

INFORMATION TO USERS

While the most advanced technology has been used to photograph and reproduce this manuscript, the quality of the reproduction is heavily dependent upon the quality of the material submitted. For example:

- Manuscript pages may have indistinct print. In such cases, the best available copy has been filmed.
- Manuscripts may not always be complete. In such cases, a note will indicate that it is not possible to obtain missing pages.
- Copyrighted material may have been removed from the manuscript. In such cases, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, and charts) are photographed by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps. Each oversize page is also filmed as one exposure and is available, for an additional charge, as a standard 35mm slide or as a 17"x 23" black and white photographic print.

Most photographs reproduce acceptably on positive microfilm or microfiche but lack the clarity on xerographic copies made from the microfilm. For an additional charge, 35mm slides of 6"x 9" black and white photographic prints are available for any photographs or illustrations that cannot be reproduced satisfactorily by xerography.

8706659

Sandall, Susan Rebecka

THE EFFECTS OF A PARENT-IMPLEMENTED INTERVENTION ON SOCIAL-
COMMUNICATIVE BEHAVIORS OF PRELINGUISTIC HANDICAPPED INFANTS

University of Washington

PH.D. 1986

University
Microfilms
International 300 N. Zeeb Road, Ann Arbor, MI 48106

PLEASE NOTE:

In all cases this material has been filmed in the best possible way from the available copy.
Problems encountered with this document have been identified here with a check mark ✓.

1. Glossy photographs or pages _____
2. Colored illustrations, paper or print _____
3. Photographs with dark background _____
4. Illustrations are poor copy _____
5. Pages with black marks, not original copy _____
6. Print shows through as there is text on both sides of page _____
7. Indistinct, broken or small print on several pages ✓ _____
8. Print exceeds margin requirements _____
9. Tightly bound copy with print lost in spine _____
10. Computer printout pages with indistinct print _____
11. Page(s) _____ lacking when material received, and not available from school or author.
12. Page(s) _____ seem to be missing in numbering only as text follows.
13. Two pages numbered _____. Text follows.
14. Curling and wrinkled pages _____
15. Dissertation contains pages with print at a slant, filmed as received _____
16. Other _____

University
Microfilms
International

THE EFFECTS OF A PARENT-IMPLEMENTED INTERVENTION
ON SOCIAL-COMMUNICATIVE BEHAVIORS
OF PRELINGUISTIC HANDICAPPED INFANTS

by

Susan Rebecka Sandall

A dissertation submitted in partial fulfillment
of the requirements of the degree of

DOCTOR OF PHILOSOPHY
UNIVERSITY OF WASHINGTON

1986

Approved by Rebecca R. Fewell
(Chairperson of Supervisory Committee)

Program Authorized to Offer Degree College of Education

Date 8/12/86

In presenting this dissertation in partial fulfillment of the requirements for the Doctoral degree at the University of Washington, I agree that the library shall make its copies freely available for inspection. I further agree that extensive copying of this dissertation is allowable only for scholarly purposes, consistent with "fair use" as prescribed in the U.S. Copyright Law. Requests for copying or reproduction of this dissertation may be referred to University Microfilms, 300 North Zeeb Road, Ann Arbor, Michigan 48106, to whom the author has granted "the right to reproduce and sell (a) copies of the manuscript in microfilm and/or (b) printed copies of the manuscript in microform and/or (b) printed copies of the manuscript made from microform."

Signature Susan R. Sandall

Date 8-21-86

University of Washington

Abstract

The Effects of a Parent-Implemented Intervention
on Social-Communicative Behaviors
of Prelinguistic Handicapped Children

by

Susan Rebecka Sandall

Chairperson, Supervisory Committee: Professor Rebecca R. Fewell
College of Education

Effective interactions between parents and infants are essential for infant development. Social interactions between parents and infants provide the basis for language, cognitive, and social development. When the infant is handicapped, effective interactions may be jeopardized, and the development of social-communicative behaviors is delayed.

The purpose of this study was to examine the effects of a parent-implemented intervention on the social-communicative behaviors

of prelinguistic handicapped infants. An additional purpose was to examine the effects of the training procedure on the parent's use of the intervention as measured in weekly classroom observation sessions.

In a multiple-baseline design, six parent-infant dyads were first observed in a baseline free-play situation. These observation sessions, which were videotaped, continued throughout the study.

During intervention, parents met weekly with a parent trainer. The parent was given an information packet which included the infant's target behavior, descriptions of suggested activities, and a description of the turntaking intervention. The turn-taking intervention consisted of 3 strategies: Follow the child's lead, establish turn-taking, and elaborate. The weekly parent training sessions included a review of the strategies, viewing of videotapes, modeling, and feedback from the parent trainer.

Measurement of intervention effects was assessed on multiple levels. Infant behaviors measured were social-communicative behaviors, initiations of topics, and percentage of turns. Parent behaviors measured were imitations of infant, percentage of turns, responsivity and use of turnabouts. A maintenance probe was conducted.

During the intervention phase, four infants increased their use of social-communicative behaviors. A fifth infant, who previously demonstrated productive use of social-communicative behaviors demonstrated increases in her use of a more sophisticated type of turn (turnabouts). The results did not show an overall increase in the

initiation of topics by the infants, however infants became more active partners in the interaction as indicated by increased percentage of turns.

Five of six parents increased their use of imitation. Changes in parental responsivity were observed. Two parents demonstrated increased use of turnabouts. The intervention was effective in enhancing more equally balanced dyadic interactions. The percentage of turns taken by parents decreased. Implications for teaching and future research are discussed.

TABLE OF CONTENTS

	Page
List of Figures.	iii
List of Tables	iv
Chapter I: Introduction	1
Chapter II: Review of the Literature.	7
Chapter III: Methods	34
Chapter IV: Results	53
Chapter V: Discussion	82
Bibliography	107
Appendix A: Elicitation Tasks and Scoring Procedures.	121
Appendix B: Packet of Parent Materials.	129
Appendix C: Turn-taking Code.	135
Appendix D: Communicative Intention Inventory	139

LIST OF FIGURES

Number	Page
1. Means: Frequency of Social-Communicative Behaviors.	56
2. Trends: Frequency of Social-Communicative Behaviors	58
3. Means: Percent of Topics Initiated.	60
4. Trends: Percent of Topics Initiated	61
5. Means: Frequency of Imitation by Parents.	63
6. Trends: Frequency of Imitation by Parents	65
7. Means: Percent of Parent Turns that were Responsive	67
8. Trends: Percent of Parent Turns that were Responsive.	69
9. Bar graphs: Turn Balance.	70
10. Means: Percent of Parent Turns, Turnabouts.	72
11. Trends: Percent of Parent Turns, Turnabouts	74
12. Infant 6: Percent of Turns, Turnabouts.	92

LIST OF TABLES

Number	Page
1. Infant Characteristics	36
2. Parent Characteristics	37
3. Outline for Parent Training Sessions	40
4. Mean Frequency, Social-Communicative Behaviors	57
5. Mean Percent Topics Initiated.	59
6. Mean Frequency, Imitation by Parent.	62
7. Mean Percent Responsive Parent Turns	66
8. Mean Percent Turns	71
9. Mean Percent Turnabouts.	73
10. Response to Elicitation Tasks.	76
11. Means and Standard Deviations, Ordinal Scales of Psychological Development.	77
12. Means and Standard Deviations, Receptive and Expressive Emergent Language Scale	79

ACKNOWLEDGEMENTS

I wish to thank the members of my Supervisory Committee. Dr. Rebecca Fewell has guided my graduate studies. She has been a valuable teacher and advocate. Dr. Joseph Jenkins provided encouragement as well as thoughtful feedback. Dr. Ellis Evans supported my interest in early childhood special education. Dr. Truman Coggins influenced my interest in early language development.

I am very grateful to the parents and infants who participated in this project. They and the other families in the infant program at the University of Washington have taught me so much.

I would also like to express my deep gratitude to Nancy Richard, my dedicated research assistant. Nancy is an excellent clinician and a dear friend. Thanks also to the trainers, testers and coders who assisted with this project.

I would also like to thank Dick McDonald and Sally Schuh for their excellent media skills and interest in the project; Susan Isoshima, Val Curnow and Bonnie Lenk for their efficient and careful word processing services; and Greg Owen and Scott Vance for their help with the graphs.

Finally, I want to thank some very special friends who have supported and encouraged me during my graduate studies: Marcy Stein, Kevin Cole, Patricia Vadasy, Don Meyer, Stephanie Prince, Janet Osborn, Susan Harris, Sam Odom, and Nancy Prill Brown.

This project was supported in part by Special Education Programs, U.S. Office of Education, Grant No. G008430029. However, the opinions expressed do not necessarily reflect the policy position of the U.S. Department of Education, and no official endorsement of the U.S. Department of Education should be inferred.

CHAPTER I

Introduction

Intervention programs for infants who are handicapped or at-risk for handicaps have grown in number in recent years. These programs share the goal of optimizing infant development. Until recently, this has meant the assessment of infant behaviors and the implementation of educational or therapeutic interventions to change or expand on those behaviors. This infant-centered approach ignored parent behavior and the interaction between infant and parent.

Research offers evidence of the importance of parent-infant interaction for all infants (e.g., Als & Brazelton, 1980). Social interactions between parent and infant provide the basis for language, cognitive, and social development (Bruner, 1975; Schaffer, 1977; Stern, Beebe, Jaffe, & Bennett, 1977). When the infant is handicapped, successful interactions between infant and parent may be jeopardized. The infant may emit signals which are dampened, delayed, or different. The infant may, for example, smile late or in a distorted manner, vocalize infrequently, or be physically unresponsive. The parent may fail to recognize the infant's signals, or misinterpret them. Some parents may be unable to respond to their infant's signals because of the initial shock and ongoing adjustment to the infant's handicapping condition.

The parent-infant relationship when the infant is handicapped is at risk whether from birth or from the time of diagnosis. An important task of early interventionists is to assist parents and other caregivers to develop and maintain mutually satisfying patterns of interaction with the handicapped infant.

Rationale

Language should be considered in the broad context of social communication (Olson, 1980). Communicative behaviors originate during the period of infancy in reciprocal exchanges between parents and infants. If all proceeds normally, these behaviors evolve into formal language, one point on the continuum of social communication. Language is acquired by the nonverbal social exchanges in infancy. These exchanges are the focus of the present investigation.

When language development is viewed from this social context, new targets of intervention become important. To better understand what these targets of intervention in social communication should be, early interventionists look to what is known about parent-child interaction when the infant is developing normally. Researchers have found that parent (usually mother) - infant interactions are finely tuned. These interactions offer experiences which support the infant's development. They offer shared meaning, predictability, and mutual pleasure. Goldberg (1977) proposed that when the infant's behaviors are readable and predictable, parents can quickly interpret these behaviors and respond in appropriate ways. Parents respond

consistently to the infant's communicative attempts, even before these attempts are intentional. By responding first to the infant's nonlinguistic but very socially responsive smiles, cries, burps, and grunts, and later to the infant's more obvious requests and comments, parents provide their infants with a high level of contingency awareness. The infant learns that his or her behavior has an effect on the people in the environment.

The success of these early interactions depend on the interactive capabilities of both partners, and for most dyads, these early interactions are successful. These capabilities may be considerably reduced, however, when the infant is handicapped. Interactions may then be less pleasurable (Als, 1982; Field, 1980), and they may also occur less frequently (Field, 1980) than in the nonhandicapped infant-parent dyad. They may be qualitatively different (Jones, 1977, 1980; Mahoney, 1983; Vietze, Abernathy, Ashe, & Faulstich, 1978), and may contain fewer of the features thought to facilitate infant development. That is, handicapped infants who most need the reinforcing feedback of successful contingent interactions to understand the nature of communication may experience fewer contingent interactions with their parents and other social partners.

Traditionally, early intervention programs have focused on the infant. Educational and therapeutic interventions have been designed to elicit specific developmental objectives set for the child. Programs for handicapped infants are, in fact, often called infant stimulation programs. Yet this traditional approach has failed to

include the child's most important learning partner in these programs--the parent. From an extensive review of the role of mother-child interaction on language development in the second year of life, Chapman (1981) concludes that adult input is particularly important to language development when it is contingent on the child's initiated actions, utterances, and interests. It is the linguistically responsive environment, rather than the linguistically stimulating one that should accelerate language acquisition in the 1- to 2-year-old child, according to Chapman.

Parents of handicapped and at-risk infants can change their behaviors in ways that result in smoother, more pleasurable, and more responsive interactions (Field, 1982; Kelly, 1982; McCollum & Stayton, 1985; Moran & Whitman, 1985). From the perspective of the interventionist, these studies are limited in a number of ways. Field's (1977, 1982) work demonstrates the immediate effects of "interactive coaching," and most of these studies have been one-time-only experimental manipulations. The ongoing effects of these strategies are not yet known. Other studies (Kelly, 1982; McCollum & Stayton, 1985; Moran & Whitman, 1985) show positive and encouraging results of strategies which can be easily implemented in early intervention programs. However, data have been reported on few dyads.

Models which incorporate interactional features into global early intervention programs are being developed (Bromwich, 1981; MacDonald, Gillette, Bickley, & Rodriguez, 1984; Mahoney & Powell, 1984). While

these models hold promise, systematic evaluation data are yet to be reported in the literature.

Purpose

The purpose of this study was to examine the effects of a parent-implemented intervention on the social-communicative behaviors of prelinguistic handicapped infants. Parents met weekly with a parent trainer. They received a packet of informational materials. The training procedures included viewing videotapes of the parent with the infant, modeling, and providing feedback. The parent was in this way guided in the use of the turn-taking intervention. The turn-taking intervention consisted of following the child's lead, establishing turn-taking, and elaborating on the child's turn. Parent and infant behaviors were charted across baseline and intervention phases, in a multiple baseline design. The measurement sessions were conducted in the classroom. A maintenance probe was conducted. Parent behaviors measured included imitation, number and type of turns, and responsivity. Infant social-communicative behaviors, initiations, and number of turns were measured. Following a closer review of the research literature, the specific experimental questions will be presented.

Definition of terms

A number of terms that will be used frequently, but may have varying meanings across contexts, have been defined below for the convenience of the reader.

Elicitation tasks: A set of items originally designed by Snyder (1978) to create a situational context to which the child responds by producing an imperative or declarative. Responses may be verbal or nonverbal.

Free-play situation: The assessment situation used in this study. Infants and parents were provided with toys. The free-play situation was videotaped for 11-12 minutes. Ten minutes were used for data gathering purposes.

Imitation: One person matches the behavior of the other person. This match must come in the next turn.

Intentional: Behavior characterized as goal-directed.

