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THE UNIVERSITY OF ALBERTA

THE EFFECTS OF JOINT ACTIVITY INTERVENTION ON CHILDREN'S PRAGMATIC DEVELOPMENT

BY

CATHERINE McCARTHY

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF EDUCATION

IN

SPECIAL EDUCATION

DEPARTMENT OF EDUCATIONAL PSYCHOLOGY

EDMONTON, ALBERTA

FALL, 1986

ISBN 0-315-32512-7

THE UNIVERSITY OF ALBERTA

RELEASE FORM

NAME OF AUTHOR: Catherine McCarthy

TITLE OF THESIS: The Effects of Joint Activity Intervention on Children's Pragmatic Development

DEGREE FOR WHICH THESIS WAS PRESENTED: Master of Education

YEAR THIS DEGREE GRANTED: Fall, 1986

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled THE EFFECTS OF JOINT ACTIVITY INTERVENTION ON CHILDREN'S PRAGMATIC DEVELOPMENT submitted by CATHERINE McCARTHY in partial fulfilment of the requirements for the degree of MASTER OF EDUCATION in SPECIAL EDUCATION.

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ABSTRACT

Four dyads, each consisting of a mother and her developmentally delayed child received approximately ten weekly intervention sessions which focused on fostering improved linguistic skills through the use of turntaking games. The children in the study, aged two to three years, experienced language delays as well as specific pragmatic impairments. Turntaking interactions were taught to each dyad within the format of structured games. The intervention consisted of two phases: Phase I (Turntaking with Actions) focused on facilitation of non-verbal communicative interaction between the mother and child in the dyad, while Phase II (Turntaking with Communications) focused on verbal interaction within the same structured games.

Repeated measures were taken of turntaking skills within the dyadic interaction. In addition, a communication task designed to elicit Declarative and Imperative Performatives was administered on a repeated basis. The results of these measures as well as developmental measures administered prior to and following intervention determined the efficacy of the intervention process. A post-hoc comparison to a sample of fourteen normally-developing toddlers and their mothers, matched to the four experimental dyads on developmental status, was also carried out.

It was found that the treatment program appeared to have some impact on the interaction style of the dyads as well as on the communication skill and language development of the four delayed children in the study.

ACKNOWLEDGEMENTS

I would like to thank my parents for the faith and love that has supported me throughout my academic endeavors.

To Gerry Kysela and Gary Holdgrafer, who started out as advisors and became friends. Thanks for the wise and thoughtful guidance, the continued support and the many, many laughs on those wintery mornings.

To Linda McDonald, who has always been a mentor and continues to be.

To Tom Maguire, whose helpful comments regarding statistics added a great deal to this work.

And finally, to Jennifer and Arlene; Daylene and Shirley; Corrie-Lynn and June; Benjamin and Joyce. Thank you for your tireless and cheerful participation and the unending insights you gave me into the language of childhood.

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INTRODUCTION

A. The Problem

Language delays have long been recognized as a major disabling factor for developmentally delayed persons, and consequently many intervention programs have focused on remediation of these delays (Gray and Ryan, 1973; Guess, Sailor and Baer, 1976; Kent, 1974; Waryas and Stremel-Campbell, 1982). Frequently, communication intervention programs for developmentally delayed children have focused on the development of word forms and semantic-syntactic structures without much consideration of potential prelinguistic precursors (Graham, 1976). Recent research (Bates, 1979; Bates, Camaioni and Volterra, 1979; Bricker and Carlson, 1981; Chappell and Sander, 1980; Dore, 1983; Sugarman, 1973) has focused on precursors to the development of formal language. The implication is that language intervention would be more effective if begun prior to the onset of verbal behavior.

Bates (1979), Bruner (1975) and Chappell and Sander (1980) postulated a systematic relationship between the dyadic social interaction process of a mother and her infant and the later emergence of competent language skills in the child. Specifically, Bruner (1975) has suggested that language is learned as an instrument for regulating these interactions. Therefore, language intervention which improves or exploits this interaction process along specific dimensions should,

theoretically, foster more effective language/communication skills in the child.

In recent years language interventionists have been making a gradual shift away from the traditional "direct teaching" model to a more naturalistic or ecological model (Spradlin and Siegel, 1982). The traditional model is characterized by a tutorial approach utilizing highly structured steps in a systematically arranged setting. The language input to the child and the consequences are carefully planned in order to teach discrete verbal responses (Hart and Rogers-Warren, 1978; Spradlin and Siegel, 1982). In contrast Fey (1986) defines a naturalistic or ecological approach as one in which treatment activities are as similar as possible to activities the child would naturally engage in, while still encompassing treatment goals.

Several principles have influenced the shift toward the naturalistic model of language intervention. These principles include the following: (1) language should always be learned in the context of social interaction (Bruner, 1975; Hart and Rogers-Warren, 1978; Mahoney, 1975); (2) these social interactions take the form of prelinguistic joint activities and linguistic conversations with primary caregivers (Dore, 1975; MacDonald and Gillette, 1982; Snow, 1972); and (3) language acquisition is motivated primarily by the child's desire to communicate intentions in the context of social interactions (Bates, 1979; Prutting and Kirchner, 1983). Language training carried out in the context of a child's natural interactions with his significant others is considered the most

ecologically valid approach (Fey, 1986; MacDonald, 1982; MacDonald and Gillette, 1982).

The early intervention programs of MacDonald (1982) and Manolson (1983) are examples of naturalistic intervention approaches which are based on the principles and concepts delineated above. Both programs are being used extensively throughout Canada and the United States and there are many subjective reports of success through use of these programs (Manolson, 1983). In particular, the aforementioned programs emphasize the importance of turntaking in mother-child interactions as a critical feature for language development. Ratner and Bruner (1977) point out that early turntaking games might be expected to give the language learning child assistance in acquiring language by "(a) limiting and rendering highly familiar the semantic domain in which utterances are to be used; (b) providing a task structure that can be easily predicted and that offers clear-cut junctures at which functionally intelligible utterances can be inserted, and (c) by allowing easily for the development of reversible role relationships between speaker and hearer" (p. 401). In addition, Ratner and Bruner point out that by preverbal practice in turntaking in early games, children learn to use dialogue "on their own with objects, people other than their mother and with the realm of objects and events that are on the level of 'pretend'" (p. 401), thus promoting generalization. MacDonald and Gillette (1984) have referred to these games as "conversations" because of their reciprocal nature. As yet, there are limited data to support the effectiveness of this approach (Girolametto, 1985) and none that show a relationship

between change in dyadic interaction style and improved child communication skills. Clearly, there is a need for objective and empirical research in this area.

B. Statement of the Problem

The aforementioned lack of evidence for improved child language skills resulting from intervention at a dyadic-interaction level clearly indicates a need for research in this area. This is particularly evident when viewed in light of the current widespread clinical emphasis on the potential effect of this general strategy in improving linguistic competence (DeMaio, 1984; Friel-Patti and Lougeay-Mottinger, 1985; McLean and Snyder-McLean, 1978). This study focused on the issue of whether turntaking games provide assistance to a child in learning language. The specific purpose of the study was to investigate the effects of "conversational" procedures (MacDonald and Gillette, 1984) on children's verbal communication skills.

The dyads involved in the study each consisted of a mother and her developmentally delayed child. The children were considered to be "pragmatically impaired" in that they had a small vocabulary, but tended to communicate through the use of gestures in situations where the words they had would normally have been more appropriate (Snyder, 1978). These dyads were compared, on a post-hoc basis, to dyads consisting of a mother and her nonhandicapped child who were matched with the experimental group according to child MA and language level.

In the current study, turntaking interactions were taught within

a format of structured "games" (Ratner and Bruner, 1978). Initially, non-verbal forms of these games were facilitated. Ratner and Bruner speculated that preverbal practice in turntaking exchanges prior to the introduction of words was necessary in order to promote generalization to more practical situations. Once this skill had reached a specific criterion level, parents were taught to gloss words onto their actions, thereby utilizing parental linguistic modeling. Ratner and Bruner (1978) termed this technique "highlighting," that is, emphasizing a feature of the action by adding an utterance. The words modeled by the parents were from among those already in the children's vocabularies. These words were selected based on their low frequency of use on structured communication tasks. The communication tasks were re-administered on a repeated basis throughout the intervention to assess any improvement in the communicative use of the words as a function of their use in the games.

This study was an attempt to empirically validate one aspect of the mother-child interaction process—that of turntaking, in order to increase word use following intervention. A review of the literature relevant to this study is presented in the following chapter, while Chapter 3 discusses the rationale for the study and the specific research questions which were investigated.

Chapter 2

REVIEW OF THE LITERATURE

A. Introduction

Educational services to handicapped children have undergone unprecedented changes in the past two decades. Perhaps the most striking changes have occurred in the use of early intervention services for young handicapped children with focus and delivery of language services being a primary example of the widespread modifications which have occurred (Kysela et al., 1979). One needs little familiarity with the developmentally delayed population to realize that the delay in acquisition of competent, functional language skills is one of the most striking characteristics of this group of children. Therefore it is readily apparent that intervention strategies are necessary in order to provide these children with a means for achieving more competent communication. The basis for these intervention strategies can be found in the research literature on the normal development of communication skills. This chapter will review literature on both the sequence and context of normal development that provide the basis for the intervention strategies investigated in the present study. Research on the communication deficits and interaction styles of parents and their handicapped children will also be reviewed. Finally, evidence from intervention studies into the parent-child interaction process will be presented.

B. The Normal Development of Communication Skills

The notion that infants demonstrate communication skills long before the acquisition of their first word has gained virtually universal acceptance over the past two decades (Bates, 1976, 1979; Bruner, 1975; Cross, 1978; Sugarman, 1983). There is a widely-held assumption (e.g., Schwartz, 1984) that the transition between pre-linguistic forms and the acquisition of the first word is gradual, however at least two diverse perspectives exist regarding this transition. Bates (1976), Harding and Golinkoff (1979) and Snyder, Bates and Bretherton (1981) advocate the existence of a causal role between preverbal communication and language development, creating a continuity in the transition from preverbal communication to language. This perspective has resulted in language intervention programs which focus on preverbal behavior. On the other hand, Dore (1975) believes there is a discontinuity between prelexical forms and true words; this separation occurs because of a lack of knowledge about the symbolic properties of language by the prelexical child.

Investigators agree that the developing child experiences progressive changes in his vocal, gestural and verbal behavior prior to the development of mature language skills. Bates, Camaioni and Volterra (1979) delineate three stages of early communication development, two of these being in the realm of nonlinguistic communication: (1) the <u>prelocutionary</u> stage, in which the child's behavior (e.g., hunger cry) has an effect on his listener (e.g., feeds baby) without having intentional control over that effect;

(2) the illocutionary stage, in which the child intentionally uses non-verbal signals (e.g., pointing) in order to indicate a statement; and (3) the locutionary stage, in which the child uses conventional signals (i.e., words) in order to express a message. In addition, Bates et al. (1979) traced the development of two communicative intentions or performatives (imperative performative and declarative performative) from their earliest prelinguistic forms through to use of the analagous word. In this way, the authors demonstrated developmental continuity between prelinguistic and linguistic communications. Bates et al. (1979) received theoretical impetus for their work from the writings of J. Austin (1962) on "speech act theory."

Performative structures are defined as follows: the declarative performative is a signal used by the child to direct adult attention to objects and events (e.g., pointing, showing, "doggie") while the imperative performative is a signal used by the child to convey a request for an object (e.g., pointing, "doggie," "open"). Both Bates et al. (1979) and Sugarman (1973) delineated recognizable criteria which would differentiate each of the stages from the other and their research has been paralleled by theoretical statements from Bruner (1975) and Dore (1974).

Bates et al. (1979) and Sugarman-Bell (1978) emphasized the importance of gestures in the progression from prelinguistic to linguistic forms of communication. Sugarman-Bell delineated a three step sequence of social-interactive behavior during the pre-verbal period, with each step incorporating progressively more

complex forms of gestural communication. Bates et al. (1979) affirmed these findings with their discussion of the development of child communicative behavior from the gestural level of perlocutions and illocutions through to the onset of verbal behavior or locutions. Investigators (Carter, 1979; Dore, 1979) also agree that between babbling and the onset of formal language as evidenced by the emergence of referential words, the child progresses through a stage of word-like utterances. These have differentially been called "symbols" (Piaget, 1952), "proto-language" (Halliday, 1975), "primitive speech acts" (Dore, 1975), "phonetically consistent forms" (Dore et al., 1976), "indexical expressions" (Dore, 1983) and "vocables" (Carter, 1979). Dore et al. (1976) grouped these utterances into two types. The first, "affect expressions" generally serve the purpose of expressing protest or glee and are typically heard during times of arousal. The second type, which generally occurs at a later developmental stage is that of "indicating expressions" which are thought to be the beginnings of referential communication. This second category of utterances more closely approximates adult speech in terms of phonemic and prosodic characteristics. Co-occurring with this stage of word-like utterances is a stage which is attributed to the beginnings of intentionality in the child.

The transition from pre-intentional to intentional behavior is characterized by Scoville (1984). The child's behavior is not only directed toward a goal (some desired object) but directed toward the adult as well in order to communicate the goal to the adult.

C. The Context of Communication Development

Bruner (1975) and Ratner and Bruner (1978) emphasize that play routines of parents and their young children provide the basis for prelinguistic and linguistic behavior eventually used by children to regulate parents' actions and attention. A basic feature of these games is joint referencing. Bruner (1977) stated that the objective of joint referencing "is to indicate to another by some reliable means which among an alternative set of things or state or actions is relevant to the child's and mother's shared line of endeavour" (p. 275). Collis and Shaffer (1975) have shown that the mother's line of visual regard commonly follows her infant's in order to ensure that she is focusing on that which holds his attention. In return, by the age of approximately four months, the child is able to direct his line of regard on that at which the adult is looking, as well as to ensure the adult's joint attention by such strategies as touching or holding the object. Thus, at this early age, there is a procedure by which either the parent or the child can control the focus of attention on an object, thereby directing the topic of prelinguistic conversation (Foster, 1985).

Joint referencing by mother and child logically leads to joint action on the object to which attention was directed. Joint action is considered to be an elaboration of joint referencing by not only mutually directing attention toward an object but by entering into some form of reciprocal action which constitutes a comment on a shared topic (Bruner, 1977). These joint action routines provide a framework for learning the rules of communicative exchange. Ratner

and Bruner (1978) investigated normally developing children between the ages of five and nine months and found that joint action routines assisted these preverbal children in learning communication strategies. Learning was facilitated due to the highly ritualized nature of the games: the responses required to take part in the games were restricted and predictable. In addition, the role each partner played in the games was both clearly delineated and reversible. Although Ratner and Bruner postulated the importance of early games for infants learning language, Snyder-McLean et al. (1984) argued that joint activity routines would be equally as important for older children who were at a prelinguistic stage of development. The latter authors proposed that joint action routines could be effectively used in clinical intervention, and provided the following definition:

> a ritualized interaction pattern, involving joint action, unified by a specific theme or goal, which follows a logical sequence, including a clear beginning point, and in which each participant plays a recognized role, with specific response expectancies, that is essential to the successful completion of that sequence. (p. 214)

Joint action routines begin very simply and become more complex, both in terms of enrichment of action and length of exchange. Routines may become elaborated by co-occurrence of mutual gaze, vocalization and action. These joint action sequences acquire a complexity and routine which gives the appearance of "well-practiced games" (Bell, 1971). Manipulation of objects or toys is one vehicle which readily captures the interest of the child and allows the mother and child to attend to the same referent. This appears to be an important non-verbal stage in the evolution toward language use.

Snow (1981) hypothesized that the games that mothers and children engage in aid in the child's developing knowledge that they must take their turn in a playful interaction. Snow labelled this skill "slot-filling." The child must learn when to "take his turn" or "fill his slot" in the game by responding with the appropriate behavior at the appropriate moment. Initially, children use some form of gesture in order to take their turn in an interaction. Snow (1981) delineates five areas in which the early learning of gesture is emphasized:

> 1. The ubiquitous use of gesture to support verbal communication. . . .
> 2. The widespread and sophisticated use of gesture by hearing children at an age when their vocal development is still limited.
> 3. The precocity of first language signers as compared to first language speakers.
> 4. The widespread use of gestural communications by mothers to infants in the prelinguistic stage.
> 5. The effectiveness of sign in language training, not only for deaf and hard-of-hearing children who have limited access to auditory input but also for. . . . children who show a specific language deficit. (pp. 203-204)

Snow hypothesized that development of skill in non-verbal slot-filling prepared a child for the early functional use of language in familiar social routines or games.

It has been suggested (Werner and Kaplan, 1963) that language originates in or arises in conjunction with overt motor actions and gestures. Language then gradually becomes decontextualized in that there is an increase in the extent to which words are used outside of the immediate context of action. Werner and Kaplan (1963) suggest that one component of this process is the child's imitation of actions and verbalizations produced by others. Imitation also provides for an

alternating sequence of communicative acts in which both the mother and child play mutual roles as initiator and responder. Pawlby (1977) studied eight normal mother-infant dyads in play situations and found that imitation occupied 16% of the total interaction time within the dyads. She compared the imitation sequences she observed with other communication sequences and found many shared characteristics between the two interactions. She suggested that the similarities between the two types of interactions were evidence that imitation was a component of the development of communication. Pawlby's research emphasized the importance of mothers imitating their children as well as the reverse, and stated that mothers unconsciously realized that mutual imitation was a means of achieving a step along the road to the child's first word. For most parents the first word marks a clear and important transition that changes the child's status as a social partner, and is therefore highly desired.

It seems reasonable to assume that socio-communicative exchanges as described above establish some of the basic techniques for sharing knowledge and taking turns which will later be utilized in verbal dialogues. Thus, children are not simply learning specific techniques of joint referencing, joint attention and imitation, but are learning the rules of discourse.

Linguistic Input to Children

The verbal environment to which nonhandicapped children are exposed has been investigated in numerous studies in the past two decades (Broen, 1972; Garnica, 1977; Snow, 1972). Mothers, the primary source of linguistic input to children, have been shown to

modify their speech to language-learning children in order to simplify the comprehension and imitation process. When compared to adult-adult speech, mothers' speech to children has been characterized as less complex in terms of both semantic and syntactic level, more repetitive, slower, clearer and more fluent, with an exaggerated pattern of intonation. This simplified and redundant form of communication serves the dual purpose of: (1) maintaining a level of speech which makes it both comprehensible and interesting to young children, thereby increasing the likelihood that children will attend; and (2) aiding children in acquiring language due to the increased opportunity to imitate simplified utterances.

Observational studies have found a number of links between maternal linguistic input and rate of language acquisition in children. For instance, the recent study by Barnes, Gutfreund, Sattersly and Wells (1983) looked at speech addressed to a representative sample of two-year-old children and correlated features of mothers' speech to their children with gains in children's language. The authors found that parental questions, directives and expansions were all correlated with specific measures of children's progress in language development. In a similar study, Cross (1978) looked at factors which facilitate or inhibit progress in child language acquisition. She suggested that parental expansions, extensions and repetitions of child language appeared to be associated with an accelerated rate of language development in children. She noted that these discourse features served to match the mother's communicative intentions with those of her [redacted], thus maintaining the topic on which the child was focusing conversationally.

In studies by Clarke-Stewart (1973), Kaye and Charney (1981) and Nelson (1973), directives and the use of negation have been associated with reduced rates of child linguistic development. However, it should be noted that many authors do not support the notion of a causal relationship between maternal speech and child language. They point out that the majority of the studies in this vein demonstrate correlations but not causality and that the experimental studies have been generally unsupportive (Shatz, 1982).

Studies presenting information on linguistic input to developmentally delayed children will be presented in the next section.

Characteristics of Communication Development in Handicapped Children

Research has generally demonstrated that developmentally delayed children learn language in a similar, but slower manner than typically developing children. Nevertheless, many authors have specifically chosen to address the issue of language development in the developmentally delayed population. Despite restricted evidence of a causal link between language input and language development in normal children, a number of studies of developmentally delayed children suggest that poor parental input may inhibit optimal language development. Buium, Rynders and Turnure (1974) examined the linguistic input to Down Syndrome children as compared to normal language-learning children matched for chronological age. They found the speech of the mothers of the Down syndrome children contained a higher number of utterances in total, with a lower Mean Length of Utterance (MLU). In addition, they used shorter sentences,

more imperatives and more grammatically incomplete sentences. This study was among the first to conclude that mothers of Down syndrome children provided deficient linguistic input to their children. Their implication that the language directed to handicapped children was at least partially responsible for their language delay was widely disputed in later studies. The Buium et al. study was criticized for neglecting to consider the effect of developmental level on maternal language input. Subsequent studies, therefore, matched comparison groups on specific developmental characteristics rather than chronological age.

O'Kelly-Collard (1978) matched Down syndrome and nonhandicapped children on mental age, receptive language age and expressive language age. She found no significant differences in parental linguistic input to the two groups of children.

Glenn and Cunningham (1983) compared Down syndrome and nonhandicapped children who were matched for developmental age. Mothers' speech to adults and to their children was analyzed according to number of words per minute and MLU. No significant differences were found between the two groups of mothers.

Rondal (1977) studied Down syndrome and typically developing children who were matched for MA and language level. The mothers of these children were measured on numerous aspects of speech directed to their children, including semantic, syntactic and pragmatic analyses. Rondal interpreted her findings as indicating that child language level was more highly correlated with maternal language input than was the diagnosis of handicap.

One study found contrasting results to the three studies reported above. Davis and Oliver (1980) compared maternal linguistic input to mentally handicapped children as compared to nonhandicapped children. The children were matched for mental age. The authors found that mothers of handicapped children vocalized more frequently, contingently responded more frequently to their children and their responses were in closer temporal proximity to those of their children. Davis and Oliver suggested that the mother's view of her child as handicapped was the most powerful determinant of her level of input to her child.

With the exception of the Davis and Oliver study, the majority of the research which matched handicapped and nonhandicapped children on developmental level rather than CA tended to demonstrate few significant differences between maternal linguistic input to these two groups of children. However, several authors (Cunningham, Reuler, Blackwell and Deck, 1981; Lazky and Klopp, 1982; Peterson and Sherrod, 1982) suggest that the language input normally provided to language-learning children may be inappropriate or inefficient in encouraging language from developmentally delayed children. Modifications of parental interactions with handicapped children may be beneficial in eliciting language with this population, therefore, the involvement of parents in language programming would appear to be important for success.

The studies reported in this section deal with the language input of mothers to their children. However, it is widely recognized that children are equal contributors to the partnership of interaction

and therefore literature which examines parent-child dyadic interaction will be examined in the next section of this paper.

D. Parent-Child Communicative Interaction

The notion that syntax is central to a theory of language acquisition has recently given way to the theory of pragmatics, the study of language used in context (Bates et al., 1979; de Villiers and de Villiers, 1978). Pragmatics theory suggests that the primary motivation for language development is the transmission of communicative functions (Bates, 1976; Friel-Patti and Lougeay-Mottinger, 1985; Halliday, 1975; Muma, 1978; Rees, 1978). A pragmatic orientation toward language acquisition dictates that the child's isolated utterances not be the primary unit of study. Rather, it is critical to look at the relationship between the child's earliest forms of communication and the context in which they evolve. The study of social interaction in infancy has assumed primary importance in the study of the origins and growth of communication. Central to this issue is the study of parent-child interaction. Two decades ago, it was common to examine unidirectional effects of the mother's behavior on her child. More recently, a bidirectional model of interaction has proliferated, with emphasis on the mutual effects mother and child exert upon each other (Bell, 1968; Brazelton, Koslowski and Main, 1974; Lewis and Lee-Painter, 1974). Sameroff (1975, 1980), Sameroff and Chandler (1975), Lewis and Lee-Painter (1974) and McLean and Snyder-McLean (1978) focused attention on the transactional nature of dyadic interactions; the partners in the dyad being involved

in a continual stream of interaction where each partner's behavior exerted an influence on the behaviors of the other. The current conceptualization, therefore, of the mother-child interaction process, is bidirectional or transactional in nature.

Although the vast majority of research in the past two decades has dealt with interaction effects within the mother-nonhandicapped child dyad, there has been a recent proliferation of research into the interaction between mothers and their developmentally delayed children. This research evolved as a result of the studies which suggested that children could exert an equally important influence on the dyadic relationship as could mothers, and that the developmental status of the child could therefore affect the interaction process. Thus, a number of studies which compared interaction patterns between mother-nonhandicapped child dyads and mother-handicapped child dyads have emerged. These will be reviewed next.

Mother-Child Interaction Studies

Numerous authors view the dyadic interaction process as the grounds upon which the rules of social interchange are learned. Social interchange and joint activity in turn, provide the rules for learning language. Bruner (1975, 1977) viewed the mother-infant interaction process as a staging ground for later language learning and use. The mother and infant jointly develop a routine for interacting, both in caregiving situations and in play. Through these joint activities, the infant learns concepts which he later acquires words to describe. Therefore, the interactions between a mother and her infant were considered important for the pragmatic, syntactic and

semantic aspects of language development.

As a result of empirical evidence which relates the mother-child interaction process to child language competency, researchers have logically turned to investigation of this process when examining language delay. Numerous comparisons have been made between mother-nonhandicapped child dyads and mother-handicapped child dyads in terms of both prelinguistic and linguistic input. Researchers have postulated that the type and degree of handicap could affect the interaction patterns between mothers and their handicapped children and consequently language acquisition might also be affected. Several studies show evidence of clear qualitative differences in interaction between mother-nonhandicapped child dyads and mother-handicapped child dyads.

Kogan et al. (1969) studied play interactions between mothers and their nonhandicapped children as compared to mothers and their mentally handicapped children. They found that the mother-handicapped child dyads took fewer turns than the comparison dyads, and were more often in a "simultaneously neutral" position in regard to each other. In other words, they "did nothing together."

Jones (1980) reported similar results, indicating that mothers and their mentally handicapped children engaged in fewer reciprocal turns in their play interactions than mothers and their nonhandicapped children. This resulted in asymmetry in the turn taking interaction, with the subsequent effect of reduced opportunity for communicative interchange. Jones postulated that the asymmetry resulted from a failure of children to respond to mothers' questions or directives,

thus passively terminating the interaction.

Prelinguistic communicative behaviors received attention in several studies. Jones (1980) compared Down syndrome children with developmentally-matched peers and found that the handicapped group initiated fewer vocalizations and these vocalizations often "clashed" with those of their mothers. This was viewed as an indication of poor turntaking skills. Berger and Cunningham (1983) confirmed these results in their study comparing Down syndrome and nonhandicapped infants. They found the mother-handicapped infant dyads engaged in a significantly higher number of vocal clashes, indicating greater asynchrony in communicative interaction. Indeed, the mother-handicapped child dyads were less successful at adapting their vocal interactions as the children got older, when compared to dyads including nonhandicapped children. In an earlier study, Buckhalt, Rutherford and Goldberg (1978) provided additional support for the asynchronous pattern of vocal interaction between Down syndrome children and their mothers when compared to typically-developing children. In addition, they reported fewer vocalizations from the Down syndrome children.

Several studies compared mothers of nonhandicapped children to mothers of handicapped children on the issue of compliance to maternal commands and directives. Cunningham et al. (1981) postulated that adults modify their speech to children based on cues provided by the child. These include such indications of reciprocity as shared attention on a topic, child responses to verbal interactions, and the ability to imitate adult verbalizations and comply with requests and

commands. Their research found that mothers of mentally handicapped children exerted a greater degree of control than mothers of non-handicapped children, despite the fact that the two groups of children exhibited an equal degree of compliance. When the mentally handicapped children were divided into a high-MA and low-MA group, it was found that the mothers of the higher-MA children were more directive and less responsive to compliance in their children. Interestingly, this was despite a higher degree of responsivity in the high-MA children.

Breiner and Forehand (1982) confirmed the results of the Cunningham et al. study on the issue of child compliance. They compared nonhandicapped and mentally handicapped children in regard to their compliance to clear and uninterrupted commands and found no difference between the two groups.

