of 98%.

The data were analyzed according to the total number of words spoken by each of the two teachers, to each of the eight children. The total number of words spoken by Teacher 1 to individual children in the non-disabled group ranged from 2,648 to 9,137 words, with a mean of 4,387 words, while the range for the disabled group was from 888 to 3,856 words, with a mean of 2,083 words. Teacher 2 spoke from 1,786 to 7,815 total words to children in the non-disabled group, with a mean of 4,054 words. Her range for the disabled children was from 1,068 to 4,018 with a mean of 2,717 words. Of a total of 52,964 words spoken by both teachers in the

four week period, 33,762 words, or 64% of the teachers' text, were addressed to the non-disabled group, while 19,202 words, or 36% of the teachers' speech, were addressed to disabled children. Table 1 presents the number of words spoken to each child, with totals for the disabled and non-disabled groups. The percentage of the total number of words spoken to each individual child by each teacher, with totals for each group, is presented in Table 2. In examining Tables 1 and 2, it is apparent that a majority of the teachers' speech, during this four-week period, was addressed to the non-disabled group of children. It should be noted that although subject 3 of the non-disabled group was absent from school for an entire week, the non-disabled group as a whole still received nearly twice as many total words as did the disabled group. In addition, subject 1 of the non-disabled group received nearly three times as many total words as did the subject with the next highest number of words. It was also noted that subject 1 of the non-disabled group received almost eight times as many total words as did the child who received the fewest number of total words. Table 2 demonstrates that the child receiving the greatest amount of speech from the teachers had 32% of the teacher speech. The child with the next largest percentage of teacher speech received only 12%, while the child receiving the least teacher speech received only 3.5%.

With respect to the four classroom situations, it was found that of the 52,964 total words spoken by both teachers, 21,095 words, or 40% of the teachers' words, were directed to the non-disabled children in unstructured free-play activities, while only 10,980 words, or 21% of the teachers' total words were directed to the disabled children in the free-play situation. During snack time, 1,203 words, or 2% of the teachers' speech were addressed to the non-disabled group, and 503 words, or less than

Table 1
 Total Number of Words Spoken to Each Child by Teacher,
 With Group Totals

	Teacher 1	Teacher 2	Total
Non-disabled Children			
1	9,137	7,815	16,952
2	2,648	3,576	6,224
3 ^a	3,047	1,786	4,833
4	2,715	3,038	5,753
Mean per Child	4,387	4,054	8,441
Non-disabled Group	17,547	16,215	33,762
Disabled Children			
1	2,159	4,018	6,177
2	888	1,068	1,956
3	1,430	3,937	5,367
4	3,856	1,846	5,702
Mean per Child	2,083	2,717	4,801
Disabled Group	8,333	10,869	19,202

^a Subject 3 of the non-disabled group was absent from the pre-school for an entire week of the data collection period.

Table 2

Percentage by Teacher of the Total Number of Words Spoken
to Each Child, With Group Totals

	Teacher 1	Teacher 2	Total
Non-disabled Children			
1	35.0%	29.0%	32.0%
2	10.0%	13.0%	12.0%
3	12.0%	7.0%	9.0%
4	10.0%	11.0%	11.0%
Non-disabled Group	68.0%	60.0%	64.0%
Disabled Children			
1	8.0%	15.0%	11.5%
2	3.0%	4.0%	3.5%
3	6.0%	15.0%	10.0%
4	15.0%	7.0%	11.0%
Disabled Group	32.0%	40.0%	36.0%

1% of the teachers' total words, were addressed to the disabled group. In the activity previously described as tablework, 5,957 words, or 11% of the teachers' speech, were addressed to the non-disabled children, and 5,603 words, or 11% of the teachers' total words, were spoken to the disabled children. The final classroom situation analyzed was circle. In this activity 5,507 words, or 10% of the total words were directed to the non-disabled children, while 2,116 words, or 4% of the teachers' speech, were directed to the disabled group of children.

