DOCUMENT RESUME

ED 285 297 EC 200 234

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TITLE Relationship between Maternal Language Parameters and the Child's Language Competency and Developmental Condition.
PUB DATE [85]
NOTE 27p.; For related document, see EC 200 232.
PUB TYPE Reports - Evaluative/Feasibility (142)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Child Development; Child Language; Communication Skills; *Downs Syndrome; Expressive Language; *Language Handicaps; Mothers; *Oral Language; *Parent Child Relationship; Verbal Communication; Young Children
IDENTIFIERS Mean Length of Utterance

ABSTRACT

Maternal language directed to 21 nonhandicapped, 21 Down syndrome, and 19 language impaired preschool children was examined. The three groups (all Caucasian and middle-class) were matched in mean length of utterance (MLU) and in developmental skills as measured on the Vineland Adaptive Behavior Scale. Mother-child language interaction was videotaped for 20 minutes during free play at home. A system of coding the function of language was developed and the videotaped transcripts were coded according to this system. Four distinct types of mother-child directed speech emerged from coding the data: (1) utterances not significantly influenced either by the child's developmental condition or MLU; (2) utterances significantly influenced only by the child's MLU; (3) utterances significantly influenced by the child's developmental condition; and (4) utterances significantly influenced by both developmental condition and MLU. Furthermore, no significant difference in the child-directed speech was found between mothers of nonhandicapped and language impaired children. (Author)

Relationship Between Maternal Language Parameters and the Child's Language Competency and Developmental Condition

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Running Head: Maternal Language Parameters

Submitted to Augmentative and Alternative Communication (AAC)

Abstract

Maternal language directed to nonhandicapped, Down Syndrome, and language-impaired children was examined. The three groups of children (all caucasian and middle-class) were matched in mean length of utterance and developmental skills as measured on the Vineland Adaptive Behavior Scale. Mother-child language interaction was videotaped for twenty minutes during free play at home. A system of coding the function of language was developed and the videotape transcripts were coded according to this system.

Four distinct types of mother-child directed speech emerged from the analysis of data: (a) utterances that were not significantly influenced either by the child's developmental condition or MLU, (b) utterances that were significantly influenced only by the child's MLU, (c) utterances that were significantly influenced by the child's developmental conditions, and, (d) utterances that were significantly influenced by both the child s developmental condition and MLU. Furthermore, no significant difference in the child-directed speech was found between mothers of nonhandicapped and language-impaired children.

Relationship Between Maternal Language Parameters and the Child's Language Competency and Developmental Condition

Perhaps no single issue has generated as much debate and research in the mother-handicapped child interaction literature as the question regarding the quality of maternal linguistic environment available to these children.

The impetus for this debate was a study carried out by Buium, Rynders, and Turnure (1974). Buium et al. observed mother-Down Syndrome infant interaction with CA-matched mother-nonretarded infants on structured tasks in a laboratory setting. The results of this study indicated that mothers adapted their speech to suit their child's capacities for comprehension. But the mothers of Down Syndrome children used more utterances, kept their utterances shorter, and expressed themselves with greater syntactic simplicity. In discussing their data, Buium et al. (1974) implied that it was possible for the eventual language differences manifested by older Down Syndrome children to be accounted for, at least in part, by their exposure to a linguistic environment different in some respects from that experienced by nonretarded children.

Buckhalt, Routhford, and Goldberg (1978) compared verbal and nonverbal interactions of mothers with their Down Syndrome infants (mean CA = 13.5, SD = 2.63) to interactions between mothers and their nonretarded infants (mean CA = 12.5, SD = 3.79). It was found that mothers' vocalizations were positively correlated

to CA in the nonretarded group, which indicates that mothers did more talking to older and more competent babies within groups. While the correlation failed to reach significance in the Down Syndrome group, there was a tendency in both groups for mother to engage in less physical contact with babies of higher MAs. It is possible that higher MA babies required less physical guidance in playing with whatever toy the mother was trying to interest them in.