Leifer and Lewis (1984) investigated the ability of young children to respond appropriately to mothers' questions. The authors viewed this skill as critical to the maintenance of conversations, and therefore to language learning opportunities. Two groups of handicapped children were matched with a group of nonhandicapped children age 18 to 23 months; the first group was matched with the non-handicapped children on the basis of CA, while the second group was matched for language level. The study thereby provided information related to the language delay/language difference controversy of the language of mentally handicapped children. When matched for CA, the mentally handicapped group showed significantly fewer appropriate responses; the majority of appropriate responses coded were action responses to directive questions. When matched for language level

(MLU = 1 word), the mentally handicapped children produced a greater number of appropriate responses to mothers' questions and a larger proportion of these were vocalizations as opposed to actions. In addition, handicapped children produced fewer "no responses," indicating that they understood the conversational rule of turntaking. Although the responses were more likely to be unrelated to the topic of conversation than those produced by the nonhandicapped group, the handicapped children were viewed to be more sensitive to conventions of discourse. The authors suggest that measurement of conversational skills may be an important measure of linguistic competence and therefore useful in decision making regarding linguistic input to developmentally delayed children.

Several authors provide evidence that the severity of the child's handicap may affect the pattern of interaction within the dyad. Terdal, Jackson and Garner (1976) hypothesized that the more severely handicapped the child, the more likely that his responses to maternal behavior would be ambiguous or absent. The authors compared the interactions of mothers and their developmentally delayed children with those of mothers and their normally developing children. The developmentally delayed children were divided into three groups according to their mental ages and compared to nonhandicapped children with similar development ages and equivalent CAs. It was found that the lowest MA group of handicapped children were less responsive to parental interactions and questions and that the mothers of these children were more directive and controlling. The authors interpreted these findings as being intercorrelated, but were unable to discern

the directionality of effect. It should be noted that chronological age was not accounted for in this study and it is difficult to tease out the proportional effects that mental age versus chronological age would play.

Vietze et al. (1978) compared two groups of developmentally delayed children (high MA and low MA) to a group of nonhandicapped children. Observations were made of typical play and caretaking interactions between mothers and their children. The mentally handicapped children as a group were found to be less responsive to mothers' vocalizations than the nonhandicapped group. However, when the developmentally delayed group was examined according to mental age status, it was found that the high MA children were more likely to vocalize contingently with their mothers than were the low MA children. Cunningham, Reuler, Blackwell and Deck (1981) studied two groups of mentally handicapped children (high MA and low MA) in comparison with nondelayed children. They found that mothers of children with high MAs used longer MLUs than mothers of children with low MAs, despite no difference in MLU in the two groups of children. The children in the high MA group were more responsive to maternal interaction, yet their mothers were in turn less responsive. The authors interpreted the findings as evidence of a relationship between maternal response style and level of development of the child.

Brooks-Gunn and Lewis (1984) investigated the effect of chronological age, mental age and handicapping condition on parent-child interaction patterns. The dyads were observed in a free play situation and their behavior was coded according to a classification

system which categorized behavior as proximal interaction (i.e., touch, kiss, hold) or distal interaction (i.e., vocalize, look, smile). Results indicated that child responsivity was positively correlated with increased mental age and chronological age. In turn, maternal responsivity was more highly correlated with child mental age than with either chronological age or handicapping condition. Thus, the overall development level of the child was the critical factor in determining maternal responsiveness.

Rondal (1977) reported consistent results in her comparison of maternal speech to Down syndrome and normally developing children. She found that maternal vocalizations were more highly correlated to their child's MLU than to their chronological age.

The developmental literature and empirical evidence presented in this section support the view that the interaction between parent and child is of primary importance to the development of language in the child. In fact, it has been postulated by several authors that a breakdown in the normal pattern of contingent interaction between parent and child may adversely affect the child's ability to learn conversational language skills. This will be discussed briefly in the next section.

Communication Characteristics of Handicapped Children

Developmentally delayed children may exhibit delays in the development of linguistic forms (e.g., words, word combinations) as well as in communicative or pragmatic abilities (Fey and Leonard, 1983). A number of recent studies have focused on differentiating

deviant from normal speakers in their use of language in social contexts (Rice, 1970). A frequent observation is that handicapped children tend to be responders rather than initiators (Fey and Leonard, 1983). DeMaio (1984) reviews factors that may contribute to this pattern of interaction:

> (1) . . . mothers of language-impaired children may not anticipate verbal participation from their children and therefore compensate by speaking for their children. . . .
> (2) . . . adults may initiate more with language-impaired children out of a desire to get them to talk. However, by asking an abundance of questions and dominating the interaction with initiations, we could be communicatively intimidating children with language disorders. . . . (pp. 200-201)

A study by Snyder (1978) clearly indicates that handicapped children are less likely to initiate interactions than normally developing children. Snyder (1978) compared language disabled children with normal children matched for Mean Length of Utterance (MLU) on their ability to produce declarative and imperative pragmatic functions in structured elicitation conditions. The children were scored on their facility at communicating information regarding an activity engaged in with the examiner. Low scores represented the use of a physical response to communicate a message while high scores indicated a linguistic response. Snyder found that the language disabled children used significantly fewer words to express their intentions than the normal subjects, despite matching for MLU and linguistic performance. She concluded that the language disabled children demonstrated more pronounced pragmatic delays than syntactic delays, i.e., although the children had words in their vocabularies, they did not use them to communicate intentions. This area is clearly one

which warrants increased research leading toward intervention procedures.

E. Intervention Studies into Parent-Child Interactions

There has been a dearth of research investigating the effects of intervention on the parent-child interaction process with developmentally delayed children and even less which is specifically related to changes in linguistic or prelinguistic communication in the child. However, there is a widely-held belief that an interdependent relationship exists between interaction and communication and clear evidence that developmentally delayed children are also delayed in language skills. Therefore, research which offers insight into mother-child interaction in general and specifically that which deals with communicative interaction will be invaluable in examining the linguistic development of mentally handicapped children.

The majority of intervention programs logically focused on the mother as the agent of intervention with the theory that intervention on the mother's behavior would consequently affect the child. For many years, parents have routinely served as partners in the clinical process of language intervention as well as provided generalization training. However, with the current conceptualization of parent-child interaction as the basis for prelinguistic and linguistic communication skill development, intervention with language delayed children must begin much earlier with parents playing a more active role. Clearly, the parents are the logical targets of intervention because of the amount of time they spend interacting with their children as

well as the strength of the socio-communicative bond which develops between parent and child. Muma (1983) suggests that parents need assistance in identifying target behaviors before they can play an active role in intervention. Cheseldine and McConkey (1979) studied parents of Down syndrome children who were given a language objective to work toward with their child, but no specific instructions on how to attain that goal. Three of the seven children studied were considered to be successful in that they began to use the target words specified for them on a regular basis during teaching sessions. Thus, it was found that while some parents could spontaneously change their language input to their children, affecting a corresponding change in child language, over 50% of the parents seemed to require more specific intervention in order to successfully adopt language teaching strategies.

Several authors have demonstrated that it is possible to modify parents' linguistic input to their children, thereby producing changes in various aspects of child behavior. Seitz (1975) used a modeling approach to train mothers in more effective play interactions with their handicapped children. Graduate students were trained to use several linguistic and behavioral strategies (e.g., commenting on the activity the child was engaged in; expanding the child's utterances; engaging the child in conversation; following the child's lead during play) while playing with the children involved in the study. The mothers observed these strategies in use with their children and subsequently attempted to reproduce the methods they had observed. The intervention resulted in changes in

both mothers and children. The mothers significantly increased their rate of positive responses as well as demonstrating an increased rate of imitations and expansions of the children's vocalizations. The children's imitations of their mothers' utterances were longer and structurally more complex. In addition, the children's rate of compliance increased significantly.

Mash et al. (1973) studied the effect of changing mothers' behavioral control strategies in order to increase child compliance in a group of mildly handicapped children. The mothers viewed another mother-child pair in a play interaction while receiving simultaneous feedback from a psychologist regarding effective and ineffective behavioral management strategies. Results of the study suggested that mothers could learn effective techniques for managing their child's behavior without actually receiving input on their interactions with their own child.

Girolametto (1985) studied the effects of training parent-child dyads in conversational turntaking skills. Twenty dyads, each containing a mother and her developmentally delayed child were involved in the research: nine dyads were in the treatment group and eleven in the control group. Parents were taught to maintain a specific topic for an increased number of turns, reduce their initiations and encourage child initiations. In addition, the specific linguistic goals of labelling, imitation of the child and verbal expansion were taught. At the end of the twelve once-weekly parent-child sessions, it was found that the children increased the total number of communicative turns they took per ten minute session

and missed fewer opportunities to communicate. Additionally, the children increased the number of communicative turns which contained words rather than utilizing non-verbal communication modes. The mothers were found to be more responsive to their children's choice of topic and initiated less often. The experimental dyads were more balanced in their interactions and were able to maintain interactions on a specific topic for a longer period of time than the comparison dyads. Although clear changes occurred in conversational turntaking development within the dyads, it was unclear whether there was an effect on linguistic development.

The intervention studies presented in this section have diverse effects on a wide variety of problem behaviors, yet all clearly show that it is possible to intervene in the mother-child interaction process.

The literature presented in this chapter has provided theoretical impetus for the present study. The ensuing research was designed as an exploratory pilot study of the discourse patterns between mothers and their handicapped children; intervention procedures were designed to modify those patterns of discourse along the specific dimensions of increased quantity and quality of turntaking and increased word usage.

Chapter 3 presents the specific research questions which were investigated, while methodological issues are discussed in Chapter 4.

Chapter 3

RATIONALE AND RESEARCH QUESTIONS

A. Rationale

The prelinguistic dyadic interaction between a mother and her child is considered to be a critical context for facilitating the development of communication/language skills in the child, as has been delineated in the introductory chapter and literature review. The mother-child dyad engages in play routines or joint action routines which provide the basis for prelinguistic and linguistic interaction through the use of reciprocal exchanges or turntaking (Bruner, 1975; Ratner and Bruner, 1978; Snow, Deblavw and Van Roomalen, 1980; Snyder-McLean, Solomonson, McLean and Sack, 1984).

Ratner and Bruner (1978) considered the functions of play routines for very young preverbal infants. Snyder-McLean et al. (1984) argue that the facilitating features of joint action routines can be effective with language delayed children who are at pre-language and emerging language levels. In particular, the use of consistent and familiar routines provides the framework that supports new response acquisition. In addition, dyadic involvement in joint action routines ensures that both partners are 'conversing' about the same topic.

It is the purpose of the present research to examine the effects of joint activity as a context for assisting a child in mastering

lexical items as evidenced by more effective communicative use of these lexical items. In order to examine the relationship between lexical skill development and mother-child interaction patterns, two situations were employed as the primary dependent measures: (1) turn-taking routines between the dyads and (2) pragmatic language tasks requiring both imperative and declarative use of lexical items. The children in the study demonstrated limited pragmatic skills as evidenced by restricted word use. It was the purpose of the study to determine if the development of joint action or turntaking routines related to specific lexical items would improve children's pragmatic skill development on these lexical items. Measures of turntaking were also included to monitor changes in mother-child interaction as a result of the intervention.

With the mother-handicapped child dyads, a two phase intervention program was instituted following baseline assessments in an attempt to develop parent-child facility both in turntaking or joint action routines and early one-word language use.

The discussion of the rationale and specific research questions as they relate to the two phases of treatment follows.

B. Phase I: Turntaking with Actions

MacDonald and Gillette (1982) have been major proponents of the notion that a quantitatively and qualitatively adequate turntaking exchange must be present in order for a child to develop socio-communicative language skills. In fact they state "turntaking may be the single most powerful tool in training language in that it sets

up the essential interaction without which little socially useful language will emerge" (p. 9). Phase I of treatment in the present study was modeled on the first module of MacDonald and Gillette's training manual 'A Conversational Approach to Clinical Management of Language Delay' (1982). This phase of treatment was geared toward establishing a "communicative network" with the child (DeMaio, 1984). Parents were trained to exchange nonlinguistic turns with their children and to encourage their children to engage more actively in the interaction. Research has suggested that parent training in the use of specific interaction strategies would result in observable changes in the discourse structure of the prelinguistic conversations between mother and child. Thus, the objectives of Phase I of treatment were to demonstrate changes in specific dyadic interaction skills as a result of parent training in the strategies discussed below.

Parents were taught to develop and maintain turntaking sequences in their non-verbal exchanges with their child. The initial strategy which was taught was mode-matching, or ensuring that the mode of communication utilized by the parent was similar to that utilized by the child (i.e., child action followed by parent action, or child vocalization followed by parent vocalization). It should be noted that the definition of mode-matching formulated by MacDonald and Gillette (1984) whereby a mother and her child communicate at levels not more than one mode removed from one another (i.e., action to vocalization, vocalization to word, word to phrase) was not rigidly adhered to in this study. This was due to the presence of the target

words in the child's vocabulary prior to the beginning of the study. Therefore parents were encouraged to add a word onto a child's action in Phase II of the study.

Imitation was the strategy suggested to ensure that mode-matching was achieved. Parents were also taught to expand upon their child's behavior in order to demonstrate the wide range of actions that could be utilized with a single toy. Additionally, the parents were taught to model new behaviors for their child. Signals and cues were utilized in order to encourage the child to fill his turn in the sequence. Through the use of these strategies, it was anticipated that the turntaking sequences would gradually increase in length, thereby providing a vehicle for the development of communication through a more conversational form of interaction. Finally, the parent was taught to approximately balance the number of turns each partner employed in a turn sequence, so that one partner was not dominant over the other.

C. Phase II: Turntaking with Communications

As previously discussed, turntaking was felt to be the basis upon which linguistic conversations were later built. Therefore the concept of turntaking received heavy emphasis in Phase I of training. It was felt that parents must understand the theory of turntaking with actions and be competent in its use prior to the introduction of turntaking with communications. Phase II began after a specific criterion was reached in turntaking during Phase I and included training focused on identical principles as were taught in Phase I;

however, in this phase of training, parents were taught to gloss specific single words and short phrases onto the actions with toys they had been performing in Phase I. Ratner and Bruner (1978) termed this procedure "highlighting." Therefore, the parents were taught a cumulative process of interaction utilizing turntaking.

A strategy which received increased emphasis during Phase II of training was that of minimal discrepancy. This procedure was closely related to mode-matching, whereby the parent communicated one to two modes higher than that which the child employed. However, in Phase II, the purpose of teaching minimally discrepant modeling was to ensure that the child did not persist in receiving input which provided no new information. Rather, he should be exposed to communications minimally different from his own so that the likelihood of imitation was higher.

Expansions were considered to be a specific form of minimally discrepant model in which the mother repeated the child's previous communicative behavior and added another behavior which was not more than two modes (i.e., actions to words) removed from the child's behavior. Scherer and Olswang (1984) defined expansions as "utterances which repeat all or part of the child's preceding utterance with the addition of semantic (and syntactic) information (e.g. child: "car." mother: "Yes, that's a big car.")" (p. 387). Expansions were felt to be particularly effective in accelerating semantic and syntactic development, and training of their use was prevalent in Phase II when the child's intent to produce words and early multiword utterances was clearly in advance of their current

expressive ability.

The answers to the research questions listed below were considered to be an indication of the degree to which the objectives of training were accomplished.

Within each set of research questions, a question will be posed which relates to baseline contrasts with a group of nonhandicapped dyads. According to Girolametto (1985) the present approach is based upon the importance of turntaking to language development and the possibility that a breakdown in turntaking skills among language delayed children would adversely affect their ability to learn language. The implicit assumption is that language delayed children have deficiencies in turntaking skills, and there is some evidence of such a breakdown (Girolametto, 1985). Thus in order to compare the discourse skills of the experimental dyads to the nonhandicapped dyads, a set of research questions was formulated. In addition, the scores obtained by the experimental dyads can be compared over time to determine the effects of treatment. Girolametto (1985) points out that there is little evidence to demonstrate that dyadic level intervention is effective in developing the kinds of joint action routines considered facilitative for language development in language delayed children. Thus, a set of questions will be posed to assess the impact of the intervention on the interaction of the dyads. Finally, a set of questions will be directed toward the effects of joint action routines on the communication skills of language delayed children.

D. Research Questions: Communication Mode

Communication mode refers to the method of communication utilized by an individual during the turntaking tasks. In the current study, frequency of four modes of communication were measured: actions, vocalizations, single words or phrases. The definitions of these modes are listed under 'Operational Definitions' at the end of this chapter.

1. During the baseline condition, was the communication mode utilized by the experimental parents equivalent to that used by the parents of the nonhandicapped children?

2. Was there a significant change in communication mode utilized by the parents of the handicapped children over the course of the study?

3. During the baseline condition, was the communication mode utilized by the handicapped children equivalent to that used by the nonhandicapped children?

4. Was there a significant change in communication mode utilized by the handicapped children over the course of the study?

E. Research Questions: Turntaking Measures

Turntaking measures were those determined during the two-minute play sessions by a mother-child dyad. The questions listed below were formulated in order to determine the quality of the turntaking exchange between a mother and her child.

5. During the baseline condition, was the mean length of turns different between the experimental dyads and the nonhandicapped

dyads? Comparisons will be made both on mode-matched and non mode-matched turns.

6. As a result of training, was there a significant change in turntaking length over the course of the study? Comparisons will be made both on mode-matched and non mode-matched turns.

7. During the baseline condition, was the number of turn sequences different between the experimental dyads and the non-handicapped dyads? Comparisons will be made both on mode-matched and non mode-matched turns.

8. As a result of training, was there a significant increase in the number of turn sequences emitted during a two-minute play session over the course of the study? Comparisons will be made both on mode-matched and non mode-matched turns.

F. Research Questions: Communication Task Measures

The communication tasks were designed to measure the child's usage of imperative and declarative performatives in order to obtain an indication of communicative skill development.

9. During the baseline condition, did the handicapped children obtain different scores on the communication tasks from the non-handicapped children? Comparisons will be made on three communication scores: Declarative, Imperative 1, and Imperative 2.

10. Was there a significant change in the handicapped children's scores on the communication tasks over the course of the study? Comparisons will be made on the following three communication scores: Declarative, Imperative 1, and Imperative 2.

11. Did the scores for the generalization objects change over the course of the study?

G. Research Questions: Communication Strategies

It was determined through a review of the literature, that certain communication strategies have been found to facilitate the development of competent, functional language skills in young children. This study was designed to teach parents to use those strategies more effectively. In addition, strategies taught to parents were dependent on those behaviors which were observed in the children. The research questions listed below were posed in order to elucidate the issue of communicative strategy use in parents and children.

12. During the baseline condition, did the experimental parents utilize an equivalent number of strategies for communication change as the parents of the nonhandicapped children?

13. Was there a significant change in the use of communication strategies by the parents of the handicapped children over the course of the study?

14. During the baseline condition, did the handicapped children utilize an equivalent number of communication strategies as the non-handicapped children?

15. Was there a significant change in the use of communicative strategies by the handicapped children over the course of the study?

H. Research Questions: Developmental Measures

16. Were there changes in the scores on the developmental measures between pre-treatment and post-treatment administration?

I. Operational Definitions

Turntaking sequence: a sequence of socially related behaviors between two participants which are not separated by the occurrence of more than three consecutive codeable behaviors emitted by one participant. Turntaking sequence can be either mode-matched or non mode-matched, as defined below:

Mode-matched sequence: a sequence of turns where the turn of one participant was not more than one mode removed from the adjacent turn of the second participant (in the mode sequence: action—vocalization—word—phrase). i.e., if the first participant was utilizing the action mode, the second participant would be considered to be mode matched if she utilized a mode no higher than a vocalization.

Non mode-matched sequence: a sequence of turns where the turn of one participant was greater than one mode removed from the adjacent turn of the second participant (in the mode sequence: action—vocalization—word—phrase). An example of a non mode-matched sequence would be one where one participant was communicating utilizing action turns while the second participant was communicating utilizing word turns. This situation occurred routinely in Phase II of intervention.

Turn: any behavior which is directly responding to another

person or is initiating contact with the person, followed by a similar behavior from the responding person. A turn is considered interrupted by any of the following behaviors:

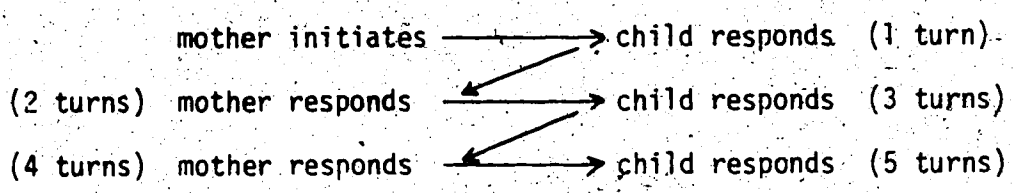
1. a pause in the turn behavior of five or more seconds;

2. three consecutive responses by one member of the dyad without an intervening response from the second member;

3. an action or utterance which is socially or linguistically unrelated to the topic of the conversation.

For example, a single turn would consist of a behavior initiated by the mother followed by a child behavior, or vice versa.

Turntaking length: the length of the turntaking sequence was determined by counting the number of successive turns chained together without an interruption. For example, the turntaking length of the sequence below is five turns:



Turn balance: a measure of the equality of distribution of turns between members of the dyad (e.g., a 50% split in the number of turns for each member of the dyad).

Turn dominance: a situation where one partner in the dyad takes three or more turns in exchange for one turn from the second partner.

Communication modes were classified according to the following criteria:

action: a non-verbal motor-gestural behavior

vocalization: a single sound (m), or a multi-sound production (oo-ee) which is nonlinguistic in intent

word: a single word or recognizable word approximation

phrase: a phrase consisting of two or more words.

Imitation: overt repetition of all or part of the partner's immediately previous behavior or an attempt at a repetition of that behavior. The imitation must occur within 10 seconds of the partner's behavior.

Expansion: a behavior by one partner which includes part or all of the immediately previous behavior of the other partner and adds a topic-relevant behavior not more than two modes removed from the partner's behavior (e.g., child: rolls ball. Parent: "Ball"). The expansion must occur within 10 seconds of the previous behavior.

Model: A novel behavior which is directed towards the partner and is not apparently elicited by the partner's immediately preceding behavior.

Minimally discrepant model: the parent's mode of communication within a turn was one to two above (action to vocalization or word; vocalization to single word; single word to phrase) the level her child employed communicatively. In this way the child was presented with communicative models which he was able to produce.

Chapter 4 presents the methodology which was used in this study and describes in detail the measurement of variables utilized in answering these research questions. The results of the data collection process are presented and described in Chapter 5.

Chapter 4

METHODOLOGY

A. Participants

Four mother-child dyads divided into two groups of two dyads acted as participants in the study. The participants were recruited through contact with Early Intervention Program workers or Speech/Language Pathologists in Edmonton and surrounding districts who were familiar with the scope and requirements of the study. Potential participants were required to fulfill the following characteristics:

1. The child must be between the chronological ages of 24 months and 48 months.

2. The child's mental age must be at least six months below their chronological age (as determined by the Mental Development Subscale of the Bayley Scales of Infant Development, Bayley, 1969).

3. The child must have a spontaneous lexicon size of a minimum of 10 words, including five object names as determined by administration of a two-hour language sample taken in the child's home.

4. The child must demonstrate a pragmatic impairment with regards to these words, as previously defined.

5. The child must have normal binaural hearing sensitivity as determined by a formal audiological examination within two months of the initiation of the study.

6. The child must not have a developmental or motoric condition

which would preclude the acquisition of intelligible speech (e.g., dyspraxia, dysarthria). This was determined by the child's ability to intelligibly articulate the words in his lexicon.

7. The dyad (child and one parent) must be available for a period of approximately 10 to 15 weeks from the initiation of the study.

Initial contact with the participants was made by the Early Intervention Worker or Speech/Language Pathologist who recommended the child for the study. At this time, a very general description of the purpose and time frame of the study was presented. If the family expressed interest in participating in the study, a follow-up phone call by the experimenter provided more in-depth information about participant requirements and set up an appointment for pre-experimental assessments. The following assessments were conducted in order to provide baseline information as well as to determine participant appropriateness:

1. Two-hour in-home language sample
2. Bayley Scales of Infant Development (BSID) (Bayley, 1969)
3. Uzgiris and Hunt Ordinal Scales of Psychological Development (Uzgiris and Hunt, 1975)
4. Sequenced Inventory of Communication Development (SICD) (Hedrick, Prather and Tobin, 1984).

The identical assessments were performed on a group of 14 nonhandicapped children matched for development status (Stewart, in prep.). These children were subsequently used to provide a sample for post-hoc comparison to the present experimental group.

The subjects under investigation ranged in age from 25 months

4 days to 36 months 2 days at the initiation of the study. They exhibited a wide range of handicapping conditions varying from Down syndrome to developmental delays of unknown etiology. Table 1 lists the specific characteristics of the research subjects at the initiation of the study. As may be seen from this table, the children's Mental Ages, as determined from the Bayley Scales of Infant Development, varied from 18 months to 21.5 months. Receptive language scores, as measured by the Sequenced Inventory of Communication Development, varied from 16 to 24 months, as did expressive language scores.

Table 2 presents the results of the Uzgiris-Hunt Ordinal Scales of Psychological Development (Uzgiris and Hunt, 1975) which were administered at the initiation of the study.

Demographic and Family Characteristics

The family characteristics of each dyad are presented in Table 3. These characteristics were felt to be important because of the strong influence that learning style and interaction skill between members of the dyad may have had on the results of treatment.

B. Research Design

This investigation employed a multiple baseline across subjects design which was replicated across two sets of two subjects. A discussion of the rationale for the selection of this design follows.

A multiple baseline across subjects design was chosen in order to evaluate individual reactions to the treatment program for each dyad. This single-subject design ameliorates the potential for

Table 1

Subject Characteristics

Child	CA	Sex	Primary Handicap	Secondary Handicap	Bayley[a] Motor	Bayley[b] Mental	SICD[c] Rec.	SICD[d] Exp.
A	27 mon. 0 da.	F	Mental handicap	Motoric disability	17 mon.	20 mon.	16 mon.	16 mon.
B	25 mon. 4 da.	F	Mental handicap (Down syndrome)		14 mon.	18 mon.	20 mon.	20 mon.
C	36 mon. 2 da.	F	Mental handicap (Multiple [redacted]ngenital [redacted]malies)	Motoric disability, Visual impairment	9.5 mon.	19 mon.	16 mon.	16 mon.
D	28 mon. 4 da.	M	Mental handicap		25.5 mon.	21.5 mon.	20 mon.	24 mon.

[a]Bayley Scales of Infant Development, Motor Development Subscale

[b]Bayley Scales of Infant Development, Mental Development Subscale

[c]Sequenced Inventory of Communication Development—Receptive Language Age

[d]Sequenced Inventory of Communication Development—Expressive Language Age

Table 2

Uzgiris-Hunt Scores

Child	Object Permanence	Means-End	Vocal Imitation	Gestural Imitation	Operational Causality	Spatial Relationships
A	V	IV	V	V	V	VI
B	V	IV	VI	VI	VI	VI
C	V	IV	VI	VI	V	VI
D	V	V	VI	VI	VI	VI

Piagetian Stage Achieved

Table 3

Parent Characteristics

Dyad	Parent	Parent Age	Parent Education	Parent Occupation	Home	Siblings
A	Mother[a]	35	High school	Homemaker	Urban	3[b]
	Father	38	High school	Salesperson		
B	Mother[a]	25	High school	Homemaker	Rural	0
	Father	26	High school	Highway patrolman		
C	Mother[a]	27	High school	Homemaker	Urban	1
	Father	32	High school	Driver		
D	Mother[a]	34	High school	Homemaker	Urban	3
	Father	33	High school	Driver		

[a]Indicates parent involved in intervention.

[b]One sibling was handicapped.

obscuring of individual treatment effects due to group averaging (Glass, Willson and Gottman, 1975). In addition, magnitude of change for each dyad is more readily observable with this type of design. Both of these factors were judged to be important in the present investigation because of the desire to determine whether the treatment was clinically significant in applied settings (Gottman, 1973). An additional contributory factor to choice of design was the limited availability of subjects. Only a small number of developmentally delayed children who fit the stringent age and developmental criteria were accessible to the researcher. Due to this factor as well as the heterogeneity of the developmentally delayed population, the research design employed herein was deemed most appropriate.