Social-communicative behaviors: These are vocal and/or gestural behaviors which are used to communicate. The social-communicative behaviors studied in this investigation were behaviors which either request or comment.

Turn: A behavior produced by one person during the course of interaction. A turn may be verbal or nonverbal.

Turnabouts: Turns which both respond to and require a response from the partner. Turnabouts may be verbal or nonverbal.

Turn balance: In an interaction, one person takes a turn. This is followed by the other person taking a turn. This continues in an alternating manner.

Turn-taking intervention: A set of intervention strategies consisting of following the child's lead, establishing turn-taking, and elaborating. These strategies were taught to the parents by the trainer.

CHAPTER II

Review of the Literature

Relevant research relating to the development of social-communicative behaviors, and parent-infant interaction is reviewed in this section. The focus is on infants under the age of three. The review is divided into the following sections:

- A. Social-Communicative Behaviors
- B. Development of Social-Communicative Behaviors by Infants with Handicaps
- C. Parent-Infant Interaction with Handicapped Infants
- D. Communication Interventions
- E. Experimental Questions

Social-Communicative Behaviors

Social-communicative behaviors in the prelinguistic child are defined as "any nonsymbolic vocal or gestural response used to communicate" (Bricker & Schiefelbusch, 1984, p. 257). Examples of these behaviors, include: looking and reaching toward mother to indicate "I want up"; or pointing to a toy and saying "da" as if to say "Look at that." Prior to the comprehension and production of words, very young children acquire these important prelinguistic behaviors and use them to communicate. These social-communicative behaviors develop within the reciprocal interaction between parents and their infants.

In the 1970s research in the area of child language began to focus on social-communicative behaviors, and parent-child interaction. Researchers and theorists from this period (e.g. Bates, 1976; Bruner, 1975, 1977; Dore, 1979, Halliday, 1975) suggest that language acquisition is one aspect of social development. Language develops within social situations and is used for social purposes. The early conversations and social interactions that parents have with their infants are the critical foundation for language learning (Bruner, 1983). Exchanges between parents and their young children are "the originating force as well as the conditions for language learning" (Rees, 1978, p. 238). Further, language develops only after a rich nonverbal communication system has been established through parent-infant interactions (Mahoney, 1975).

Several taxonomies or classification systems are available for describing the social-communicative behaviors young children use during social interactions (Bates, 1976; Coggins & Carpenter, 1981; Dore, 1975; Greenfield & Smith, 1976; Halliday, 1975). These descriptive reports have suggested that there is a sequence of progressively more sophisticated levels of communication. The sequence serves to identify the types and modes of behaviors that should be targets of intervention for young children at risk for developmental delays.

Three of the taxonomies (Bates, 1976; Coggins & Carpenter, 1980; Halliday, 1975) are particularly relevant to this review. These focused on the prelinguistic period while Dore (1975) and Greenfield

and Smith (1976) described the uses of language at the one-word stage of development.

Halliday's (1975) work followed a child from the prelinguistic period through the transition to formal language. The prelinguistic period (Halliday's Phase I and Phase II) is pertinent here. Halliday identified seven uses demonstrated during this period via idiosyncratic vocalizations. He referred to these uses as: instrumental, regulatory, interactional, personal, heuristic, imaginative, and informative. The first four uses occurred between 8 and 15 months, and the remaining three appeared after 16 months of age.

Bates, Camaioni, and Volterra (1975) followed three youngsters through the sensorimotor period and reported in detail on their communicative acts. While Halliday described the vocalizations of his child, Bates et al., chose to describe the use of gestures and vocalizations in the development of protoimperatives and protodeclaratives. Initially, the infants produced signals which their caregivers responded to as meaningful. Then, the infants used action schemes to obtain an object or to make contact with an adult. Gradually, the infants learned to use more complex means to communicate, and to use the adult as an agent to obtain an object or end. At first, children's purposeful communicative behaviors were gestural, and later, vocalizations were added. This process is continuous with the onset of language and conventional social-communication (Bates, 1976; Sugarman, 1978). Bates (1976) proposed a three-stage sequence for these early communicative

behaviors. In the first, the perlocutionary stage, the infant's behaviors such as crying, cooing, and smiling are interpreted by the adult and differentially responded to as if intentional. The second or illocutionary stage begins at about 8 months of age for normally developing infants. Now, the infant uses more conventional signals, such as reaching to be picked up, and uses them intentionally. By about 18 months of age, infants enter the locutionary stage. Now the infant uses words to communicate his wants, needs, and interests.

The taxonomies of Bates (1976) and Halliday (1975) are limited in at least two ways. First, the systems were based on data from very few children. Second, reliable definitions were not always used to assign behaviors to categories. In response to these limitations, the Communicative Intention Inventory (Coggins & Carpenter, 1981) was developed for clinical and empirical use. This system was developed and validated on 35 normally developing infants. For a behavior to be coded in this system it must meet the operational definition of one of the eight categories: comment on action, comment on object, request for action, request for object, answering, acknowledging, request for information, and protesting. This inventory has been used with children with Down syndrome (Coggins, Carpenter & Owings, 1983; Messick, Chapman, Brown & Spitz, 1983) and with autistic children (T.E. Coggins, personal communication, June, 1986). Carpenter, Mastergeorge, and Coggins (1983) followed the developmental course of six prelinguistic infants using this inventory and found the following pattern of emergence: protesting, request for action, request for

object, comment on action, comment on object, and answering. One category (request for information) did not occur for this sample. Mode of expression also followed a developmental course. Gestural and gestural-vocal behaviors were predominant from 8 to 12 months of age. The gestural mode declined after 10 months. Verbal behaviors begin to be used at 13 months of age. This sequence is in agreement with the illocutionary and locutionary stages described by Bates (1976).

The acquisition of social-communicative behaviors appears to be a product of the dynamic social interactions between a child and competent speakers in the environment. Caregivers, usually mothers, and their babies engage in multiple exchanges during the naturally occurring games and routines of caring for an infant. A variety of researchers have investigated the nature and impact of caregiver-child interactions on the development of early communication (Bateson, 1979; Bruner, 1975; Chapman, 1981; Cross, 1978; Nelson, 1978; Osofsky & Connors, 1979; Sugarman, 1978). While these exchanges have the appearance of playfulness and spontaneity, they are characterized by identifiable patterns that contribute to the development of more sophisticated dyadic exchanges. Ratner and Bruner (1977) described four features of what they suggest are rule-governed interactions. These features are (1) a limited number of elements and semantic relationships, (2) a clear repetitive structure, (3) positions for appropriate vocalizations or gestures as markers for the game, and (4) reversible role relationships in which the infant gradually assumed aspects of the roles that the mothers had originally played. These

features were distilled from careful descriptions of the "appearance and disappearance" (peek-a-boo) game of two mothers and their infants between 5 and 9 months of age.

There are other developmental changes in parent-child interaction. A mother and her 3-month-old infant may average 6 games per day, and at 6 months the number of games may increase to 13 per day (Snow, 1981). Game playing increases both in number of episodes and types of games over the next 6 months (Gustafson, Green, & West, 1979). These routines and games involve turn-taking, and they provide a predictable structure in which the infant learns to participate. They provide multiple opportunities for the infant to practice emerging behaviors. Through this play, shared meaning develops between the parent and infant. Within this context, the infant learns that others will respond to his or her signals. Over time, the infant becomes more adept and uses conventional signals. The infant practices these prelinguistic skills within these ongoing interactions with the parent and significant others. The prelinguistic infant and parent are able to partake in meaningful and playful social interactions that resemble the verbal exchanges between older individuals. Through these naturally occurring encounters, infants learn the communication process.

Development of Social-Communicative Behaviors by Infants with Handicaps

Children with Down syndrome and other developmental delays associated with mental retardation are at a very high risk for delayed

language development (Miller, 1985). In his review, Miller (1985) concluded that while language of mentally retarded children is clearly delayed relative to chronological ages many of the differences disappear when the children as a group are compared with normal children matched for similar mental ability. However, some studies of young children with Down syndrome (Rondal, 1978) and various etiologies (Mahoney, Glover & Finger, 1981) indicate that these children have significantly lower levels of language functioning than a group of normal children matched for mental development. Reed, Pueschel, Schnell, and Cronk (1980) also found that children with Down syndrome typically demonstrated language performance below their measured cognitive performance.

These children are also at high risk for delays, and perhaps, differences in the development of social-communicative behaviors. The following review focuses on the development of gaze, gestures, and vocalizations by developmentally delayed infants.

Parents interpret an infant's gaze as a signal for interaction. Mutual gaze and visual exchange are major contributors to reciprocal interaction (Rowland, 1984). Researchers have reported that infants with Down syndrome demonstrate less sustained eye contact (Field, 1983; Snow, 1984). Further, the development of mutual gaze takes longer and is less flexible for infants with Down syndrome than nonhandicapped infants (Gunn, Berry, & Andrews, 1982; Krakow & Kopp, 1983; Motti, Cicchetti, & Sroufe, 1983).

Gunn et al. (1982) studied infants' gaze or looking behavior as a means of initiating or terminating interactions. The looking behavior of eleven infants with Down syndrome between 6 and 9 months of age was compared with a group of normal infants matched for developmental age. They found that the infants with Down syndrome looked more frequently at mothers than at objects.

Krakow and Kopp (1983), however, found that developmentally delayed infants looked at parents less frequently than nonhandicapped infants. The developmentally delayed infants (Down syndrome and undiagnosed etiology) in this study were older, 12 and 18 months of age, than in the Gunn et al. (1982) study. Krakow and Kopp also reported that the infants with developmental delays showed less gaze switching than nonhandicapped infants, and less sustained attention to toys, spending more time with apparently unfocused gaze.

Jones (1980) in a study of six infants with Down syndrome between 8 and 24 months, and developmentally matched normal infants, also found differences in the gaze of infants with Down syndrome. The infants with Down syndrome displayed less frequent referential eye contact than the nonhandicapped infants. Referential eye contact is where eye contact serves as a communication signal about a third event outside the dyad (e.g., looking from parent to object and back to parent). This form of gaze allows infants to develop increasing control in early communication.

In addition to gaze, parents and caregivers interpret facial gestures as meaningful. Infants with developmental delays may display

dampened affect or may be unable to adequately control their facial muscles. Emde, Katz, and Thorpe (1978) reported that infants with Down syndrome had a reduced range of expression. This suggested that their smiles were less effective at eliciting social responses. Cicchetti and Sroufe (1978) found that smiling was delayed in infants with Down syndrome, and was characterized by a narrow range of intensity. Blind babies display quite undifferentiated facial gestures which their mothers have difficulty in reading (Fraiberg, 1977).

Infants use a variety of gestures to communicate. The development of gestures may be influenced by neurological, physical, cognitive and emotional variables. In a report on the development of gestures in infancy, Masur (1980) observed that infants "master" communicative gestures such as reaching, pointing, head shaking, showing, and waving between 10 and 15 months of age. The infants in this study demonstrated coordination of gestures with visual gaze to adults and objects between 12 and 18 months of age. Similar developmental trends are reported by Bates et al. (1975) and Sugarman (1978) in studies of normally developing infants.

In a study by Bricker and Carlson (1980), a group of ten infants with Down syndrome showed a lag in the acquisition of certain social-communicative behaviors, relative to a comparison group of normal infants. The pattern of development, however, was similar in both groups. Very young infants relate to objects or people exclusive of one another. But between 9 and 13 months, for normal infants, and

after 17 months for infants with Down syndrome, infants are capable of using mother as a social agent.

In a comparative study, Dunst (1980) also found infants with Down syndrome were delayed in the development of social-communicative behaviors. This study included 12 infants with Down syndrome and a group of nonhandicapped infants matched by sensorimotor level. Dunst reported no difference between groups in frequency of use of nonverbal gestures. He also reported that both groups of infants demonstrated similar patterns of gesture/look/vocalization. These results are similar to those reported by Bricker and Carlson. Messick et al. (1983) reported similar results when a group of children with Down syndrome (ages 22-44 months) were matched by sensorimotor level and vocabulary size to a group of normally developing children. While there were no differences between the two groups on frequency and type of communicative behaviors, the children with Down syndrome were chronologically older. Again, the finding was delayed rather than different development.

In addition to the gaze differences reported earlier, Jones (1980) also found differences between infants with Down syndrome and normal infants on other early communication skills during spontaneous interactions with their mothers. The normal infants were matched for developmental age. The infants with Down syndrome participated in more ritualized nonverbal exchanges than nonhandicapped infants. And, the nonhandicapped infants displayed more communicative participation characterized by motoric excitement and anticipation of events.

Greenwald and Leonard (1978) compared the communicative behaviors of infants with Down syndrome and a group of nonhandicapped infants matched for sensorimotor level. In contrast to the previous studies, in which a free-play situation was used, these researchers used a set of elicitation tasks. They found that the infants with Down syndrome used more gestures than infants in the comparison group. The nonhandicapped infants used more vocalizations.

Vocalizations are another powerful prelinguistic communicative signal. The vocal development of nonhandicapped infants begins with reflexive vocalizations (both crying and noncrying) and progresses to playful squeals, screams, coos, and babbles (McCormick, 1984). Parents interpret such sounds as meaningful.

Studies of the development of vocalizations in infants with Down syndrome and other delays, suggest both general delays and important differences. Smith and Oller (1981) and Stoel-Gammon (1980) found that the general sequence of vocal development is similar but delayed for infants with Down syndrome. However, within the context of social interactions, differences have been observed. Infants with Down syndrome are reported to vocalize less frequently, take longer to respond, and display vocal asynchrony with social partners.

Berger and Cunningham (1983) studied vocalizations of infants with Down syndrome and nonhandicapped infants during the first 6 months of life. They found that the infants with Down syndrome vocalized less frequently during the first 3-4 months. Their development did not parallel the nonhandicapped infants in that no decrease in vocal

output was observed. The nonhandicapped infants showed a rapid decrease in vocalization after 4 months, which was thought to reflect the infants' more active listening to adult speech.

Buckhalt, Rutherford, and Goldberg (1978) compared 10 infants with Down syndrome age 9 to 18 months with 10 nonhandicapped infants of similar chronological ages. The focus of the study was mothers' interactions, however, they also report that the infants with Down syndrome vocalized and smiled less frequently than the infants in the comparison group.