Comparing the results of the two aforementioned studies, Buckhalt et al. (1978), explains that while mean length of utterances of mothers of nonretarded children was much higher when directed toward 24-month-olds (MLU 4.20; Bulum et al.) than toward 12-month-olds (MLU 3.16; Buckhalt et al.), the mean of mothers of Down Syndrome children remained constant across the age span (MLU = 3.50, Bulum et al.; MLU = 3.50, Buckhalt et al.). These findings are consistent with those of cross-sectional and longitudinal studies: Mothers' language complexity only begins to increase as the child begins to exhibit greater language competence (e.g. Broen, 1972). While the nonretarded 2-year-old has typically reached the stage of two-word utterances and simple sentences, the Down Syndrome 2-year-old is often either nonverbal or still producing only one-word utterances and simple sentences.

In Bulum et al.'s study (1974), the differences found may have been due to the fact that the children were at different levels of language development. In Buckhalt et al.'s study (1978), although no formal measurement of the level of expressive language development of the children was made, only a few of the nonretarded and one of the Down Syndrome children appeared to

have progressed beyond one-word utterances in their expressive ability. Therefore, the different findings in the two studies suggest that mothers of Down Syndrome and nonretarded children were responding with language appropriate in each instance. In contrast to Buium et al.'s conclusions, Buckhalt et al. concluded that the findings considered together do not necessarily reflect deficiencies or abnormalities in the provided language environment. Instead, the comparison may reflect predictable adjustments in language that adults make in accordance with the child's perceived competence.

Rondal (1977) studied language interaction at home between mother-Down Syndrome and mother-nonretarded children. The two groups of children were matched on MA as well as on their level of language functioning. The results of Rondal's study was similar to those found in the Buckhalt et al. study. Rondal (1977) found no differences between the two groups of mothers on various aspects of maternal speech, including total number of words produced, mean length of utterance (MLU), different types and subtypes of sentences (e.g., declaratives, imperatives, etc.), grammatically incomplete sentences, attentional utterances, mothers' exact repetitions of their own utterances, proportions of expansions and corrections of children's speech, mothers' repetition of children's utterances, and so forth. In contrast to the absence of Down Syndrome versus nonretarded group differences, Rondal found a number of significant differences in mothers' speech according to the child's level of language functioning. Based on these findings, Rondal suggested that the

child's level of language functioning, rather than whether he/she was retarded or nonretarded, was a more powerful variable in influencing maternal speech.

O'Kelly-Collard (1978) matched Down Syndrome and nonretarded children on MA, receptive language age, and expressive language age. No difference was reported in the characteristics of maternal speech directed at Down Syndrome and nonretarded children. She found that in both groups rate of speech was slow, as shown in low MLUs and high proportions of single word utterances.

Maternal speech is only one, though significant, aspect of a child's linguistic environment. Thus, each of the aforementioned studies share a common difficulty - maternal speech cannot be completely characterized without regard to the topics selected for conversation.

Other factors are also a part of the child's linguistic environment. The kinds of games, for example, that a mother uses with her child contribute to the environment. A recent study (Cook & Culp, 1981) examined this particular aspect. Conducted in a home setting, Cook and Culp (1981) studied mutual play behavior of Down Syndrome and nonretarded children matched on their cognitive and language abilities. Mothers, given a choice to use any or all of 9 preschool toys, did not differ in their choices of the number or types of toys presented to their children. The toys of preference for both groups of mothers were those that produced language when manipulated in a particular way by the infant (e.g., talking dolls).

Another population of children receiving investigators attention is language-impaired children who do not have any

accompanying handicap such as mental retardation or hearing impairment. The maternal linguistic environment of language-impaired children has been the focus of much controversy. While some researchers have argued that the environment mothers of language-impaired children provide is not conducive for language learning (Wulbert, Inglis, Kreigsmann, & Mills, 1981), others have argued the reverse (Lederberg, 1980). Further, some researchers have implied that mothers of language-impaired children may be the cause of their children's delay or they may serve as maintaining factors of the language problem (Grossfeld & Gekker, 19); Schodorf & Edwards, 1981).