In choosing a research design, the traditional reversal (ABAR) design where treatment is alternately applied and withdrawn was not considered appropriate for the following reasons. There would appear to be a strong probability of carry-over effect which would be evident in the withdrawal phase of treatment. This would negate the ability to return to the original baseline levels of behavior (Glass et al., 1975). In the present study, for example, the first phase focused on teaching a process of interaction between the members of the dyad. It was felt that once this process was learned, it would be difficult for the dyad to revert to their pre-treatment manner of interaction. In addition, the parents may have been reluctant to discontinue use of an interaction pattern which was perceived to be effective in promoting increased levels of interaction within the dyad (Hersen and Barlow, 1976). As well, the reversal design was

judged to be inappropriate for the present study due to the intention of achieving relatively permanent behavioral changes within the dyad. Therefore, the use of short experimental phases which are facilitative in achievement of reversal of the experimental effects (Kazdin, 1973) was not desirous in the current investigation.

Alternatively, a multiple-baseline across subjects design was employed in this study. Baseline data were collected on the standardization measures (BSID, SICD) at the initiation and termination of the study. The remainder of the dependent variables (turntaking tasks, communication tasks) were investigated once weekly for two weeks at the initiation of the study and thereafter at the beginning and end of each of the two phases of treatment (turntaking with actions and turntaking with communications). In all, the measures of these dependent variables were repeated six times. The entire treatment protocol was replicated across two sets of two subjects, with a one week lag in institution of treatment procedures between one dyad and the next within a set. Although this design does not enable direct demonstration of treatment effects, as is possible with a reversal design, the results of treatment can be inferred from the lag in institution of treatment procedures.

Although it was recognized that the number of subjects investigated in the present study was relatively small, this number of subjects has been found to be adequate for demonstration of the effects of experimental treatment (Hersen and Barlow, 1976).

The following sections describe the administration of the research and the specific tasks utilized.

C. Setting

Language Sample

In order to provide baseline information regarding spontaneous language usage, each mother-child dyad was observed in their home for a period of two hours. The home setting was chosen because it was judged to be the setting most familiar and least restrictive for the child, thus presumably creating the most natural language environment for the dyad. The activities each dyad employed varied widely, however some attempt at standardization of activities was attempted by observing the first two hours of the child's day. In this way, it was assumed that several standard interactions between mother and child could be observed (i.e., awakening, diaper changing, bath, breakfast, free play, etc.). The family were asked to continue with their normal daily routine as much as possible without regard to the researcher.

The family constellation and father's work schedule dictated the family members present during the administration of the language sample. In all cases, the mother, target child and experimenter were present at all times, while in several families the father and/or siblings were present for at least a portion of the two hour time period.

Each language sample was taken by a trained speech/language pathologist who orthographically recorded each word or word approximation the child uttered. The observer was otherwise passive during the language sampling procedure. Unintelligible utterances were translated by the mother when possible; if the mother and the

examiner both found the utterance to be unintelligible, the utterance was not recorded. In addition to the recording of words expressed by the child, the words uttered were divided into four categories:

1. Spontaneous. Those words that were uttered without prior prompting by any person present during the language sample.

2. Response to question. Those words that were uttered as a response to a question asked by a person present during the language sample; e.g., "What's next?", "What do you want?"

3. Prompted. Those words that were prompted by that which was said by a person present during the language sample; e.g., "Say _____."

4. Imitated. Those words that were directly imitated from that which was said by a person present during the language sample; e.g., Parent: "It's a baby." Child: "Baby."

The child's utterances were coded with the letters S, RQ, P and I to indicate the four categories described above.

It was found that recording the samples orthographically was readily accomplished, as the paucity of child language at the time of the sample afforded ample time for recording by hand.

In addition to the language sample taken by the experimenter, the parents were asked to write down the words that their child used at home. The parents were provided with a brightly-colored language sampling sheet which they were asked to post in a conspicuous location in their home. The experimenter verbally described the difference between spontaneous utterances and elicited utterances in addition to providing the parents with a written description of the same

categories. In this manner it was hoped that the utterances sampled by the parents would compare to those sampled by the experimenter. The parents were asked to record as many different utterances that their child produced as was possible in the time period provided. The language sampling sheets were given to the parents on the date of the experimental language sample and collected one week later. The parental language sampling procedure was designed to provide a "double-check" of the experimental language sample in order to ensure that the word usage while the experimenter was present was representative of the word usage in a completely natural setting. In all four cases, this was judged to be true.

The language sampling procedure was performed at the initiation of the study and repeated at the termination of the study, following the treatment phase.

On the date of the language sample, the Bayley Scales of Infant Development (BSID) were administered in order to judge mental and motor development of the child. Within seven days of administration of the BSID, the Sequenced Inventory of Communicative Development (SICD) and the Uzgiris-Hunt Ordinal Scales of Psychological Development were administered. The BSID and SICD were re-administered at the termination of the study.

Clinic

Prior to the initial assessments in the clinic setting, the mothers signed a consent form (Appendix A) which informed them of the nature of the study and gave the research group permission to videotape the sessions.

Subsequent to the determination of appropriateness of the family for the study, the dyad was observed in a group treatment room in the Education Building at the University of Alberta, Edmonton, Alberta, Canada. The room was carpeted and furnished with tables and chairs. Four remote-controlled cameras set up at the ceiling level in each corner of the room provided audio and videotaping capability. The mother-child dyad was in one room 5 meters by 5 meters, while the research team recorded and observed from an adjacent room separated by a one-way mirror and wall. The clinic room had curtains on two sides, a chalkboard on the third and the one-way mirror on the top half of the fourth wall. Three types of data were collected in this setting:

1. measurement of turntaking behaviors of the mother-child dyad utilizing a standard set of six toys with all children;

2. measurement of communicative-interactive skills of the child on two specific communication tasks across a number of object words appearing on the language sample and according to parental report;

3. measurement of turntaking behaviors of the mother-child dyad utilizing toys specifically chosen for each child. These toys were chosen based on words not used consistently on the communication tasks.

The language sample, turntaking measures and communication task measures were performed on a one-time basis with a group of 14 non-handicapped children matched for developmental status (Stewart, in prep.) in order to provide a nonhandicapped sample for post-hoc comparison with the present experimental group.

D. Independent Variable

The independent variable in the current study was comprised of a two-part treatment procedure, with each part corresponding with a phase of intervention. The phases were as follows: (1) intervention provided in the area of dyadic turntaking using action turns and (2) intervention in the area of turntaking with communicative turns as mentioned in the previous chapter. These will be described in detail below.

Turntaking with Actions

The first phase of intervention, turntaking with actions, focused on training parent-child dyads on turntaking in a nonlinguistic format. Parents were trained to exchange turns during play with their children using action as a major component of the dialogue. The turntaking was done specifically with the toys mentioned above. Each toy was played with in a separate turntaking game (e.g., rolling a car back and forth, caretaking with a doll). Although linguistic turntaking (i.e., use of specific or related words) was not discouraged, it was de-emphasized, while the importance of action turns was stressed. Parents were taught that just as communication can occur in the absence of words, similarly conversations can occur prelinguistically. A conversation was defined (MacDonald, 1982) as "any turntaking behavior in which two people exchange messages with each other." It was stressed that conversations could be based either in conventional modes of language, or in action or play.

In prelinguistic conversations, just as in those based

linguistically, it is crucial that each conversational partner be provided with an approximately equal opportunity to input into the conversation. Therefore, parents were taught the concept of turn balance. Frequently in an adult-child dyad, conversations are imbalanced in favor of the adult, and some researchers feel that this imbalance is more pronounced when the child in the dyad demonstrates a developmental or communication delay (MacDonald, 1982). A basic goal of this phase of the training was to attempt to balance the turn distribution between the partners in the dyad in order to discourage turn dominance by either partner. Therefore, the general rule taught to the parents was to "take an action turn, then wait for your partner to take a turn" (MacDonald and Gillette, 1984).

Once the concept of turn balance was established, the parents were taught to attempt to increase the length of turntaking sequences (i.e., the number of turn exchanges occurring between child and mother) which they were engaging in with their children. This increase in turntaking length (TTL) provided a vehicle for increased interaction between the members of the dyad, thus improving the opportunity for natural language learning to take place.

The third major concept taught in this phase of treatment was that of following the child's lead in order to ensure that both members of the dyad were sharing a common frame of reference. Joint attention and joint activity routines between dyadic partners are commonly felt to be essential precursors to the development of social interaction and communication skills (Bruner, 1975, 1977; Snow, 1981). Parents were taught that following their child's lead ensured

joint attention on a topic which was interesting to the child and which was developmentally appropriate for the child. Thus, they imitated their child's actions, thereby accomplishing the two-fold purpose of increasing the turntaking length and encouraging continued interaction from the child due to familiarity of the "game." The mothers were also taught that it was appropriate to initiate turns themselves, by modelling appropriate play behavior.

A strategy which was found to be beneficial in encouraging the increased level of interaction was developed by MacDonald (1982) and was a goal of this phase of treatment. He described a graded technique of using successively more specific cues for prompting communicative interaction from the child. This technique was designated "wait-signal-prompt" and consisted of the following three components:

1. Wait. If the child did not take his turn, the mother was requested to wait silently for five seconds which encouraging the child to respond by maintaining eye contact and demonstrating anticipation via facial expression. Waiting was felt to encourage responding by providing the non-dominant child with time and space to take his turn.

2. Signal. A signal was defined (MacDonald and Gillette, 1984) as "anything . . . which encourages the child to take a turn" (p. 16). This strategy was utilized when waiting was found to be ineffective and was felt to be a slightly more intrusive form of prompt. Signals such as pointing to the toy or giving the child the toy to interact with were signals which mothers used routinely prior

to the initiation of intervention. However, during treatment they were taught to systematically utilize these signals when the interaction broke down at a specific level.

3. Prompt. Physical guidance was felt to be the most intrusive level of prompt in this hierarchy, however it was also the most effective for recalcitrant non-responders. If both waiting and signalling were ineffective as a means of encouraging interaction, the parents were taught to physically guide the child through performance of an action. On occasion, turn-dominant children required prompts to wait so that their partner could take a turn.

When a mother-child dyad utilized a minimum of three consecutive action-based turns on at least three occasions during a two-minute turntaking interaction, or exhibited extended turntaking for at least half the two minutes, it was determined that the criterion for Phase I of intervention had been reached.

Turntaking with Communications

The second phase of intervention utilized the same conceptual base as the initial phase, but expanded from nonlinguistic turntaking to communicative turntaking utilizing the specific words chosen for each child as well as any related vocalizations, words and phrases that appeared to fit naturally into the activity.

The goals of turn balance and increased length of turns, which had been established in the prior phase of intervention, were reiterated in the second phase. However, parents were taught to add a communicative message onto the action message which had been used previously, e.g., action message: rolling a ball between

parent and child. Communicative message: "Ball." In addition, parents were encouraged to imitate their child's vocal communicative attempts, however modest, and to model developmentally appropriate vocal or verbal communications for their child. Specifically, parents were asked to model the target words which had been selected for their child whenever their use was situationally appropriate. A technique to ensure joint focus of communication was the placing of verbal labels on the child's action by the parent.

In this phase of treatment the concept of progressive match was introduced. Hunt (1961) outlined the principles of this concept as it related to education in general, and entitled it the "minimal discrepancy model." He indicated that an educational model provided for a learner should be "minimally discrepant" from the learner's current behavior. Thus, an effective model would be slightly more sophisticated than the learner's current behavior in order to provide some degree of challenge, but would be well within the learner's developmental level to ensure the child has models which he is capable of producing.

MacDonald and Gillette (1982) recommend that parents model a communicative message which was no more than one mode higher than the mode their child was utilizing. Therefore, if the child was communicating mainly with actions, parents used actions or vocalizations in order to communicate; if the child used vocalizations, the parent used actions, vocalizations or words, and if the child used words the parent used any mode up to and including short phrases. The children in the present investigation already manifested some use

of the target words (as determined by language samples and parental report). Therefore, the sequence delineated above was modified somewhat in that words were modeled or "put on actions" (MacDonald and Gillette, 1982) and vocalizations were not emphasized as an intermediary step.

In each of the two phases of intervention, an important overriding concern was the affective communication level displayed by the parent. MacDonald and Gillette (1984) stressed that animated communication not only garnered the child's attention, but improved the intelligibility of the parental message by increasing the contextual cues provided. The second phase of intervention was terminated when a child produced the target words either spontaneously or in spontaneous imitation (i.e., not prompted by "Say . . .") of the adult's production at least three times in the two-minute play sessions over two successive weeks of intervention.

Teaching methods were replicated for each of the two phases of treatment, with the major difference being the goals. The following sequence of teaching was carried out for each phase of intervention:

1. Verbal explanation of the concepts and goals of the intervention as they related to each individual child. Please refer to Appendix B for the material presented to the parents. Parents were taught the concepts which were outlined in the previous section of this thesis and were given an opportunity to ask questions. The parents were provided with a "reminder sheet" in point form which they were asked to post in a conspicuous location in their home. This aided parents in remembering concepts which may have been alien to

them prior to intervention. See Appendix C for an example of a reminder sheet.

2. Parents were given two toys which were individually selected for their child. The selection of these toys was based on perceived child interest as well as information acquired from the in-home language sample; each toy represented a word which the child had been heard to use previously but did not use in specific communication situations. The same two toys were utilized throughout the two phases of treatment and were taken home between intervention sessions to enable the dyads to practice the techniques they had been taught. Parents were asked to practice the strategies once per day for five to ten minutes and were encouraged to use the toys provided for them as well as favourite toys from home. In this way, generalization was fostered and the attempt was made to generate the idea of learning a process of interaction rather than a set of rules for communicating.

3. Each week when the parents returned to the university, an informal review of their week's work was conducted. Parents were asked to relate their problems and successes and the variety of toys they utilized. In addition to utilizing the review time as an opportunity for problem solving, a general estimation of the number of times the dyad had practiced during the week could be obtained.

4. Each week, the dyad demonstrated their facility at utilizing the techniques taught. They were videotaped in two-minute play sessions with the two target toys. Subsequent to the first videotaped intervention session, the parents were encouraged to bring a

toy from home which they had found to be successful in promoting turntaking within their dyad. This toy was then incorporated into all future turntaking sessions.

5. The videotaped play sessions were immediately played back to provide feedback to the mother. This included discussion of specific examples of successful interactions as well as missed opportunities for use of facilitative techniques.

6. Following the discussion of areas of interaction which required change, a set of goals for the following week was negotiated and a "reminder card" outlining these goals was given to the parent.

7. On the third week of intervention within each phase, the techniques which each parent was experiencing difficulty with were demonstrated by the experimenter. The experimenter played with the child utilizing the experimental toys in order to allow parents to view the experimenter interacting with their child. Following the initial playback, the mother and the experimenter each completed a scoresheet which was designed to elucidate each of the goals of the intervention sessions. (Please refer to Appendices D and E for examples of the scoresheets for Turntaking with Actions and Turntaking with Communications.) These scoresheets were not used to specifically rate dyadic interaction, but as a vehicle for discussion and to determine degree of agreement between the mother and the experimenter on the use of the techniques for intervention.

The videotapes were then played back to demonstrate potential solutions for persistent problems.

The families came to the university for training once per week

and continued with their at-home practice on the intervening days. This weekly schedule was occasionally interrupted by participant illness or by the occurrence of major holidays, e.g., Christmas.

Each phase of treatment required approximately seven weeks to complete, with five of these weeks being devoted to intervention. The remainder of the sessions consisted of repeated measures of the dependent variables and pre and post-testing. Please see Table 4 for an outline of the overall schedule for assessment and intervention and the material covered in each intervention session.

E. Dependent Variables

Communicative Task Measures

The communication task measures were adapted from those developed by Snyder (1978). They were used to measure any improvement in communicative use of the target words as a function of the intervention. Snyder designed a series of experimental measures in order to elicit imperative and declarative performatives through the use of an interactional play context. The declarative task was designed such that an object or toy was changed while the play action remained the same. This task was based on a consideration of children's reference to new or changing situational elements as opposed to old or unchanging elements (Rowan, Leonard, Chapman and Weiss, 1983; Greenfield and Smith, 1976). The declarative performative task chosen for the present study was as follows: The child was presented with a large opaque nylon bag containing three one-inch plastic blocks and a toy or object. The researcher encouraged the child to

Table 4.

Assessment and Intervention Schedule

Phase	Week (Approx.)	Activities
Assess	1	Language sample BSID SICD Uzgiris-Hunt Acclimatization turntaking session
I	2	TT_1 CT_1
I	3	TT_2 CT_3 Verbal explanation of turntaking with actions Two target toys given to dyads for home practice
I	4	Review Videotape play sessions using 2 target toys View tapes Mutual rating of strategies and discussion of areas for change Negotiate goals for following week
I	5-7	Review Videotape play sessions using 3 target toys (one from home added) View tapes Mutual rating of strategies and discussion of areas for change Demonstration by experimenter TT_3, CT_3 on date of criterion Negotiation of goals for following week
II	8	TT_4 CT_4 Verbal explanation of turntaking with communications Previously used toys utilized for home practice
II	9	Review Videotape play session using 3 target toys View tapes Mutual rating of strategies and discussion of areas for change Negotiation of goals for following week
II	10-12	Review Videotape play sessions using 3 target toys View tapes Mutual rating of strategies and discussion of areas for change Demonstration by experimenter Negotiation of goals for following week TT_5, CT_5 on date of criterion
Assess	13	TT_6 CT_6 Language sample BSID SICD

Note: Intervention schedule is approximate only: Dyads varied slightly from this schedule.

search inside the bag and remove the blocks. The blocks were manipulated in such a way that only one at a time was available to the child for removal. The child removed the three blocks, one at a time, then the target object. The three blocks represented old or unchanging elements while the target object was the new or changing element. The child's removal of objects from the bag was the consistent play action.

The imperative performative tasks created a situational context in which the task stimuli were within the child's visual field but out of his reach. These tasks were selected from Snyder's (1978) study, which in turn were adapted from Sugarman's (1973) research. The two imperative performative tasks chosen were the following:

1. The toy or object which was utilized in the declarative performative task was removed from the child and placed out of his reach but within his visual field.

2. The toy or object which was utilized in the prior imperative performative task was placed in a large clear plastic container with a tightly-sealed lid. The child was able to see the object, but not obtain it without help from one of the adults present.

The three communication tasks were video and audio tape recorded and later scored according to a six point scale based on a scale devised by Sugarman (1973) (see Appendix L) which described the child's social/communicative interaction with the adults who were present. The scores on the scale ranged from 1 (no interaction with the adults present) to 7 (labelling of the object with a specific target word).

The communication tasks were administered in the same setting at the University of Alberta as were the turntaking tasks. However, in addition to the target dyad, the researcher was present and administered the communication tasks. The child sat on his parent's knee on the researcher's right side. The mother was instructed not to prompt her child to respond, and specifically not to ask questions such as "What's that?". She was informed that she could respond noncommittally to her child's attempts to engage her in the activity, but not to aid her child in acquiring the target toy nor to vocalize the name of the toy.

It was found that children interacted both with the researcher and with the parent during the administration of the communication tasks. This establishment of social-communicative contact did not appear to favor one adult over the other.

The children were allowed a maximum of ten seconds to respond linguistically to the toy. If they had not labelled the toy with a specific, accurate label at the termination of the ten second time period, the examiner proceeded to the next portion of the communication task sequence. In all cases, the sequence was as follows:

1. administration of declarative performative task utilizing the three blocks and the nylon bag.

2. administration of the imperative performative task by placing the object from the nylon bag out of the child's reach but within his sight.

3. if the child did not offer a specific label to request the

object on the first imperative task (score of 6 or less), administration of the imperative performative task utilizing the plastic container occurred. If the child labelled the object accurately (score of 7) on the first imperative performative task, task number three was not administered.

Turntaking Measures

The measurement of turntaking behaviors was used to determine the impact of turntaking instructions on the interaction of each dyad. MacDonald and Gillette (1984) defined a turn as "any behavior that is either directly responding to another person or is initiating contact with the person. It may or may not be communicative and it may take sensorimotor or linguistic form" (p. 7). The method of evaluating turn usage in the present study was through analysis of play within the mother-child dyad. Each dyad was videotaped in two minute play sessions with a standard set of six toys. A description of these toys and their common functions can be found in Appendix F. The dyads were presented with one toy at a time and the mothers were given instructions regarding how to play with the toy. In addition, the mothers were asked to attempt to have each member of the dyad take as many alternating turns as was possible. Full instructions for each toy are presented in Appendix G.

The dyad was seated on a blanket on the floor in order to provide as natural a situational context for play as was possible in the clinical room. Once the toy had been presented, the experimenter left the room and videotaping of the dyadic play interaction commenced. Videotaping was generally carried out for approximately

2 1/2 minutes to ensure that a full two minute segment would be available for analysis. In general, the children's interest in the toy could readily be maintained for the full 2 1/2 minutes, however on occasion they lost interest in the toy or wandered to a part of the room in which videotaping was difficult. If this occurred more than twice for time periods longer than ten seconds, videotaping was terminated for that toy and attempted again following presentation of the remainder of the toys.

The measures of turntaking ability were repeated six times throughout the course of the study, at intervals relating to the phases of training (i.e., twice in baseline, twice after Phase I and Phase II). (Refer to Table 4 for schedule.)

Two types of data were collected from the administration of the turntaking measure. The first set of data related to the interaction between the members of the dyad and was collected utilizing a modified version of the Preschool Observation System devised by Kysela and Barros (1983). This system utilized five behavioral categories which allowed for the continuous recording of the behaviors of both members of the dyad while they were involved in two minute play sessions. The categories included Initiate, Respond, Imitate, Signal and Guide. Appendix H lists definitions of each scoring category which were provided in order to minimize the amount of interpretation required by the scorers. The five generic categories were chosen by determination of the importance of the behavior to the outcome of the treatment as well as by attempts to combine behavioral classes into units large enough that they could be

reliably scored (Sackett et al., 1978).

In addition to the five molar behavioral categories, the dyadic interaction was further described according to the mode of communication utilized by each participant (motor-gestural, vocalization, single word, phrase). The definitions of these categories are also provided in Appendix H.

The data were recorded manually using prepared data sheets. The format of the data sheets employed by the observers is presented in Appendix I. Each sheet contained two columns, one for recording of parental behaviors and one for the child's behaviors. Each column was in a different color in order to differentiate between adult and child behaviors. Within each column a series of blocks, each containing nine letters representing the nine categories of behavior was repeated. The occurrence of scorable behaviors was indicated by marking the appropriate letter with a diagonal slash. If no scorable interactive behaviors occurred during any ten second interval, a horizontal line was drawn across both columns. Interactive behaviors were coded in a temporal sequence, and this was indicated by sequential behaviors being scored below those that occurred previously. Simultaneous behaviors were coded on the same row.

Scoring of interactive behaviors was done via videotapes in order to provide repeated opportunities to view a turntaking session. This was deemed desirable because of the complex nature of the scoring system employed.

Interactive Strategies

The second set of data collected from the turntaking measures related to the interactive strategies utilized by the members of the dyad. Eight behavioral categories representing interaction strategies taught during the two intervention phases of the study were codable for each member of the dyad. However, while all eight categories were recorded for both members of the dyad, only five categories were utilized in computation of the data for the children, as these were the categories deemed most useful in the study. These categories were explicitly defined in order to allow for minimal interpretation of observed behaviors by the scorers. The behavioral definitions are outlined in Appendix J.

Data were again recorded manually on a data sheet (illustrated in Appendix K) that contained six columns, to accommodate the maximum of six toys which could be utilized in a weekly session. The columns contained two sets of eight blocks, each block representing a strategy. The uppermost set of blocks represented parental use of strategies while the lower set represented child strategies. Use of strategies was indicated by marking the appropriate block.

Scoring of strategies was also done through observation of videotapes.

Developmental Measures

Sequenced Inventory of Communicative Development (SICD). The SICD is stated by its authors to be "a screening tool of communication" (Hedrick, Prather and Tobin, 1984, p. 7) which results in

receptive communication score and an expressive communication score expressed in months. The age range of the test is from four months to four years. The test samples prelinguistic responses and allows parental reporting of communicative behaviors, which makes it viable for use with young or low-functioning children.

The SICD was administered by a trained speech-language pathologist in the child's home. It was administered within seven days of the initial language sample and again within seven days of the final language sample following the training portion of the study.

Bayley Scales of Infant Development (BSID). The BSID was "designed to provide a tripartite basis for the evaluation of a child's developmental status in the first 2 1/2 years of life" (Bayley, 1969, p. 888). The test is divided into three scales: Motor Scale, Mental Scale and Infant Behavior Record, with the former two scales only being administered in the current study.

The BSID was administered by a speech-language pathologist trained in administration of the scales and familiar with assessment of young handicapped children. Administration took place in the child's home on the dates of the initial and final language samples.

Language Sample. Each mother-child dyad received two language samples, at the beginning and end of the study. These two-hour in-home samples were designed to record a representative sample of the child's productive language, and were conducted by a trained speech-language pathologist.

F. Observer Training and Reliability

Turntaking

Prior to the study, two observers received training on the Preschool Observation Record (see Appendix I). Observers were initially instructed in the definition of the different response categories, then practiced using the code while observing videotapes. When the mean reliability between the two observers exceeded the minimum criterion of 80% over five consecutive two-minute segments, coding of the videotaped segments began.

Reliability figures were obtained by having two observers independently code a minimum of five two-minute segments from each of the four children. Reliability was calculated by dividing the number of agreements by the total of agreements plus disagreements in each two-minute segment; repeated measures of reliability were calculated at approximately the half-way mark and again at the termination of scoring to ensure that "drift" did not occur (Kent and Foster, 1977). Reliability varied from 78% to 89% and was maintained at a mean of 82.3% over the course of the study.

It should be noted that a possible threat to the reliability figures in this study lay in the potential for inter-scorer influence. Romanczyk et al. (1973) demonstrated that an observer who had previously communicated his idiosyncratic scoring criteria to a second observer could markedly influence the second observer's scores. One method of reducing the effect of inter-scorer influence would have been to train a greater number of scorers in order to minimize the possibility of familiarity of scoring styles.

Communication Tasks

During the study, two observers received training on usage of the communication task scoring methods (see Appendix L). This training consisted of verbal instructions regarding the scoring categories in combination with practice utilizing videotapes of children performing the communication tasks. When the mean reliability between the two observers exceeded the minimum criterion of 80% over three consecutive communication tasks (minimum of 30 scored items) divided between at least two children, scoring of the videotaped communication tasks began.

Reliability was determined by having the two observers independently score a minimum of thirty items which had been randomly selected from the communication tasks of all four children, and was calculated by dividing the agreements by the total of agreements plus disagreements. Reliability figures were repeated approximately half way through the scoring process and again at the termination of scoring. Reliability ranged from 90% to 100% and was maintained at a mean of 94.3% over the counse of the study.

Strategies

Reliability figures were also calculated for the scoring of strategies utilized by parents and children (see Appendix K for scoring format). This scoring was performed by the experimenter and a graduate student observer who was utilizing the same scoring format for a complementary study. The two observers devised the format and were therefore intimately familiar with the definitions of scoring categories. Videotapes of dyadic play sessions were

observed and coded for the particular strategy which was being utilized at a given moment, i.e., model, imitate, expand. Scoring occurred every ten seconds for each two-minute segment thus producing a maximum of twelve "scorable moments" in a two-minute segment of play. This method was utilized in order to facilitate accuracy in scoring: it prevented scoring of different categories by each observer. On occasion, less than twelve segments would be scored as it was possible for the dyad to be non-interactive at the moment scoring was to occur. However, a two-minute segment would only be scored for reliability purposes if it contained between eight and twelve "scorable moments."

The two observers simultaneously coded behaviors at ten-second intervals as observed from a visually time-coded videotape. Scoring did not begin until reliability figures between the two observers reached a minimum of 80%. Calculations of reliability were obtained by dividing the number of agreements by the total of agreements plus disagreements in each two-minute segment. Reliability checks were randomly scheduled across different subjects. Reliability figures were obtained prior to initiation of scoring and were repeated at approximately the half-way point and again at the termination of the scoring. Reliability ranged from 77% to 100% with a mean of 89.9% over the course of the study.