However, Jones (1980) reported no differences in frequency of vocalization. These results suggest that the infants with Down syndrome did vocalize with less consideration of their role in the interaction. These infants used more repetitive vocalizations and allowed less time for their mothers to respond than did the nonhandicapped infants. Stevenson, Leavitt, and Silverberg (1985) also suggested a timing rather than a frequency problem. They analyzed their data on 2 infants with Down syndrome using lag sequential analysis. Unlike Jones, these researchers showed a longer response time for infants with Down syndrome. The effect, however, may be similar in that the infants respond less contingently than expected. That is, the infants had difficulty taking turns. In a study of mildly and severely delayed infants, Vietze, Abernathy, Ashe, and Faulstich (1978) inferred from their data that severely delayed infants responded less contingently to their mothers. These infants were unable to discriminate between their mother's vocalizations and

nonvocalizations. Noncontingent responding on the part of the infant may affect the parent's behavior. Parents may reduce their own initiations for interaction. Or, if they are unable to interpret the child's behavior and thus are unable to share a focus of attention, may assume the role of director of the child's attention. The parent becomes less responsive to the child's communicative attempts.

The preceding discussion of the development of prelinguistic behaviors by infants with Down syndrome and other developmental delays leads to the following general conclusions:

- development of prelinguistic communicative behaviors is delayed
- development of gaze as a communicative signal is both delayed and qualitatively different
- development of gestural signals is delayed
- development of vocal behaviors are delayed and different when viewed in a social context.

Parent-Infant Interaction With Handicapped Infants

Social-communicative behaviors develop within the context of ongoing parent-infant interactions. The review now expands on the nature of parent-infant interactions when the infant is handicapped.

When one or both partners in the exchange is not responding in a predictable or readable manner, the interactions may be disrupted. In the preceding section, it has been shown that handicapped infants may produce signals which are delayed, infrequent, and/or difficult to read. In addition, infants may respond in a noncontingent manner.

Investigators of the interactions between parents (usually mothers) and their handicapped children have generally found that the language used by these mothers is comparable to mothers of normal children matched by language level or mental age (Cunningham, Reuler, Blackwell, & Deck, 1981; Rondal, 1978). The mothers of handicapped children made semantic and syntactic adjustments (i.e., reduced sentence complexity, used expansions, limited vocabulary use) when conversing with their language-learning children.

However, significant differences have been found in the style in which mothers converse with their handicapped children. Mothers of handicapped or high-risk children have been reported to talk more frequently (Buckhalt, Rutherford, & Goldberg, 1978; Field, 1977; 1980; Peterson & Sherrod, 1982), be less responsive to their child's conversational interests (Jones, 1977; Peterson & Sherrod, 1982; Walker, Levine, & Grasse, 1982) and be more directive (Buim, Rynders, & Turnure, 1974, Cardoso-Martins & Mervis, 1985, Cunningham et al., 1982; Greenberg, 1971; Jones, 1977, 1980; Marshall, Hegrenes, & Goldstein, 1973; Walker et al., 1982; Tyler, Kogan, & Turner, 1974).

Plausible arguments have been made to account for these stylistic differences. Lowered responsiveness on the part of the infant may prompt mothers to increase the directiveness and structure in their interactions (Rondal, 1978). Jones (1977, 1980) suggested that mothers of infants with Down syndrome have a self-expressed desire to teach their infants. This desire is expressed in increased use of commands and instructions. Jones further pointed out that the mothers

in this study missed naturally occurring opportunities. Thus, the mothers were not as responsive to their child's interests and ideas.

Walker et al. (1982) examined maternal language to their handicapped infants in both a teaching and a play situation. In both situations, the mother's use of commands was higher than has been reported with nonhandicapped infants. Further, more commands were used in the teaching than in the play situation. In contrast to the Jones study, these researchers found that mothers' language was highly related to the infants' focus of attention (object or activity). However, fewer maternal utterances were related to the preceding infant vocalization in the teaching than in the play situation.

Mahoney and Robenalt (1986) compared mothers and their two- and three-year-old children with Down syndrome with mothers and their normal infants. The normal infants were matched on language and cognitive level, and sex. Mothers were also matched on age and education. Dyads were compared on several interactional measures, and group differences were found. The children differed in that the infants with Down syndrome were less active and produced more meaningless vocalizations. Their mothers were as responsive as the mothers of normal children, but were significantly more dominant (in total number of turns and number of mands). Mahoney (1983) attempted to link the interactional style or patterns of mothers of handicapped infants with language development. This was a correlational study of one- to three-year-old handicapped children and their mothers. The researcher found that mother-child dyads could be classified into

three general interactional patterns -- responsive, attentive, and ignoring. These patterns were associated with differences in children's language functioning. The children in the responsive group scored higher on the Receptive and Emergent Expressive Language Scale (Bzoch & League, 1970), and these children also communicated more frequently, and were more competent on discourse measures than children in the other two groups. The mothers in the responsive group, responded more frequently to their child's topic, used simple linguistic input, and were more emotive than mothers in the attentive or ignoring groups. That is, the more responsive mothers had more responsive and communicatively competent children.

The results of these studies indicate that mothers talk or act more frequently in interactions with their handicapped infants than do mothers of normal infants. Mothers of handicapped infants are also more directive than are mothers of normal infants. These differences do not disappear when infants are matched for mental or language level. The results on maternal responsiveness are mixed. While Jones (1977) reported lack of responsiveness, Walker et al. (1982) found this in the teaching but not the play setting. Mahoney (1983) found that approximately one-third of the mothers in the study showed an overall pattern of responsiveness. However, these mothers were still more directive than has been reported for mothers of normal children. What emerges is a pattern of interaction in which the mother is the dominant partner. Mahoney and Robenalt (1986) suggested that by increasing their interactional dominance, mothers may be actually

teaching their children to interact and communicate less often and less actively. Children will then have fewer opportunities to behave. Further, the child's signals to communicate may go unrewarded.

Communication Interventions

The preceding review of social-communicative behaviors and developmental and interactional differences when the infant is handicapped suggests that the following features should be incorporated in interventions with infants at risk for communication delays:

1. The parent or caregiver functions as the primary intervention agent.
2. Intervention focuses on interactional behaviors.
3. Intervention takes advantage of natural contexts and contingencies.

Parent-implemented intervention. The parent (or caregiver) is an obvious choice for the primary intervention agent. Typically, the parent is both motivated and available as the infant's first social partner. Further, infants spend most of their time with the parent. Thus, the parent can provide multiple learning opportunities throughout the day.

An established procedure in early intervention programs has been to have parents assume the teaching role in one-to-one skill building. Hanson (1976, 1979) designed a parent-implemented intervention program for infants with Down syndrome. Developmental skills were task analyzed. With the assistance of a home trainer,

parents were instructed in the use of shaping procedures to successfully teach these skills to their infants. Filler and Kasari (1981) demonstrated that similar parent-implemented strategies were successful with two severely handicapped infants.

In the language training area, McDonald, Blott, Gordon, Spiegel, and Hartmann (1974) designed a training program for parents of language delayed, preschool-aged children. Parents were taught to imitate and expand their child's utterances. Pre- to post-test gains showed that children whose parents had received training made larger gains than a control group. Mahoney and Snow (1983) used the same language training program (Environmental Language Intervention Program) with the mothers of two- to three-year-old children with Down syndrome. Results of the five-month intervention suggested that the children made substantial gains in language functioning.

These studies all focused on parents as the targets of intervention, and measured specific child behaviors. The designs of these studies essentially ignored the interactional aspects of the parent-child relationship. These aspects can, however, be improved by teaching the parent to read the child's cues and signals and respond appropriately to the child's social-communicative efforts.

Focus on interactional aspects. The use of interventions which incorporate interactional variables are advocated for handicapped infants (Bricker & Schiefelbusch, 1984; Dunst, 1981; McCollum & Stayton, 1985; Mahoney & Powell, 1984), at risk infants (Field, 1982), language delayed children (MacDonald, Gillette, Bickley, & Rodriguez,

1984), and severely/profoundly handicapped children and adults (Hogg & Sebba, in press; Rogers-Warren & Warren, 1984). Such interventions are aimed at increasing and maintaining pleasurable interactions by following the child's lead and focus of attention, and by placing emphasis first on the function of the child's behavior and later on the form. As reviewed previously, early interactions between parents and their infants are the critical foundation for language learning. When the infant is handicapped, either the infant's or the parent's behaviors may result in interactions which are different from those of parents and their normally developing infants. Most notably, handicapped infants may be less active, be delayed in their production of communicative behaviors, and provide less readable cues, while their parents take on a more dominant role in the interaction. In 1977, Goldberg proposed that the unpredictable, unreadable, or unresponsive infant has the potential for trapping a parent in cycles of ineffective interaction, even though the parent may be initially responsive and motivated. Studies suggest, however, that not all parents use ineffective interaction styles. Mahoney (1983) classified 21 of 60 dyads as responsive, and as noted previously, these children were more communicatively competent than the rest of the sample. The design of his study does not allow any causal inferences. Cheseldine and McConkey (1979) found that when simply asked to help their child learn a language objective, some parents of children with Down syndrome at the one-word stage effectively altered their interactions. They used shorter sentences and used comments rather

than commands. This had not been their spontaneous mode of interacting with their child when first asked to interact with their child.

Some recent studies have taken an interactional approach to intervention. Kelly (1982) studied the effects of what she called verbal feedback intervention on parent-infant interaction. The infants in this study were between ages 2 and 18 months and had various handicapping conditions. The verbal feedback intervention consisted of a home visitor reviewing videotapes with the caregivers, and providing information and feedback on desirable interactional behaviors. Intervention lasted 8 weeks. Results showed that caregivers in the intervention group significantly increased the frequency and duration of total positive behaviors as a result of treatment. Controlling behaviors also decreased after intervention for caregivers in the intervention group. However, there was no significant increase in positive infant behaviors as a result of treatment.

The effectiveness of an imitation strategy as opposed to an attention-getting strategy in mother-child interaction has been reported by Field (1977). In this study of high-risk infants at 3 1/2 months post expected date of delivery, mothers were videotaped spontaneously interacting with their infants. Then mothers were asked to try to get their infants attention and to imitate their infant (order was counterbalanced). The results of these manipulations showed that the attention-getting procedure resulted in more maternal

activity and less infant gaze. However, the imitation strategy resulted in less maternal activity and more infant gaze. Further, the imitation situation was associated with increased smiling and laughing behaviors. Field (1982) used interactive coaching to assist caregivers to adjust their own interactive characteristics to better match those of their infants. The effects of imitation, repetition of phrases, silencing during infant pauses, attention-getting, and the use of games were studied. The subjects were high-risk infants at 4 months post expected due date, and their mothers. Imitation, repetition and silencing proved effective in reducing the mother's activity level and increasing the infant's attentiveness (gaze) and affective responses (smiling). Attention-getting and game-playing generally resulted in increased maternal activity and increased infant gaze aversion. However, for a small number of infants gazing increased during the more active manipulations. Examination of the spontaneous mother-infant interactions showed that these mothers were relatively inactive. For these dyads increasing the mothers activity level enhanced the infant's behavior. The results of Field's work suggest that high risk infants and their mothers can learn to interact more harmoniously. The results also point out the importance of tailoring the intervention to the dyad.

A model for facilitating social interaction between parents and their handicapped infants is described by McCollum and Stayton (1985). In this model intervention targets and strategies were individually determined. All targets were related to increasing

pleasurable interactions. In a series of single-subject studies, such strategies as positioning the child, taking turns, imitation, and playing social games were shown to be successful in increasing infant's vocalizations and gaze. The intervention procedures included viewing videotapes, modeling, and feedback.

Parent, infant, and interactional variables were all positively affected as a result of a play-oriented parent training program designed and implemented by Moran and Whitman (1985). Subjects were five mother-infant dyads. Infants ranged from 11 to 30 months and had various etiologies. The goal of the intervention was to increase responsivity by both mothers and infants and to increase appropriate toy play and self-initiations made by the infants. The behaviorally-oriented intervention consisted of three sessions. In the first, mothers were given information on modeling, prompting, feedback, rewards, and fading procedures as means for getting their children to play with toys. In the second and third sessions, mothers were observed, given feedback, and training procedures were reviewed. The study design was a multiple baseline across five dyads. Multiple measures were taken of the intervention effects. All mothers displayed the target skills taught, and their infants increased their appropriate toy play. Further, mothers and infants were more responsive toward each other. Maternal responsivity was defined as the occurrence of appropriate mother response following the infant's behavior, and infant responsivity was the occurrence of appropriate play immediately following maternal prompt or reward. The infants also self-initiated more frequently following intervention.

While the specifics of the interventions vary from study to study, these studies share some important features. The overriding goal was to balance the interaction by increasing parental responsivity and by increasing the social-communicative behaviors of the infant. Effective strategies for increasing parental responsivity include imitating the infant, taking turns, and using modeling, prompting and rewards. Infants in these intervention studies have been shown to increase their frequency of gaze, vocalization, general activity and self-initiation. Mothers in these studies have been observed to show more appropriate and responsive behaviors.

Natural contexts and contingencies. There are strong arguments to support teaching within parent-infant play activities. Rituals, games, and caregiving routines offer an ideal context for teaching and practicing communicative skills. The topics and context of most early communicative exchanges revolve around familiar play activities, objects, and other environmental cues (Mahoney & Weller, 1980). Social activities can facilitate the acquisition of communicative competence through opportunities for the infant to actively participate and experiment, and through the mutual reinforcement both infant and parent provide each other. However, when the infant is developmentally delayed, these naturally occurring social activities may become asynchronous.

When relatively simple strategies are incorporated into parent-infant social play, harmony can be achieved or restored. When the parent is very active, imitating the infant can be an effective

intervention (Field, 1977, 1982; McCollum & Stayton, 1985). Imitation simplifies the mother's behavior and may allow the infant to process the mother's turn and maintain attention (Field, 1982). The use of imitation may also evolve into chains of turns where the partners imitate each other.

Routines, games, and rituals play an important role in the development of social-communicative behaviors by normal infants (Bruner, 1982; Snow, 1982). Dunst (1981) proposed that interventions that systematically incorporate social activities can be effective in promoting attainment of social-communicative behaviors by handicapped children. These routines, games, and rituals share important features. First, the semantic content of the play routine is familiar. The routines focus on objects, people, and events which are in the infant's view and experience. Second, these activities have a repetitive, "your turn, my turn" structure. The peek-a-boo game is an example. First, the infant's head is covered, then parent asks a question, the infant uncovers his or her face, parent says "peek-a-boo", and the infant smiles. The game continues in this manner. The third feature is a clear definition and often reversible nature of roles. For example, in peek-a-boo, either parent or infant may cover their face. In this way the infant has an opportunity to experience a role variation within a familiar context. Field's (1982) results caution interveners to carefully incorporate turn-taking into game-playing. This researcher found that just asking mothers to play a game with their infant resulted in increased gaze aversion for some

infants. McCollum and Stayton (1985) successfully used game-playing to increase the gaze of a young child with cerebral palsy.

