

The Nature of Verbal Interactions among Handicapped and Nonhandicapped Preschool Children

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GURALNICK, MICHAEL J., and PAUL-BROWN, DIANE. *The Nature of Verbal Interactions among Handicapped and Nonhandicapped Preschool Children*. CHILD DEVELOPMENT, 1977, 48, 254-260. The nature of verbal interactions among handicapped and nonhandicapped preschool children was examined in instructional and free-play settings. A wide variety of linguistic parameters designed to reflect verbal productivity and grammatical complexity was selected for analysis. The speech of designated nonhandicapped children was analyzed separately according to the type of listener to whom their speech was addressed. Listeners were classified as manifesting mild, moderate, severe, or no developmental delays. The results indicated that the speech of the designated children tended to be more complex, more frequent, and more diverse when addressed to developmentally more advanced children in both settings. These results were discussed in terms of their significance for facilitating the development of the language-delayed child.

The significance of the linguistic environment in determining the linguistic competence of the language-learning child is a generally acknowledged fact. Accordingly, many recent efforts have been directed toward analyzing the nature of language that is addressed to young children, especially parental speech. Comparisons of speech to different age children have revealed that mothers tend to simplify their speech to younger children, repeat sentences more often, pause appropriately, and in general organize their verbal interactions in a manner that tends to facilitate the child's understanding of linguistic structure and function (Broen 1972; Snow 1972). In fact, Snow (1972, p. 561) notes that the ". . . set of utterances [addressed to the child by the mother] . . . seems quite well designed as a set of 'language lessons.'"

In a parallel fashion, the linguistic input provided by mothers to their handicapped children has been of interest to a number of investigators (e.g., Buium, Rynders, & Turnure 1974; Goldfarb, Goldfarb, & Scholl 1966; Howlin, Cantwell, Marchant, Berger, & Rutter 1973; Marshall, Hegrenes, & Goldstein 1973). These studies have clearly demonstrated that mothers of handicapped children provide a different, generally less complex linguistic environment than mothers of nonhandicapped children. In contrast to the studies concerned with normal maternal-child in-

teractions, many of these authors have suggested that exposure to these linguistic differences may adversely affect the handicapped child's language development. However, Rondal (Note 1) has recently demonstrated that when children are matched in terms of mean length of utterance (MLU), mothers of Down's syndrome children appear to make as appropriate a linguistic adjustment to their children as do mothers of normally developing children.

The maternal-child interaction research for both handicapped and nonhandicapped children provides an empirical and conceptual base for the major focus of this study—an analysis of linguistic interactions among children at different developmental levels. We have recently begun to recognize that child-child interactions, especially among children at different age and/or developmental levels, may have considerable developmental significance for the language-learning child. Certainly, the rapid growth of day care and the substantial increase in preschool programs for handicapped children have contributed to this recognition. Of particular relevance here is that a growing proportion of these children have been integrated into programs serving both handicapped and nonhandicapped children. This phenomenon has been the result of various pressures, including the mandate requiring that 10% of the

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children in Head Start be handicapped and the current principles and concepts of normalization and mainstreaming.

Nevertheless, despite its potentially important implications for many issues, investigations regarding the processes and effects of integrating children at various developmental levels have only recently been undertaken. Research by Guralnick (1976) has indicated that interventions which promote the quality of social play among children at different developmental levels are associated with increases in the number of positive verbalizations addressed to nonhandicapped children by handicapped children. Also explored there were the relative contributions of modeling and reinforcement by more advanced peers as a means of facilitating language usage in handicapped preschool children. In addition, Shatz and Gelman (1973) investigated the communication patterns of 4-year-old children and compared their verbal interactions to adults, 2-year-olds, and other 4-year-olds. They found that even young children do adjust their speech to the level of the listener, and that these adjustments were similar to those typically found in studies of mothers of young children (Broen 1972; Snow 1972).

With this background, we examined the nature of the verbal interactions that exist among handicapped and nonhandicapped preschool children. We were particularly interested in analyzing any communication adjustments that might be made in accordance with the developmental level of the listener and in obtaining empirical information to help assess the potential value of these interactions as one means of fostering the language development of handicapped preschool children. Specifically, in this study we asked if certain parameters of linguistic development will vary when nonhandicapped children talk to children with either mild, moderate, severe, or no handicaps. This was assessed in two situations. The first consisted of an instructional setting where nonhandicapped children were attempting to convey certain skills and information to their handicapped peers, whereas in the second situation interactions were assessed as they occurred more spontaneously during free play.