It appears, from the preceeding studies, that the language delay of Down Syndrome children may be attributed to their typical delays in cognitive develcpment. In contrast, it seems that the language delays of otherwise intellectually average children may be due to the detrimental linguistic style of their mothers.

In 1982, Peterson & Sherrod devised a study that would clarify some of the parameters of maternal language style that are associated with children's language delay. The language interaction of Down Syndrome, language-delayed, and normal children with their mothers at home during free play was analyzed. Language irrelevant to the interaction was used more by mothers of language-delayed children, followed by mothers of Down Syndrome children, followed by mothers of "normal" children. And, mothers of language-delayed children tended to focus more on their child's physical behavior and less on their his/her utterances than the other mothers.

In summary, from the above studies, we can state that (a) mothers of handicapped children, just like mothers of nonhandicapped children adjust their speech to the child's language competency levels, (b) chronological age does not play a significant role in adjustment of mothers' language for retarded children as compared to nonretarded children of the same age, and (c) it is probably not fruitful to study mothers' linguistic input in isolation. In such a study, the developmental characteristics of the child and the setting in which language interaction takes place must be taken into account.

The major objective of this study was to examine the mothers' speech directed to three groups of children: nonhandicapped (NH), Down Syndrome (DS), and language impaired (LI) during free play at home in order to see what ways, if any, mothers adjust their speech to the child's developmental condition and linguistic competency. Additionally, in view of the uncertainty existing in literature regarding the use of language by mothers of language delayed children when compared to mothers of "normal" children, the focus of this study was to find out if there were any differences between these two groups of mothers.

The data in this investigation were collected as one aspect of an ongoing 3-year Department of Education supported study of language interaction within and among three groups of children: nonhandicapped (NH), Down Syndrome (DS), and language-impaired (LI) and their mothers.

Method

Subjects

The subjects consisted of 21 NH (10 female, 11 male), 21 DS (10 female, 11 male), and 19 LI (6 female, 13 male) children and their mothers (all Caucasian). The mother-child dyads were recruited through several school districts in the Dallas/Fort Worth metroplex, the Down Syndrome Guild, and the Callier Center for Communication Disorders of the University of Texas at Dallas.

The mean age for the mothers of the NH children was 30.0 years (SD = .80; Range = 20 to 45 years) and for the mothers of the two other groups was 36.0 years (SD = 1.34; Range = 20 to 46 years for mothers of DS children and SD = .94; Range = 20 to 45 years for mothers of LI children).

The educational level ranged from a minimum of high school to a postgraduate degree for mothers of NH children; and from a minimum of partial college to a maximum of B.A. or B.S. degree for the other two groups. The mean family socioeconomic level was 55.32 for NH, 49.67 for DS, and 50.63 (middle-class) for LI children on the Hollingshead Index of Social Status (1975). The mean parity was 1.81 for families with NH children, 3.09 for families with DS, and 2.05 for families with LI children.

The mean age for NH children was 26.75 months (SD = 4.24; Range = 16 to 35 months), for DS children was 64.48 (SD = 27.87; Range = 38 to 138 months), and for LI children was 44.84 (SD = 9.23; Range = 32 to 69 months).

The Adaptive Behavior Composite (ABC) score on the Vineland Adaptive Behavior scale (VABS) (Sparrow, Balla, & Cicchetti,

1984) was 29.83 (SD = 5.68; Range = 17 to 42 months) for NH, 39.13 (SD = 16.26; Range = 18 to 70 months) for DS, and 39.84 (SD = 8.92; Range = 21 to 64 months) for LI children. The mean Receptive Communication on VABS was 40.67 (SD = 9.20; Range = 18 to 47 months) for NH, 47.49 (SD = 26.77; Range = 14 to 97 months) for DS, and 41.53 (SD = 8.34; Range = 30 to 56 months) for LI children. The mean Expressive Communication on VABS was 29.61 (SD = 8.88; Range = 13 to 53 months) for NH, 29.91 (SD = 15.12; Range = 12 to 66 months) for DS, and 33.42 (SD = 9.45; Range = 17 to 48 months) for LI children. DS children were significantly delayed in their adaptive behavior and communication functioning $t = 7.94$ and 7.1, respectively, $ps < .01$. According to Karyotype, 22 DS children were diagnosed as Trisomy 21 and one as Translocation. For LI children, it was found that there was no significant difference between the means of their chronological age and the ABC score. Their communication functioning was found to be significantly delayed $t = 2.29$, $ps < .05$. The language impairment of LI children was attributed primarily to middle ear infections, cleft palate (sugically corrected), and nonspecified causes.