In addition to offering familiar, natural contexts, these social activities lend themselves to the use of natural contingencies. The most natural reinforcers of communicative behaviors are those that simulate the desired effect of communication in most environments. These effects are continued social interaction, participation in desired activities, or obtaining desired objects or information. That is, the individual successfully communicates and obtains a desired social or tangible end. Natural contingencies have become more important as researchers have struggled with the problem of generalization in language training programs. Often what is taught and mastered in language training sessions is not used in other situations (Spradlin & Siegel, 1982). Natural contingencies may alleviate this problem (Stokes & Baer, 1977). By responding to the infant's communicative attempts with attention, desired objects, or services which are linked to the infant's intent (or inferred intent), the parent teaches the young child that these communicative behaviors are effective.

In summary, language is a social behavior and arises from the infant's early, prelinguistic exchanges with a primary caregiver. These early social turns form the basis for later conversational turns. Handicapped infants are at risk for later language delays. These delays can be identified during the prelinguistic period within the context of parent-infant interactions. Parents of handicapped

infants, as a group, also differ from the norm, when studied within the context of parent-infant interaction. Recently, investigators have focused on interactional variables as targets of intervention efforts. Results are promising, but research reports are limited. In the present study, a turn-taking intervention which is implemented by parents and incorporates interactional features within the natural context was developed and implemented.

Experimental Questions

Two major questions were addressed by this study. These were:

1. Does a parent-implemented intervention produce increases in the social-communicative behaviors of prelinguistic handicapped infants?
2. Is the parent training procedure effective in increasing parent's use of the intervention strategy as measured during classroom observation sessions?

A series of hypotheses were generated. As a result of the turn-taking intervention it was hypothesized that:

1. Infants will use more social-communicative behaviors.
2. Infants will initiate more of the "conversational" topics.
3. Parents will imitate their infant's actions and sounds more frequently.
4. Parents will become more responsive to their infants.
5. Turns will become more equally balanced.
6. Parents and infants will increase the length of their turn-taking exchanges.

While the primary measure of infant's behavior change was frequency data collected during free play with the parent, a set of elicitation tasks were also administered. Performance on these tasks provided additional information as to the infant's production of social-communicative behaviors in a structured situation.

Finally, to gauge changes in the infant's general ability, a cognitive measure and a language measure were given prior to and following intervention.

CHAPTER III

Methods

The methods used to implement the study will be described in this chapter. The methods will be described in the following order: subjects, settings and materials, procedure, general measurement procedures, and observer training and reliability. A description of the turn-taking intervention is found in the procedure section. A description of the measures is found in the section on general measurement procedures.

The purpose of the study was to examine the effects of the parent-implemented intervention on the social-communicative behaviors of prelinguistic handicapped infants. In a multiple baseline design, infant and parent behaviors were charted across baseline and intervention phases. A maintenance probe was also conducted.

Subjects

Infants. Six developmentally delayed infants served as subjects for this investigation. All subjects were drawn from the infant-parent program at the Experimental Education Unit (EEU), University of Washington.

The infants ranged in age from 10 months to 24 months of age at the onset of the study. There were 4 girls and 2 boys. Five of the infants were diagnosed as having the Trisomy 21 form of Down syndrome. The sixth child had a rare chromosomal abnormality

described as damage to the eighth chromosome. All of the infants demonstrated significant developmental delay as measured by the Bayley Scales of Infant Development. Their developmental indices on the Mental Scale of this instrument ranged from less than 50 to 72. The infants selected for this study met several prerequisite skills. These were: sound localization, visual tracking, following line of regard, imitation, and reaching and grasping. The infants passed items 40, 47, 48, 70, and 92 on the Bayley Scales of Infant Development to demonstrate acquisition of these prerequisite skills.

On the Ordinal Scales of Psychological Development (Uzgiris & Hunt, 1975), Subjects 2, 3, and 4 were functioning at Stage IV (coordination of secondary circular reactions). Subject 5 was functioning at Stage III (secondary circular reactions). Subject 1 was functioning between Stages III and IV. And, Subject 6 was functioning at Stage V (tertiary circular reactions).

The infant subjects and their demographic characteristics are listed in Table 1.

Table 1
Infant Characteristics

Infant	Sex	Etiology	Age	MDI	Stage
1	F	Chromosome damage	21 mos.	< 50	III-IV
2	F	Down syndrome	12 mos.	74	IV
3	F	Down syndrome	13 mos.	71	IV
4	M	Down syndrome	14 mos.	< 50	IV
5	M	Down syndrome	10 mos.	72	III
6	F	Down syndrome	24 mos.	50	V

MDI - Mental Developmental Index, Bayley Scales of Infant Development
 Stage - Stage placement on the Ordinal Scales of Psychological Development

Parents. The infants participated with their parents. Parents in the study agreed: 1) to have their infants involved in the study; 2) to participate in the training procedures; and 3) to implement the interventions in their homes. Five infants participated with their mothers. One infant participated with her father who was the primary caregiver at the time of the investigation. Prior to beginning the study, parents were informed that the purpose was to investigate young children's early developing communication skills.

The parent subjects and their demographic characteristics are listed in Table 2.

Table 2
Parent Characteristics

Parent	Sex	Age	Occupation	Marital Status
1	F	29	waitress	married
2	M	27	self-employed	married
3	F	38	homemaker	married
4	F	31	homemaker	separated
5	F	37	homemaker	separated
6	F	28	homemaker	married

Setting and Materials

Data collection and training of the parents were conducted in the infant classroom at the University of Washington. This classroom was familiar to both the infants and their parents. The classroom was equipped with standard infant toys and materials. As part of the training procedure parents viewed their videotapes in a quiet, divided area of the classroom while their child received physical therapy. During each weekly session, the infant and parent were videotaped in a free-play situation. The camera was positioned such that parent and infant were able to use approximately one-half of the classroom space

and still be within view of the camera. The parent wore a miniature microphone. Vocalizations and verbalizations by both parent and infant were recorded. A set of toys was provided. A set of toys always included a ball, a bottle of bubbles, a doll, a container and small objects, a wind-up toy, books, and a cloth. These toys were necessary props for the games and activities which were part of the intervention package. The parent was free to add other toys or objects from home or classroom to the play situation.

The free-play situation was videotaped for 11-12 minutes to ensure 10 useable minutes of tape. Following one-half of the videotaped free play settings a set of six elicitation tasks was administered to each infant by the experimenter. These tasks were selected from previous work by Bruder (1984), Dale (1980), and Snyder (1978). These tasks were designed to elicit social-communicative behaviors in a structured situation. These elicitation tasks are described in Appendix A.

The turn-taking intervention was implemented by the parents in their own homes. At the end of each observation session, the parent trainer gave feedback and provided suggestions for home implementation. At the beginning of each training session in the classroom, the parent trainer asked the parent if the strategies were used, how frequently they were used, and if any of the games or activities were played.

Procedure

Variables. Social-communicative behaviors produced by the infants were the dependent variable of this study. Several other behaviors were observed and measured. The independent variable consisted of the turn-taking intervention which was implemented by the parents; an informational packet; viewing videotapes; and modeling and feedback provided by the parent trainer.

Experimental design. Experimental effects were analyzed by the use of a multiple baseline design across subjects (Hersen & Barlow, 1976). After an initial baseline, determined by the variability of the infant's data, the parent was taught the turn-taking intervention. The intervention was applied sequentially to additional dyads. The original proposal called for the intervention to be applied to subjects in random order to comply with the requirements of the Rn statistical test (Revusky, 1967). However, after Subjects 1 and 2 were entered in this manner, it became apparent that absences and illnesses would interfere with this procedure. Consequently, available children were entered if they showed flat or decreasing baselines. The sixth dyad was added late in the study after Dyad 2 had withdrawn from the study due to unforeseen changes in the parent's work schedule. Baseline and training sessions were held weekly for each dyad. Length of baseline ranged from 3 to 18 weeks. Length of the intervention phase ranged from 4 to 17 weeks. The mean length of intervention was 10.33 weeks.

Baseline. During baseline procedures, the parent was given the instruction: "Play with (child's name) as you normally would at home." The set of toys was available. Parents were told that they could play with these toys, they could add others if they wished, or they could play without toys. The free-play situation was videotaped for 11-12 minutes. The infant's regular therapy and education session followed.

Turn-taking intervention. Parent training sessions were held after the videotaped free-play session. The parent met individually with the parent trainer for 10-15 minutes. The parent trainer guided the parent in the use of the turn-taking intervention. The outline for training sessions is shown in Table 3.

Table 3
Outline for Parent Training Sessions

Day 1

Procedure

1. Videotape free play.
2. Describe goal of intervention.
3. Give parent packet of materials and describe contents.
4. View tape of balanced turn-taking.
5. Explain strategy: Following child's lead.

Table 3 continued

Day 2 - end of intervention phase

Procedure

1. Videotape free play.
2. Feedback on session.
3. Review goal, activities, strategies.
4. Explain/review strategy.
 - a. Following child's lead
 - view taped examples
 - b. Turn-taking
 - view taped examples
 - c. Elaborating
 - view taped examples
5. Review/discuss.
6. Model with child.
7. Parent plays with child, trainer provides feedback.
8. Suggestions/reminders for week.

On the first day of training the parent was given a packet of information. This included 1) a description of the goal of intervention for his or her infant, 2) the turn-taking interventions and 3) the parent-infant games and activities. These are found in Appendix B. Parts 2 and 3 of this packet were the same for all parents. The parent trainer then showed the parent a short training tape which consisted of examples of balanced turn-taking interactions between parents and their young children.

The turn-taking intervention consisted of following the child's lead, establishing turn-taking, and elaborating. Each of these strategies was introduced to the parents in this order. That is, the intervention was begun at the same point for each dyad. The parent trainer reviewed the videotapes and followed the parent's performance to determine which strategy(ies) was emphasized during a training session.

Following the child's lead. This means that the parent observed what the child showed interest in, and then used this focus of interest to build an interactional exchange. The parent took his or her cue from what the child did. The parent was helped to recognize even small or quiet signals such as touching, looking, or patting an object. As an easy way of following the child's lead, the parent was asked to imitate the child's action or sound. In this way, parent and child shared an activity or topic.

Establishing turn-taking. Engaging the child in turn-taking was aimed at 1) balancing turns, and 2) increasing the number of turns a parent and child take on a topic. A turn could be a motor movement, a vocalization, or a string of words. Parents were helped to increase the length of turn-taking exchanges by waiting for the child to take a turn, assisting the child in taking a turn, and responding to the child's turn. For example, the child might pat the ball. Then the parent patted the ball. Next the parent waits. The child might look up at the parent. The parent might smile, pat the ball, and wait.

Elaborating. Parents were also taught to elaborate on their child's behavior. This strategy involved learning to take the child's turn a small step further. The parent could build on the child's turn by adding gestures, words, or phrases. For example, the child might point at a ball and say "uh." The parent could elaborate by pointing at the ball, and saying "uh ball."

To implement the turn-taking intervention, the parent trainer modeled and suggested 6 games/activities/toys. These games/activities/toys are included as part of the parent packet (see Appendix B).

On all subsequent training sessions, the parent trainer provided general feedback on the videotaped session. The parent trainer reviewed the intervention strategies with the parent. Then, they viewed segments from the previous week's session together. The parent trainer provided feedback. Then the trainer modeled the strategies with the child. Then the parent used the intervention strategies. The parent trainer provided praise, suggestions for use of the strategies in the coming week, and reminders to use the games/toys/activities.

Maintenance. Generalization of treatment effects over time were also examined. A maintenance probe was conducted approximately six weeks after the last training session. The parent and infant were videotaped in a freeplay situation using similar toys. They were given the same instructions as in all previous baseline and training sessions. This session was held in a studio. The elicitation tasks were administered at the end of this session as well.

General Measurement Procedures

The target of intervention for each infant was to increase production of social-communicative behaviors which initiate an exchange. As defined by the Communicative Intention Inventory, these are request for action, request for object, comment on object, comment on action, and request for information. These are similar to the imperatives (requests) and declaratives (comments) described and measured by Bates et al. (1975) and Snyder (1978). Further, to be counted by the Communicative Intention Inventory, these behaviors must be displayed at the illocutionary (intentional) level or above. All infants showed their capacity for production of these behaviors on the elicitation tasks.

These social-communicative behaviors were the dependent variable for the study. However, several other behaviors were measured and examined.

Each observation session was coded using the Communicative Intention Inventory (Coggins & Carpenter, 1981), a project-developed measure of imitation, and a project-developed measure of initiation. For all measures taken from videotaped free-play sessions, a 10-minute section was identified for use by coders. The start time for this section was 30 seconds after the first image on the tape. The stop time was exactly 10 minutes later. A continuous real time measurement system was used to record frequency of occurrence.

Transcripts were made of the first 5 minutes of each session. Transcripts included verbal utterances, approximations of all

vocalizations, and notations of nonvocal signals such as gesturing, looking, smiling, and other significant facial cues (e.g., wide-open eyes or mouth, grimacing, puckering lips). Videotapes were transcribed by a communication disorders specialist. All transcripts were checked by the experimenter for accuracy. Similar transcription procedures were used by Mahoney and Robenalt (1986). The code developed by Kaye and Charney (1980, 1981) was used to classify turns. A turn was defined as any behavior produced by one person during the course of interaction. A turn could be either a single utterance with accompanying gestures, two or more utterances strung together without a pause of at least two seconds between them, or nonverbal acts alone. Each turn was classified as one of four types: Mand - a turn which requires a response and to which it would be rude not to respond in normal adult discourse; response - a turn which is a response to the other person; response-mand - a turn which is both a response to a previous turn and simultaneously requires a response from the other person (also called a turnabout); unlinked - a turn which cannot be classified as one of the other three categories. Definitions and examples for these turn types are found in Appendix C.

A set of elicitation tasks was administered following one-half of the sessions. Prior to and following intervention a general measure of infant cognition (Ordinal Scales of Psychological Development) and language (Receptive and Expressive Emergent Language Scale) were administered.

Each measure will be described below.

Social-communicative behaviors. The Communicative Intention Inventory (Coggins & Carpenter, 1981) includes eight categories of communicative intentions: request for action, request for object, comment on action, comment on object, protesting, answering, acknowledging, and request for information. Each category of behavior can be shown by gestures, gestures combined with vocalizations, or verbalizations. This observation tool including operational definitions is found in Appendix D. Only the requesting and commenting categories will be reported. These are the social-communicative behaviors which constitute the dependent variable.