Please refer to Table 5 for a visual representation of reliability for the three scoring systems.

Table 5

Calculations of Reliability

	Beginning		Middle		End		Overall
	Range	Mean	Range	Mean	Range	Mean	
Preschool Observation Record	78-85.5	80.2%	79-86.5	82.8%	79-89	84%	82.3%
Communication Tasks	91-100	94%	90-100	92%	92-100	96%	94.3%
Strategies	77-100	84.6%	80-100	96.1%	77-100	89%	89.9%

G. Internal and External Validity

Internal Validity

Kratochwill (1978) defined internal validity as "the degree of certainty that manipulation of the independent variable is responsible for the observed changes in the dependent variable" (p. 11). It has been widely recognized that research which occurs in naturalistic settings often lacks the control which can be established in more experimental settings (Glass et al., 1975; Kratochwill, 1978). Because of this factor, efforts to minimize the threats to internal validity are particularly important in research which employs designs of this nature. A discussion of the possible threats to internal validity for multiple baseline research designs follows.

Kratochwill (1978) outlined the threats to internal validity for research designs of this sort as follows: history, maturation, testing, instrumentation, multiple intervention interference, instability, change in unit composition and reactive intervention. The threats which were considered applicable to the current research will be outlined below.

History: Historical confounding occurs when events that are extraneous to the independent variable but that occur concurrently with it produce changes in the dependent variable. Because of the extended time period involved in the present research, confounding due to history posed a significant threat.

Three of the four dyads who participated in the study were concurrently receiving developmental training through a home-based early intervention program for developmentally delayed infants and toddlers.

In order to avoid confounding the results of experimental communication training with training provided by the home program, the early intervention worker involved with each child delayed provision of language training until the completion of the study. The fourth dyad was not involved in any concurrent developmental training during the course of the study.

Maturation: The possibility exists that performance of the participants in the research may be attributed to maturation rather than to treatment effects. However, due to the relatively short time frame of the study, invalidity due to maturation was of minimal concern. In addition, it is generally agreed that developmentally delayed children mature at a slower rate than do children with average developmental status. Therefore, the effect of maturation would be more modest with the participants in the present investigation than it would be with CA-matched peers.

Testing: The effect of repeated measures over the course of an investigation is a possible cause of invalidity due to a learning effect (Kratochwill, 1978). The communication task measures and turntaking measures were repeated over a period of approximately twelve weeks, therefore testing effects created a possible source of invalidity in the present investigation.

Instrumentation: Lack of reliable measurement devices can prove to be a serious threat to the internal validity of a study. Reliability is of particular concern when data collection is performed by human observers (Johnson and Bolstad, 1973; Kratochwill, 1978). The invalidity of treatment effects due to instrumentation in the present

investigation was controlled by videotaping all treatment sessions and ensuring that scoring was performed in a reliable and consistent manner. In this manner, the scoring of behaviors during both the turntaking sessions and the communication task measures was judged to be an accurate representation of the activities that occurred during the sessions. The reliability section provides a complete account of methods for determining reliability for this research.

Instability: The threat to internal validity caused by instability or natural variation of the subjects poses a potential problem. In particular, the present investigation is in jeopardy due to the developmentally delayed population of subjects which was sampled. Numerous authors (i.e., Baumeister, 1969) have described the characteristic variability of performance of this population.

Reactive Interventions: The final threat to internal validity which will be discussed is that of reactive interventions. Glass et al. (1975) described this as an intervention introduced as a reaction to either a past or impending change in a data series. The treatment effects can then be confounded due to extraneous factors which shift the data in the expected direction of the intervention effect.

External Validity

Kratochwill (1978) defined external validity as "the extent and manner to which results of an experiment can be generalized to different subjects, settings and experimenters" (p. 11). The research literature frequently states the difficulties inherent in single subject designs due to the unknown generality of results (Birnbrauer

et al., 1974; Hersen and Barlow, 1976; Kratochwill, 1978), and suggests that generality of results is improved via intersubject replication of the experimental conditions. In order for the results of a study to be applicable outside the research setting, external validity must be established both for the population sampled and for environmental influences.

Population Sample Characteristics: There was a great deal of heterogeneity among the participants chosen for the current investigation. Although this situation was not ideal in terms of generalization of treatment effects, it should be noted that the heterogeneity in the treatment group mirrored that of the population of developmentally delayed children for whom the treatment was hoped to prove effective.

Ecological Validity: Ecological validity refers to the degree to which experimental conditions are representative of conditions to which the investigator may wish to generalize (Bracht and Glass, 1968; Kratochwill, 1978). In the present investigation, the two types of ecological validity which are of greatest concern are those involving the parent in the dyadic interaction ("therapist generality") and those involving a change in settings ("setting generality)". Kratochwill (1978) listed the possible threats to external validity as follows: describing the independent variable explicitly; multiple-intervention interference; Hawthorne effects; novelty and disruption effects; experimenter effects; pretest sensitization; posttest sensitization; interaction of history and intervention effects; measurement of the independent variable; interaction of

time of measurement and interaction effects; and referent generality. The factors which were considered to pose a threat to the external validity of the present investigation will be discussed below.

Describing the Independent Variable Explicitly: An explicit description of the independent variable was provided, thus this was not felt to be a significant confounding factor to the external validity of the study.

Hawthorne Effect: The Hawthorne effects refers to the changes in responses to intervention which may occur as a result of the subjects' knowledge that she is involved in research. The mothers in the present investigation were well aware that they were involved in an intervention study, thus the Hawthorne effect may have been a potential confounding influence to external validity. In addition, there may have been some "evaluation apprehension" (Kratochwill, 1978) associated with the videotaping process. However, the situational familiarity generated by the length of the study may have reduced these effects.

Experimenter Effects: Experimenter effects refer to the effects the experimenter has upon the behavior of the subjects to the degree that the treatment does not generalize to the population in general. Attempts to reduce the likelihood of this effect were made by having parents do self-evaluations prior to the investigator evaluating their performance. In this way, it was hoped that parents would become less reliant on the investigator for confirmation of the efficacy of their interactions with their child.

Pretest Sensitization: Kratochwill (1978) determined that

baseline measures which were similar or identical to the intervention measures could sensitize the participants to the intervention. In the present investigation, the baseline measures were performed under identical circumstances to the treatment measures, with the exception of a difference in toys utilized. Therefore, pretest sensitization presented a minor confounding effect to external validity.

Chapter 5 will present the results of the data collection process, while Chapter 6 will discuss the implications of these results.

Chapter 5

RESULTS

The purpose of this study was to investigate the application of a ten to twelve week program of treatment on four handicapped toddlers and their mothers. The treatment incorporated two phases: Turntaking with Actions and Turntaking with Communications. In each phase of treatment, the goal was to increase the quantity and communicative quality of reciprocal turns engaged in by a mother-child pair. Repeated measures of turntaking behaviors were administered six times over the course of the study. In addition, a measure of communicative skill development in the areas of imperative and declarative performatives was administered six times in order to judge improvement in this area.

The results of this investigation are presented in the same order as the research questions in Chapter 3.

It should be noted that indication of statistical significance for the variables to be compared in the following research questions was not possible. This was due to several inequalities in the comparison of the data:

1. the number of dyads in the normative sample was not equal to the number of dyads in the experimental group;

2. the number of stimuli used in the turntaking tasks.

For these reasons, visual analysis of the data rather than determination of significance through the use of statistical tests was

utilized in this study. Parsonson and Baer (1978) supported the use of this type of analytic process by stating:

> The analysis is essentially a visual process; determination of change is dependent on the change being of sufficient magnitude to be apparent to the eye. Compared with the potential algebraic sophistication of statistical tests of significance (not always realized in practice), the above procedure usually is relatively insensitive, yet that very lack of refinement may have important and valuable consequences for the analysis of behavior. (Baer, 1977:111)

One potential weakness in utilizing visual analysis of graphed data is the increased probability of making a Type II error (accepting a null hypothesis when it should have been rejected).

It should be noted that, in the presentation of the data in this study, the term significance refers to clinical significance as opposed to statistical significance.

The use of a box and whiskers display (Maguire, 1984) allows a somewhat more accurate analysis of graphed data than that normally provided by simple visual analysis, particularly for variability and central tendencies. In this type of graph (see Figure 1), 50% of the scores fall within the boundaries of the box, with the upper and lower boundaries of the box indicating the second and third quartiles. The line running horizontally through the box indicates the median score. The highest and lowest scores in the range are indicated by the length of the whiskers which extend from either end of the box.

Data which are being compared to scores presented in a box and whiskers display can generally be considered to be significant if they fall outside the range of the middle 50% of the display (i.e., outside the area bounded by the box). Of course, the scores which fall closest to the normative mean are those most likely to be

similar to the normative scores.

The research questions and data relating to them will be presented below.

A. Communication Mode Utilized by Parents

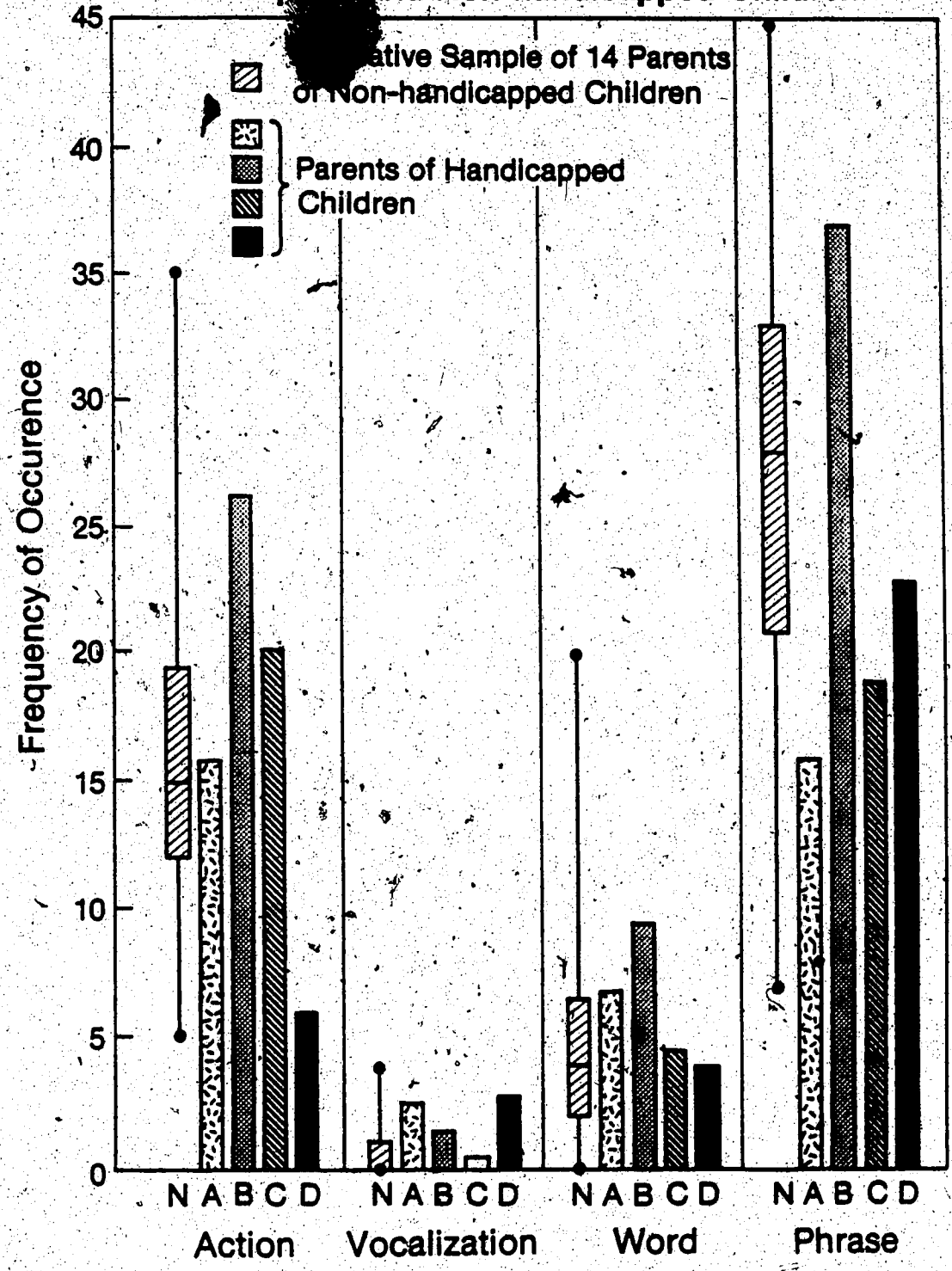
Research Question #1

> During the baseline condition, was the communication mode utilized by the experimental parents equivalent to that utilized by the parents of the nonhandicapped children?

Figure 1 presents a graphic representation of the comparison between the communication mode utilized by the mothers of the nonhandicapped children and the mothers of the handicapped children during the baseline condition. The mean frequency of occurrence for each of the four parents of the handicapped children is represented by an individual bar, while scores for the parents of the fourteen nonhandicapped children are grouped together in a box and whiskers graph (Maguire, 1984). This graphic format will be utilized for each presentation of normative data in comparison to data for the handicapped dyads during the baseline condition. Each of the four communication modes (Action, Vocalization, Word and Phrase) will be discussed individually.

The left-most box and whiskers display in Figure 1 shows the frequency of occurrence of actions by the parents of fourteen nonhandicapped children during a two-minute play session with their children. The scores for one of the parents of the handicapped children fell within the range of the middle 50% of the normative sample, while another score is only slightly above this range. The

Figure 1. Parent's Use of Communication During Baseline Condition: Comparison Between Parents of Handicapped and Non-handicapped Children



third score lies within two standard deviations below the mean normative score of 16.3, while the fourth score lies within two standard deviations above this mean.

The normative sample of parents exhibited a low number of vocalizations during the two-minute play sessions. The mean frequency of vocalizations was .58 with a standard deviation of .91, while the mean for the experimental parents was 1.86. Scores for three of the four parents of the handicapped children fell within the upper 25% of the normative scores.

Single words were used by the parents in the normative sample a mean of 5.27 times in two minutes, while the experimental parents used single words a mean of 6.26 times. Three of the four experimental parents fell within plus one standard deviation of the normative sample mean, with the fourth only marginally outside of this range.

Both the experimental parents and the normative sample parents utilized a large number of phrases of two or more words during the baseline condition. The mean for the parents of the nonhandicapped children was 26.53 phrases in two minutes, with a standard deviation of 9.00. The mean for the experimental parents was 23.85 phrases. Two of the four experimental parents were within one standard deviation of the normative mean; a third was within minus two standard deviations and a fourth was within plus two standard deviations of that mean. Only one of the experimental parents scored within the middle 50% of the normative range of scores.

Overall, there appeared to be wide variation in the normative

sample of parents for each of the communicative mode categories. The experimental parents demonstrated variation as well, however the spread of the scores was not as wide as for the normative sample.

Research Question #2

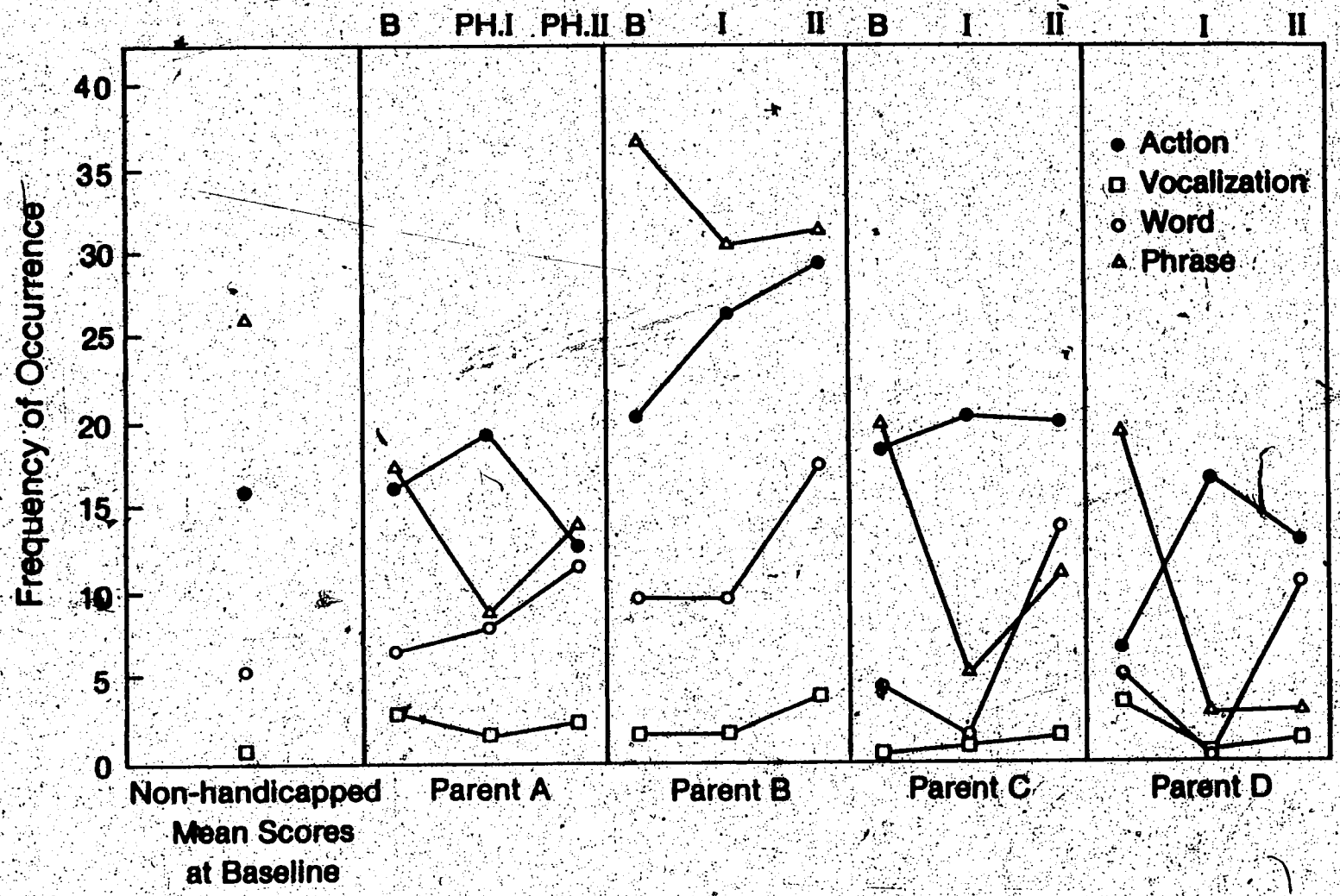
> Was there a significant change in communication mode utilized by the parents of the handicapped children over the course of the study?

Figure 2 depicts treatment effects relating to the four modes of communication (Action, Vocalization, Word and Phrase) over the course of the study. There are several general trends evident from the data presented in Figure 2. The frequency of occurrence of parental actions rose during Phase I of treatment (from a mean of 15.26 at the baseline condition to 20.30 following Phase I of treatment). During Phase II of treatment (Turntaking with Communications), the frequency of occurrence of action communications dropped for three of the four parents, resulting in a mean frequency of 18.40 actions in a two-minute play session.

Parents' use of vocalizations as a communication mode generally decreased following Phase I of treatment, from a baseline level of 1.86 to 1.02 vocalizations. They subsequently increased to a mean of 2.23 vocalizations following Phase II of treatment.

Similar to the vocalization communication mode, the trend was for the frequency of single words to decline during Phase I (from a mean baseline level of 6.26 to a mean of 4.65 following Phase I of treatment) and rise during Phase II to a mean of 13.63 words. This final level was significantly higher than the mean of 5.27 utilized

Figure 2. Change in Communication Mode Utilized by Parents



by the mothers of nonhandicapped children during the baseline condition.

There was a marked decrease in frequency of occurrence of phrases of two or more words by parents in Phase I of treatment, with the mean frequency declining from 23.85 during the baseline condition to 12.46 at Phase I. There followed a subsequent rise during Phase II to a mean of 15.66 phrases. Subject B was responsible for a slight upward skewing of the mean number of phrases utilized by parents during the two-minute play sessions, as her scores were significantly higher than the other three subjects during all three conditions of the study.

B. Communication Mode Utilized by Children

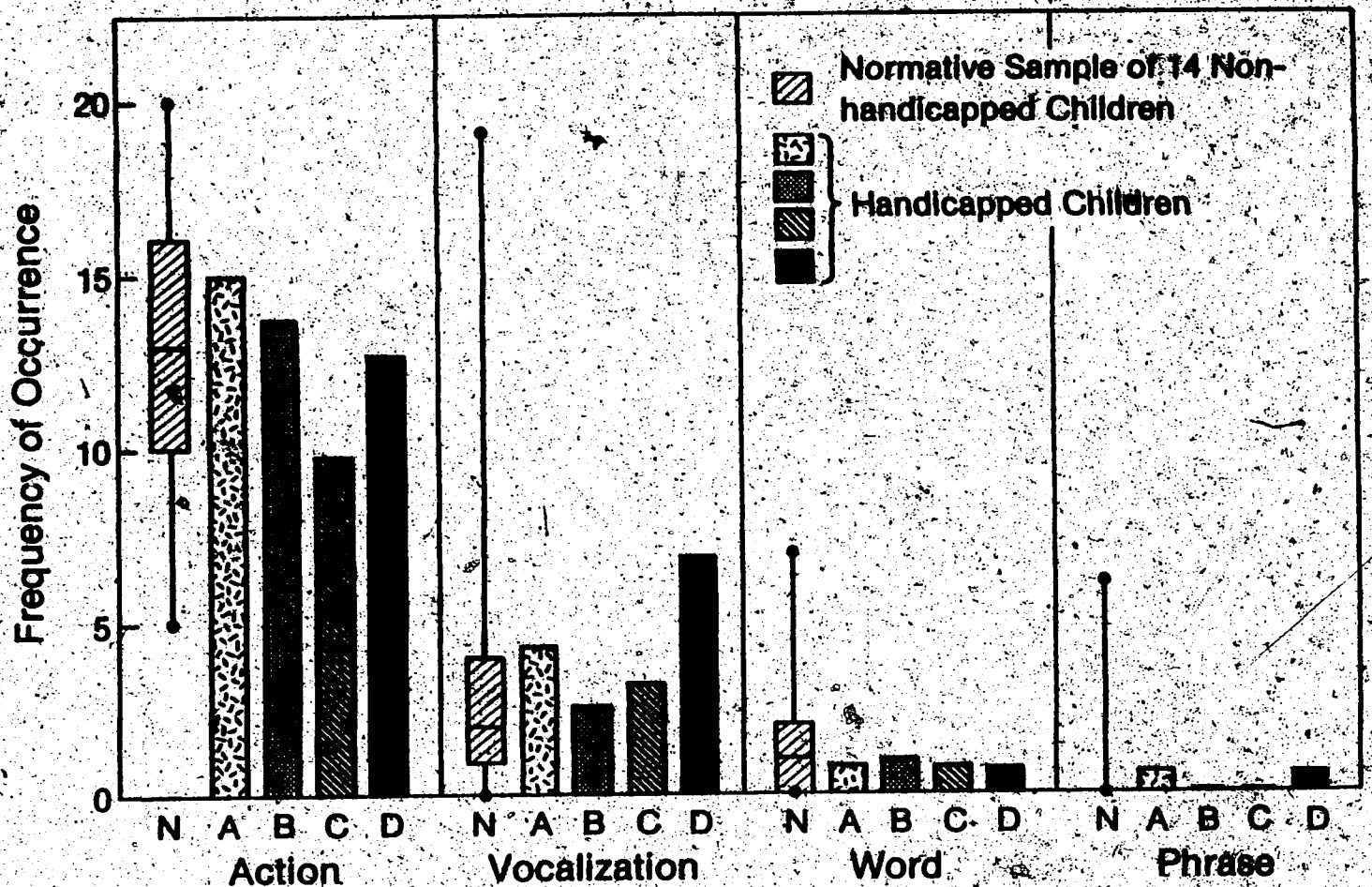
Research Question #3

> During the baseline condition, was the communication mode utilized by the handicapped children equivalent to that used by nonhandicapped children?

Figure 3 presents a graphic representation of the comparison between communication mode utilized by the normative sample of fourteen nonhandicapped children and that used by the four handicapped children in the study. The normative sample of children is represented on the graph by a box and whiskers display, while the scores for the handicapped children are each represented by an individual bar.

The communication mode which was used most frequently by both the handicapped and nonhandicapped children was the action mode. This was not an unexpected finding for this group of toddlers. The scores for all four of the handicapped children fell within one standard

Figure 3. Children's Use of Communication Mode During Baseline Condition: Comparison Between Handicapped and Non-handicapped Children



deviation of the mean for the normative sample, indicating that the handicapped children were functioning at a level consistent with their MA-matched peers in terms of frequency of action mode. In addition, the mean scores for all four handicapped children fell within the range of the middle 50% of the normative scores.

The vocalization mode was used relatively infrequently by both groups of children. Three of the four handicapped children fell within one standard deviation of the mean for the normative sample, with the fourth only slightly outside this range. This would indicate relatively consistent performance between the normative sample and the experimental group as regards frequency of use of vocalizations to communicate.

The use of single words to communicate during the two-minute play sessions was infrequent for both groups of children. Each of the handicapped children utilized this mode less than once on average, with the mean for the nonhandicapped children being only slightly higher. The scores for all of the handicapped children fell within one standard deviation of the normative mean, and were tightly clustered. The scores also fell within the boundaries of the middle 50% of the normative sample.

The use of phrases of two or more words was consistently low for all children, with few phrases heard in any of the two-minute samples. Two of the handicapped children did not use phrases during the baseline condition, while two children used phrases a mean of 0.11 times. Each of these scores fell within one standard deviation below the mean for the normative sample.

Overall, the communication mode scores for the handicapped children were relatively consistent with those for the normative sample during the baseline condition.

Research Question #4

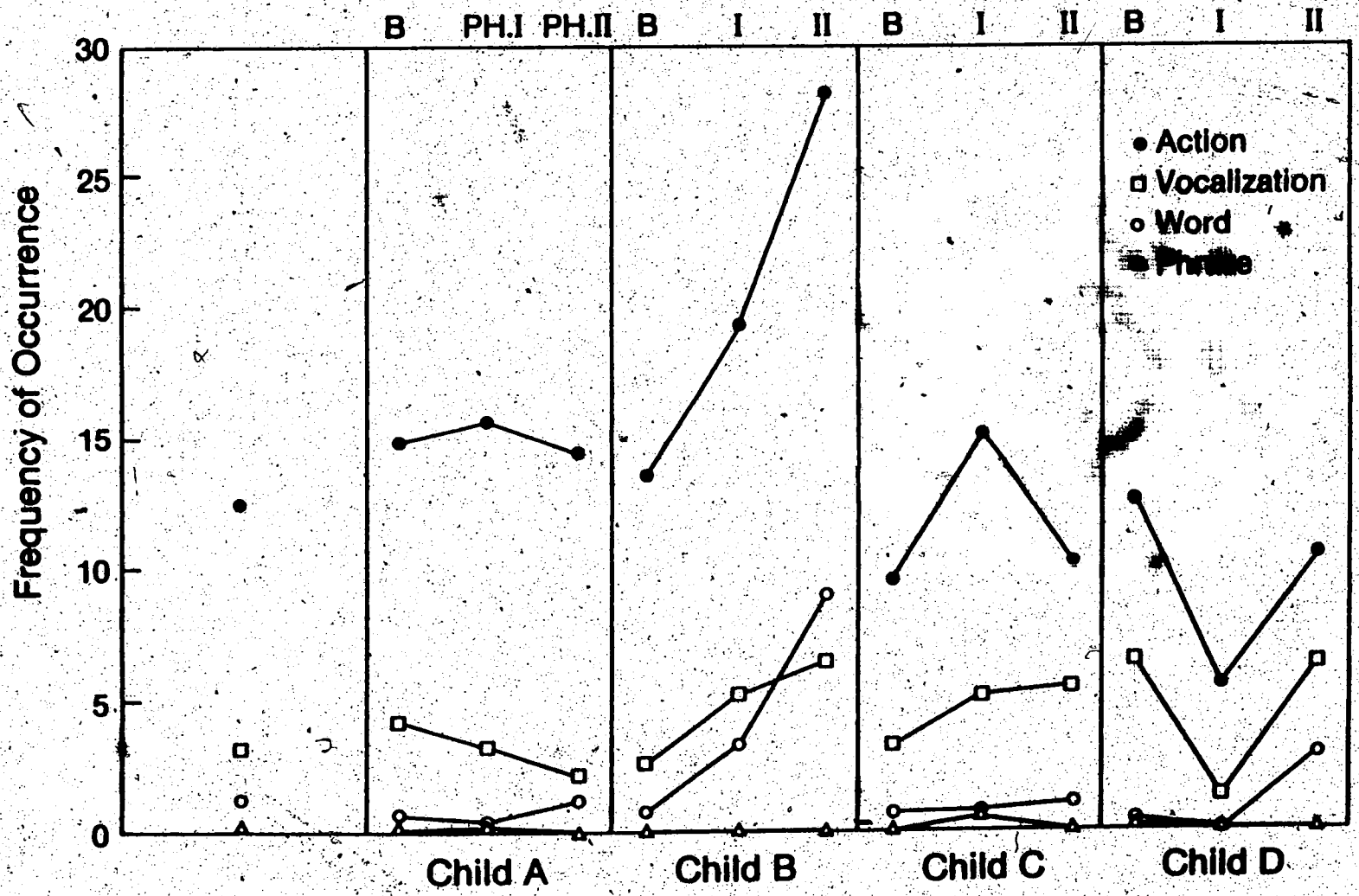
Was there a significant change in communication mode utilized by the handicapped children over the course of the study?