Procedure

Two female observers made two visits to the home of participants. In the first visit, the VABS and demographic inventory were administered. During the visit, the observers conducted an informal interview with the mothers and children for the introduction of videotaped recording into the research.

In the second visit, a language sample during playtime was videotaped for 20 minutes. The participants were not restricted to play with any toys or to remain in any position. The mothers were told to "carry on their play activities as they normally do."

After the videotape was transcribed and typed, it was checked by the observer who verified its accuracy and added the necessary contextual information. The final product was a complete record of verbal and behavioral events and the context in which these events occurred. All transcriptions were made in ordinary English orthography with phonetic notation used in cases where an English word could not be identified. Normal English punctuation was used to denote intonation patterns, to make the meaning of a sentence clear, or to indicate the pauses and stops which the speaker makes in speaking. The mood of each utterance was identified primarily on the basis of intonation and secondarily on the basis of structural features. For example, declarative sentences which ended in rising intonation were coded as interrogative mood.

In order to have a uniform transcription, transcribers were provided with SALT (Systematic Analysis of Language Transcripts,

Miller and Chapman, 1985) instructions for preparing and marking of the transcripts. Sample transcripts were jointly reviewed in conference to clarify and answer questions about instructions. An utterance-by-utterance reliability of the transcription was estimated by having the transcribers independently transcribe ten representative videotapes. The interrator agreement was computed to be .99.

A system of coding utterances of mothers and their children was developed by using the transcribed data and videotapes in conjunction. The coding system evolved from continuous observation and by employing existing categories developed mainly by Dore (1977), Hooshyar (1978), McShane (1980), and Broome and Uzgiris (1985).

The Mother-child Language Usage (McLU) system consists of eight major categories: queries, declaratives, imperatives, performatives, feedbacks, imitations, self-repetitions, and miscellaneous. These categories describe the general character of language used by the mothers and their children. They are further subdivided into 37 subcategories which identify the specific function of utterances used by mothers and their children. The reliability of the categories was estimated by computing the number of agreements divided by the sum of agreements and disagreements. The computed reliabilities ranged from 0.75 to 0.96 for the children's categories and from 0.71 to 0.94 for the mothers' categories. This procedure proved very useful for defining the categories unambiguously.

Results

Two-way analysis of variance by developmental conditions and child's mean length of utterance (MLU) level was carried out for all parameters of mother's language, lexical diversity (TTR), total utterance, MLU, and number of different word roots.

Table 1 presents the results of two-way analysis of variance and associated F values for the maternal language categories which were significantly influenced by the child's developmental condition and/or MLU level. In this study, the child's MLU was divided into two levels. Following Brown (1973), if the MLU was above 1.75 it was designated as high MLU, otherwise it was considered low MLU. It should be noted that except for mother's MLU, TTR, and number of different word roots, scores for the rest of the variables are based on frequencies.

In order to present the results in a more comprehensive way, we also carried out the analysis of variance on the total queries, declaratives, imperatives, performatives, feedbacks, imitations, and self-repetitions directed toward the child. It was found that the amount of queries, performatives, and feedbacks directed toward the child were not significantly influenced by the child's condition nor MLU. However, two-way analysis of variance by condition and MLU indicated that the usage of declaratives and imperatives were significantly influenced by the child's developmental condition $F(2,62) = 4.92$, $P<.05$ and $F(2,62) = 7.29$, $P<.05$, respectively. Also, usage of imitations and self-repetitions were significantly influenced by the child's MLU level $F(1,62) = 13.54$, $P<.01$ and $F(1,62) = 4.09$, $P<.05$,

respectively.