The total number of words spoken to each individual child in each of the four classroom situations is presented in Table 3. This table also presents the percentage of total number of words spoken, that were directed to children of each group, in each of the four situations. By compiling the individual child data into group data in each of the four situations, it appears that the majority of the teachers' speech, for each group, occurred in the unstructured free-play situation, while the fewest number of words, again for each group, occurred during snack time. From examination of this table, it would appear that during the snack situation, only a minimum of the total amount of the teachers speech was uttered. Even further, two non-disabled and two disabled children were spoken to during only 4 or 5 data collection periods out of the four-week period, during snack, and the remaining two subjects in the non-disabled group were spoken to during snack, in only 3 data collection periods, out of the four-week period. In addition, subjects 2 and 3 of the disabled group were never talked to during snack, over the entire four week period.

Although the percentages of teachers' speech to the children were more evenly distributed during the tablework situation, the teachers worked with

Table 3

Total Number of Words Spoken to Each Child and Percentage of
the Total for Each Group of Children in Each of
Four Classroom Situations

	Free-Play	Snack	Tablework	Circle
Non-disabled Children				
1	10,907 (31) ^a	582 (4)	2,660 (17)	2,803 (23)
2	4,044 (21)	151 (5)	1,197 (8)	832 (12)
3	3,330 (15)	178 (3)	897 (7)	428 (6)
4	2,814 (20)	292 (3)	1,203 (6)	1,444 (13)
Non-Disabled Group	21,095	1,203	5,957	5,507
Percentage TNW	40%	2%	11%	10%
Disabled Children				
1	3,222 (23)	320 (5)	2,027 (6)	608 (14)
2	1,488 (13)	0	18 (2)	450 (10)
3	2,419 (13)	0	2,545 (5)	403 (9)
4	3,851 (19)	183 (4)	1,013 (7)	655 (15)
Disabled Group	10,980	503	5,603	2,116
Percentage TNW	21%	1%	11%	4%

^a Indicates the total number of samples addressed to each child in each situation, out of a possible 32 total samples over the four-week period.

the non-disabled children an average of 10 times each, but with the disabled children only an average of 5 times each. In addition, subject 1 of the non-disabled group was addressed during tablework almost nine times more often than subject 2 of the disabled group.

The Carroll type-token ratio ranges and the percentage of occurrence of each are presented in Figure 1. Note that 90% of the CTTR's calculated for the disabled children were 3.49 or below, with the remaining 10% being in the range from 3.50 - 4.49. On the other hand, for the non-disabled children, only 59% of the CTTR's were 3.49 or less, while 42% ranged from 3.50 to 5.49. From these data it becomes apparent that the non-disabled children received the more diverse vocabulary from the teachers.

Table 4 presents the mean CTTR for each individual child, as well as for each group, in each of the four classroom situations. In all four situations, the non-disabled group received a more diverse, or less redundant vocabulary from the teachers, as indicated by a higher mean CTTR. Inspection of Table 4 reveals that for both groups of children, the classroom situation in which the teachers exhibited the most redundant or less diverse vocabulary (as indicated by smaller CTTR's), was snack time. In addition, the situation in which both groups received the most diverse or least redundant vocabulary was the unstructured free-play situation, as indicated by higher CTTR's.

As stated earlier, the percentage of unique words in a sample which appear on the Thorndike-Lorge list of the 1,000 most frequent words, gives an indication of the concreteness of vocabulary choice, since words on this list tend to be simple and concrete. Table 5 presents the