Experiment I

Method

Subjects.—Eight nonhandicapped and 12 handicapped preschool children, ages 4–6 years, were selected for participation in the study. All children were currently enrolled in a preschool program that integrated handicapped and nonhandicapped children. None of the children was

physically handicapped. The four most verbal nonhandicapped children as determined by the preschool staff were selected as “tutors” and the remaining four served as one group of “companion” children. The 12 handicapped children, also companions, were selected such that four would be considered as having mild, moderate, and severe handicaps in accordance with the American Association on Mental Deficiency’s manual on classification and terminology (Grossman 1973). Classification, however, was based jointly on standardized test scores and language skills. In terms of language development, children in the severe group could express one-word utterances at most, whereas the maximum length of utterance expressed by any of the moderately delayed children was three words. The children in the mildly handicapped group generally used full grammatical sentences in their speech with utterance lengths ranging from four to seven words. However, many of the children in this group tended to have various speech difficulties including mild articulation problems. The mean IQs (and chronological ages) for the mild, moderate, and severe groups were 62.5 (5-6), 51.75 (5-2), and less than 30 (5-5), respectively. For the nonhandicapped children the mean IQs (and chronological ages) for the tutors and companions were 105.7 (4-3) and 90.25 (4-3), respectively.

Design.—Each of the four nonhandicapped tutors was randomly paired with each of four children—one companion child from each of the three handicapped children’s categories and one of the nonhandicapped peers. Accordingly, each developmental category was considered an experimental condition (tutor-companion pair) for both design and analysis purposes. The order of presentation of each condition to each of the four tutors was random, with the restriction that each condition appeared an equal number of times at each position in the sequence.

Procedure.—Each tutor-companion pair was given two 15-min familiarization sessions in a small playroom which served as the setting for the experiment. Data recording of verbal interactions took place during the third session, referred to as “instruction.” Prior to this third session, the tutors provided the experimenters with a set of three drawings which were introduced in the instructional session.

Standardized instructions asking the tutor to describe the drawings and to teach the companion child were provided prior to each instructional session. Two experimenters were present during all sessions but did not interact with the children except to provide instructions and prompt interac-

tions according to a predetermined schedule. Specifically, if tutors did not verbalize for a 20-sec interval, a verbal prompt by the experimenter to do so was provided.

Tape recording and transcription.—Each 15-min instructional session was recorded on audiotape using a Panasonic recorder (model RQ-309AS) with a G.C. Electronics (model 157) microphone. In addition, one of the experimenters transcribed the tutor's verbalizations during the sessions, including the context and to whom the speech was directed. The other noted time intervals.

Tape recordings were transcribed according to Schiefelbusch's (1963) criteria, and only the tutor's speech was transcribed. Comments to adults were not included in the analysis. Reliability of the transcriptions was obtained by having one experimenter and one independent rater listen to 25% of the tapes and then compute percentage agreement. For utterance boundaries and markers, mean reliability for the sample of tapes was 81% (range 79%–83%), and 81% (range 68%–90%) for word agreement. The final protocols used for analysis were based on decisions resulting from discussion of disagreements after returning to sections of the tape where disagreement occurred.

Linguistic parameters.—A wide variety of language categories designed to reflect verbal productivity, diversity of speech, and grammatical complexity were selected for analysis. These 41 variables and their definitions were based on the results of previous investigations, including those of Broen (1972), Lee (1974), Schiefelbusch (1963), Shatz and Gelman (1973), Snow (1972), and Tyack and Gottsleben (1974).¹ Variables included word and utterance counts, MLU, complex sentences, repetitions, interrogatives, attentionals, imperatives, and various sentence elements.

Reliability in terms of percentage agreement between two independent raters was calculated separately for each dependent measure. Agreement was high in all instances, with a mean of 92% (range 84%–100%).

Results

Analysis of the data for each of the four tutor-companion pairs at each developmental level was accomplished using the Friedman analysis of variance by ranks (Siegel 1956) and revealed nine significant differences ($p < .05$). Most prominent were the differences in speech productivity. As

indicated in table 1, in the 15-min instructional sessions, nonhandicapped tutors spoke considerably more to more advanced children. This pattern also emerged for mean length of utterance (MLU) and the number of complex constructions. The most frequently used complex constructions were coordinate constructions, "wh" complementizers, and infinitives. Figure 1 illustrates that more long and the longest utterances were addressed to the more advanced children. In addition, this figure reveals that although mean MLU differences were obtained, the tutors did produce utterances of varying lengths to children at all developmental levels, with many complex constructions included among the long utterances.