Tables 2 and 3 show the means of language parameters which were significantly influenced by the child's MLU and developmental conditions, respectively. A post hoc analysis using Tukey's HSD was carried out for those language variables which were significantly influenced by the developmental condition of the child. The result of this analysis is presented in Table 4. To illustrate how Table 4 presents this result, let us note that the first line in Table 4 shows that for Total Declaratives the pairwise difference between the means of DS-LI are only significantly different and the other pairwise differences for Total Declaratives are not significant at the .05 confidence level.

Discussion

The results of this study indicate that speech directed to the three groups of children who participated in this study fall into four types. Type 1 speech, are those utterances that are addressed to the child regardless of the child's developmental condition or linguistic competency as measured by MLU. This type of speech includes those maternal utterances which attempt to persuade the child to perform an action, maternal acts accompanied by words, and maternal responses which directly complement preceding verbal and/or nonverbal performance.

Type 2 speech are those speeches that are solely used on the basis of the child's MLU level, and are not significantly influenced by the child's developmental condition. Type 2 speech included maternal utterances which attempt to induce the child to

produce a specific word. It also includes when mother pantomimes the action to enliven the child's intersest, or to involve the child in an activity, or to teach the child something, and so forth. Table 2 presents Type 2 speech.

Those utterances which are solely dependent on the child's developmental condition and are not significantly influenced by the child's MLU are Type 3 speech. Examples of Type 3 speech would be those utterances which intend to offer information about people, actions, places, or things; statements which express facts, wishes, beliefs, attitudes, or emotions; or utterances which summon, signal, demand, invite, forbid, or reprove, and so forth. Except for the Guiding Category, the rest of the maternal language parameters presented in Table 3 fall into Type 3 speech.

Type 4 speech are those utterances whose usage is dependent on both the child's developmental condition and MLU level. In this study, Type 4 speech is the Guiding Category and is exemplified by such utterances as mother physically coercing, guiding, or assisting the child to perform a specified action while simultaneaously talking about the action.

Considering the results of Tables 1 and 2, it is evident that regardless of the child's developmental conditions, mothers of low MLU children resort more to the type of language interaction which requires less verbal response from the child. The child's lowered verbal response in turn causes these mothers to verbalize more than mothers of high MLU children during free play activity. On the other hand, mothers of high MLU children tend to concentrate more on the type of speech which encourages the child's initiation (and consequently independence), enhances the

child's vocabulary, and broadens the child's linguistic knowledge base. It should be emphasized that the pattern observed was similar for all three groups of mothers. That is, mothers of NH, DS, and LI children used those categories of language presented in Table 2 solely on the basis of the child's linguistic competency not on his/her developmental condition.

Type 3 speech as presented in Table 3 essentially shows that DS children, regardless of their linguistic competencies, are treated differently from the other two groups in respect to Type 3 speech addressed to them. In other words, DS children as compared to LI children receive fewer maternal utterances in the form of declarative statements. Furthermore, the MLU of mothers of DS children is less than the MLU of mothers of LI children. It should be noted that although these differences seem to exist between mothers of NH and DS children, the difference between these two groups was not statistically significant at .05 level of confidence. However, the differences between the usage of feedback and imperative categories were significant both for NH-DS and DS-LI groups. In other words, mothers of DS children consistently offered evaluative feedback (e.g., very good, that's right, right, you smart cookie) to the child's performance and directed Imperatives (e.g., look at me, John; press it; show me the kitty; let's wipe) to the child more than the mothers of NH and LI children.

Guiding utterance was found to be of Type 4 speech and is used more selectively, depending on both the child's developmental condition and MLU level. In other words, the use of this

type of utterance is more prevalent among mothers of high MLU DS children as compared with NH children of comparable MLU level.

In summary, the main difference between mothers of NH-DS children was in their use of Type 3 speech. Specifically, mothers of DS children used significantly more total imperatives, especially in the form of requests for action and proposal for joint action; and more evaluative feeedback than mothers of NH children. This finding is in line with results by Kogan et al. (1969), Marshal et al. (1973), and Buium et al. (1974). In the aforementioned studies, the investigators examined CA-matched NH and DS mother-child language interaction during structured activity in the laboratory setting. Kogan et al., Marshall et al., and Buium et al. attributed their findings to a difference in the quality of the early linguistic environment provided by mothers of DS children as compared to that provided by mothers of "normal" children.