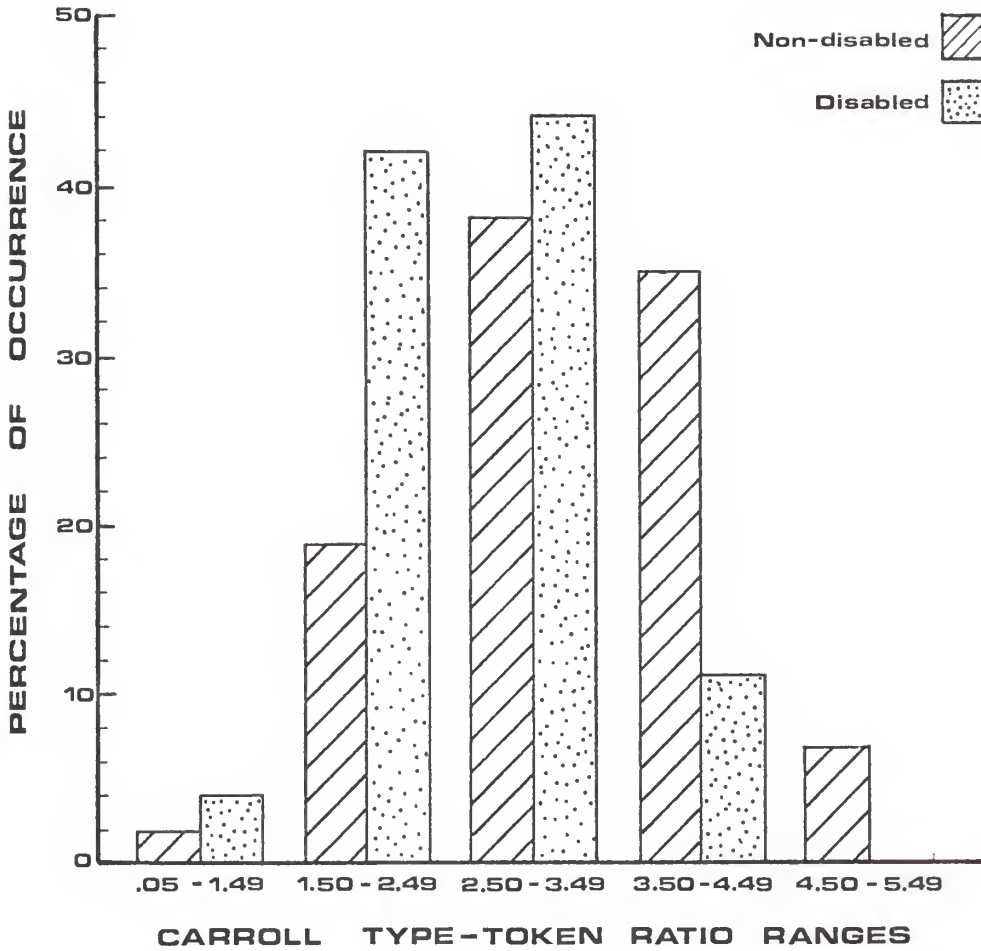


Figure 1

Percentage of Occurrence in Carroll Type-Token Ratio Ranges for Disabled and Nondisabled Groups

Table 4

Mean CTTR for Each Child & Group in Each of
the Four Classroom Situations

	Free-Play	Snack	Tablework	Circle
Non-disabled Children				
1	4.63 (31) ^a	4.06 (4)	3.99 (12)	4.30 (20)
2	4.33 (18)	2.91 (4)	3.78 (5)	3.40 (8)
3	4.49 (12)	3.50 (3)	3.83 (6)	3.59 (5)
4	4.49 (18)	4.10 (3)	3.90 (6)	3.91 (11)
Non-disabled Group	4.49	3.64	3.88	3.80
Disabled Children				
1	3.99 (19)	3.14 (4)	4.02 (5)	3.42 (7)
2	3.91 (11)	b	c	2.92 (7)
3	3.29 (9)	b	2.90 (4)	2.83 (7)
4	3.87 (19)	2.99 (4)	3.66 (6)	3.14 (8)
Disabled Group	3.77	3.07	3.53	3.08

^a Indicates the total number of samples containing 25 words or more addressed to each child in each situation.

^b Teachers did not talk to subjects 2 and 3 of the disabled group at all during snack, over the four-week period.

^c Subject 2 of the disabled group did not receive sufficient teacher speech to compute CTTR.

Table 5

Mean Percentage of Occurrence of Unique Words on the
Thorndike-Lorge List of 1,000 Most Frequent Words

	Non-disabled	Disabled
Children		
1	83.26	82.37
2	80.25	82.96
3	83.09	80.38
4	80.92	82.93
Total	81.88	81.93

percentage of words occurring on the Thorndike-Lorge list for speech addressed to each group of children. As indicated by this table, there were only very small differences between the percentage of words that occurred on the Thorndike-Lorge list, when comparing the disabled and the non-disabled groups.