The data pertaining to the effects of training on communication mode utilized by the handicapped children are presented in Figure 4.

During Phase I of treatment (Turntaking with Actions), the frequency of use of actions rose for three of the four children, while Child D's frequency decreased markedly. It may be significant that all the communication mode scores for Child D dropped following Phase I of treatment, indicating a relative dearth of communication activity on the dates data were collected. The overall mean for the four children rose from 12.8 at the baseline condition to 14.1 at the end of Phase I. At the end of Phase II of treatment (Turntaking with Communications), this mean rose again, to 15.9. Subjects A and C experienced a decrease in their action scores, while Subjects B and D demonstrated an increase. Overall, the action scores increased with each successive phase in the study, however it should be noted that there was a great deal of variability in the scores of the individual children, with no general trend evident.

At baseline, the handicapped children utilized vocalizations as a mode of communication an average of 4.2 times in a two-minute period. Overall, this score remained relatively stable after Phase I of treatment, however there was a great deal of variability in the

Figure 4. Change in Communication Mode Utilized by Children



scores of individual children. Subjects B and C showed dramatic increases in their vocalization scores, while Subjects A and D vocalized less frequently than during the baseline measure. Subject D showed a subsequent reversal of this trend by increasing his vocalization score in Phase II of training. The other three subjects tended to follow the trend they had established in Phase I.

During baseline, each of the four handicapped children used single words less than once in a two-minute time period, on average. From this level, the scores of two of the four children increased, while the other two decreased: Subject D's scores dropped to 0. This created a mean score of 0.63 at the end of Phase I, which remained relatively stable as compared to the mean of 0.68 at the baseline condition. Each of the children's scores subsequently rose significantly during Phase II to a mean of 3.54 words.

In each phase of the study, the use of phrases of two or more words remained low by all four children. There was a slight increase from the mean of 0.06 at baseline to 0.67 following Phase I. However, at the end of Phase II, the scores for each of the four children dropped to 0, indicating no use of phrases during this phase of treatment.

C. Turntaking Measures

Turntaking measures were those measures employed during the two-minute play sessions involving [illegible]er and her child. The research questions listed within this [illegible] will outline the type of measures which were employed to determine change in turntaking status.

Research Question #5

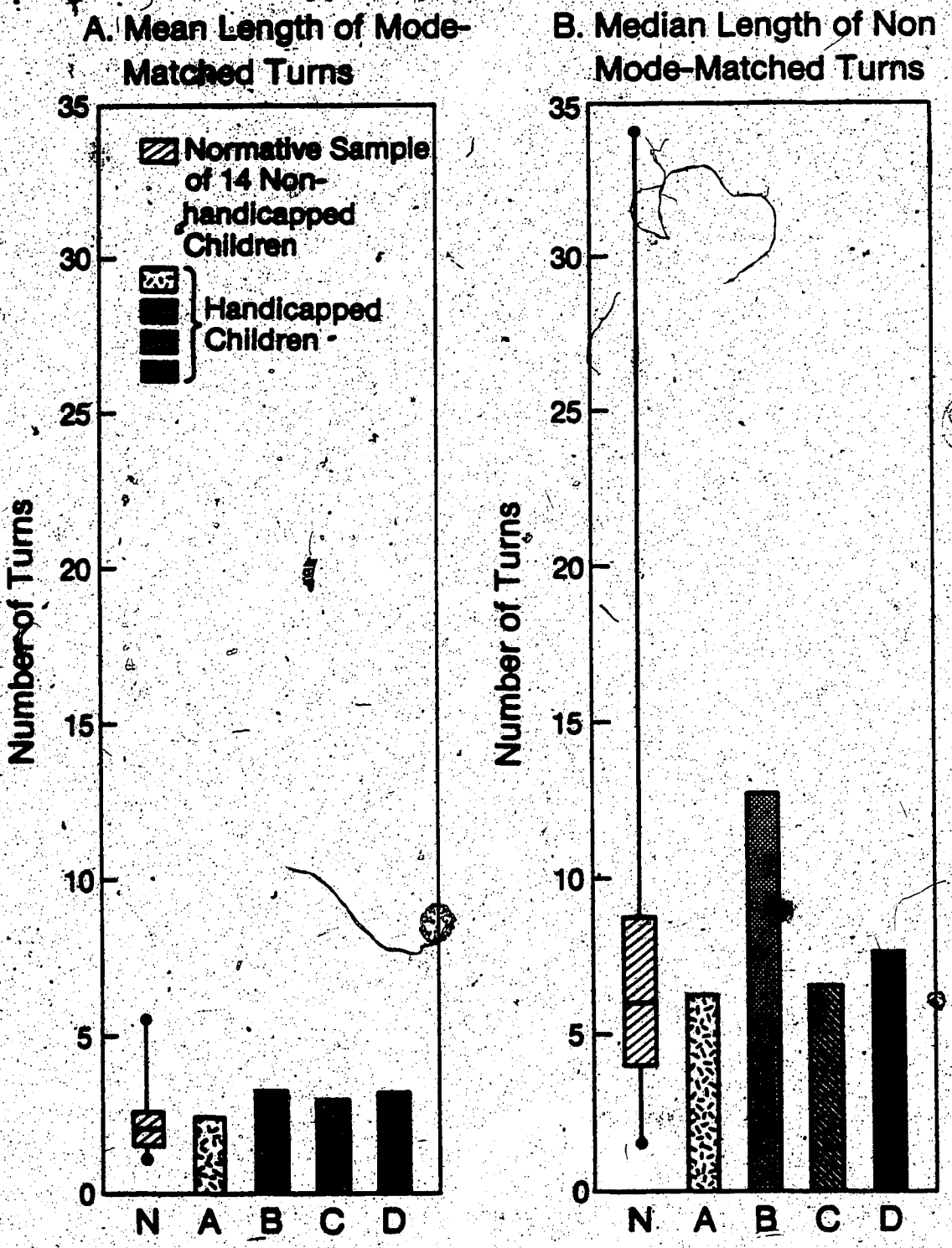
During the baseline condition, was the mean length of turns different between the experimental dyads and the nonhandicapped dyads? Comparisons will be made both on mode-matched and non mode-matched turns.

Measurement of mean turn length was accomplished by observing videotape recordings of play sessions between mother-child dyads and counting the number of uninterrupted successive behaviors which were related to the partner's previous behavior. Turns were considered to be interrupted by (1) cessation of action for ten seconds or more, (2) movement away from the area where videotaping was possible, (3) three or more successive turns taken by one partner in the dyad, (4) physical guidance by one partner to encourage the other partner to take his turn or (5) in the case of mode-matched turn length, a turn was interrupted by one partner performing in a communication mode different from that of the other partner.

Figure 5a presents data relating to mean length of mode-matched turns for the two groups of children at baseline. All four of the scores for the handicapped dyads were higher than the normative mean for turn length. One of the four dyads scored within the middle 50% of the normative scores, while the other three dyads were above this range, but within one standard deviation of the normative mean. The mean score for the four experimental dyads indicated that they engaged in mode-matched turn exchanges which were almost one turn longer, on average, than those employed by the nonhandicapped dyads.

The statistic of choice for measurement of central tendency for non mode-matched turns was the median, due to the skew in distribution of these data. Information on median length of non mode-matched turns

Figure 5. Length of Turns at Baseline: Comparison Between Handicapped and Non-handicapped Dyads



at baseline is presented in Figure 5b. The data for the normative sample of mother-child dyads are on the left-hand side of this graph. All four of the scores for the handicapped dyads were above the median for the normative sample, with three being within one standard deviation of the normative median. The fourth dyad demonstrated turn length which was more than two standard deviations higher than the normative sample.

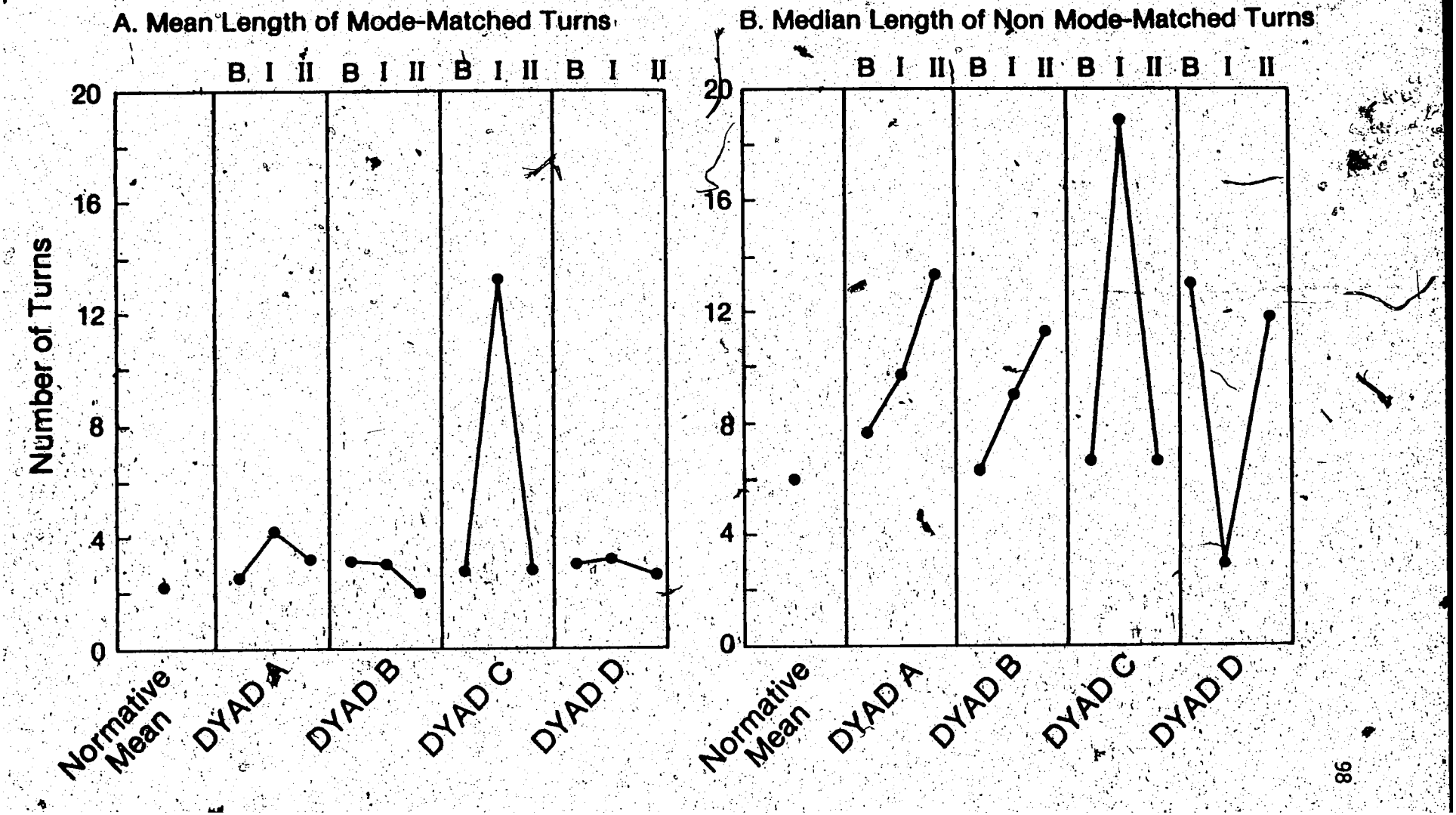
Research Question #6

> As a result of training, was there a significant change in turntaking length over the course of the study? Comparisons will be made on both mode-matched and non mode-matched turns.

Figure 6a presents data indicating change in mean turntaking length utilizing mode-matched turns. The normative mean is indicated on the left-hand side of the graph. The baseline mean of 2.96 for the experimental dyads rose to 5.93 turns following Phase I of treatment with three of the four dyads showing an increase in turn length. It can be assumed when referring to data presented in Figure 2 that the majority of this increase in turn length can be accounted for by an increase in action turns by both members of the dyad. Communicative turns, on the other hand, experienced a decrease in frequency during this treatment period (refer to Figure 2). During Phase II of treatment, all four dyads demonstrated a decrease in turn length.

Figure 6b presents data pertaining to the change in median length of non mode-matched turns over the course of the study. Three of the four dyads showed an increase in non mode-matched turn use following Phase I of treatment, while the fourth dyad showed a

Figure 6. Change in Turn Length



decrease. Following Phase II of treatment, Dyads A and B continued their upward trend while Dyad C showed a reversal to the pre-treatment level. Dyad D also demonstrated a reversal by increasing the length of their non mode-matched turns.

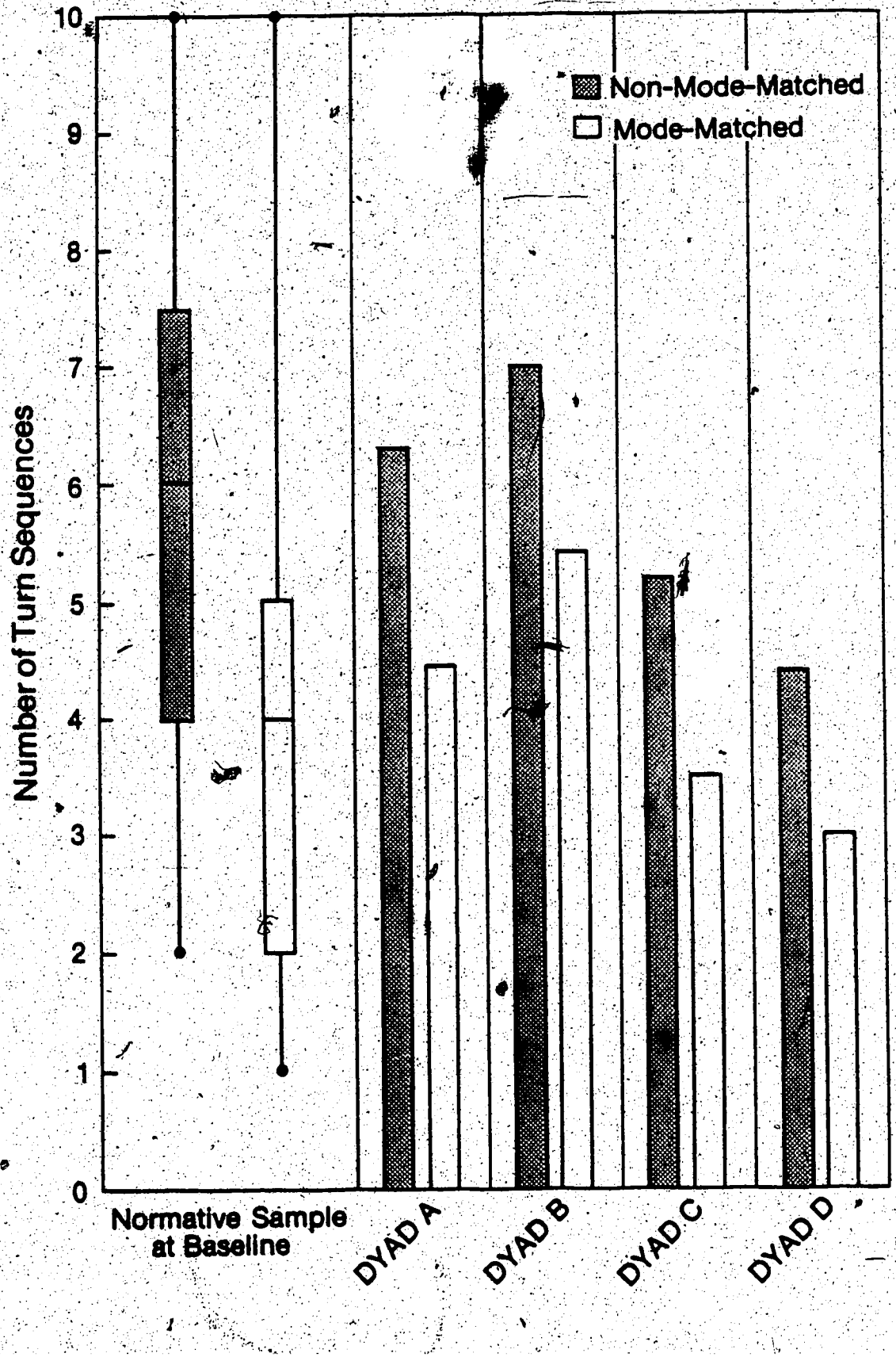
Research Question #7

> During the baseline condition, was the number of turn sequences equivalent between the experimental dyads and the nonhandicapped dyads? Comparisons will be made both on mode-matched and non mode-matched turns.

The number of turn sequences refers to total turn exchanges which are engaged in by the partners in the dyad during a two-minute play session. This figure, along with mean length of turns, is a measure of turn usage by the dyads. Figure 7 presents data regarding number of turns utilized by each group of mother-child dyads during the baseline condition. Three of the four dyads containing handicapped children had scores which fell within the middle 50% of the range of scores of the nonhandicapped dyads. In addition, the scores for all four of the experimental dyads fell within one standard deviation of the normative mean, two within plus one standard deviation and two within minus one. The handicapped dyads demonstrated comparable scores to those of the nonhandicapped dyads in terms of number of turn sequences emitted during a two-minute play session.

The data for number of non mode-matched turns utilized during the baseline condition indicates that the scores for three of the dyads containing handicapped children fell within the range of the middle 50% of the normative scores, while the other dyad was slightly above this range of scores. Two of the dyads containing handicapped

Figure 7. Mean Number of Turn Sequences of Baseline: Comparison Between Handicapped and Non-handicapped Dyads



children had scores which were within plus one standard deviation of the normative mean, while the other two dyads were within minus one standard deviation of that mean. The number of non mode-matched turns utilized by the experimental dyads during the baseline condition was generally comparable to that used by their nonhandicapped peers.

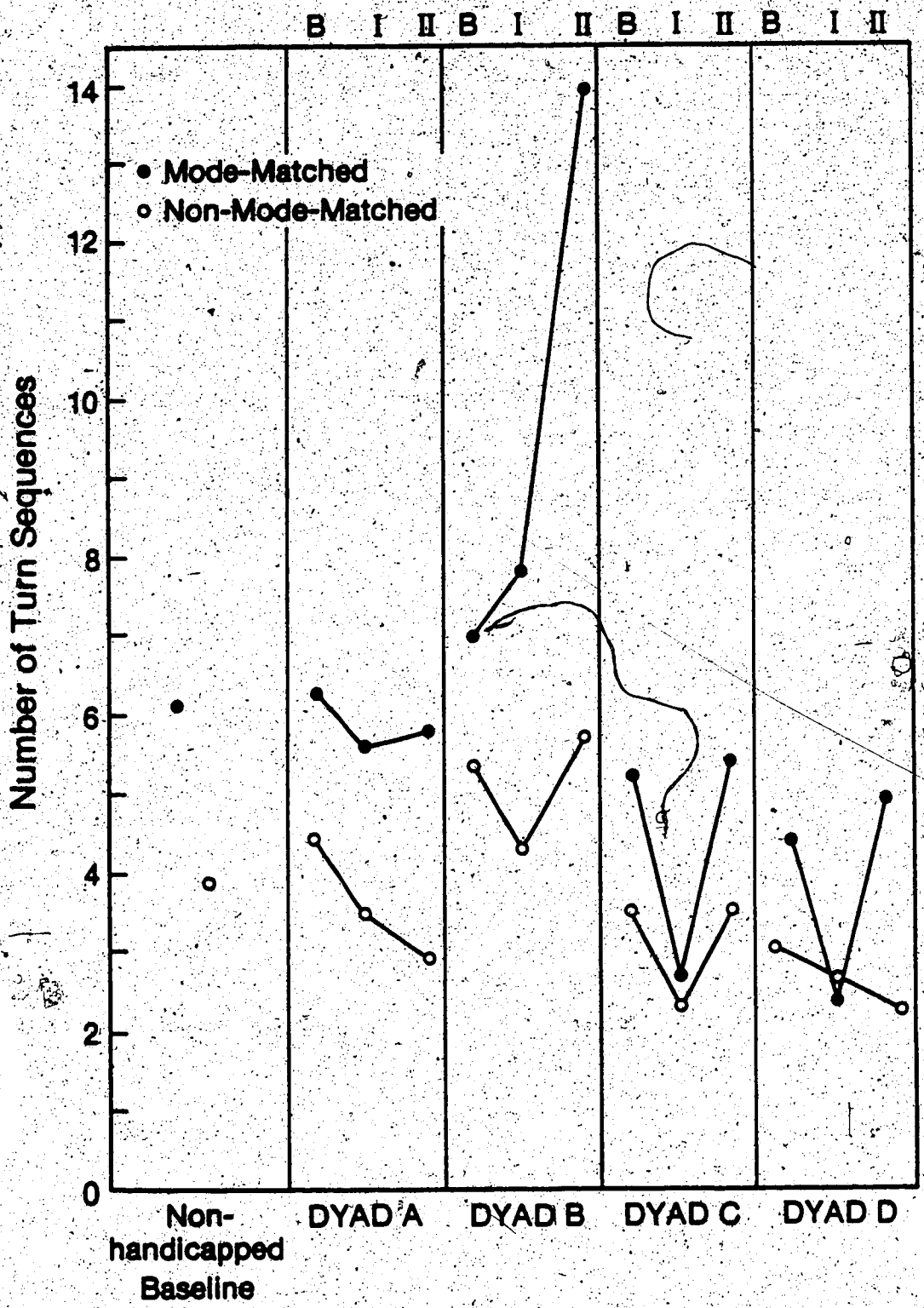
Research Question #8

> As a result of training, was there a significant increase in the number of turn sequences emitted during a two-minute play session over the course of the study? Comparisons will be made both on mode-matched and non mode-matched turns.

The data pertaining to Research Question #8 are presented in Figure 8. The mean number of mode-matched turns decreased following Phase I of treatment for three of the four dyads, while one dyad showed a slight increase. Following Phase II of treatment, all four dyads demonstrated an increase in number of mode-matched turns, with Dyad B showing a dramatic increase. Overall, the final mean for all four dyads was almost a full standard deviation higher than the normative mean at baseline.

Figure 8 also displays data regarding changes in number of non mode-matched turns over the course of the study. In all four dyads, the number of non mode-matched turn sequences decreased following Phase I of intervention. In two of the four dyads, the number of non mode-matched turns showed a reversal following Phase II of treatment, while the other two dyads continued in their downward trend. Therefore no definitive statement can be made regarding an increase in non mode-matched turns over the course of the study.

Figure 8. Number of Turn Sequences



D. Communication Task Measures

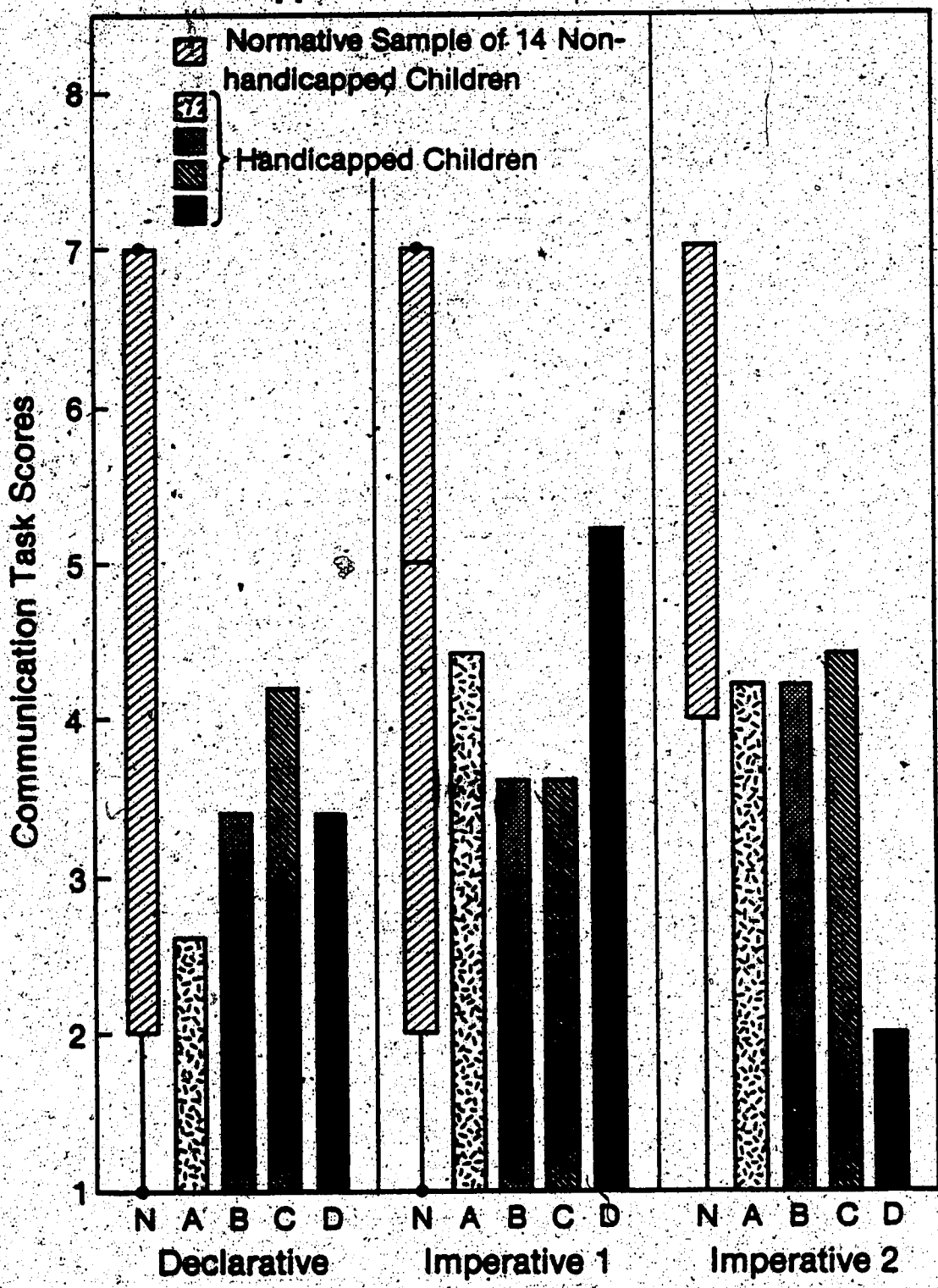
Research Question #9

During the baseline condition, did the handicapped children obtain different scores on the communication tasks from the nonhandicapped children? Comparisons will be made on three communication task measures: Declarative, Imperative 1 and Imperative 2.