Coding of communicative intentions was carried out as specified by the authors. The coding of these behaviors took two steps. First, while viewing the videotape the observer identified behaviors which were potentially communicative. Second, the observer reviewed each of these behaviors and recorded them into one of the eight categories if it met the operational definition.

Initiations. To measure changes in initiations by the infant the initiator of each topic was recorded. This required identification of topics and topic changes. Topics were the six games/activities/toys plus vocal games or other game. The observer recorded each time the topic changed. A topic could be started by a look, touch, or handling a toy in some way, gesturing, or vocalization/verbalization. The coder then counted total number of topics and number started by parent and number started by infant. The percentage of topics started by the infant was then calculated.

Imitation. The first strategy the parent was asked to do was to follow the child's lead. Specifically the parent trainer suggested that the parent imitate the child's vocal or motor behavior as a quick way of interacting at the child's level. To record frequency of imitations, an observer viewed each videotaped session. She simply counted all occurrences of the parent imitating the infant during the 10-minute session. To be counted as an imitation the parent had to match the infant's behavior in the parent's next turn.

Parent-responsivity. By implementing the strategy of following the child's lead, changes in parent-responsivity were expected. To measure parent-responsivity, two of the Kaye and Charney (1980, 1981) categories were combined--response and response-mand. Both responses and response-mands are linked to the infant's preceding turn. Frequency of responses and response-mands made by the parent were counted. Then the percentage of the parent's turns that were responses or response-mands was calculated for each session for a measure of parental-responsivity. The 5-minute transcript was used. Coding was conducted with the coder using the transcript and the videotape recording simultaneously so that the coder could use the nonverbal contexts as a basis for making coding judgments.

Turn balance. As part of the strategy of establishing turn-taking, parents were helped to achieve balanced turns. To measure turn balance, the 5-minute transcript was used. The number of turns by the infant and by the parent were counted. Then the percentage of total turns by the infant and by the parent were calculated for each session.

Turnabouts. As a measure of turn length, turnabouts were counted. Turnabout is another name for a response-mand. An increase in the number of turnabouts implies that the individual is attempting to link turns together in order to increase the length of turn-taking on a topic. Parental turnabouts were counted. Then the percent of total turns categorized as turnabouts was calculated.

Elicitation tasks. The elicitation tasks were scored according to Bruder (1984) and Dale's (1980) modification of Snyder's (1978) original coding scheme (see Appendix A). The infant's response to each task could be scored on a 5-point scale or hierarchy. The tasks were specifically designed to elicit imperatives (similar to requests) and declaratives (similar to comments). There was a 5-point hierarchy for imperatives and another one for declaratives. The scoring hierarchies were based on the work of Bates et al. (1975) and Sugarman (1978). These 5-point hierarchies represent the observed developmental progression of social-communicative behaviors (imperatives and declaratives) beginning with prelinguistic behaviors and ending with the appearance of words. Snyder (1978) used these tasks with language-delayed and nondelayed toddlers. Dale (1980) studied normally developing children between ages 1 and 2. Bruder (1984) validated the imperative tasks with developmentally delayed and normal infants and toddlers.

There are 10 imperative and 10 declarative tasks. In this study 3 imperative and 3 declarative tasks were randomly selected for presentation after one-half of the observation sessions. The infant

sat in a chair with a tray table. The experimenter presented each task as described. The tasks were also recorded by videotape so that scoring could be done following the session. The scores for the 6 tasks were examined. For each session the typical or modal score for imperatives and declaratives was determined. The highest score for imperatives and for declaratives was labeled the optimal score. Greenwald and Leonard (1979) have previously used this method of score presentation.

Other measures. Two additional measures were also given to the infants before and after the intervention, the Ordinal Scales of Psychological Development (Uzgiris & Hunt, 1975) and the Receptive and Expressive Emergent Language (REEL) Scale (Bzoch & League, 1970). These measures were selected to detect any changes in the infants' overall development over the course of the study. Testing on these instruments took place in the infant's home by a communication disorders specialist who was not involved in this investigation. The Dunst (1980) manual was used to guide the administration of the Ordinal Scales. Seven subscales were administered: (a) Object Permanence, (b) Means-Ends, (c) Vocal Imitation, (d) Gestural Imitation, (e) Causality, (f) Spatial Relationships, and (g) Schemes for Relating to Objects. The highest step demonstrated by the child within each subscale was used as the score. The REEL scale, a parent report scale, was administered to the parent after the Ordinal Scales were completed. This measure yielded receptive and expressive scores, and a combined language score.

Observer Training and Reliability. Reliability of data collection consisted of both training observers to criterion levels and conducting frequent reliability checks. Descriptions of observers, their training, and reliability procedures will be presented for each of the measures.

The observers for the Communicative Intention Inventory were two graduate students in speech language pathology. The observers completed the training procedures specified by the authors. Training took 10-15 hours. The trainer was a trained observer from another study which used this inventory.

Observers were trained to a criterion of 80% or better on a specially constructed reliability tape borrowed from the developers of this inventory. Twenty-four videotapes (four for each infant) were rescored by a second observer for a check on reliability. The second observer was given a list of times to observe on the tape. These were the times of the behaviors coded by the first observer as intentional plus two to four noncommunicative behaviors. Inter-observer agreement on classifying behaviors into the appropriate categories and the null category was calculated. During week 17, the observers again coded the specially constructed reliability tape and obtained the criterion level of agreement.

The observer for the measure of topic initiation was a graduate student in special education. Reliability on the initiation measure was checked on 20% of the videotapes. A second observer (usually the investigator) rescored each videotape. Interrater reliability

$(\text{Agreements}/\text{Agreements} + \text{Disagreements} \times 100)$ was computed for topic change and topic initiator.

The observer for the measure of parent imitation of infant behavior was an undergraduate student in psychology. Again 20% of the videotapes were rescored by the investigator, and percent interrater agreement was calculated.

The measures of parent responsivity, turn balance, and turnabouts were all taken from the Kaye and Charney code of the transcripts. The coders were a graduate student in family therapy and an undergraduate student in psychology.

Coders were trained for a total of 15-20 hours. Coders were trained using videotape recordings and transcripts of play between parents and infants who were not part of this study. Coders were trained to achieve at least 85% intercoder reliability for each of the categories. Training was conducted by the investigator. Reliability checks were conducted on 15% of the videotapes by the experimenter. Reliabilities $(\text{Agreement}/\text{Agreement} + \text{Disagreements} \times 100)$ were calculated for classification of the turn types of parents.

The elicitation tasks were coded by a graduate student in family therapy, who had been trained to achieve at least 85% interrater reliability on this code. The experimenter conducted the training. Tapes of infants involved in an earlier study were used for training purposes. Twenty percent of the elicitation task sessions were rescored by the investigator to measure reliability. All elicitation tasks had been videotaped.

Reliability of parent training procedures or procedural reliability (Billingsley, White, & Munson, 1980) was also assessed. A procedural checklist was written. The parent trainer used this as an outline for each of her sessions. Items were checked off as completed. An observer (a graduate student in family therapy) sat in on nine sessions, and using a copy of the procedural checklist, checked off training procedures which she observed. This procedure gave an estimation of the reliability with which training procedures were followed.

CHAPTER IV

Results

Reliability

Interobserver reliability on the Communicative Intention Inventory was measured by rescoring twenty-four randomly selected videotapes (four for each infant). The number of behaviors coded was 120. The interobserver score for each videotape ranged from 79% to 100% with a mean of 91%.

For the measure of topic initiation, 20% of the videotapes were rescored. Interobserver reliability was calculated for both topic change and topic initiator. The interobserver score for each videotape ranged from 86% to 100% with a mean of 95%, for topic change. For topic initiation the mean percent agreement was 90% with a range of 82 to 100%.

Twenty percent of the videotapes were also rescored to check on the measure of parent imitation of infant behavior. Interobserver agreement ranged from 75% to 100% with a mean of 93%.

Reliability checks were conducted on 15% of the transcripts to measure reliability of classifying parent turn types. The second coder achieved a mean of 87% agreement with a range of 74% to 97%.

Twenty percent of the elicitation task sessions were also rescored. The mean percent agreement was 89% with a range of 83% to 100%.

To judge procedural reliability an observer sat in on nine parent training sessions. She and the parent trainer both checked off training items as completed. Mean percent agreement was 91% with a range of 80% to 100%.

Changes in Magnitude and Rate

To assist in the visual inspection of the graphed raw data, determinations were made of the changes in means and levels which are related to magnitude, and changes in trend which are related to rate (Kazdin, 1982). Changes in means across phases refer to shifts in the average rate of performance. Means were calculated separately for baseline and intervention phases for each subject. That is, the scores for each session during baseline and during intervention were summed. Then the means were calculated. The mean scores are represented by dashed horizontal lines in the graphs. By plotting means as horizontal lines, the overall effects of the intervention can be viewed.

Changes in level refer to the the shift of performance from the end of one phase (baseline) to the beginning of the next phase (intervention). Level changes tell what happened immediately upon a change in phase.

Changes in trend refer to the tendency of the data to show systematic increases or decreases over time. Trend estimation procedures were used to aid in making visual judgements about the data. The quarter-intersect, median-split method (White & Haring,

1980) was used to draw trend lines. This method allows for the examination of the trend within each phase and permits comparison of trends across phases (baseline and intervention). The data for a phase were divided at their midpoint; each half was divided in half again. The median data point was determined for each half of the phase, and the trend line was drawn.

Social-Communicative Behaviors

A major purpose of the intervention was to increase the infant's use of social-communicative behaviors. The selected behaviors were the five initiating behaviors from the Communicative Intention Inventory. These behaviors were counted and plotted. Results are shown in Figures 1 and 2, and Table 4.

Changes in means are shown in Figure 1. As indicated by the dashed horizontal line, changes in means are apparent for all six infant subjects. Changes in means are also shown in Table 4.

Figure 1

Infants' frequency of social communicative behaviors.
Means are indicated.

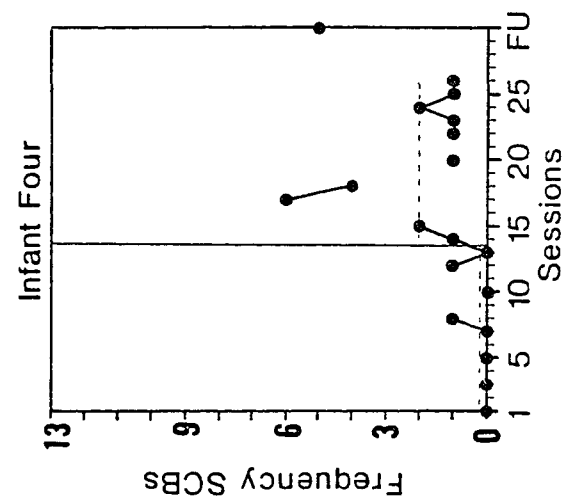
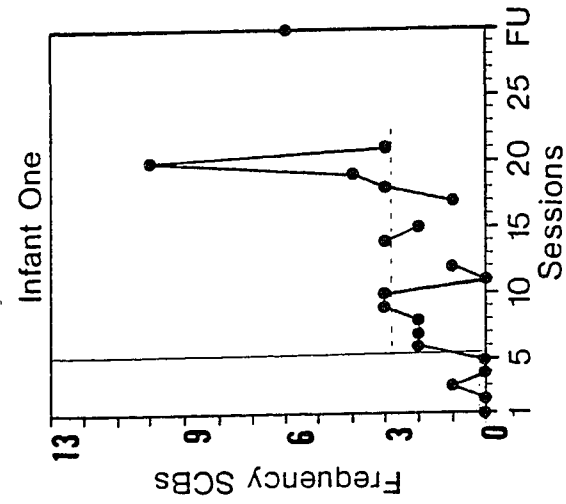
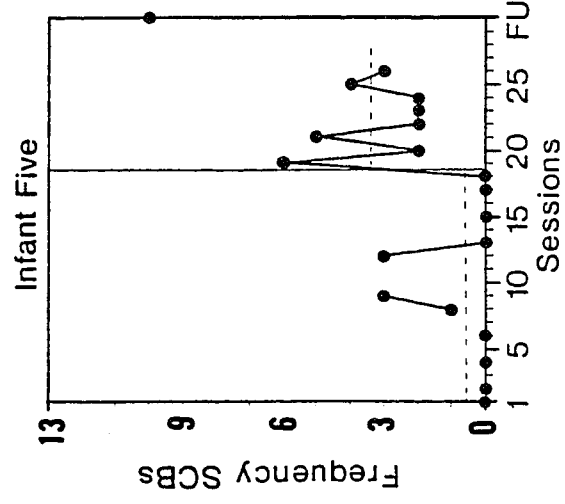
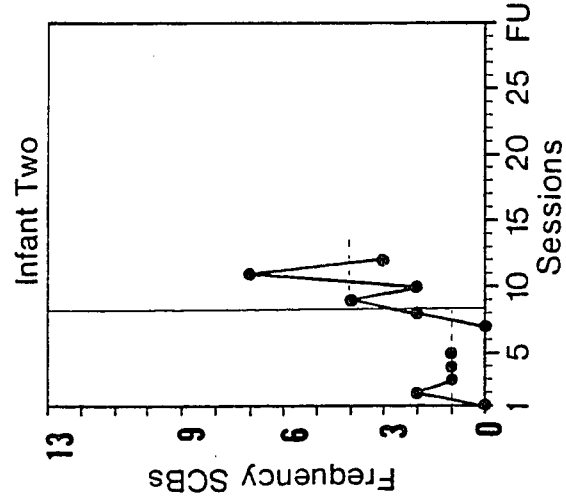
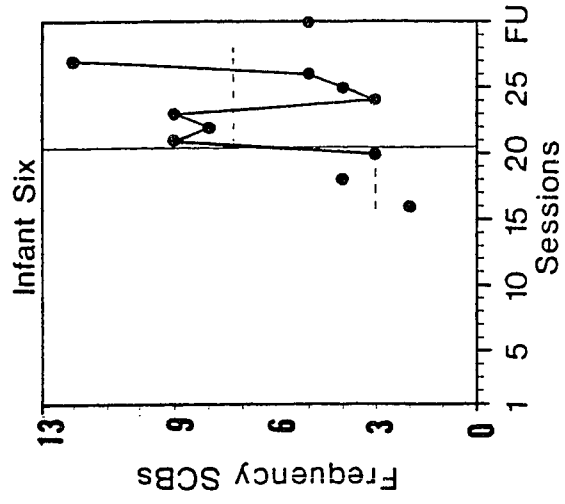
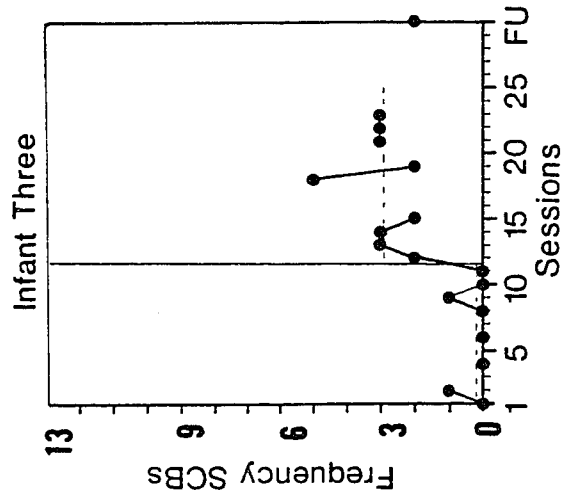