Moreover, as the developmental level of the companion child increased, the tutor used more and a greater number of different nouns, asked more questions, and used more personal pronouns, noun modifiers, and indefinite pronouns. These findings are, of course, linked to the speech productivity differences noted earlier. Marked but not statistically significant tendencies of a similar nature were noted for total verbs, the percentage of interrogatives, the total number of conjunctions, the percentage of conjunctions, and the total number of adverbs.

Two other interesting patterns were observed. First, for the most part, whenever differences emerged they tended to reflect a categorization between severe and moderate developmental levels on the one hand, and mild and nonhandicapped levels on the other. Second, even though, as a result of the productivity differences, there was a general tendency for the nonhandicapped tutors to use not only more but a greater variety of nouns, verbs, adjectives, and adverbs when addressing the higher level children, the diversity of their speech tended to remain in proportion for each developmental level as indicated by the similarity of the type-token ratio (TTR) measures. In addition, this proportionality was maintained with a wide variety of other measures as well.

Experiment II

Method

Subjects and setting.—Recordings of spontaneous verbal interactions of designated nonhandicapped to handicapped and other nonhandicapped children were obtained during morning free-play activities at the preschool. The large play area contained the usual assortment of toys and

¹ A complete description and the results for each of the dependent variables may be obtained by writing the senior author.

TABLE 1
SIGNIFICANT DIFFERENCES IN VERBAL INTERACTIONS ACROSS DEVELOPMENTAL
LEVELS FOR THE INSTRUCTIONAL SETTING

LINGUISTIC PARAMETER	DEVELOPMENTAL LEVEL OF PEER			
	Severe	Moderate	Mild	Nonhandi- capped
Words (total)	298.25	351.00	594.25	614.50
Utterances (total)	89.00	97.25	147.00	144.25
Mean length utterance	3.30	3.61	4.10	4.22
Complex sentences (total) ^a	9.75	12.00	30.75	27.00
Nouns (total)	41.25	50.50	71.75	83.25
Number of different nouns (total)	15.00	18.75	29.00	36.75
Interrogatives (total)	4.00	3.50	10.00	16.00
Personal pronouns (total)	27.75	27.50	76.25	78.75
Noun modifiers and indefinite pronouns (total)	48.50	44.00	87.25	81.75

NOTE.—All data represent means of the four tutors; all tests employed the Friedman two-way analysis of variance by ranks with the level of significance set at .05.

^a One of the four tutors was eliminated from the analysis since she produced few complex utterances.