Reference to the definitions for imperative and declarative scoring in Appendix L will clarify the scoring format for the communication tasks. Scores were assigned only on a whole integer basis, however derivation of mean scores for the two groups of children yielded scores which were calculated to two decimal points. The scoring definitions in Appendix L give an approximate perception of the quality of communicative exchange engaged in by the two groups of children, when the figures from the graphs and tables in this section are used as reference points.

Figure 9 presents data pertaining to baseline scores received on the three communication tasks by the two groups of children. The declarative scores for each of the handicapped children fell below the mean declarative scores for the nonhandicapped group. In addition, the experimental children all received scores which placed them within one standard deviation below the normative sample. The Imperative 1 scores received by the handicapped children clustered closely around the normative mean with two handicapped children within one standard deviation above the normative mean and two within one standard deviation below this mean. Analysis of Imperative 2 baseline scores indicates all four of the handicapped children received scores which

Figure 9. Communication Task Scores at Baseline Condition: Comparison Between Handicapped and Non-handicapped Children



were below the normative mean. Three of the four children in the handicapped group fell within one standard deviation below the mean, while the fourth fell within minus two standard deviations of this score.

Analysis of the same data in tabular form is presented in Table 6. On each of the three communication tasks (Declarative, Imperative 1 and Imperative 2) the scores received by the nonhandicapped children were higher than those received by the handicapped children, generally by one level of communication according to Sugarman's (1973) system of communication. A further breakdown of the data in Table 6 is presented in Table 7. Table 7 compares the two groups of children on what percentage of their responses on the three communication tasks were linguistic (score of 6 or 7) versus nonlinguistic (score of 1 through 5). The percentage of linguistic scores received by the nonhandicapped children was higher in each case (Declarative, Imperative 1 and Imperative 2) than those received by the handicapped children. In particular, there was a large gap between the percentage of linguistic scores [redacted] the declarative measure.

Research Question #10

> Was there a significant change in the handicapped children's scores on the communication tasks over the course of the study? Comparisons will be made on the following three communication scores: Declarative, Imperative 1 and Imperative 2.

The communication task measures (Declarative, Imperative 1 and Imperative 2) were administered twice during the baseline condition, twice following implementation of Phase I of training and twice

Table 6

Communication Task Scores at Baseline Condition: Comparison between Handicapped and Nonhandicapped Children

	Nonhandicapped Children	Handicapped Children[a]
Declarative	5.01	3.40
Imperative 1	4.37	4.20
Imperative 2	4.74	3.70
Means	4.71	3.77

[a]These data were collected on the second baseline session.

Table 7

Linguistic Performance on Communication Tasks at Baseline: Comparison between Handicapped and Nonhandicapped Children

	Nonhandicapped Children[a]		Handicapped Children[b]	
	Nonlinguistic	Linguistic	Nonlinguistic	Linguistic
Declarative	39.1%	60.9%	67.8%	32.2%
Imperative 1	61.8%	38.2%	67.8%	32.2%
Imperative 2	64.3%	35.7%	66.3%	33.7%
Means	55.1%	44.9%	67.3%	32.7%

[a] In some cases, not all items were presented.

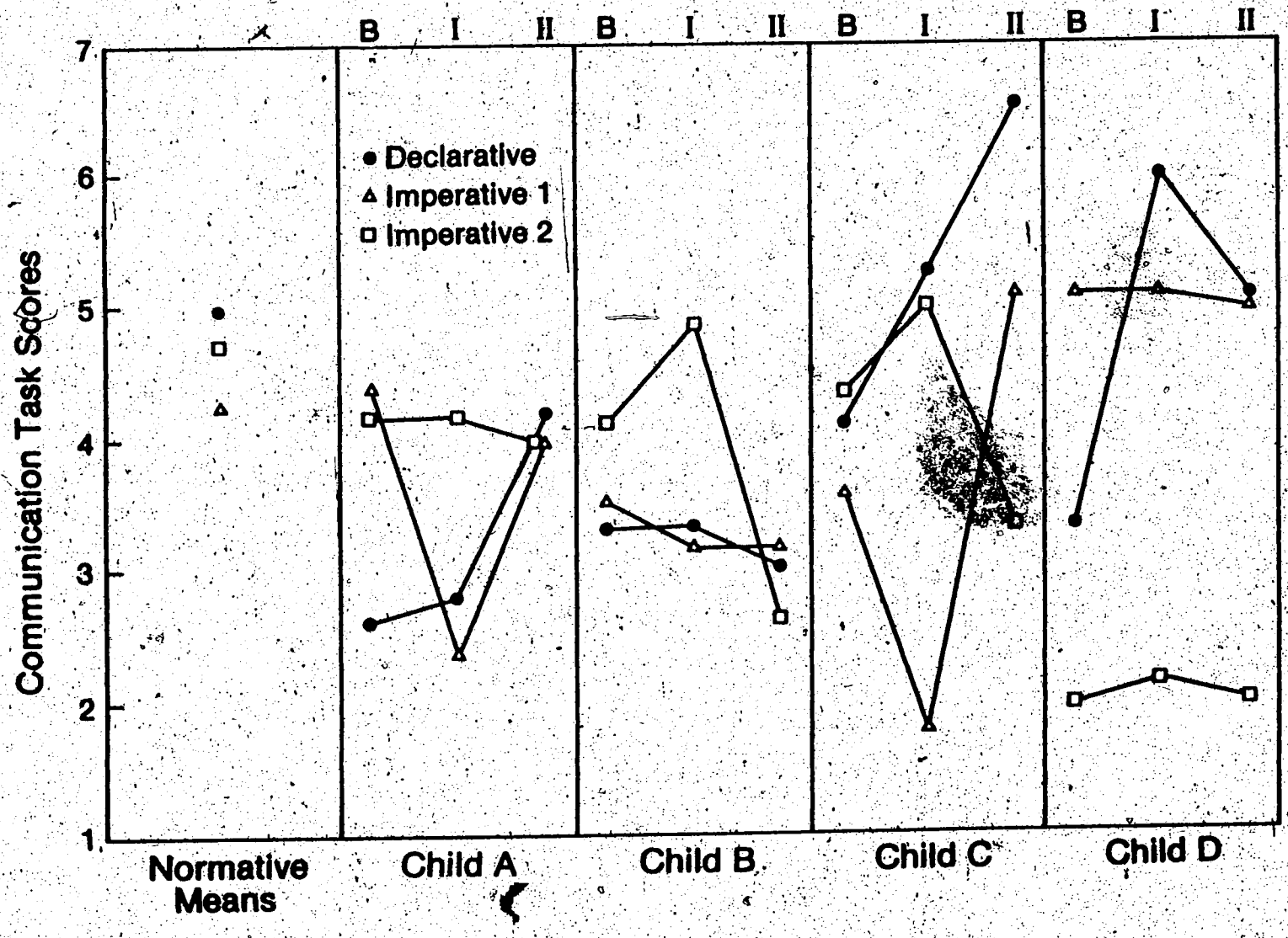
[b] These data were collected on the second baseline session.

following Phase II of training. Figure 10 presents data relating to changes in communication task scores following implementation of each phase of treatment. As can be seen in the graph, the mean declarative scores for each handicapped child were significantly lower than the mean score for the fourteen nonhandicapped children at the baseline condition. Following implementation of treatment Phase I, the declarative scores of three of the four handicapped children rose, while the fourth remained stable. Following Phase II of training, the scores of two of the handicapped children rose significantly, while two decreased somewhat. At the termination of treatment, the mean declarative score for the four handicapped children was comparable to that of the nonhandicapped children during baseline.

The mean Imperative 1 score for the four handicapped children at baseline was comparable to that of the nonhandicapped children, indicating performance consistent with that of their peers prior to the implementation of treatment. The scores for three of the children decreased significantly following Phase I of treatment, with the fourth remaining stable. Following implementation of Phase II of treatment, two of the children demonstrated marked increases over Phase I performance in their Imperative 1 scores with the remaining two children remaining virtually stable in their scores.

The mean baseline score for the handicapped children on the second imperative measure was significantly lower than the mean score for the normative group. This score subsequently rose slightly following implementation of Phase I of training, with two children's scores increasing while two remained the same. Phase II brought a

Figure 10. Changes in Communication Task Scores



decrease in Imperative 2 scores for all four children.

Table 8 presents data pertaining to the proportion of communication task responses which are linguistic (score of 6 or 7) out of the total number of communication tasks presented. The proportions for the Declarative scores and the Imperative 1 scores will have a denominator of ten. This number was derived from administering a communication task with five different objects over two sessions (either two baseline sessions, two sessions following Phase I or two sessions following Phase II). The denominator for the Imperative 2 task is generally less than ten. This is because the second imperative measure was not administered in cases where the child received a score of 7 on Imperative 1, indicating maximum performance on this communication measure. As can be seen in Table 8, three of the four children became more linguistic in their responses on the Declarative measure following Phase I of treatment, with the fourth child's scores remaining stable. Following Phase II of training, the scores for two of the children increased, indicating a greater degree of linguistic performance, while the scores for the remaining two children decreased slightly.

Following Phase I of intervention, two of the children decreased their linguistic ability on the Imperative 1 task, while two children remained the same. These Imperative scores showed a subsequent increase following Phase II for three of the four children, while the fourth child showed a decrease.

On the Imperative 2 measure, one of the children became more linguistic in his performance, two became less linguistic, and one

Table 8

Proportion of Communication Task Responses Which are Linguistic

	Child A			Child B			Child C			Child D		
	B	I	II	B	I	II	B	I	II	B	I	II
Declarative	4/10	4/10	3/10	3/10	8/10	7/10	3/10	8/10	10/10	0/10	2/10	5/10
Imperative 1	2/10	2/10	1/10	6/10	6/10	8/10	3/10	0/10	5/10	3/10	0/10	2/10
Imperative 2	4/9	5/8	4/9	0/4	0/4	0/4	3/9	3/10	6/8	4/8	1/10	4/8

remained the same following Phase I of intervention. Subsequent to the second phase of training two children increased their scores, one remained the same and one decreased his score.

Research Question #11

Did the scores for the generalization objects change over the course of the study?

The communication tasks consisted of three performative measures (Declarative, Imperative 1 and Imperative 2) which were assessed utilizing a number of toys/objects. A core of five objects was introduced during the baseline session and continued to be utilized on communication tasks throughout the study. Of these five objects, two were termed Generalization objects. These were objects which could be labelled with the same name as the objects used in actual training sessions (e.g., if a stuffed dog was utilized as a training object for a specific child, a plastic dog could be a generalization object). Table 9 presents scores received for these generalization objects over the course of the study. The scores separated by commas indicate presentation on two separate dates (i.e., two baseline sessions, two sessions following Phase I and two sessions following Phase II). Analysis of these data indicates that the percentage of these scores which were linguistic (score of 6 or 7) for each of the performative measures (Declarative, Imperative 1 and Imperative 2) remained stable or increased with each successive phase of the study. This breakdown is presented in Table 10.

During the last two communication probes (sessions 5 and 6) two toys which were used during the actual training sessions were added

Table 9

Changes in Generalization Scores Over the Course of the Study

			Child A	Child B	Child C	Child D
Generalization Word #1	Baseline	D	1, 1	4, 3	2, 5	3, 3
		I1	3, 3	7, 7	3, 3	1, 2
		I2	4, 4	-, -	3, 5	4, 3
	Phase I	D	5, 1	7, 7	6, 6	2, 2
		I1	3, 2	7, 7	4, 3	2, 1
		I2	6, 4	-, -	5, 4	4, 4
	Phase II	D	1, 1	7, 7	6, 6	7, 3
		I1	3, 2	7, 7	2, 3	4, 3
		I2	6, 5	-, -	6, 6	4, 4
Generalization Word #2	Baseline	D	1, 1	6, 5	6, 6	1, 1
		I1	1, 2	7, 7	6, 3	4, 2
		I2	3, 3	-, -	3, 3	6, 6
	Phase I	D	1, 1	6, 7	7, 7	2, 3
		I1	3, 4	4, 7	7, 7	2, 2
		I2	3, 7	1, -	-, -	4, 4
	Phase II	D	1, 1	6, 7	7, 6	3, 2
		I1	2, 3	7, 7	7, 7	5, 3
		I2	6, 2	-, -	-, -	6, 4

Note: Underlined figures indicate a linguistic response.

Table 10

Percent Linguistic Responses: Generalization Words

	Baseline	Phase I	Phase II
Declarative	18.75%	50.00%	56.25%
Imperative 1	31.25%	31.25%	37.50%
Imperative 2	16.66%	16.66%	50.00%

to the communication task measures in order to determine whether decontextualization played a role in communication proficiency. The data pertaining to the comparison of scores between the Generalization Objects and the Training Objects on the final two communication probes are presented in Table 11. This table shows that Child A's Training scores were higher than his Generalization scores on all three measures (Declarative, Imperative 1 and Imperative 2). Child B's Training scores were slightly lower on the Declarative and Imperative 1 measures. No comment could be made on the Imperative 2 measure, as no Imperative 2 generalization items were administered. Child C's Training scores were consistently lower than his Generalization scores, while the Training scores for Child D were higher than his Generalization scores on two of the three measures. His Imperative 2 Generalization score was higher than his Training score.

Table 12 presents data relating to the percentage of Generalization words and Training words which were linguistic (score of 6 or 7) versus nonlinguistic (score of 1 through 5) on the final two communication probes. These data, similar to those presented in Table 11, show a general lack of consistency across performative measures, however each subject's behavior was relatively stable. Child A consistently demonstrated superior performance on the Training objects, while Child C showed superior performance on the Generalization objects. Child B and D's performance did not change on the Declarative and Imperative 1 measures, while on the Imperative 2 measure, Child D's performance decreased. No comment could be made regarding Child B's performance on the Imperative 2 measure.

Table 11

Mean Communication Task Scores Following Phase II: Comparison between Generalization Objects and Training Objects

	Child A		Child B		Child C		Child D	
	Gen.	Train.	Gen.	Train.	Gen.	Train.	Gen.	Train.
Declarative	1.0	2.5	6.8	6.5	6.3	5.3	3.8	4.0
Imperative 1	2.5	5.7	7.0	6.8	4.8	4.0	3.8	4.3
Imperative	4.8	6.0	--	4.0	6.0	5.3	4.5	2.8

Table 12

Percentage of Words Which were Linguistic Following Phase II: Comparison between Generalization Objects and Training Objects

	Child A		Child B		Child C		Child D	
	Gen.	Train.	Gen.	Train.	Gen.	Train.	Gen.	Train.
Declarative	0%	25%	100%	100%	100%	50%	25%	25%
Imperative 1	0%	67%	100%	100%	50%	25%	0%	0%
Imperative 2	50%	100%	--	0%	100%	67%	25%	0%

E. Communication Strategies Utilized by Parents

Research Question #12

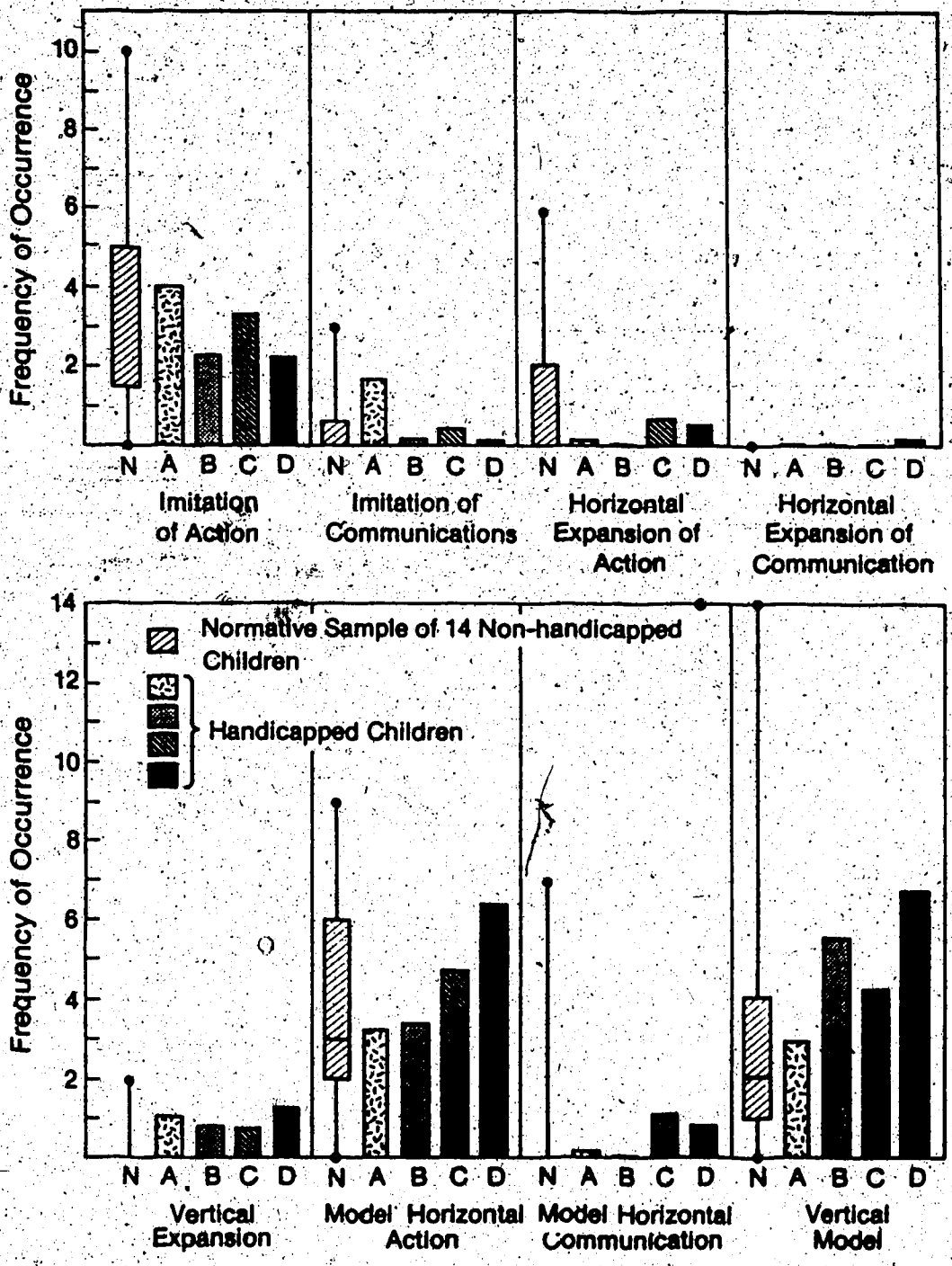
During the baseline condition, did the experimental parents utilize an equivalent number of strategies for communication change as the parents of the nonhandicapped children?

Figure 11 presents a graphic representation of the comparison between the communication strategies utilized by the mothers of the nonhandicapped children and those used by the mothers of the handicapped children during the baseline condition. The mean frequency of occurrence for each of the four parents of the handicapped children is represented by an individual bar, while scores for the parents of the fourteen nonhandicapped children are grouped together in a box and whiskers display. Data were collected on eight strategies for communication change. These strategies are described in Appendix J. Each of the eight strategies is represented by a separate area on the graph and will be discussed individually.

The first strategy to be discussed is that of parental imitation of the child's action. All four of the parents of the handicapped children scored within one standard deviation of the normative mean, and their scores fell within the boundaries of the middle 50% of the normative sample, indicating similar performance by both groups of parents in terms of motor-gestural imitation.

Parental imitation of child communications (vocalization, single word or phrase) occurred less frequently than that of imitation of child actions. Three of the four parents of the handicapped children had scores which fell within one standard deviation of the mean for the nonhandicapped group, while Subject A's scores were more than two

Figure 11. Parent's Use of Communicative Strategies During Baseline Condition: Comparison Between Parents of Handicapped and Non-handicapped Children



standard deviations above the normative mean. In addition, Mother A was the only mother to score outside the boundaries of the middle 50% of the normative sample.

There was a great deal of variability in the scores of the nonhandicapped sample in terms of horizontal expansion of action. Each of the four parents of the handicapped children scored within one standard deviation of the normative mean, however it should be noted that each of these scores was also significantly lower than the average score for the normative sample. In general, the parents of the handicapped children utilized fewer horizontal expansions of action than the parents of the nonhandicapped children.

Horizontal expansion of communications was a communicative strategy utilized very infrequently by all participants. The normative sample was not observed to utilize this strategy during play sessions, while the mean for the four parents of handicapped children was 0.03. Three of the four parents of handicapped children did not utilize this strategy during observed play sessions.

Vertical expansions were utilized a mean of 0.09 times by the parents of the nonhandicapped children. The mean for the parents of the handicapped children was significantly higher at 0.93. Two of the experimental parents were within two standard deviations above the normative mean, a third was within three standard deviations and the fourth was within four standard deviations. Thus the data show that the parents of the handicapped children utilized a significantly larger number of vertical expansions than the parents in the normative sample.

Modeling horizontal actions occurred relatively frequently in both groups of parents. Three of the four parents of the handicapped children scored within plus one standard deviation of the normative mean, while the fourth parent was within two standard deviations above that mean. Overall, the parents of the handicapped children utilized horizontal modeling of actions more frequently than the normative sample.

Horizontal modeling of communications was not a frequently utilized strategy. Three of the four experimental parents scored within one standard deviation of the normative mean, while one parent scored within two standard deviations above that mean. Because there was no range of scores between the first and third quartile of the normative sample, no comment can be made regarding relative placement of experimental scores within these bounds.

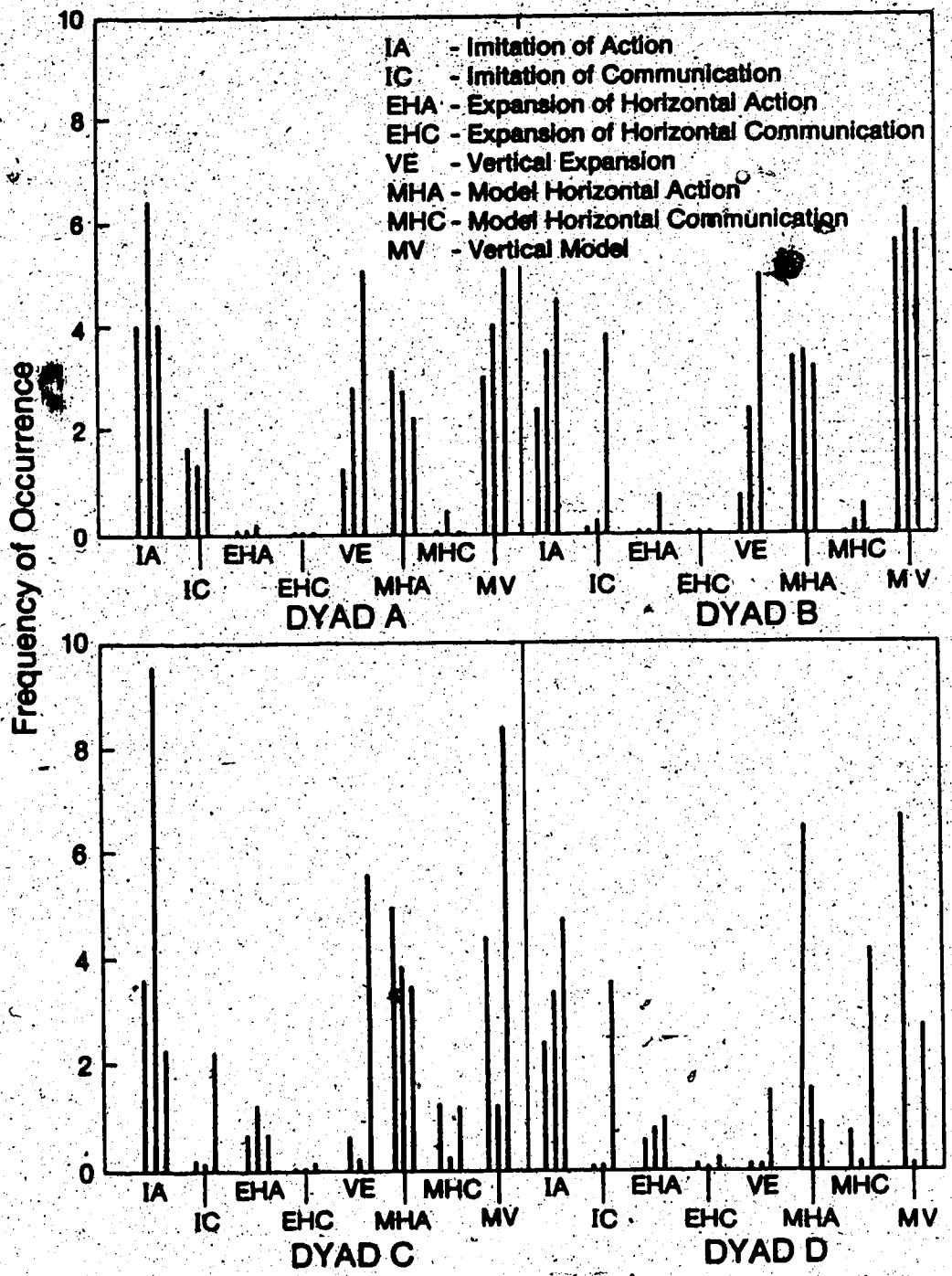
The final communicative strategy scored was that of vertical modeling. Three of the four experimental parents fell within one standard deviation of the normative mean, while Subject D's scores were within two standard deviations above that mean. Overall, the parents of the handicapped children utilized this strategy significantly more often than the parents in the normative sample.

Research Question #13

Was there a significant change in the use of communication strategies by the parents of the handicapped children over the course of the study?

Figure 12 presents a visual representation of the changes in use of eight communication strategies over the course of the study. The definitions of each of the communication strategies is found in

Figure 12. Parent's Use of Communication Strategies



Appendix J.

In general, the use of imitation of actions as a communicative strategy rose during Phase I of training (Turntaking with Actions). All four of the parents demonstrated an increase in use of this strategy. Following Phase II of training, the overall use of imitation of action by parents dropped sharply. However, it should be noted that Parents A and C were responsible for the majority of this change, as Subjects B and D demonstrated a continuation of their prior upward trend.

Parents' use of imitation of communications showed a minor downward movement from the pre-treatment phase to Phase I of training. Phase II of training brought a sharp increase in imitation of communications.

Parental use of horizontal expansion of actions increased for three of the four dyads following Phase I of treatment, while the scores for the fourth dyad remained stable. Following Phase II of intervention, three of the four dyads showed an increase while the fourth decreased.

Parents' use of horizontal expansion of communications was observed less than once on average during baseline and was not observed to be used during Phase I of treatment. The overall use of this strategy increased slightly following Phase II of intervention, however it should be noted that this change could be accounted for by the behavior of only two subjects, as the scores for the other two subjects remained at zero.

The overall use of vertical expansions increased following

Phase I of treatment. This increase resulted largely from the scores of two subjects, as the scores of the other two subjects decreased slightly. Following Phase II of treatment, the scores of all four parents increased sharply.

Parental use of horizontal action models decreased for three of the four subjects following Phase I of treatment, with one subject showing a slight increase. Subsequently, the scores for all four parents decreased slightly following Phase II of training.

Visual analysis of data regarding use of horizontal communication models shows a general lack of consistency across subjects. Two of the four parents showed an increase in this communication strategy following Phase I of treatment, while two parents showed a decrease. Following Phase II of treatment, three of the four parents increased their use of horizontal communicative models, while the fourth decreased to a score of zero.

The final parental strategy for communication change to be discussed is that of vertical modeling. Again, visual analysis of these data shows a general lack of consistency across subjects, particularly when observing the data from Phase I. The scores for two of the parents increased mildly, while the second set of parents' scores dropped markedly. Following Phase II of treatment, three of the four parents demonstrated an increase in use of this communication strategy.

F. Communication Strategies Utilized by Children

Although data were collected on the eight communication strategies which are described in Appendix J, it was decided to omit from discussion those strategies dealing with children's use of expansions. This was not a topic which received attention in the intervention phases and therefore will not be examined in this chapter.

Research Question #14

> During the baseline condition, did the handicapped children utilize an equivalent number of communication strategies as the nonhandicapped children?