Table 4
Mean Frequency of Social-Communicative Behaviors
During Baseline, Intervention and Follow-up

	Baseline	Intervention	Follow-up
Infant 1	.2	2.79	6
Infant 2	1.0	4.00	-
Infant 3	.25	2.89	2
Infant 4	.25	2.00	5
Infant 5	.64	3.25	10
Infant 6	3.0	7.14	5

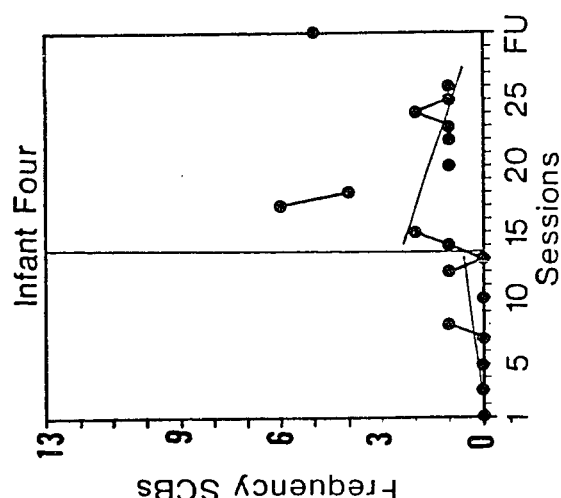
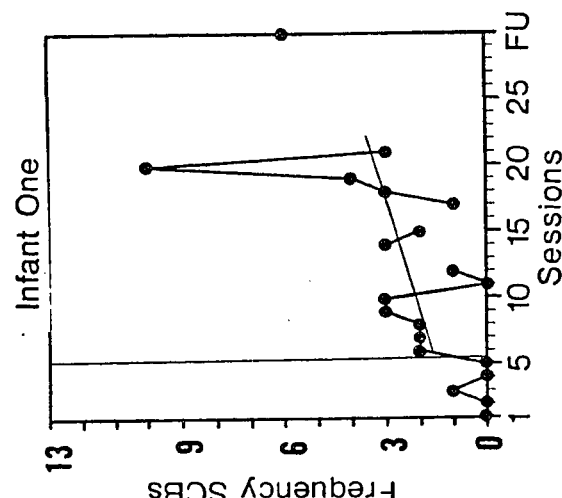
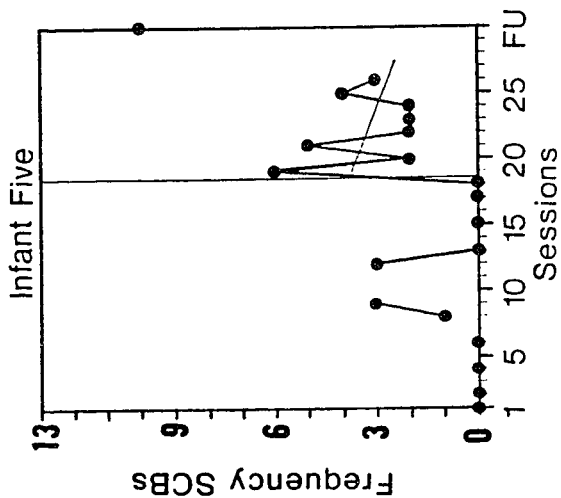
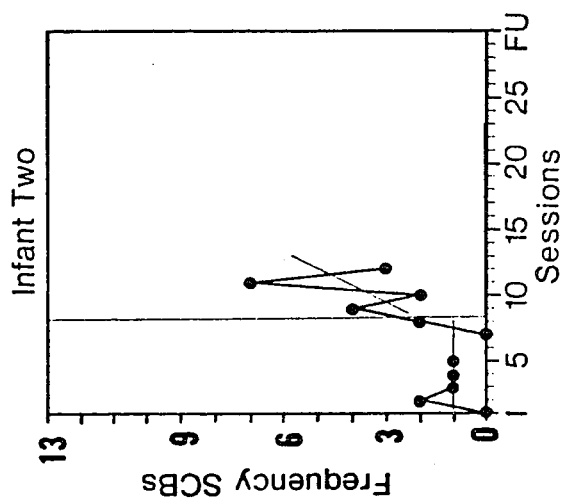
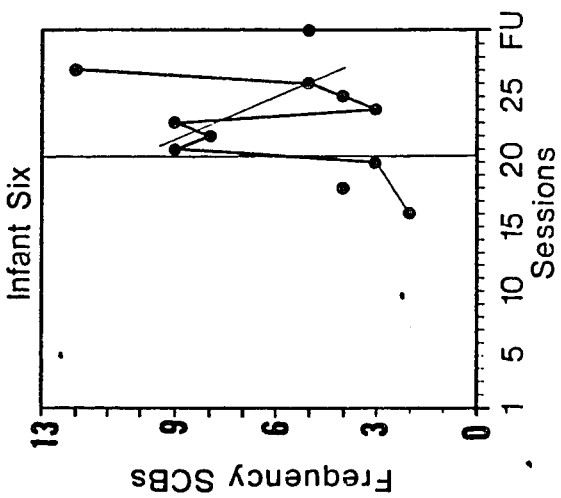
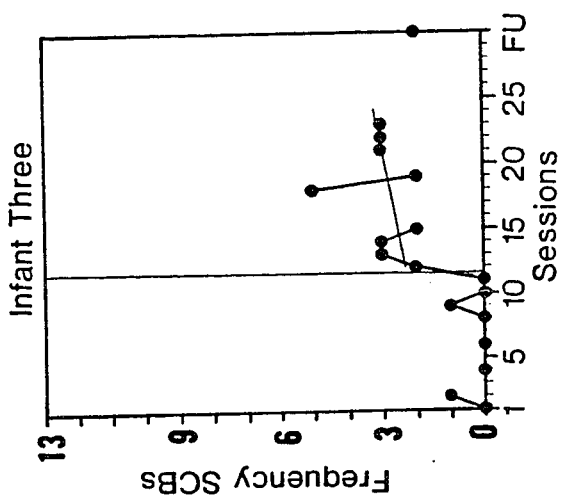
Figure 1 shows changes in level as well. All subjects showed a shift in level from the last data point in baseline to the first data point in intervention. However, only infant Subjects 5 and 6 showed a substantial shift in level immediately following the phase change.

Changes in trends are less consistent. These are shown in Figure 2. The trends for the first 3 subjects are clear. All showed flat lines (no trend) during baseline, and all showed increasing trends during intervention. Infant Subject 5 also had no trend during baseline. This infant increased use of social-communicative behaviors during intervention, but then showed a decreasing trend. All data points during the intervention phase exceeded the baseline trend. Both infant Subjects 4 and 6 showed increasing trends during baseline, but decreasing trends during intervention. The downward trend of infant Subject 6 occurred after a substantial level change.

Figure 2

Infants' frequency of social-communicative behaviors.

Trend lines have been included.



Initiations. Figures 3 and 4 and Table 5 show changes in infant's initiations of "conversational" topics. To code initiations, topic changes were first recorded. Then, the coder counted topics started by parent and topics started by infant. Data are reported as percent of "conversational" topic started by the infant. Changes in means are shown in Figure 3 and Table 5. All infants showed increases in initiations from baseline to intervention when mean percentages of initiations are compared.

Table 5
Mean Percent of Topics Initiated
During Baseline, Intervention and Follow-up

	Baseline	Intervention	Follow-up
Infant 1	27.4	34.6	42.9
Infant 2	20.9	63.1	-
Infant 3	5.1	26.4	70
Infant 4	17.1	26.4	0
Infant 5	20.6	41.6	46.2
Infant 6	80.4	89.3	100

Figure 3

Percent of "conversational" topics initiated by infants.

Means are included.

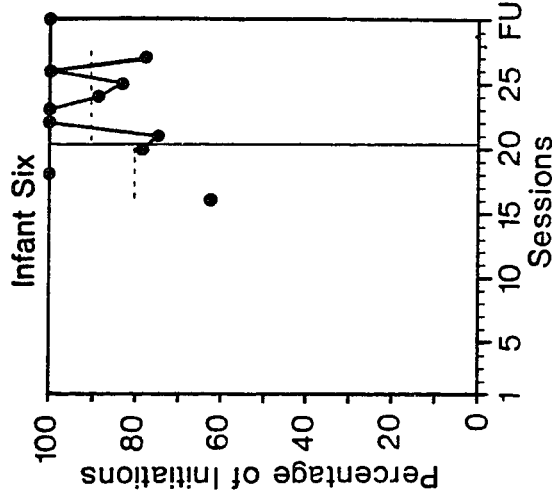
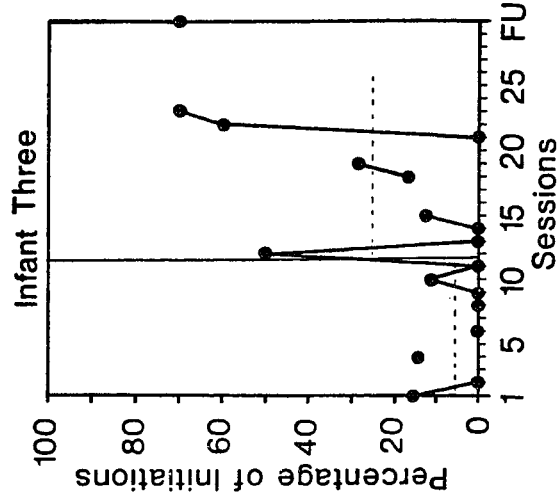
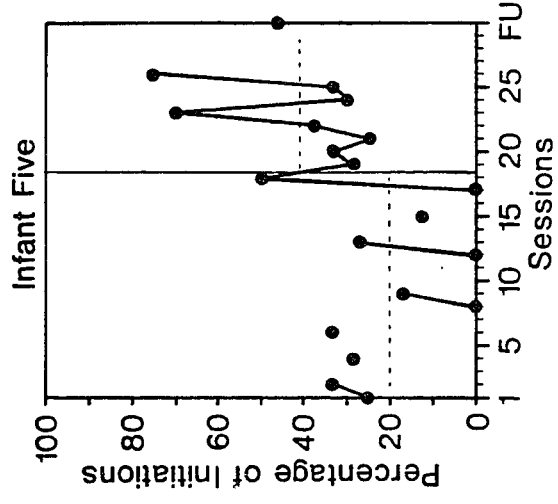
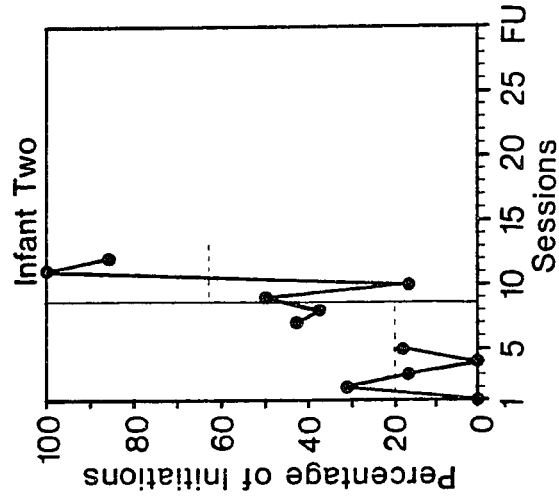
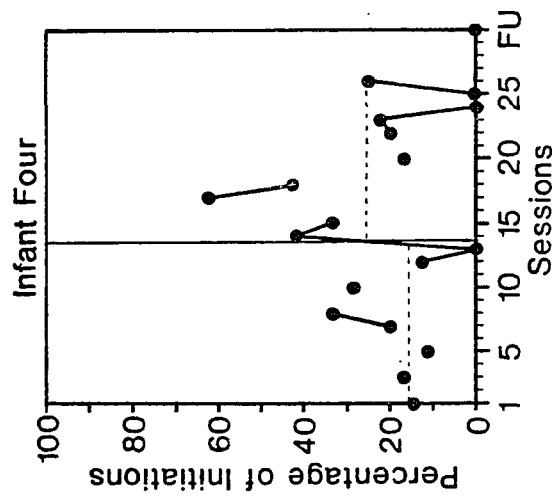
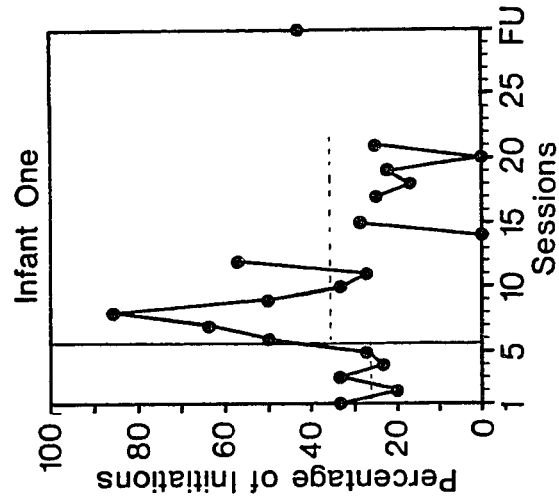
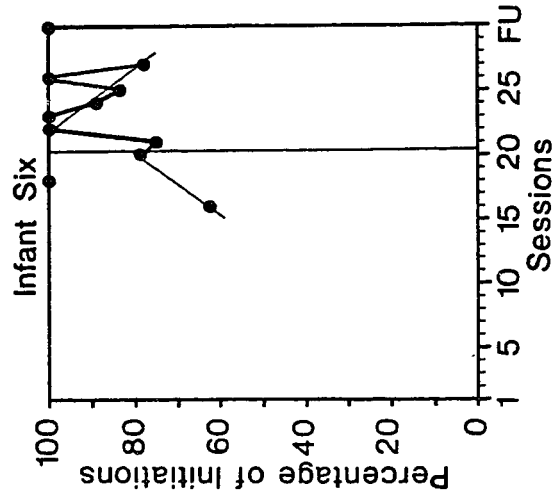
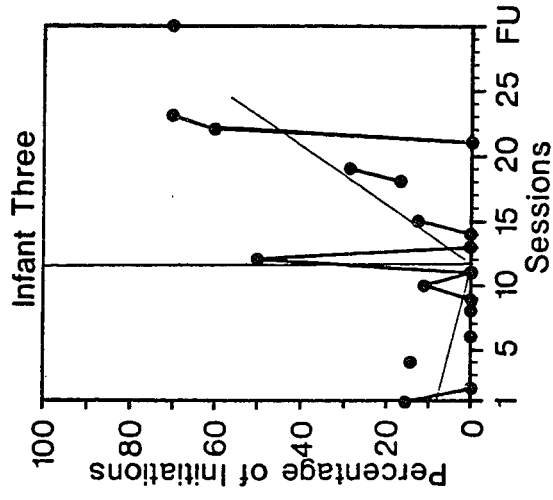
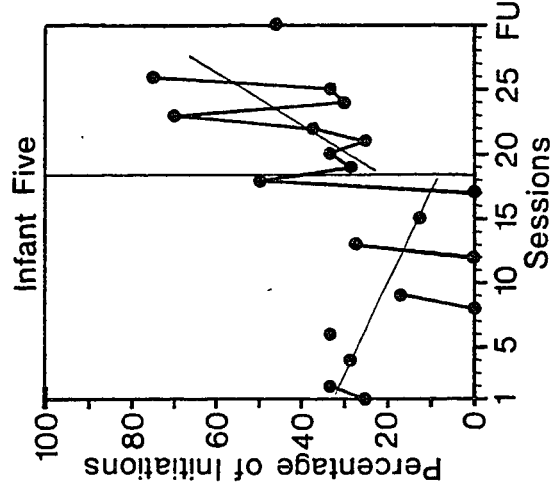
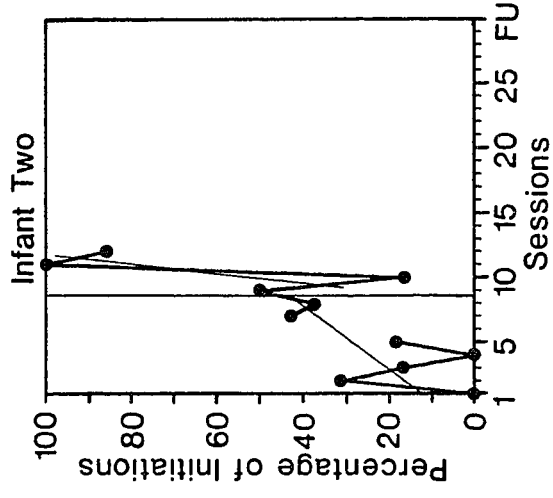
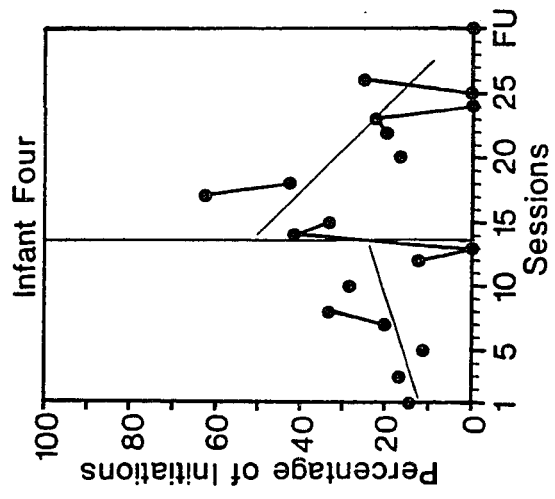
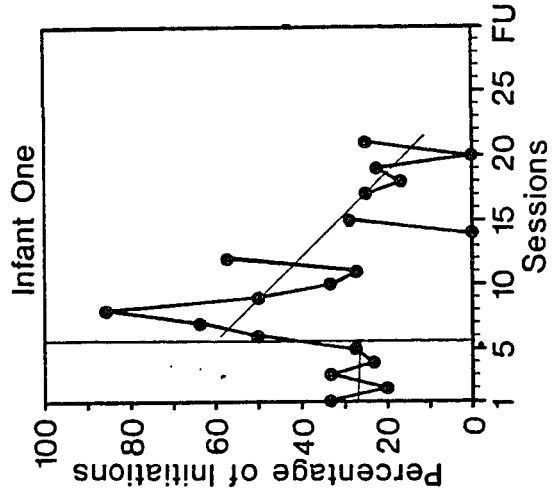