Rondal (1977) examined the maternal speech addressed to MLU-matched DS and NH children during free play at home and did not find any significant difference between the two groups. Rondal offered several explanations for the difference in findings in Kogan et al., Marshall et al., and Buium et al., and his study. But the fact this difference was found in maternal speech directed to MLU-matched NH-DS children during free play at home, in the present study, indicates that the difference is of a fundamental nature and the explanation given in the literature is not adequate. Further study is needed to understand this difference.

Another finding shows that DS children's maternal speech differed more from the LI children's mothers' than from the NH

children's mothers'. Mothers of DS children not only used significantly more imperatives and evaluative feedback as compared to mothers of LI children, but they also used significantly less declarative speech than the mothers of LI children. Furthemore, the MLU of the mothers of DS children were significantly less than the MLU of the mothers of LI children.

Finally, it should be emphasized that no significant difference in the child-directed speech was found between mothers of NH and LI children. That is, the linguistic environments provided by the mothers of NH and LI children are basically of the same type and quality.

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Author Notes

This research was partially supported by Grant Number G008402115 and CFDA84.023D, from the Department of Education.

The author would like to thank the parents for their participation, the school systems, the Down Syndrome Guild, Ellen Formby, and Corliss Kaiser for their assistance in recruiting subjects.

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Table 1

Maternal language categories which are significantly effected by the child's developmental conditions and/or MLU

Maternal Language Variables	Developmental Condition F (2,62)	MLU F(1,62)	Interaction Term F(2,62)
Coaching		3.76*	
Informing	2.98*		
Request Action	6.06**		
Proposal for Joint Action	3.94*		
Demonstrating		6.26*	
Guiding			5.50**
Evaluative	4.44*		
Feedback			
Granting Permission		6.38*	
Reduced Imitation		12.80**	
Expanded Imitation		3.99*	
Modified Imitation		29.72**	
Reduced Self-Repetition		10.02**	
Expanded Self-Repetition		5.26**	
Modified Self-Repetition		6.98**	
MLU	3.76*		
Total Utterance		5.37**	
TTR		3.98*	
No. Diff WR		6.38**	

* $p < 0.05$

** $p < 0.01$

Table 2

Maternal language parameters which are significantly influenced by child's MLU

Maternal Language Variables	MLU High	MLU Low
Coaching	0.21	0.80
Demonstrating	0.21	0.76
Total Self-Repetitions	11.12	14.88
Reduced	1.11	2.99
Expanded	1.19	1.81
Modified	3.16	4.22
Total Utterance	367.32	441.84
Granting Permission	0.92	0.38
Total Imitation	5.65	0.30
Reduced	0.63	0.20
Expanded	1.10	0.52
Modified	1.79	0.30
TTR	44.42	41.38
No. Diff. WR	94.92	77.85

Table 3

Maternal language parameters which are significantly influenced by child's developmental condition

Maternal Language Variables	Developmental Condition NH(21)	DS(21)	LI(19)
Total Declaratives	20.73	17.06	22.60
Informing	12.51	10.74	15.02
MLU	4.29	3.95	4.76
Evaluative Feedback	1.35	2.82	1.43
Total Imperatives	7.41	13.91	9.26
Request Action	5.11	9.59	5.98
Proposal for Joint Action	0.85	1.80	1.43
Guiding*	0.01	0.46	0.11

*Guiding utterances directed to high MLU children.

Table 4

Effect of Developmental Condition on Maternal Language Categories

Maternal Language Variables	Groups which were different from each other at the 0.05 level
Total Declaratives	DS-LI
Informing	DS-LI
MLU	DS-LI
Evaluative Feedback	NH-DS and DS-LI
Total Imperatives	NH-DS and DS-LI
Request Action	NH-DS and DS-LI
Proposal for Joint Action	NH-DS and DS-LI
Guiding*	NH-DS

*Guiding utterance directed to high MLU children.