DISCUSSION

The present investigation has demonstrated a definite difference in the total quantity of teacher speech addressed to the disabled and non-disabled children. While little difference was found in the quantity of speech from one teacher versus the other, there was a large difference when comparing the combined amount of teachers' text to children of different linguistic levels (Table 1). The mean number of total words addressed to a non-disabled child was 8,441, while the mean directed towards a disabled child was 4,801 words, or almost half as many. The non-disabled children in this study received a majority of the teachers text - 64%, as compared to 36% of the teachers' speech which was addressed to the disabled group (Table 2). These results confirmed the examiner's initial hypothesis that teacher speech to the non-disabled children would be greater in quantity than that to the disabled children. Similar results have been demonstrated by Siegel (1963), who found that the lower the linguistic level of the child, the less he was talked to.

Additionally, the present investigation indicated that individual children received varying proportions of the teachers' speech. Of the eight children in the preschool, one child received 32% of the teachers' speech, while the child receiving the next largest percentage of the

teachers' speech had only 12%. Further, one child received only 3.5% of the combined teachers' speech. This percentage of total teachers' speech received by the first child was considerably larger than that received by any of the other seven children, and more than nine times greater than that received by the child with the lowest percentage of teacher speech. These results were very similar to those reported by Conn & Richardson (1976), who indicated that the percentage of teachers speech to eight children ranged from 35.8% to 6.1%.

Calculation of the total number of words spoken to the disabled and non-disabled children in four different situations (Table 3) presented interesting results. For all four situations, the non-disabled children received a larger amount of speech from the teachers than did the disabled children. These results are especially interesting in light of the fact that at the onset of the investigation, both teachers indicated that because the disabled children were previously enrolled in the preschool, they would continue to receive the largest amount of attention and time from the teachers. In other words, they stated that the non-disabled children would not be interacted with as much as the disabled children. However, it would appear that, rather unconsciously, the teachers interacted with the non-disabled children more than with the disabled, regardless of their previously stated intentions to the contrary.

For children of both linguistic levels, teachers emitted the largest amount of speech in the unstructured free-play situation, and the least amount during snack. The total number of words to the non-disabled group in free-play, in snack, and in circle was nearly twice the number addressed to the disabled group in each of those situations. However,

the percentages of the total amount of teachers' speech were still the highest in free-play and the lowest in snack. These findings were not in agreement with those discussed by Siegel & Harkins (1963), who found that when comparing an unstructured with a teaching task situation, adults had their greatest amount of verbal output during the structured situation. For both groups of children, the situation in which teachers uttered the second largest amount of speech was tablework. In addition, this situation was the only one of the four in which the teachers' speech was even approximately evenly divided between the two groups of children. This finding was to be expected, due to the fact that it was the only situation in which the teachers interacted with the children on an intensive one to one basis.

The snack situation was the one which proved most interesting. Because all children and both teachers were seated together for snack-time, there was ample opportunity for both teachers to interact with both the disabled and non-disabled children. Instead, they appeared to have verbally ignored them as a whole, disabled and non-disabled alike. Out of a total of 52,964 total words spoken by the teachers, only 1,706 of those words, or less than 3% of the total text, were spoken during snack. In addition, the number of times that one or more children were addressed was extremely small. Recall that data were collected over a four-week period, four days per week, for a total of 16 days. Because there were two teachers, each of whom could have interacted verbally with each child during snack, there was a total possibility of 32 separate samples for each child during snack. But, the child who was interacted with the greatest number of times during snack had a total of only 5 samples. Even further, two of the children in the disabled group were never spoken

to at all during snack, over the entire four-week period. These data definitely indicate that the teachers were not utilizing snack-time as an efficient teaching device. This finding is especially unfortunate, since snack was one of the few daily situations in which the teachers (and the non-disabled children also) could easily have served as appropriate models for the disabled group.