Figure 4

Percent of "conversational" topics initiated by infants.

Trend lines have been included.



Next, level changes were examined. Immediate level changes are observed for infants Subjects 1-4. Immediate decreases are shown for infant Subjects 5 and 6.

However trend lines (see Figure 4) show that three infant subjects (2, 3, 5) showed a positive trend during intervention while three infant subjects (1, 4, 6) showed negative trends. It is noted however that fluctuating data are observed in all phases for all subjects.

Imitation. As part of the intervention, parents were asked to imitate their infant's behaviors (motor or vocal) as a way of following the child's lead. Parent imitations were counted. Results of this component of the intervention are shown in Figures 5 and 6, and Table 6.

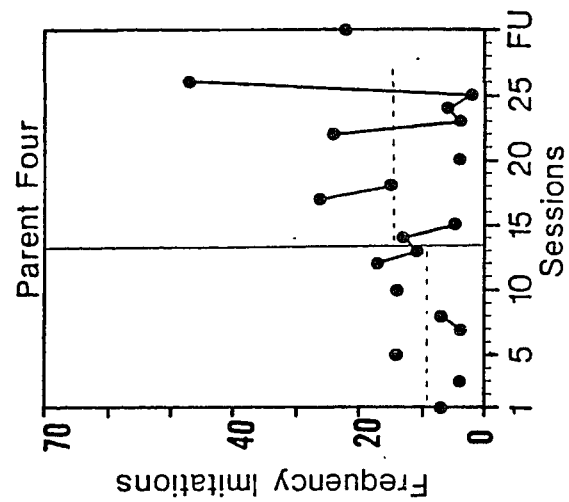
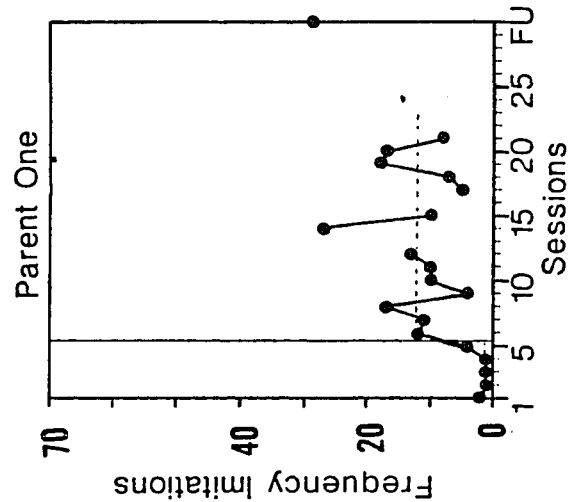
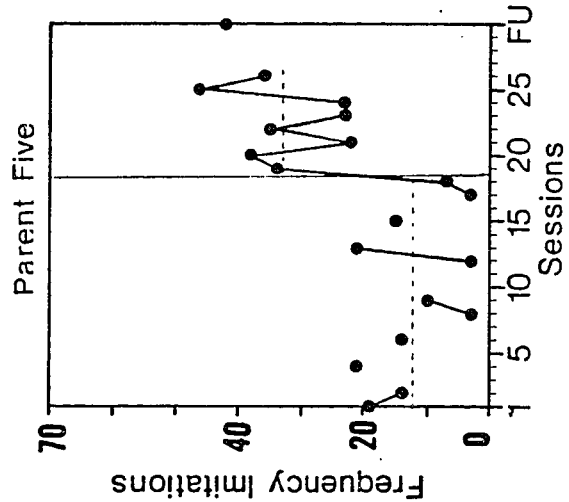
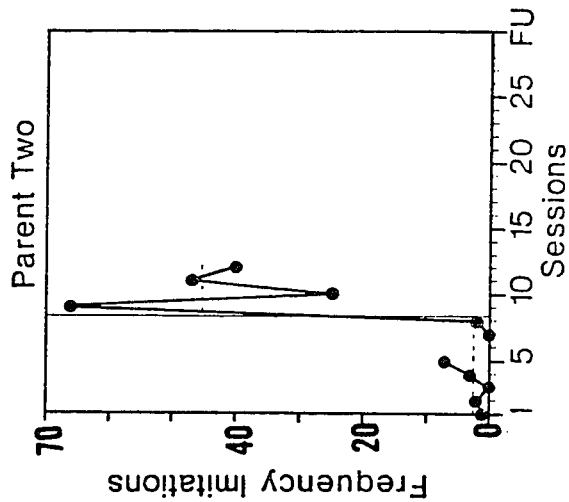
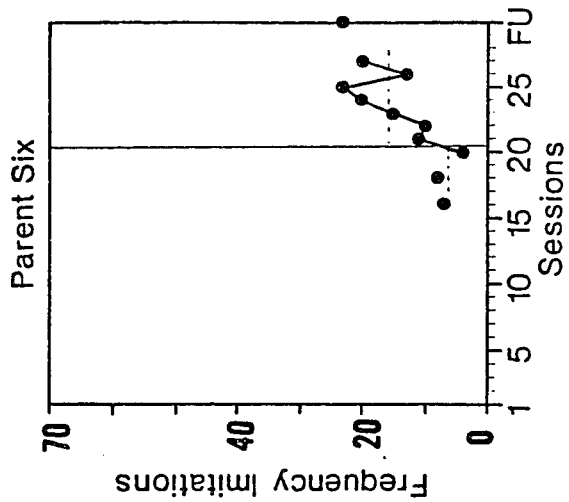
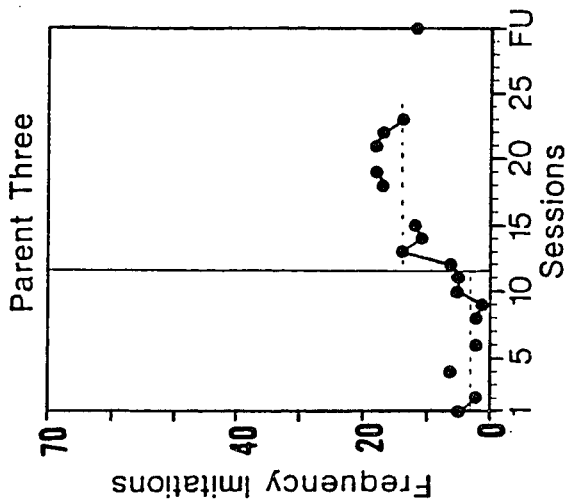
Table 6
Mean Frequency of Imitation by Parent
During Baseline, Intervention, and Follow-up

	Baseline	Intervention	Follow-up
Parent 1	1.80	12.79	29.00
Parent 2	2.14	44.50	-
Parent 3	3.50	14.11	12.00
Parent 4	9.75	14.60	22.00
Parent 5	11.82	32.125	42.00
Parent 6	6.33	16.00	23.00

Figure 5

Parents' frequency of imitation of infant behavior.

Means are included.



Changes in means are shown in Figure 5. Means are again indicated by dashed horizontal lines. All parent subjects showed shifts in use of imitation from baseline to intervention. However the change in means by Parent 4 is minor. This parent continued to demonstrate variable performance during intervention.

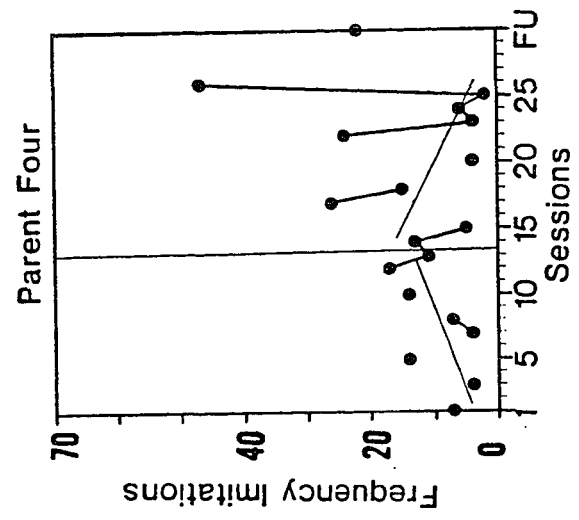
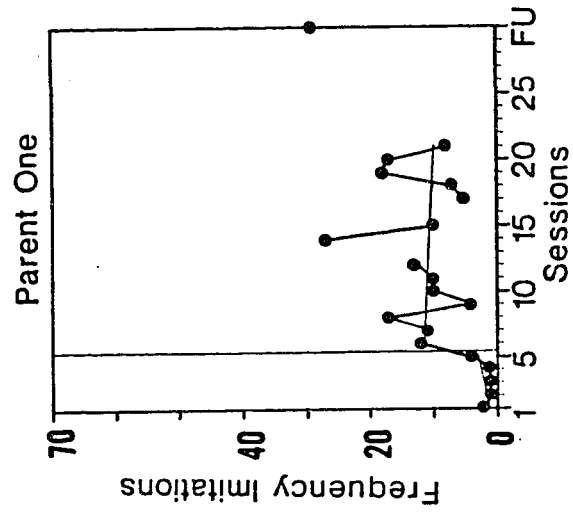
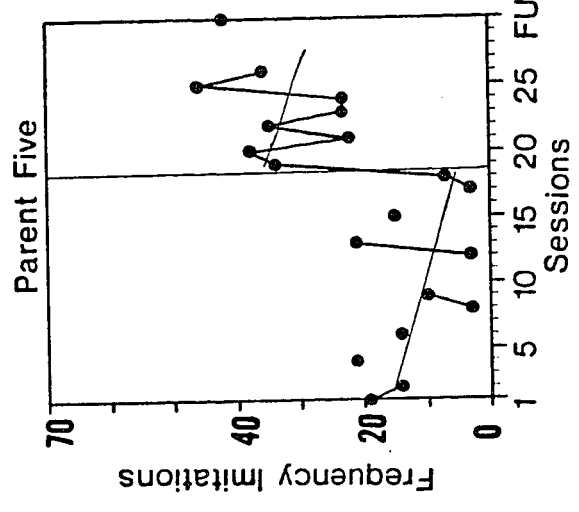
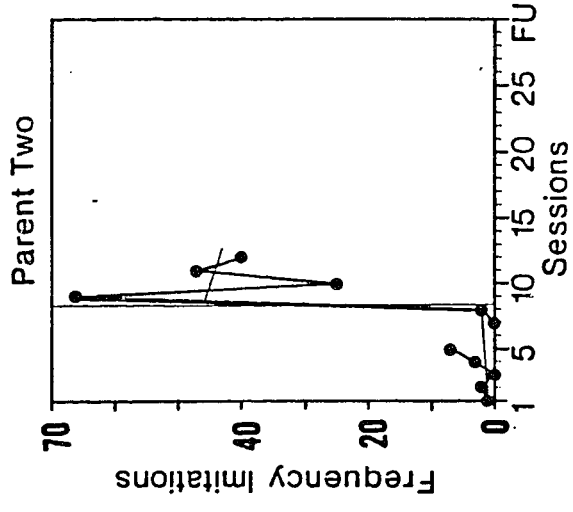
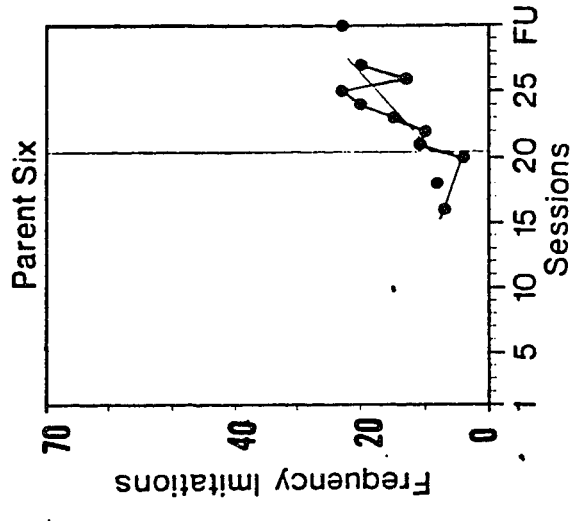
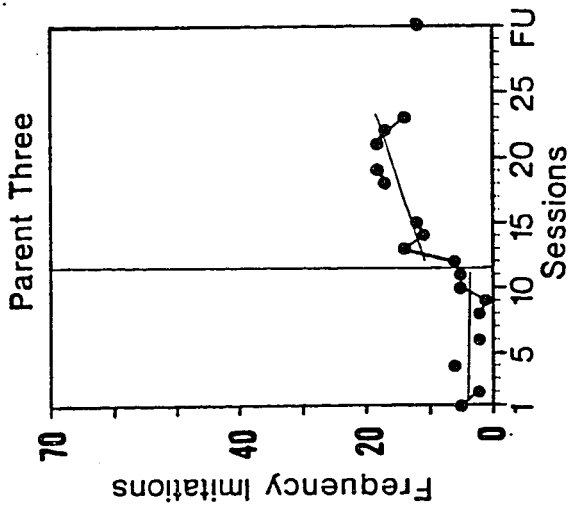
Level changes were also examined. Parent Subjects 2 and 5 showed substantial upward shifts in level from end of baseline to beginning of intervention. Parent Subjects 1 and 6 showed moderate upward shifts. And, parent Subjects 3 and 4 showed minor shifts.