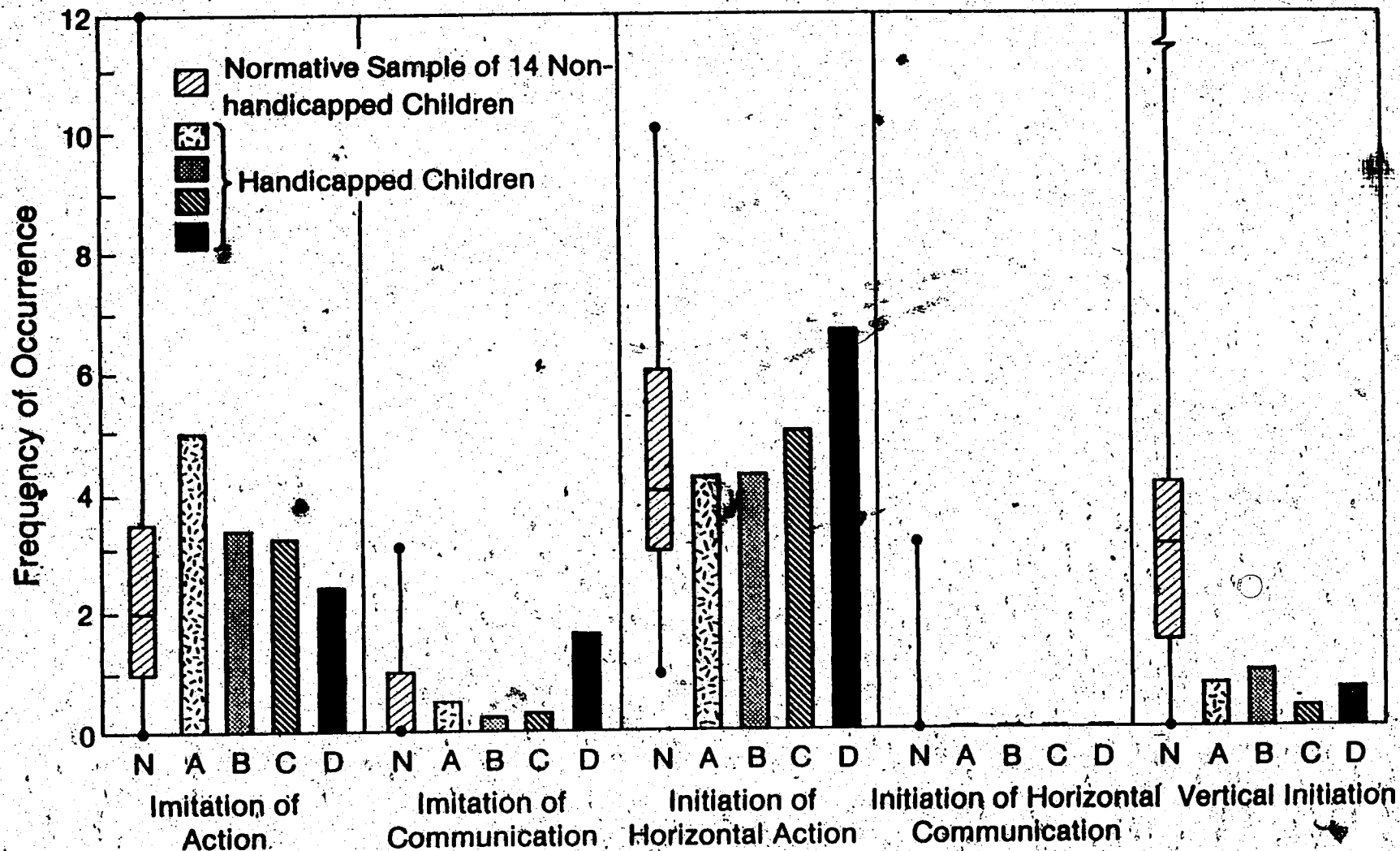
Figure 13 presents a graphic representation of the comparison between communication strategies utilized by the handicapped children versus those used by the nonhandicapped children during the baseline condition. Data for five communication strategies are presented in this figure.

The nonhandicapped children were found to utilize imitation of parental action a mean of 2.85 times in two minutes. The scores of all four handicapped children fell within plus one standard deviation of the normative mean.

Imitation of communications was an infrequently used strategy by both groups of children. The scores of three of the four handicapped children fell within one standard deviation of the normative mean, while the fourth child scored within plus two standard deviations of the mean. Three of the four handicapped children's scores fell within the range of the middle 50% of the normative scores.

Initiation of horizontal actions was a relatively frequently

Figure 13. Children's Use of Communicative Strategies During Baseline Condition: Comparison Between Handicapped and Non-handicapped Children



used strategy by both groups of children. Three of the four handicapped children had frequency scores which fell within one standard deviation of the normative mean, while the fourth child was only slightly outside of this range. This pattern was also representative of the scores of the handicapped children in relation to the middle 50% of the normative range.

Both groups of children were found to utilize initiation of horizontal communications minimally, if at all. The fourteen nonhandicapped children had a mean score of 0.29 on this strategy, while none of the handicapped children was observed to utilize initiation of horizontal communications.

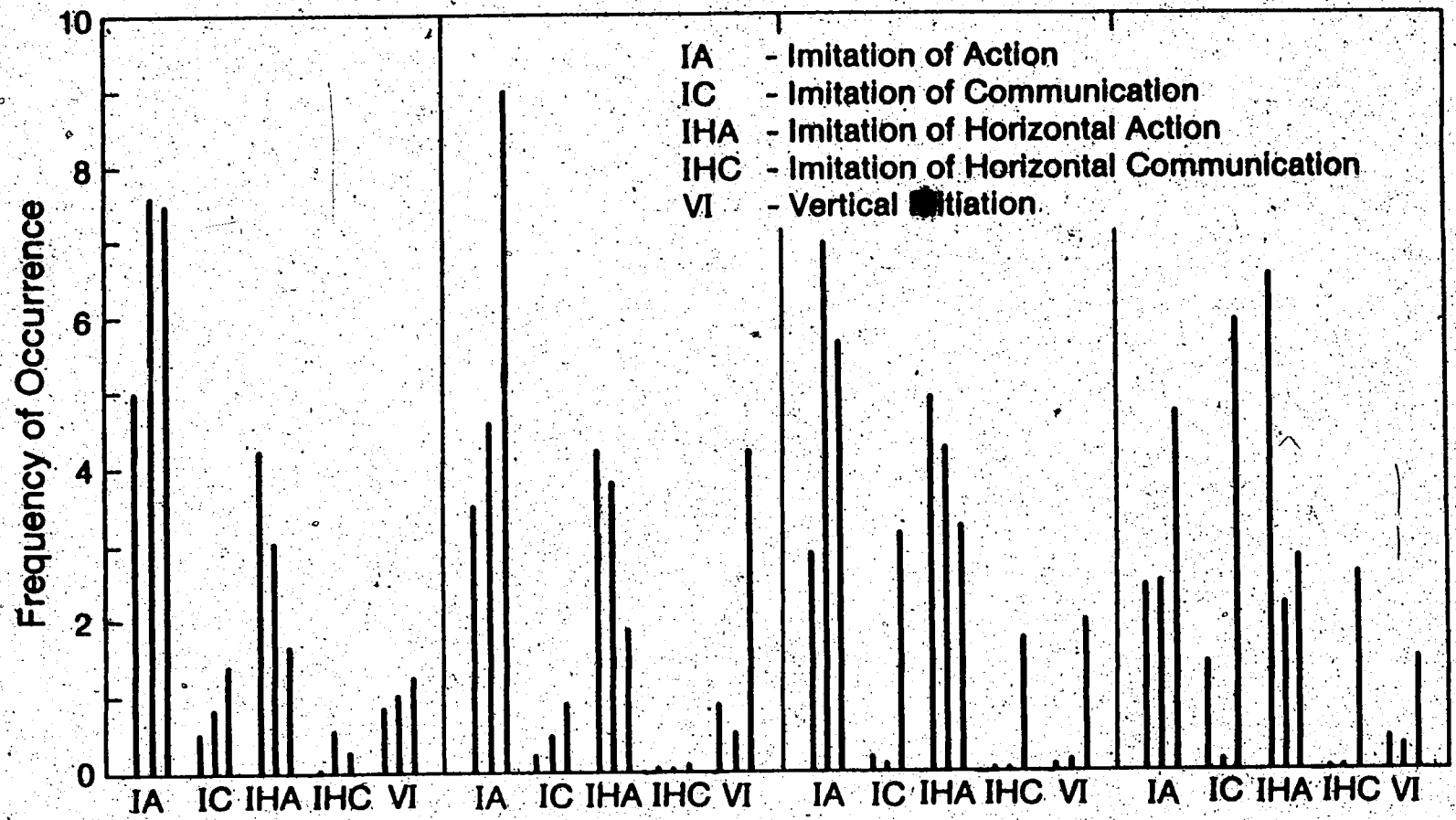
The final child strategy to be discussed is that of vertical initiation. This strategy was utilized by the nonhandicapped children a mean of 3.69 times. Although all four of the handicapped children fell within one standard deviation of the normative mean, it should be noted that their scores were significantly lower than those of the nonhandicapped children, with a mean of 0.60. The scores for each of the handicapped children fell outside the range of the middle 50% of the normative range; all were within the lower quartile of the normative scores.

Research Question #15

> Was there a significant change in the use of communication strategies by the handicapped children over the course of the study?

Figure 14 presents a visual representation of the changes in use of five communication strategies by the handicapped children over the course of the study. The definitions of each of the communication

Figure 14. Children's Use of Communication Strategies



strategies are found in Appendix J.

Children's use of imitation of actions showed a general increase following Phase I of intervention, with three of the four children increasing their scores on this strategy and one remaining virtually unchanged. Following Phase II of intervention, two children showed a further increase, while two children decreased their scores.

Imitation of communications was a strategy infrequently utilized by the children during the baseline phase of the study. Following Phase I of training, two children showed a minimal increase in this strategy, while two demonstrated a decrease. Following Phase II of training, which focused on turntaking utilizing various forms of communication (vocalization, single words, phrases), the overall use of imitation of communication rose moderately. This score resulted from a slight increase in the scores of two children and a marked increase in the scores of the other two children.

Initiation of horizontal actions was a strategy utilized relatively frequently during the baseline condition. All four children demonstrated decreases in their scores following Phase I of intervention, while three of the four children showed decreases following Phase II. Thus, the children were generally observed to initiate horizontal actions less frequently with each successive phase of the study.

During baseline, initiation of horizontal communications was never utilized by the handicapped children. Following Phase I of treatment, one child showed an increase in use of this strategy while the other three subjects' scores remained at zero. Following

implementation of Phase II of treatment, one child's scores increased marginally, two increased markedly and one showed a slight decrease.

The final strategy to be discussed is that of vertical initiation. Following Phase I of treatment, the scores of two of the four children decreased slightly, while two increased slightly. Each of the four children showed a significant increase in use of vertical initiations following Phase II of intervention.

G. Developmental Measures

Research Question #16

> Were there changes in the scores on the developmental measures between pre-treatment and post-treatment administration?

Several developmental measures were administered prior to the implementation of treatment and all but one of these were re-administered following treatment. The developmental measure which was not re-administered was the Uzgiris and Hunt Ordinal Scales of Psychological Development. These scales were administered in order to determine whether the child's development in six areas was at a minimum required level prior to implementation of treatment. The results of the Uzgiris-Hunt administration are presented in Table 2. Analysis of these results reveals that three of the four children failed to reach Piagetian Stage V on the Means-End Scale. This was the only scale where a sub stage V result was obtained.

The pre- and post-intervention results on the standardized developmental assessments are presented in Table 13. On the Bayley Scales of Infant Development (Mental Development Subscale), two of the children showed increases which were greater than those

Table 13

Developmental Measures: Pre-Treatment vs Post-Treatment

			BSID[a]		SICD[b]	
		Age	Mental	Motor	Receptive	Expressive
Child A	Pre	27 mon. 0 da.	20 mon.	17 mon.	16 mon.	16 mon.
	Post	31 mon. 6 da.	25 mon.	18 mon.	20 mon.	20 mon.
Child B	Pre	25 mon. 4 da.	18.5 mon.	14 mon.	20 mon.	20 mon.
	Post	29 mon. 14 da.	22 mon.	19 mon.	20 mon.	20 mon.
Child C	Pre	36 mon. 2 da.	19 mon.	9.5 mon.	16 mon.	16 mon.
	Post	38 mon. 25 da.	22 mon.	11.5 mon.	24 mon.	24 mon.
Child D	Pre	28 mon. 4 da.	21.5 mon.	25.5 mon.	20 mon.	24 mon.
	Post	32 mon. 13 da.	30 mon.	28.5 mon.	20 mon.	24 mon.

[a]Bayley Scales of Infant Development

[b]Sequenced Inventory of Communication Development

expected for the time span of the study. However, only the results of Child D's were significantly higher than expected.

The results on the Sequenced Inventory of Communication Development (SICD) are also presented in Table 13. Two of the children showed an increase in both Receptive and Expressive Language Ages following treatment, with Child C demonstrating unexpectedly large gains in relation to the time span of the study. The scores of the other two children remained stable. However, it should be noted that there was no systematic relationship between increases in BSID scores and SICD scores.

The data relating to changes in language emitted by the children during the pre-treatment and post-treatment language samples is presented in Table 14. The total number of words emitted during the two-hour language sample with its type-token ratio is presented to the left of the double vertical line, while the number of spontaneous words (those not prompted, imitated or emitted as a response to a question) and its type-token ratio is presented to the right of the double line. The type-token ratio is an indication of lexical diversity (Miller, 1981). The numerator of the ratio (type) represents the number of different word types used while the denominator (token) represents the total number of words used. Templin (1957) reported that type-token ratios of approximately 1:2 were consistent across all groups of children she studied. This implies that ratios significantly different from 1:2 may be indicative of a specific language deficiency. However, it should be noted that Templin did not study children below the age of three years, so her results must be interpreted with caution

Table 14

Language Sample Data: Pre-Treatment vs Post-Treatment

		Total Words			Spontaneous Words		
		Type	Token	Ratio	Type	Token	Ratio
Child A	Pre	39	45	.86	33	40	.83
	Post	87	152	.57	60	121	.50
Child B	Pre	33	53	.62	24	28	.86
	Post	37	140	.26	30	118	.25
Child C	Pre	63	127	.49	26	62	.42
	Post	98	255	.38	73	179	.41
Child D	Pre	12	24	.50	9	18	.50
	Post	40	67	.59	29	52	.56

when comparing them to the results of the present group of children.

Table 15 presents data pertaining to the language samples of the normative group of children. These children, ranging in age from 15 months 14 days to 19 months 6 days showed similar data to those found in sampling the language of the handicapped children in the study.

Table 16 presents data pertaining to the frequency of target word use during the pre-treatment and post-treatment language samples. All four children showed increases in use of each of their target words, with these increases ranging from 300% to 1,300%.

The interpretation of these results as well as some directions for further research will be presented in Chapter 6.

Table 15

Language Sample Data: Nonhandicapped Children

Child Number	Age (Mon.-Days)	Total Words			Spontaneous Words		
		Type	Token	Ratio	Type	Token	Ratio
1	16- 4	44	99	.44	30	66	.46
2	19- 6	93	132	.71	60	88	.68
3	18-11	12	24	.50	12	20	.60
4	17-24	18	41	.44	15	33	.46
5	17-15	23	34	.68	5	9	.56
6	18-24	30	50	.60	21	37	.57
7	15-14	26	47	.55	20	33	.61
8	18-18	18	23	.78	10	10	
9	18- 5	50	110	.46	37	85	.44
10	16- 2	14	55	.26	11	45	.24
11	17-23	16	29	.55	9	13	.69
12	18-23	38	75	.51	22	31	.71
13	16-27	16	35	.46	11	22	.50
14	16-26	29	46	.63	18	29	.62
Means		30.5	57.1	.54	20.1	37.2	.58

Table 16

Frequency of Target Word Use: Pre-Treatment vs Post-Treatment

		Child A	Child B	Child C	Child D
Word 1	Pre	1	2	1	1
	Post	13	7	6	4
Word 2	Pre	2	4	1	1
	Post	6	38	2	6

Chapter 6

DISCUSSION

The following discussion will attempt to evaluate the specific effects of the treatment procedure on the group of mother-handicapped child dyads, with possible explanations for these effects. It should be stressed that the research was exploratory in nature. This discussion will attempt to identify some of the potentially relevant variables which may have had an effect on the treatment results, and offer suggestions about possible modifications to the intervention procedures.

A. Comparison to Nonhandicapped Dyads

An implicit assumption in this study was that because the handicapped children demonstrated pragmatic communication deficits, they would also demonstrate interaction deficits. Inspection of the data reveals that, with minor exceptions, the nonhandicapped children and their mothers fell into the normal range on measures of communication mode, turntaking measures and interaction strategies. This was somewhat surprising in view of interactional deficits reported in other literature. It should be pointed out, however, that three of the four handicapped children were involved in intervention programs with their mothers, and were therefore accustomed to participating in 'learning' activities with their parents. In addition, two of the four children had significant motoric difficulties which made it more

likely for them to remain seated with their parents. In contrast, the nonhandicapped children were observed to be less attentive during the experimental tasks, possibly because they were unaccustomed to this type of activity. Additionally, they appeared to be inclined toward more independent behavior. The net result of this may be the generally equivalent performance of the two groups.

The intervention can be considered to be a refinement of the interaction of each of the dyads. Joint activities were structured to focus specifically on the treatment variables discussed earlier. In effect, modifications were made on what might be considered already "normal" interaction in order to increase the frequency and intensity of natural variables thought to contribute to language development. Therefore, the hypothesis upon which the treatment procedure was based was that the group of handicapped children required additional input than that provided to the nonhandicapped children in order to affect their language development along positive lines.

B. Research Design

The present research employed a multiple baseline across subjects design which was replicated across two sets of two subjects. Overlap of dyads within each set occurred due to illnesses and absences of subjects, eliminating the initial lag between subjects in application of the intervention. Therefore, the results will be discussed in terms of a replication of the procedures across four dyads. The following discussion will consider each of the research questions in

the order in which they were presented in the previous chapter, with tentative hypotheses concerning the treatment effects presented.

C. Communication Mode Utilized by Parents

The frequency of parental actions generally increased during Phase I of treatment and decreased during Phase II. The only exception to this was Parent B, who continued to show an increase in actions following Phase II of intervention. This change in communication mode was felt to result from training which emphasized parental action in Phase I and the use of single words and, if appropriate, short phrases in Phase II. Thus, the general decrease in use of single words by parents during Phase I of training, and its subsequent marked increase following Phase II corresponds with the differing emphasis in the two phases of intervention. All four parents of the handicapped children demonstrated a high frequency of phrase use during the baseline phase of the study. The impact of this fact may not be fully represented by the data, as the data do not show the length of these parental phrases. In some cases the parental phrases extended to 15 to 17 words in length, which showed a serious mode-mismatch between parent and child. Phrase use dropped dramatically following Phase I of training for all four parents, and increased following Phase II when the parents were taught to utilize a communicative mode which was one mode higher than that used by their children. The effect on the use of vocalizations by parents was less dramatic and more variable than that displayed on the other three communicative modes. This was felt to be due to

the fact that the vocalization mode did not receive the same degree of attention during treatment as did the other modes of communication. The use of vocalizations was not taught specifically as an intermediary step between action communication and the use of single words.

D. Communication Mode Utilized by Children

During Phase I of training, which focused on teaching the parents to utilize action communication more frequently, three of the four children demonstrated a concommitant increase in action use. As will be seen in discussion of other communication modes, the fourth child decreased his frequency of use of all communications following Phase I. It is possible that this was an artifact of the timing of these communication probes, however it appeared more likely that it was due to the drastic change in communicative behavior of Mother D: this mother virtually ceased all previously prolific verbal communication, which appeared to have a strong impact on her child. Following Phase II of treatment, use of actions dropped for two of the children and rose for the other two. This variability was not unexpected, as actions were not emphasized during this phase of treatment. Parents therefore placed differing degrees of emphasis on their use of actions.

Children's single word use showed a high degree of variability following Phase I of training. Again, this was not unexpected, as use of single words was not a focus of training in Phase I. Following Phase II of training, all four children showed an increase in word use, which was the expected result of intervention.

In a similar fashion to parental use of vocalizations, child vocalizations showed variable impact following both phases of intervention. Again, this was felt to be due to a lack of specific teaching of this strategy.

Child phrase use showed minimal impact following either phase of intervention. This was an expected result, as the children were generally not at the phrase level of communication. Phrases, where used, were generally ritualized or overlearned (e.g., "What's that?" "Where's mommy?").

E. Turntaking Measures

Both length of turns and number of turn sequences were considered to be measures of competency in turn use for the mother-child dyads. Extending the length of turntaking exchanges was a major goal of both phases of intervention. MacDonald (1982) stated "a primary goal in training is to extend the Turntaking length (TTL) of conversations across appropriate social contact purposes. Just as MLU is a reflection of increasing linguistic competence (Brown, 1973), TTL may well become an index of communicative competence (Sacks et al., 1974; Schlegloff, 1973; Jefferson, 1972)" (p. 22).

Mode-matched turn length increased for three of the four dyads following Phase I of treatment. As mentioned in Chapter 5, this increase was accounted for by an increase in action turns by both members of the dyad during Phase I (see Figure 2). Following Phase II of treatment, all four dyads demonstrated a decrease in mode-matched turns. Although this decrease was not expected, in retrospect it

appears to have a logical origin. Mode-matched turns required parents to be communicating at a level not more than one mode higher than the mode used by their children. Therefore, in order to fulfill the criteria for mode-matched turns during Phase II, a parent and her child had to communicate about the same topic for a number of uninterrupted turns utilizing at least the single word level. It seems unlikely that the children would be able to maintain communication at a word level for as long as they were able to at the action level. Thus, there was a decrease in mode-matched turn length following Phase II of the study.

The criteria for non mode-matched turns were not as stringent as that for mode-matched turns. Non mode-matched turns were counted as uninterrupted, successive, related behaviors, regardless of the level of communication utilized by the members in the dyad. Therefore, it was anticipated that non mode-matched turn length would be greater than mode-matched turn length. This was borne out by the data in Figures 6a and 6b. Following Phase I of training, three of the four dyads showed an increase in non mode-matched turn length which again, could be largely accounted for by an increase in action turns by both dyadic members. The fourth dyad, contrary to expectations, demonstrated a marked decrease in turn length. This decrease may have been due, in part, to an overall paucity of communicative behaviors exhibited by both members of Dyad D following Phase I of treatment (see Figures 2 and 4).

Following Phase II of training, Dyads A and B demonstrated a continuation of their prior upward trend. This was the anticipated

result of training, as the intervention process focused on increasing turn length in general. The maxim taught to the parents was "keep your child in the interaction," and this was achieved by increased turn length on a topic interesting to the child. Dyad C showed a reversal of their prior upward trend, to a pre-treatment level. There was no obvious explanation for this reversal. Dyad D also reversed their prior downward movement. It appears likely that the overall lack of communicative behavior by Dyad D during Phase I pulled their turn length scores down and the reversal of this trend was a return to more typical behavior for this dyad.

The number of turn sequences emitted by a dyad during a two-minute play session was the second measure of turn use utilized in the study. Again, the turns were subdivided into mode-matched and nonmode-matched turns, with the measure of central tendency being the mean for each of the two groups. The number of mode-matched turn sequences decreased following Phase I of training for three of the four dyads. These same three dyads demonstrated an increase in turn length over the same period of time. The reverse case is true for Dyad B: they showed a decrease in turn length with a concommitant increase in number of turn sequences per two-minute play session. It appears that at this level of development, turn length and number of turn sequences may be corollary concepts. Indeed, when comparing these two measures across each phase of intervention, the trend becomes clear: in all cases, when turn length increased, the number of turn sequences decreased, and vice versa. Thus, it appears that the dyadic competency in turn use remained relatively constant or

showed an increase over time, with turn length increases predominating during Phase I of training and increases in number of turn sequences predominating during Phase II. This would indicate that the dyads changed topic more frequently during Phase II, or changed mode more frequently, which may not be entirely inappropriate for dyads whose communicative competency is increasing.

The number of non mode-matched turn sequences decreased for all four dyads following Phase I of treatment. In three out of four cases, this correlated with an increase in length of non mode-matched turns, similar to the situation with mode-matched turns. This pattern was also apparent following Phase II of treatment, with increases in turn length being matched with decreases in number of turn sequences.

F. Communication Task Measures

Appendix L lists the definitions for Imperative and Declarative Scoring. It should be noted that the scoring system which was utilized throughout the study and which was adapted from that developed by Snyder (1978), had different numerical values than those reported in Appendix L. The original scores ranged from zero to five, with a score of five having two designations: specific or non-specific. This system was revised in order to enable calculations to be performed on the computer. Thus, the original and revised forms of the scoring system are as follows:

Original	Revised
0	1
1	2
2	3
3	4
4	5
5ns (non-specific)	6
5s (specific)	7

All scores reported in this thesis are from the revised scale.

The Imperative and Declarative communication tasks were administered at baseline to both the handicapped and nonhandicapped children. Comparison between these two sets of scores revealed that prior to treatment, the communication task scores of the nonhandicapped children were at least one communicative level higher (according to Sugarman's (1973) system) than those of the handicapped children on two of the three performative measures (Declarative and Imperative 2). Of these two scores, the Declarative scores showed a particularly wide discrepancy between the two groups of children. This finding would indicate that the nonhandicapped children were strikingly more proficient at directing adult attention to objects present during the communication tasks than were the handicapped children. Their ability to convey a request for an object was also more proficient than the handicapped children, although not as markedly so. In addition to this deficiency in communicative competency exhibited by the handicapped children, these children also demonstrated a pragmatic deficit. This has been previously defined as a deficit in the ability

to utilize words although they may be present in the vocabulary (Snyder, 1978). The pragmatic deficit is evident on examination of Table 7 which compares the two groups of children on linguistic versus nonlinguistic performance on the communication tasks. The greater the percentage of nonlinguistic responses on a particular task, the more pragmatically impaired a child is. On comparison of the two groups of children, the data show that the nonhandicapped children had a higher percentage of linguistic responses than the handicapped children on each performative measure (Declarative, Imperative 1 and Imperative 2), indicating greater pragmatic proficiency. The score which showed the greatest discrepancy between the two groups of children was the Declarative score. This would conform with the results of the previous measure of communicative competency, which also showed a wide discrepancy between the two groups of children on the Declarative measures. Thus, the nonhandicapped children were not only more competent at conveying a message but were also more likely to convey this message using linguistic means.

The communication tasks scores for the four handicapped children following Phase II of training will be examined next. There was a great deal of variability between the four children on all three performative measures (Declarative, Imperative 1 and Imperative 2) with no consistent trends evident. However, on observation of the videotaped communication tasks, several mediating factors became evident. It was apparent that the children's general behavior pattern on the date of the communication task played a role in their performance.

Thus on a day when a child may have been tired and irritable, his performance was generally poorer than on another day. In addition, specific toys appeared to be more desirable for certain children, with the desired toys generally eliciting a better performance on the communication tasks. Because these factors are subjective, it is difficult to take them into account when analyzing the results of the communication tasks, however it is apparent that they played a role in the results obtained. In order to reduce the effect of such factors, several options can be suggested. Several of the objects from the core of five objects presented during the communication tasks (preferably the Generalization objects) could be presented each training session. This would effectively reduce the impact of inconsistent data due to poor behavior on the dates data were collected. However, a negative effect of frequent repeated measures is a reduction in novelty of the task, thereby reducing the task's effectiveness in eliciting communication behavior. A second option may have been to have several varying modes of presentation of the communication tasks. For example, instead of always having three blocks and an object drawn out of a nylon bag, the researcher could have hidden objects around the room. Overall it must be stated that child variables such as fatigue and irritability may have overriden the effects of intervention on the children's performance on the communication tasks, limiting the usefulness of the communication tasks as a dependent measure.

There was a tendency for the communication task scores to become higher over the course of the study (see Figure 10), particularly the

Declarative scores, indicating an increased level of communication. The communication task responses following Phase II of training were similar to the responses of the nonhandicapped children at baseline. In addition, the children tended to become more linguistic in their responses over the course of the study (see Table 8). In all cases (Declarative, Imperative 1, Imperative 2) the mean response level of the handicapped children is more linguistic than that of the non-handicapped children, with the Declarative scores showing the greatest impact of treatment.