Turning now to a consideration of the quality of teachers' vocabulary to the children of varying linguistic levels, it was found that both teachers did vary their vocabulary diversity (as measured by CTTR) according to the level of the child being addressed. These results were in agreement with those reported by several previous investigators (Broen, 1972; Granowsky & Krossner, 1970; Phillips, 1973; Riedl, Note 2; Siegel, 1963, 1967). There was a large difference in the ranges of the CTTR's addressed to each group (Figure 1). While the mean CTTR range for the non-disabled group was 3.61 - 4.25 ($\bar{x} = 3.99$), the range for the disabled group was 3.17 - 3.64 ($\bar{x} = 3.41$). In this investigation, the mean CTTR for both groups of children was considerably lower than those reported in previous research. Granowsky & Krossner (1970) found that when teachers interacted with normal children, their average CTTR was 5.06. This compares favorably with a study by Riedl (Note 2), who found that the average CTTR of teachers to high level normal children was 5.26, and 5.13 to low level normal children. Additionally, in a study of mothers speech to one, two, and three-year old children in a play situation (Longhurst & Stepanich, 1975), it was reported that mothers' speech to 3-year-olds had a CTTR of 4.61; to 2-year-olds, 4.26; and to 1-year-olds, 3.96. When comparing the CTTR's found in this investigation

for the non-disabled ($\bar{x} = 3.99$) and disabled children ($\bar{x} = 3.41$) with previously reported data, it appears that the teachers in the present investigation were not providing as rich or diverse a vocabulary as may have been more appropriate for further language development. In addition, when comparing the mean CTTR's reported by Longhurst & Stepanich (1975) with those found in this investigation, it seems that the teachers' vocabulary diversity to these preschool children corresponds with that used by mothers to their one-year-old children. Again, it appears that the children in this study did not receive an optimal linguistic environment.

The remaining semantic measure reported in this investigation was a comparison of unique words in a sample with those on the Thorndike-Lorge list of 1,000 most frequent words (Table 5). There were only very small differences in the percentage of occurrence of words on this list between the speech addressed to the disabled and non-disabled groups of children. These results differ somewhat from previous research. Granowsky & Krossner (1970) indicated there was a significant difference between the percentage of common words used when teachers addressed adults (66.4%) as compared with their kindergarten children (75.3%). Riedl (Note 2) found similar results in that the teachers in her study tended to use more common words in their speech to low linguistic level children than to high level normal children. If such a comparison were to be made using the data of the present study, but with the Thorndike-Lorge list of the 500 most frequent words, it is possible that results more similar to those reported by Granowsky & Krossner, and Riedl would be obtained.

In general, this investigation has confirmed the experimenter's initial hypothesis that teacher vocabulary to the non-disabled high level children would be greater in quantity and quality than that addressed to the children in the disabled group. In addition, specific adjustments in the teachers' vocabulary were found to be typical of the four classroom activities, with the unstructured free-play situation containing the largest and most diverse teacher vocabulary. This study has shown some important differences in the quantity and quality of teachers' speech to disabled and non-disabled children. These findings should be of particular interest to teachers and other professionals who have considerable control over children's linguistic environment.

The literature reviewed as well as the results of this investigation, leads to the question of whether simplification of adult vocabulary is necessary for effective communication with low language level children. In view of the suggested importance of a rich verbal environment for language development, one wonders whether adults' "watered down" speech directed to language disabled children is in fact helping to teach them language, or on the contrary is a factor that contributes to their continued low linguistic level.