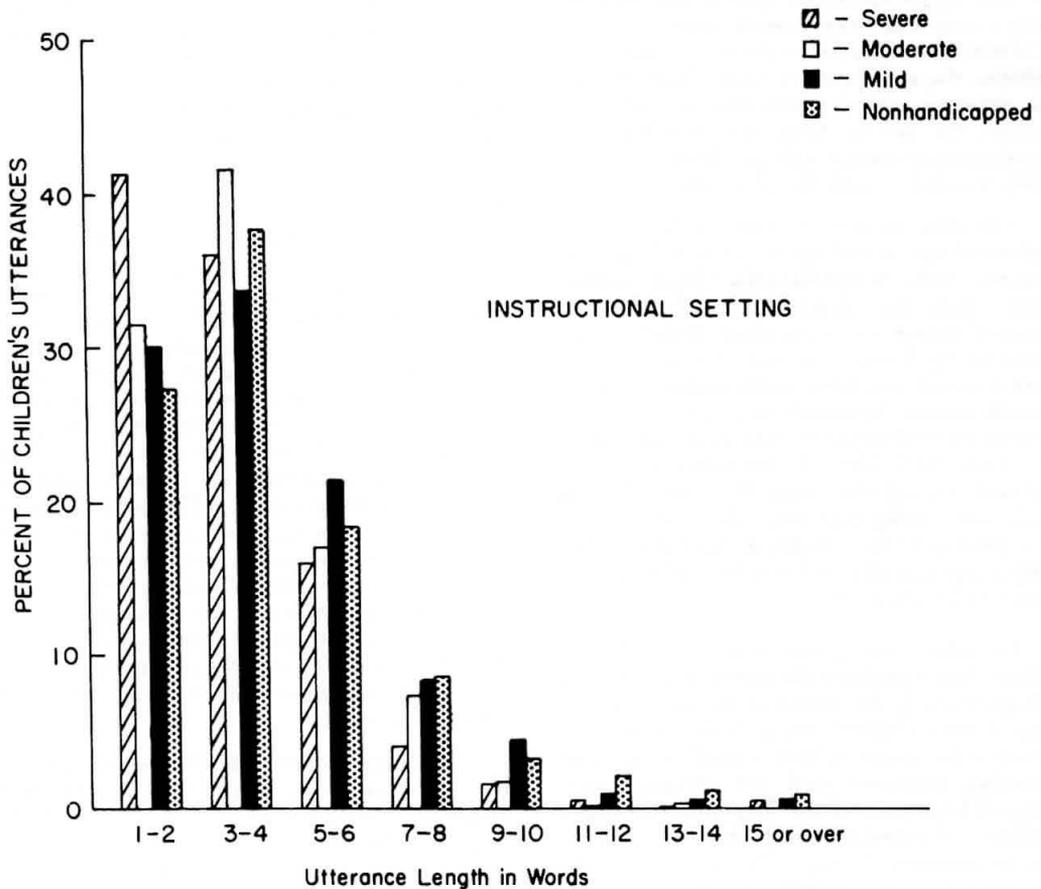


FIG. 1.—Distribution of utterance lengths as a function of developmental level in the instructional setting

related materials to which all children had access. To facilitate comparisons with Experiment I, the speech of the same four tutor children was recorded in the free-play setting. As explained below in the section on procedure and speech sampling, speech samples of the four nonhandicapped children were separately analyzed according to the developmental level category of the child to whom they were addressed. The same developmental categories and definitions (including IQ scores and language production) used in Experiment I applied here as well, although the number of children addressed in each of the four developmental categories varied. The mean IQs (and chronological ages) for the nonhandicapped (listeners), mild, moderate, and severe groups were 96.7 (4-2), 67.3 (5-4), 50.5 (5-2), and less than 30 (5-5), respectively. For the four nonhandicapped speakers (referred to as tutors in Experiment I), the mean IQ (and chronological age) was 105.7 (4-3).

Tape recording and transcription.—Each of the four target children's speech was recorded using a concealed Sony Cassette recorder (model TC-110A) carried by one of the experimenters. In addition, the experimenter wrote down the specific utterances and to whom they were directed. Overall, the person doing the recording maintained minimal contact with the children and generally blended in with the play activities.

Classification of written protocols and transcription of tape recordings were carried out in accordance with Schiefelbusch's (1963) criteria. Again, only the designated nonhandicapped speakers' speech was transcribed. Reliability was measured by having a second observer obtain a written record and listen to the audiotapes every seventh session. Comparisons in terms of agreement for each rating produced a mean reliability of 90% (range 81%–100%) for utterance boundaries and markers, and 89% (range 78%–94%) for word agreement. Reliability was also obtained for agreement as to the identity of the listener. Percentage agreement was found for children in all groups to be above 99.

Procedure and speech sampling.—After all children had completed the instructional sessions in Experiment I, the speech of the four nonhandicapped tutor children was recorded in the play setting in the course of their normal interactions. Recording continued until 100 utterances were obtained from each of the four nonhandicapped speakers as directed toward children in each of the four developmental groups. Utterances to specific children only were counted, not those directed to groups. To obtain representative samples, speech

directed to children within a developmental group was recorded from each of the four nonhandicapped speakers on a number of different days over a 9-week period. Utterances were recorded consecutively for each child, but changes occurred in a manner to ensure a proportional sampling of different speakers and listeners. The mean number of days sampled to obtain the 400 utterances (100 from each of the four nonhandicapped speakers for each of the four groups—nonhandicapped, mild, moderate, and severe) was 10.75, 11.25, 10.25, and 8.25, respectively. Similarly, the mean number of different listeners to whom the utterances were directed as classified according to the groups noted above was 6.25, 8.75, 7.00, and 4.75, respectively. In some instances, to ensure the occurrence of these distributions, the experimenter requested the teacher to encourage a target pair to play in proximity of one another.

Linguistic parameters.—The same linguistic parameters and definitions used in Experiment I were employed here as well. Categories reflecting percentages of total utterances were deleted since utterances were held constant at 100 for each pair. Reliability for each dependent measure was determined in terms of percentage agreement between two independent raters. Agreement was again high in all instances with a mean of 90% (range 76%–98%).

Results

Analysis of the data using the Friedman analysis of variance by ranks (Siegel 1956) revealed seven significant differences (see table 2). Specifically, as the developmental level of the listener child decreased, the nonhandicapped speakers used fewer words, produced a shorter mean length utterance, and tended to repeat utterances more frequently. As in Experiment I, utterances of widely varying lengths were spoken to children at each developmental level, and more long and the longest utterances were addressed to the more advanced children. In addition, fewer verbs, personal pronouns, different verbs, and different adverbs were addressed to children at lower developmental levels. Although not statistically significant, there was a strong tendency for the nonhandicapped children to use more complex constructions and fewer single word utterances to the more advanced peers.