When the Generalization objects were parsed out of the remainder of the objects on the communication tasks, it became apparent that this general increase in percentage of linguistic responses for all Core objects was also present for the Generalization objects. The impact of training on the Generalization objects appeared to be greatest for the Declarative and Imperative 2 measure.

In comparing the Generalization objects to the objects used during training, the results were equivocal with two children generally showing superior performance on the Generalization objects and two showing superior performance on the Training objects. This latter pattern was that which was expected, due in part to the apparently high degree of entertainment associated with the Training objects. In the vast majority of training sessions, the mothers were successful at making the sessions fun for their children, therefore it was assumed that the Training objects would be highly motivating for the children. In fact, there appeared to be no consistent pattern of superior performance on the Training objects.

This was similar to the pattern when comparing Generalization objects to Training objects on the percentage of linguistic responses.

G. Communication Strategies Utilized by Parents

In comparing communication strategies utilized by the mothers of the handicapped children with those used by mothers of the nonhandicapped children, the two groups were generally similar on the majority of strategies. The only strategy where marked differences occurred between the two groups was vertical expansions. The overall mean for the four parents of the handicapped children indicated that they used this strategy more than ten times more frequently than the normative sample of parents. This may have been because of previous input to the parents of the handicapped children from an early intervention worker or speech-language pathologist who indicated that expanding on a child's utterance is a language-learning strategy. Numerous authors (for example, Barnes et al., 1983; Cross, 1978) have postulated a correlation between maternal expansions and an increased rate of language acquisition.

There were several significant changes in parental strategy use which have some logical correspondence to the intervention. Imitation of actions rose following Phase I of intervention (Turntaking with Actions) and dropped following Phase II (Turntaking with Communications). Imitation of communications showed the reverse pattern with a slight decrease following Phase I and a marked increase following Phase II. Both of these results appeared to be in response to the intervention. Several desirable communicative behaviors taught

during the training sessions showed their effect in scoring of the communication strategies. Horizontal expansion of action showed increases following each phase of intervention. This finding indicated that when the child utilized an action, the parent repeated that action and expanded on it, which was an advantageous response. Vertical expansions also showed an increase following each phase of intervention. As mentioned previously, expansions have been associated with language acquisition in children. Following Phase II of intervention, two types of parental models showed an increase. These were horizontal communicative models and vertical models. Both of these types of models indicated that the parents were attempting to diversify their language input to their children at a time when the parents judged the children to be linguistically capable of handling this increased input. On the other hand, horizontal action models decreased following each phase of intervention. This was a desirable situation, as this type of model was basically considered to be a topic shift. Thus parents showed a decrease in shifts to a different topic than that about which the child was communicating.

H. Communication Strategies Utilized by Children

Strategy use was fairly similar between the handicapped and non-handicapped children at baseline, with one notable exception. The use of vertical initiations by the handicapped children was markedly lower than that of the nonhandicapped children. This finding is consistent with the diagnosis of pragmatic deficit assigned to the handicapped children.

Following intervention, several changes occurred in strategy use by the handicapped children. After Phase I of training (Turntaking with Actions) there was an increase in imitation of action by the handicapped children, while after Phase II of intervention (Turntaking with Communications) an increase in imitation of communications was demonstrated. Successive decreases in initiation of horizontal action with each phase of intervention indicated that the children were maintaining a topic and introducing fewer topic changes. Increases in vertical initiations by the handicapped children following Phase II of intervention indicated that they were becoming more capable linguistically: they showed increased ability to communicate at a mode higher than that utilized by their parents.

I. Developmental Measures

Uzgiris and Hunt Scales

As mentioned previously, three of the four children failed to reach Piagetian Stage V on the Means-End Scale. Snyder (1975) observed similar results in the performance of her language delayed children on this scale. Despite comparable results between her normal subjects and language delayed subjects on a measure of infant intelligence, the performance of the language delayed subjects on the Means-End Scale was consistently lower than that of the normal children. Snyder postulated a relationship between performance on the Means-End Scale and the communication tasks utilized in her study, and suggested that the language delayed children may have been experiencing a specific representational deficit. Bates, Camaioni

and Volterra (1975) concurred with these findings in their observation that the emergence of intentionality in the child coincided with Stage V play, particularly in the area of Means-End skills. The normative group of children in this study, on the other hand, all demonstrated at least Stage V performance on the Means-End Scale.

Sequenced Inventory of Communication Development (SICD)

The SICD findings were inconsistent among the handicapped children. It appears that this test is an insufficiently sensitive measure of the changes in child language which received focus in this study (e.g., increase in initiations or lexical acquisition). Girolametto (1985) found similar results in his study of 20 mother-child dyads involved in a similar intervention program. It is possible that continued changes in SICD scores may have been detected subsequent to the final administration of this test, as it was anticipated that the dyads would continue to utilize the strategies taught to them. However, it is impossible to substantiate this conjecture without further research.

Language Sample Data

The handicapped children all showed substantial increases in lexicon size following treatment. These increases ranged from 64% to 248% on the total words in the sample and from 189% to 321% on the spontaneous words. Stoel-Gammon, Kelly, Tinsley and Kellog (1984) looked at lexicon size in a group of 9 to 24 month old infants. They found that the mean number of words in the vocabularies of the 24 month old children was 50.7. Two of the experimental children

(with developmental ages of 25 months and 28 months) had a higher number of word types in their lexicons, while the number of word types in the vocabularies of the other two experimental children (developmental ages 22 months and 30 months) was lower. Thus the study was successful in normalizing the size of the lexicon for two of the four children and increasing the lexicon size for the other two children.

In comparing pre-treatment to post-treatment use of the specific target words, all four children showed considerable increases over the course of the study.

J. Summary

The difficulties with the research design in the present study, as well as lack of clear replicated effects across subjects resulted in limitations in the ability to make cause-effect statements about the data presented. The results are at best suggestive, based on some logical correspondence between the results and the intervention process. The analysis of the data gathered over the twelve to thirteen week treatment period for each child indicated that generally, the training of parents utilizing a specific treatment protocol based on the work of MacDonald and Gillette (1982, 1984), suggested that there were some notable changes in the dyads following treatment. It is clear that the treatment program had some impact on the interaction style of the dyads. This was evidenced particularly by the changes in communication mode by each member of the dyad as well as changes in use of communication strategies. In addition, the treatment

program appeared to have some impact on the communication skill and language development of the four children in the study. This was demonstrated both by changes in communication task and language sample results and by subjective impressions of the researchers and the parents of the children. Several changes in the research design or procedures can be suggested as a result of this pilot study. First, it would be important to attempt to re-institute the multiple baseline design in order to more clearly demonstrate that the changes in the dyads were as a result of the treatment process. This may be more readily accomplished if the lag in institution of treatment between each dyad in a set was increased to at least two weeks. In this way, the likelihood of illnesses attenuating the effects of the multiple baseline design would be decreased.

Secondly, an increase in sample size would be important if replication of the study was attempted. This would serve to demonstrate the applicability of the treatment program across a wider range of subjects as well as increase the possibility of demonstrating a clear and consistent pattern across subjects.

Thirdly, institution of more frequent probes of the Generalization Objects on the communication tasks may lead to clearer treatment effects in terms of the communication tasks. It is suggested that these probes be conducted under different conditions in order to maintain their novelty effect.

Lastly, increased frequency of language samples through the training procedure may more clearly demonstrate the effects of training on word use. Additionally, it may be useful to implement a

structured language sampling procedure in which toys from the communication tasks would be presented to each child a specific number of times. In this way, it would be possible to equalize the number of opportunities the child would have to logically respond to an object presented to him.

In addition to the suggestions for future research presented above, some implications for intervention will be discussed. In regards to parent training, it appears that the treatment program implemented in the current study may have some validity for use with parents of developmentally delayed children who experience language delays. The parent training portion of the study was perhaps that which showed the most consistent results across subjects. Therefore, it would be possible to streamline the parent intervention to be presented as a 'package' which included teaching in the areas of mode-matching, progressive match and the strategies of imitation of actions and communications, horizontal expansion of action, vertical expansion, horizontal communication models and vertical models.

One striking difference between the nonhandicapped and the handicapped children in this study was the comparative competency at utilizing the Declarative performative. In other words, the handicapped children were less proficient at directing adult attention to objects utilized in the communication tasks. This may be a skill which warrants specific intervention for language delayed children.

K. Conclusion

The analysis of treatment effects demonstrated in this study indicated some clear positive results as well as some results with a significant degree of variability across subjects. It is clear that continued research is necessary in order to determine the efficacy of this treatment procedure.

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APPENDICES

APPENDIX A

INFORMED CONSENT FORM

INFORMED CONSENT FORM

Some early intervention programs for developmentally delayed children stress the importance of parent-child interaction for the development of child language skills such as learning to ask for things and drawing attention to some interesting event. The purpose of this study is to evaluate intervention procedures that increase parent-child interactions in terms of effects on children's language performance. Parents and their developmentally delayed children will be seen for intervention at the University of Alberta in a ten to fifteen week program. Game activities will be developed for each parent-child pair and each parent will be instructed on the use of specific strategies for increasing interaction. Short segments of each game will be videotape-recorded and discussed with the parent throughout the program for the purpose of providing additional instruction for increasing interaction. This will be accomplished in weekly visits of about 1 to 1 and 1/2 hours in length. Parents will be requested to practice the game activities on a daily basis in their own homes. The children will be periodically assessed on language tasks that involve asking for things and commenting on interesting events. This assessment will be done as part of a weekly visit and is for the purpose of evaluating the effects of the intervention procedures. It will also be videotape-recorded.

I have been adequately informed about the nature of the above study. I _____ (name) consent to participation in the study with my child _____ (name). I understand that I can withdraw from the study at any time.

_____

Signature of parent or guardian

APPENDIX B

Week One—Phase I

Before a child has language, he must be able to communicate. We're all aware that children communicate long before they are capable of using words. For example, a baby's cry is a very effective means of communicating his wants and needs. Just as we can have communication without words, we can also have conversations without words. We will be using the term conversation to mean any turntaking behavior in which two people exchange messages. These conversations can exchange word-messages or sound-messages or action-messages.

Language has its basis in play activities, with two behaviors generally preceding talking:

1. action play
2. turntaking.

Each of these behaviors will be worked on during our sessions together.

You might ask why we would work on actions when our eventual goal is for your child to talk. A child's actions are the building blocks to his/her language and thought patterns. In addition, actions are more readily able to be prompted and they are effective in capturing a child's attention.

In order to encourage turntaking, we must structure the activity so that it is easy for the two of you to take turns together. Selecting toys which your child is highly interested in will help this process.

Also, our goal is to attempt to have each of you take an approximately equal number of turns in your "action conversations."

I'm sure you've been involved in adult conversations where your conversational partner won't let you get a word in edgewise. Or, on the other hand, you may be forced to take all the conversational turns because your partner is very non-communicative. Each of these conversational situations is uncomfortable because the number of turns taken by each partner is not balanced. A good conversation is one where each partner takes an approximately equal number of turns. Sometimes one partner dominates the conversation. It is especially common for a parent to be the dominant partner when their child is delayed in speech and language skills. You've probably heard speech therapists and educators tell you to "talk to your child." But we also must make sure that the child has an opportunity to respond. The child must learn to "give in order to get." Sometimes you must cue your child by waiting expectantly in order to give him/her the idea that (s)he should be doing something.

Once your child understands the idea of turntaking, our goal will be to increase the length of turns you engage in. For our purposes we'll be defining a turn as a behavior engaged in by one partner which is immediately followed by a complementary behavior engaged in by the other partner. So a turn must have two parts: one behavior by each partner. We want to increase turntaking length in order to keep your child engaged in longer and longer conversations. Why? Because the longer a conversation, the greater the amount of natural language teaching that goes on. Increasing turntaking length will increase the number of opportunities your child has for using communication. Therefore, a change in your interaction

with your child can result in a change in his/her communication behavior.

It is important to ensure that your communication level is similar to your child's in order to foster conversations. Just think what the conversation would be like if you were interested in talking about the weather and your conversational partner was interested in talking about brain surgery! One way to make sure you're operating at the same communication level as your child is to imitate his/her actions. In addition, this effectively gets the child's attention and lets him/her know (s)he's having an effect on others.

Don't worry about imitating your child's actions; we won't stay at this level for very long. Rather, we're hoping that your imitation of your child will encourage him/her to imitate you in return. Then you can begin to model more sophisticated forms of communication and more varied communications. Modeling can also be used in order to begin an interaction.

So, our goals are:

1. take turns with your child
2. balance your turn exchanges. Take your turn, then wait for your partner to take a turn
3. follow your child's lead by imitating his/her actions
4. model communications for your child
5. increase your turntaking length.

Your assignment for this week is to take these toys home and practice playing with your child with them. Please play with each toy a

minimum of once per day for 5 or 10 minutes. If you want to work on turntaking with another toy at home, that's fine too. Please bring both of these toys back next week so you can show us how you play together. Next week we'll do some videotaping of you and your child.

Week Two—Phase I

In order to encourage your child to take an equal part in your conversations, we'll be working through a series of cues. The least obtrusive cue is to simply wait expectantly for your child to take his/her turn. You may be surprised at how long you have to wait for some children to respond. Try counting slowly to 5 to make sure you're waiting long enough. If your child has not responded by this time, you can signal him/her to take his/her turn. A signal is anything that encourages the child to take a turn, e.g., pointing to the child or the object, smiling, putting your hands out, etc. If a signal is unsuccessful at cueing your child to take a turn, you should prompt him/her by using physical guidance. So, the hierarchy is: wait—signal—prompt.

Week Eight—Phase II

We're going to be working on many of the same goals we worked on before, but this time our focus will be on adding words to the actions you've been using. The goal for your child is to develop a turntaking habit with words, just as (s)he has already done with actions. So, we're going to move from action communications to communications using actions, sounds and words.

There are several parent goals for these sessions: the first is

to model communications which are just slightly above where your child is currently functioning. This appears to be the best way for children to learn language. So, to avoid "talking above your child's head," you should imitate your child's action and add a slightly more mature form of communication to that action. The rule is "imitate and expand."

It's important to get into the habit of communicating in this fashion. Every message you send is a potential language teaching opportunity; if your message is beyond your child's level, you have missed an opportunity for teaching language.

The next parent goal is to imitate your child's sounds and words, just as you imitated his/her actions. Do you remember how it caught his/her attention when you imitated his/her actions? Well, we feel the same thing will happen with sounds and words, which will get turntaking with communications going. We don't want you to say things such as "Say book," but rather to encourage your child to imitate by first imitating him/her.

A third parent goal is to model messages for your child by labelling his/her actions. For example, if (s)he rolls a ball toward you, you should say either "roll" or "ball" while returning it. Remember to keep your messages short and simple. It's tempting to model complex messages, but you're more likely to get greater amounts of turntaking if your child can participate equally in the conversation.

Parent goal number four is to communicate once and wait. This helps to balance the number of turns that each partner takes so that

neither partner is dominating the conversation.

Lastly, remember to increase your turntaking length. The greater the number of turns, the more opportunities for communicating.

So, our goals are:

1. imitate and expand
2. model new messages for your child
3. communicate once and wait
4. increase your turntaking length.

APPENDIX C

EXAMPLE OF A REMINDER SHEET

EXAMPLE OF A REMINDER SHEET

1. Balance your turns! Take your turn then wait.

2. Imitate _____'s actions.

3. Try to increase the number of turns.

APPENDIX D

TURNTAKING WITH ACTIONS RATING FORM

Child _____ Scorer _____ Date _____

TURNTAKING WITH ACTIONS

C. STRATEGIES: Key: 1 = never, 2 = low, 3 = emerging, 4/5 = stable

	Ratings	Comments/Examples
1. Balance turns		
2. Imitate action turns		
3. Model action turns		
4. Turntaking length		

TTL Rating Scale:

1 = no clear occurrence of a turn

2 = appearance of one turn sequences

3 = instances of two turn sequences

4/5 = three or more turn sequences

APPENDIX E

TURNTAKING WITH COMMUNICATIONS RATING FORM

Child _____ Scorer _____ Date _____

TURNTAKING WITH COMMUNICATIONS

1 = never 2 = low 3 = emerging 4/5 = stable

	Ratings
1. Balance turns	
2. Model messages	
3. Imitate and expand	
4. Turntaking length	

TTL Rating Scale:

1 = no clear occurrence of a turn

2 = appearance of one turn sequences

3 = instances of two turn sequences

4/5 = three or more turn sequences

APPENDIX F

TOYS UTILIZED IN TURNING TASKS

TOYS UTILIZED IN TURNTAKING TASKS

1. Fisher-Price Clanking Clown: a cylindrically-shaped toy whose main function is to roll. The clowns inside the cylinder produce a clanking sound when rolled.
2. Tomy Gas Pump: a small plastic replica of a gas pump which has several functions:
   i. pushing a button on top of the pump produces a ringing noise and changes pictures within a window display
   ii. turning a dial produces a cranking noise and also changes pictures in the window display
   iii. gas nozzle can be removed and replaced in a slot on the side of the pump.
3. Fisher-Price Drum: a plastic drum with metal "keys" on top. When hit, the keys produce varying musical tones. The drum has a stick which can be removed from a handle on the side of the drum and used to hit the drum. In addition, the handle can be rotated, producing a cranking noise.
4. Tonka Top: a plastic spin top. When the top is pressed with the hand it rotates, producing a multicolored swirled pattern.
5. Fisher-Price Creative Blocks: large, easily stackable plastic blocks.
6. Fisher-Price Snap-Lock Beads: large, plastic multicolored beads which can be snapped together and pulled apart.

APPENDIX G

INSTRUCTIONS FOR TURNTAKING TASKS

INSTRUCTIONS FOR TURNTAKING TASKS

"I'm going to give you a series of toys, one at a time, to use in playing with your child. Each toy will involve playing by taking turns: you take a turn, (s)he takes a turn, you take a turn, (s)he takes a turn, and so on. I will show you specifically how to take turns with each toy. Encourage your child to keep taking turns with you for as long as possible. To keep him/her interested, talk to him/her, use facial expressions, actions or whatever you wish. We would like to videotape two minutes of play with each toy. However, if (s)he is uninterested in any of the toys, I will replace it with another.

Please try to contain your play to the area of the blanket. As we are videotaping, this will aid us in focusing accurately."

Prior to each two-minute play session, the researcher presented a new toy along with specific instructions and demonstration of how to play with the toy. The researcher then left the room to observe from the adjacent room.

APPENDIX H

DEFINITIONS OF SCORING CATEGORIES

DEFINITIONS OF SCORING CATEGORIES

B Initiate: a behavior directed toward another person through the use of an action, vocalization, word or phrase that was not apparently elicited by another person's immediately preceding verbal or non-verbal behavior.

R Respond: an action, vocalization, word or phrase which was apparently elicited by another person's action, vocalization, gesture or phrase.

I Imitate: an overt repetition of an action, vocalization, word or phrase. Imitated behaviors must contain all or part of the modeled behavior with no changes except minor deletions which do not alter the mode level of the behavior. Examples of acceptable deletions are:

Action Level: Mother bangs drum 4 times; child bangs drum 3 times

Vocalization Level: Mother says "oo-ee-oo-ee"; child says "oo-ee."

Word Level: Mother says "ball"; child says "ball."

Phrase Level: Mother says "shut the door"; child says "shut door."

S Signal: an action, vocalization, word or phrase which was apparently intended to prompt a response from another person and which follows a previously unsuccessful attempt.

e.g. Mother: [illegible]

Child: [illegible]

Mother: bah-bah-bah

Child: bah

Mother: Great!

G Physical guidance: physical contact intended to assist another person to complete a specific activity.

DEFINITIONS OF COMMUNICATION MODE

A Action: a non-verbal motor-gestural behavior.

V Vocalization: a single phoneme (e.g., "m"), or a multiphonemic production (e.g., "oo-ee") which is non-linguistic in intent.

W Word: a single word or word approximation.

P Phrase: a phrase consisting of two or more words.

APPENDIX I

PRESCHOOL OBSERVATION RECORD

PRESCHOOL OBSERVATION RECORD

Page __ of __

Child _____ Scorer _____

Parent _____

Date _____

ADULT	CHILD	ADULT	CHILD
B R I S G A V W P	B R I S G A V W P	B R I S G A V W P	B R I S G A V W P
B R I S G A V W P	B R I S G A V W P	B R I S G A V W P	B R I S G A V W P
B R I S G A V W P	B R I S G A V W P	B R I S G A V W P	B R I S G A V W P
B R I S G A V W P	B R I S G A V W P	B R I S G A V W P	B R I S G A V W P
B R I S G A V W P	B R I S G A V W P	B R I S G A V W P	B R I S G A V W P
B R I S G A V W P	B R I S G A V W P	B R I S G A V W P	B R I S G A V W P
B R I S G A V W P	B R I S G A V W P	B R I S G A V W P	B R I S G A V W P
B R I S G A V W P	B R I S G A V W P	B R I S G A V W P	B R I S G A V W P
B R I S G A V W P	B R I S G A V W P	B R I S G A V W P	B R I S G A V W P
B R I S G A V W P	B R I S G A V W P	B R I S G A V W P	B R I S G A V W P
B R I S G A V W P	B R I S G A V W P	B R I S G A V W P	B R I S G A V W P

APPENDIX J

DEFINITIONS FOR SCORING STRATEGIES

DEFINITIONS FOR SCORING STRATEGIES

Imitation

Action (I-A): Overt repetition of all or part of the partner's immediately previous motor-gestural behavior or an attempt at repetition of that behavior. The imitation must occur within 10 seconds of the behavior.

Communication (I-C): Unelicited overt repetition of all or part of a communicative behavior (vocalization, single word or phrase). Does not include responses to verbal prompts. (e.g., "Say ____.")

Expansion

Horizontal/Action (E-H/A): A motor-gestural behavior by one partner which includes part or all of the immediately previous motor-gestural behavior of the other partner, adds a mode-matched topic relevant motor-gestural behavior and occurs within 10 seconds of the previous behavior. Does not include elaborations.

Horizontal/Communicative (E-H/C): A communicative behavior of one partner that includes the immediately previous communicative behavior of the partner, adds a mode-matched topic-relevant communicative behavior and occurs within 10 seconds of the previous behavior. Does not include elaborations.

Vertical (E-V): A behavior by one partner which includes the immediately previous behavior of the partner, adds a topic relevant behavior which is of a higher mode than the partner's

behavior but within two mode levels of the partner's behavior and occurs within 10 seconds of the previous behavior.

Model/Initiate (Model refers to adult; Initiate refers to child)

Horizontal/Action (M-H/A): A novel motor-gestural behavior that is directed toward the partner; occurs at the same mode as the previous behavior; and is not apparently elicited by the partner's immediately preceding behavior. Note: Models that occur at the beginning of a two-minute segment will be designated horizontal if they occur at the action level and vertical if they occur at any higher mode.

Horizontal/Communicative (M-H/C): A novel communicative behavior (vocalization, word or phrase) that is directed toward the partner; at the same mode as the previous behavior; and is apparently not elicited by the partner's immediately preceding behavior or is a topic-relevant elaboration that does not include imitation of all or part of the previous behavior. Not a signal or direction. Note: If two different but mode-matched behaviors occur within 10 seconds of one another within a partner's turn, only one incidence is scored.

Vertical (M-V): A novel communicative behavior that is directed toward the partner; at a higher mode than the partner's previous behavior; within two communicative modes of the partner's previous behavior; and not apparently elicited by the partner's previous behavior or is a topic-relevant elaboration that does not include imitation of all or part of the previous behavior.

Does not include signals or directions by the adult. Note: If two different models occur within a turn at different modes, each model is scored once.

Additional Guidelines

1. Unintelligible utterances are scored as vocalizations.
2. Attempts to re-engage a child in the interaction will not be scored. e.g., action level: shaking the toy to get child's attention; word level: calling the child's name; phrase level: "Come here!"
3. Uninterrupted multiple repetitions of behaviors at the same mode level by the same partner are treated as one behavior.
4. Parental verbal reinforcements will not be scored, e.g., "Good!"
5. Children's attempts at motor-gestural behaviors are scored, despite non-completion.
6. Provision of physical guidance by mothers is not scored as a mother behavior.

APPENDIX K

STRATEGIES SCORESHEET

STRATEGIES SCORESHEET

Name _____ Date _____ Tape _____ Training/Non-training

	TOY						TOY						TOY						TOY						TOY						TOY					
PARENT							PARENT						PARENT						PARENT						PARENT						PARENT					
IMITATE	A						IMITATE	A					IMITATE	A					IMITATE	A					IMITATE	A					IMITATE	A				
	C							C						C						C						C						C					
	H/A							H/A						H/A						H/A						H/A						H/A					
EXPAND	H/C						EXPAND	H/C					EXPAND	H/C					EXPAND	H/C					EXPAND	H/C					EXPAND	H/C				
	V							V						V						V						V						V					
	H/A							H/A						H/A						H/A						H/A						H/A					
MODEL	H/C						MODEL	H/C					MODEL	H/C					MODEL	H/C					MODEL	H/C					MODEL	H/C				
	V							V						V						V						V						V					
CHILD							CHILD						CHILD						CHILD						CHILD						CHILD					
IMITATE	A						IMITATE	A					IMITATE	A					IMITATE	A					IMITATE	A					IMITATE	A				
	C							C						C						C						C						C					
	H/A							H/A						H/A						H/A						H/A						H/A					
EXPAND	H/C						EXPAND	H/C					EXPAND	H/C					EXPAND	H/C					EXPAND	H/C					EXPAND	H/C				
	V							V						V						V						V						V					
	H/A							H/A						H/A						H/A						H/A						H/A					
INITIATE	H/C						INITIATE	H/C					INITIATE	H/C					INITIATE	H/C					INITIATE	H/C					INITIATE	H/C				
	V							V						V						V						V						V					

APPENDIX L

DEFINITIONS FOR IMPERATIVE AND DECLARATIVE SCORING

DEFINITIONS FOR IMPERATIVE AND DECLARATIVE SCORING

Declarative

1. No attempt to get adult attention.
2. Child uses direct manipulation (grasp, approach, reach, manipulation, etc.) to get the adult's attention (and looks at adult).
3. Child uses "showing off" to get the adult to smile, laugh, attend, etc. (using an action and/or smiling and laughing at adult while manipulating the object).
4. Child uses showing, giving and/or pointing to an object to get the adult to attend to it.
5. Child uses a ritualized signal (pointing and vocalizing) to get the adult to attend to the object (could include interpatterning of vocalization with other communication gestures such as showing and giving).
6. Child uses a word to get the adult to attend to the object. The word may be a related, nonspecific word (e.g., "Wow," "Mine").
7. Child uses the target word to get the adult to attend to the object.

Imperative

1. No attempt to get object or to engage the adult.
2. a. Child looks at adult.
   b. Child looks at and extends arm toward object.
3. a. Child looks at and fusses at the adult.
   b. Child extends arm toward object, reaches, vocalizes, and/or points to the object.
   c. Child looks at and reaches for the adult's hand.
4. a. Child points to and/or reaches for the object and then looks at the adult.
   b. Child points to and/or reaches for the object and then looks at the adult's hand.
   c. Child manipulates the container and then looks at the adult and/or pushes container to the adult.
5. a. Child does something to get the adult's attention first (e.g., looks at adult) and then points to and/or reaches for the object.
   b. Child looks at adult and pushes the container toward adult without manipulating.
6. Child uses a word to indicate desire for the object. The word may be a related nonspecific word.
7. Child uses the target word to get the adult to attend to the object.

APPENDIX M

COMMUNICATION TASK SCORESHEET

COMMUNICATION TASK SCORESHEET

TAPE # _____

SUBJECT _____

OBJECT	SITUATION	COMMENTS	SCORING
1. _____	Blocks/bag		
	Out of reach		
	In container		
2. _____	Blocks/bag		
	Out of reach		
	In container		
3. _____	Blocks/bag		
	Out of reach		
	In container		
4. _____	Blocks/bag		
	Out of reach		
	In container		
5. _____	Blocks/bag		
	Out of reach		
	In container		
6. _____	Blocks/bag		
	Out of reach		
	In container		
7. _____	Blocks/bag		
	Out of reach		
	In container		