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APPENDIX A

Criteria for Counting Total Number of Words in a Sample

1. Hyphenated words and compound nouns which seem to function as single words are counted as one word (Examples: "good-bye", "free-play", "nobody").
2. Contractions of a subject and predicate such as "you're" and "we'll" are counted as two words.
3. Contractions of a verb and a negative such as "can't" and "don't" are counted as one word.
4. Combinations such as "gonna", "wanna", and "kinda" are counted as two words ("going to", "want to", and "kind of").
5. When the speaker is spelling a word, the entire phrase is counted as one separate word (Example: "J-o-h-n-n-y" counts as one word).
6. Numbers are counted as if they were written out; for example: "23" is counted as two words ("twenty" and "three"), "20" is counted as one word.
7. Each expression of affirmation ("yes", "yeah", "uh-huh"), of negation ("no", "huh-uh", "nope"), of interrogation ("huh", "what"), or of exclamation ("hummm", "ah", "woops", "wow") is counted as a separate word.
8. When the same word or phrase is repeated several times consecutively it is counted only once; for example: "he he he is gone", "he is he is here" - only the first word or phrase of each repetition series is counted.
9. Descriptive noises such as "grrr", or "arf-arf" are not counted.
10. Proper names ("John Smith", and "Mr. Brown") are each counted as two separate words.

APPENDIX B

Criteria for Counting Number of Unique Words in a Sample

Follow the same criteria used for counting the total number of words, with the following additions:

1. Words such as "em" and "cause" are counted as their whole counterparts, "them" and "because".
2. Forms which end with and without plural markers are counted as the same word so long as the stem remains the same; for example: "ball" and "balls" count as the same word.
3. Forms which end with different inflections such as tense markers are counted as unique words even if the stem is the same; for example: "jump", "jumping", and "jumped" each counts as a separate word.

APPENDIX C

Criteria for Counting the Number of Words Which Appear on the
Thorndike-Lorge List of 1000 Most Common Words

1. If a stem appears on the list, variations of it which are inflected for number or tense are counted, unless the variation is an irregular form.
2. Hyphenated words are counted if each part of the word appears on the list.
3. Compound words are not counted unless they appear on the list exactly as they occurred (Examples: "anybody", "alright", "maybe").
4. Contractions are counted if both of the words in the uncontracted form appear on the list, with the exception of "let's", which must appear as written.

QUANTITY AND QUALITY OF TEACHER'S VOCABULARIES ADDRESSED TO
DEVELOPMENTALLY DISABLED AND NONDISABLED PRESCHOOL CHILDREN

by

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There has been considerable recent research interest in the speech of adults addressed to children. Most of the investigators have focused on mother's speech and there has been relatively few investigations of teacher speech. The purpose of the present investigation was to analyze the quality and quantity of teacher's vocabulary directed to developmentally disabled and non-disabled pre-school children. Answers for several questions were sought; 1) Are there specific differences in quality and/or quantity of teacher's vocabularies addressed to disabled and non-disabled children? 2) Does the proportion of vocabulary addressed to individual children differ? 3) Are certain adjustments in teachers vocabulary typical of specific classroom situations?

Two teachers and eight children, four disabled and four non-disabled, served as the subjects for this study. Throughout the five-week study, effort was made to avoid altering the environment existing at the preschool. Teacher speech was monitored and recorded through the use of an FM telemetry system. Each teacher had the opportunity to interact with the children daily in any of four classroom situations. The first situation was an unstructured free-play activity, in which the children could be interacted with individually or in small groups. The second situation was called circle, and involved a group discussion time in which all children participated. Tablework was the third activity, and consisted of one teacher interacting with one child in the teaching of pre-academic skills. The fourth classroom situation was a snack-time, in which all adults and children participated. Three analyses were used to assess the teachers vocabularies; 1) total number of words, 2) Carroll type-token ratio, and 3) a comparison of unique words with the Thorndike-Lorge list of the 1000 most frequent words.

Results indicated that teacher vocabulary to the non-disabled children was greater in quantity and quality than that addressed to the children in the disabled group. Considerable differences in total number of words and CTTR were noted in teachers speech to the two groups. Only small differences between groups were found for comparisons of unique words with the Thorndike-Lorge list. Additionally, there were large differences among the proportions of total teacher speech addressed to individual children, with one child receiving nearly three times more discourse than the child who received the next largest amount of teacher speech. Specific adjustments in teachers vocabulary were also found to be typical of the four classroom situations, with the unstructured free-play situation containing the largest amount and discourse and most diverse teacher vocabulary.