Other correlations with the instructional setting were noted in that the nonhandicapped speakers' communication patterns tended to be similar for the severe and moderate groups on the one hand and to the mild and nonhandicapped groups on the other. Moreover, most of the TTR and percentage measures did not vary across de-

TABLE 2
SIGNIFICANT DIFFERENCES IN VERBAL INTERACTIONS ACROSS DEVELOPMENTAL
LEVELS FOR THE FREE-PLAY SETTING

LINGUISTIC PARAMETER	DEVELOPMENTAL LEVEL OF PEER			
	Severe	Moderate	Mild	Nonhandi- capped
Words (total)	328.50	336.75	444.00	428.25
Mean length utterance	3.29	3.37	4.44	4.28
Verbs (total)	94.00	94.50	138.25	135.25
Number of different verbs (total)	30.75	38.25	48.00	57.25
Repetitions (total)	46.75	31.50	23.25	21.75
Personal pronouns (total)	29.26	40.75	73.00	69.25
Number of different adverbs (total)	10.50	12.75	17.25	20.25

NOTE.—All data represent means of the four nonhandicapped speakers; all tests employed the Friedman two-way analysis of variance by ranks with the level of significance set at .05.

velopmental levels. Since, in general, more and different parts of speech were spoken to more advanced children, this suggested once again that the overall extent of new or different information remained proportional to the total number of words spoken.

Discussion

The results of these two experiments clearly indicate that nonhandicapped preschool children do adjust their speech to the developmental level of similar age peers. In general, speech tended to be more complex, more frequent, and more diverse when addressed to developmentally more advanced children. Interestingly, although the instructional and free-play settings were very different, the overall pattern of the verbal interactions in these situations was quite similar. The possibility does exist, however, that these similarities reflect the fact that the free-play data were collected following the completion of the instructional sessions, although Shatz and Gelman (1973) have indicated that such order effects tend to be minimal.

Moreover, in both settings, verbal interaction analyses revealed that nonhandicapped children tended to divide their classmates into two groups. The first consisted of children with mild and no handicaps, with the second group consisting of those with severe and moderate delays. Since chronological age differences cut across these two groupings, these classifications were probably based on the developmental levels of the companion children.

Looking at these results from the perspective of the listener, the linguistic environment of handicapped preschool children as provided by their nonhandicapped peers is indeed different, and the degree of difference varies directly with the sever-

ity of the developmental delay. Bearing in mind the large number of programs in existence that integrate handicapped and nonhandicapped preschool children, a question arises as to the potential impact of these differences on the development of the language-learning child. Although more direct evidence is needed, our data are consistent with the proposition that these language differences are indeed appropriate adjustments and may well have positive developmental value for handicapped children. One line of support stems from the finding that although a greater and more diverse vocabulary was directed to the more advanced children, there was considerable similarity among the TTR measures as well as an overall equivalence of the percentages of most sentence elements and grammatical categories, especially the proportion of complex utterances per number of long utterances. This suggests that handicapped children are provided with an opportunity to hear advanced and diverse linguistic information, but in proportion to their developmental levels. Similarly, although average differences in MLU exist, it is important to note that the less advanced children were exposed to a wide distribution of utterance lengths and degrees of grammatical complexity. In addition, speech to the more severely handicapped children was not simply a reduction to the level and form of the handicapped child's speech. In fact, inspection of our two- and three-word utterance protocols revealed that these utterances were designed to assist in clarifying information and instructions and often consisted of complete sentences—a finding that is consistent with that of Shatz and Gelman (1973), who presented a similar analysis. Finally, we may note that the overall adjustments in MLU and in complex constructions, may have served to prevent the occurrence of input that could overwhelm the handicapped child, a hypothesis that is consistent with the in-

terpretations and findings of others (e.g., Broen 1972; Seitz & Stewart 1975; Snow 1972).

The suggestion offered here is that a more detailed analysis of verbal interactions among handicapped and nonhandicapped children, in which measurement is focused on the interactions and adjustments that may occur within a sequence of utterances for both speaker and listener, is required in order to more adequately assess the functional value of these communication adjustments. This can best be accomplished by combining analyses of grammatical complexity and speech productivity with functional interaction measures such as those suggested by Friedlander, Jacobs, Davis, and Wetstone (1972) and expanded and adapted for handicapped children by Howlin et al. (1973). Additional research along these lines should enable us to better understand the complex processes and interactions involved in mainstreaming and early intervention. Moreover, and of equal importance, are the many aspects of this overall phenomenon, including language and nonlanguage processes relating to modeling, imitation, and peer relationships, that appear to have relevance to various conceptual and empirical issues in child development.

Reference Note

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