Trend lines were examined next. These are shown in Figure 6. The charts for parent Subjects 3 and 6 reveal flat or decreasing trends during baseline and increasing trends during intervention. Parent Subjects 1, 2, and 5 had decreasing trends during intervention but these occurred after moderate to substantial changes in level with the onset of intervention. All data points during the intervention phase for Parents 2, 3, 5, and 6, are above the trend lines of baseline. Trend lines for parent Subject 4 were inconsistent with the hypothesized changes.

Parent responsivity. To assess parent responsivity, two of the Kaye and Charney (1980, 1981) codes were combined--response and response-mand. Both parental responses and response-mands are linked to the infant's preceding turn. So increases should reflect increased responsivity. Data are from the 5-minute transcribed portion of the taped session.

Figure 6

Parents' frequency of imitation of infant behavior.
Trend lines have been drawn.



Data on parental responsivity are presented in Figure 7 and Table 7. All parents showed a change in mean from baseline to intervention. This change was minimal for Parent 4, but meaningful for the other 5 parents. Level changes were also examined. All parents showed an immediate increase in responsivity when intervention began.

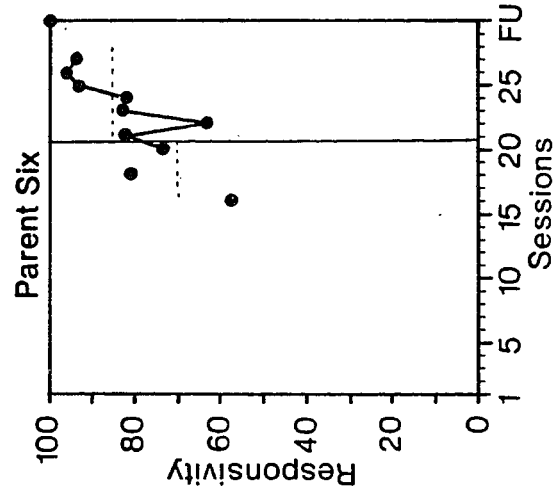
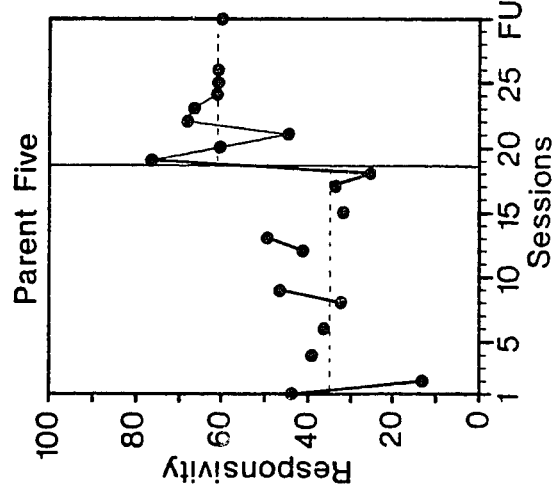
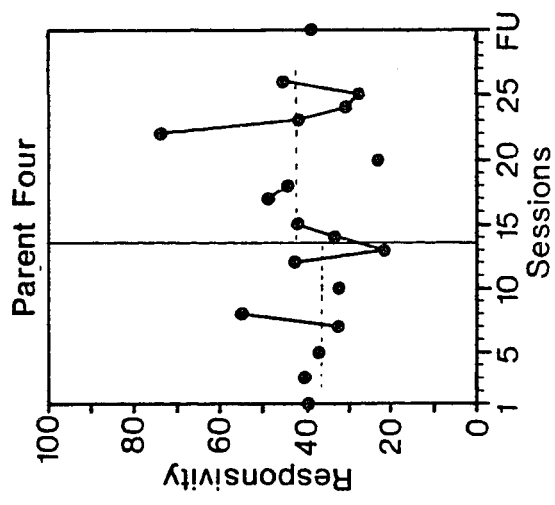
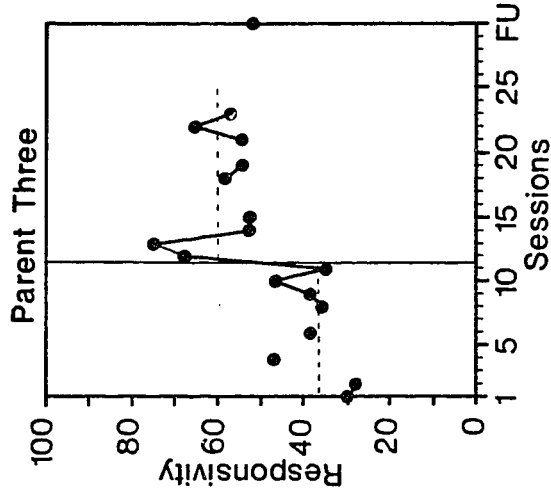
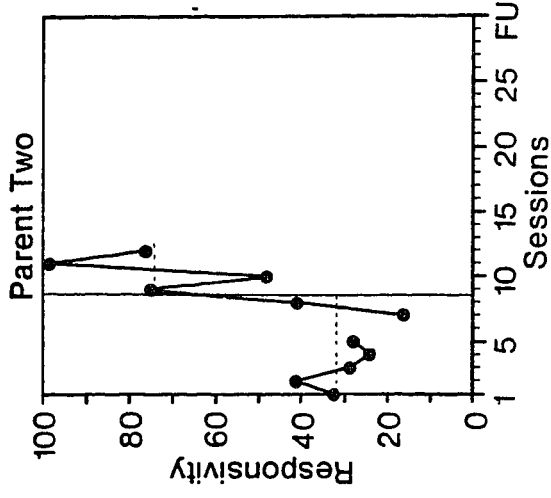
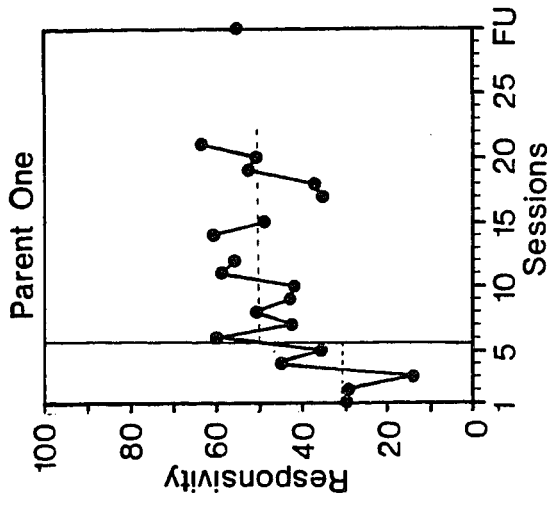
Table 7
Mean Percent of Parent Turns that were Responsive
During Baseline, Intervention and Follow-up

	Baseline	Intervention	Follow-up
Parent 1	30.7	50.1	55.0
Parent 2	30.2	74.5	-
Parent 3	37.5	59.7	51.8
Parent 4	37.6	41.1	38.9
Parent 5	35.7	62.5	60
Parent 6	70.5	84.6	100

Figure 7

Percent of parents' turns which are responses or response-mands.

Means are included.



Trend lines were drawn and are shown in Figure 8. Parent 6 maintained the accelerating trend line of baseline during intervention. An accelerating trend line was also found for Parent 2. Parent 1 showed an elevated but flatter trend line during intervention. Changes in responsivity by this parent were observed just prior to the phase change. Trend lines for Parents 3 and 5 are decelerating but all data points exceed baseline trends. Trend lines for Parent 4 show no change.

Turn-balance. Parents were also encouraged to balance turns. In an evenly balanced turn-taking episode each partner would take 50% of the turns. Turn-taking data are presented in Figure 9. Data are from the 5-minute transcribed portion of each videotaped session. Means for each phase were calculated for each dyad and are shown in Table 8. Examination of the means shows that in Dyads 1 through 5, the parents took most of the turns during the baseline phase. The group mean for parents during baseline was 65% of turns. During intervention all parents reduced their percentage of turns and consequently the infants increased their percentage of turns. The group mean for parents during intervention was 56% of turns. While parents in Dyads 1 through 5 decreased their percentage of turns during intervention, they did not, on average, achieve a 50:50 ratio. Dyad 6 demonstrated nearly a 50:50 ratio of turns during baseline and maintained this balance during intervention.

Figure 8

Percent of parents' turns which are responses or response-mands.
Trend lines have been drawn.

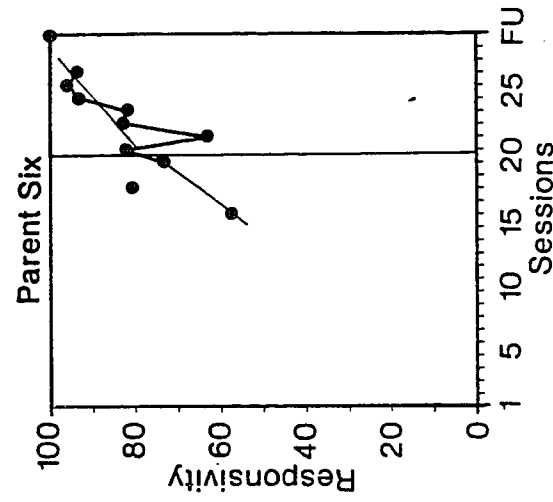
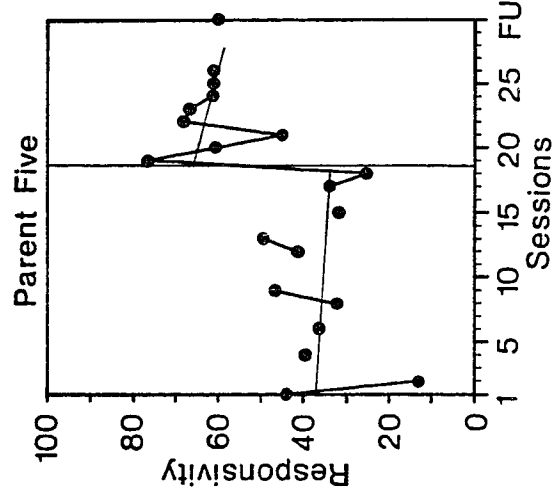
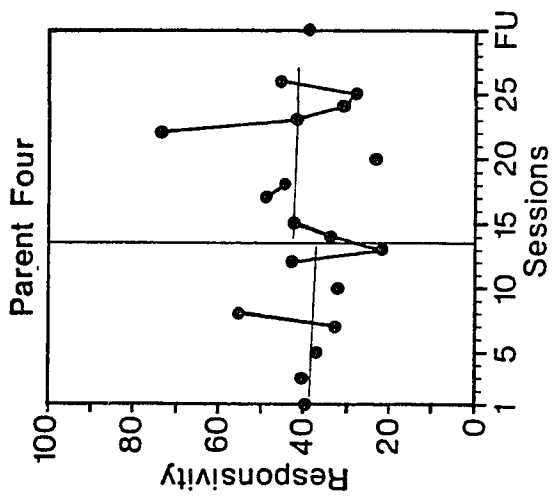
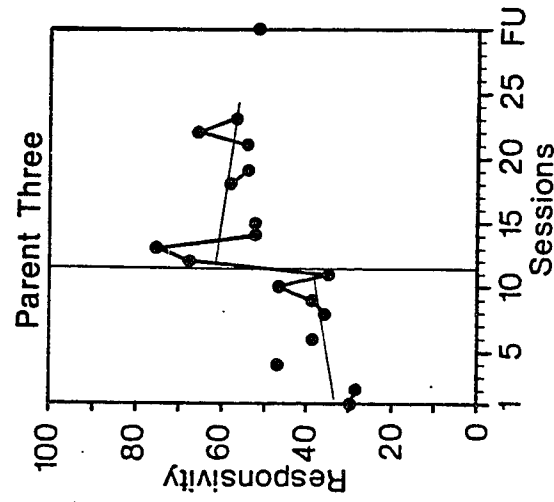
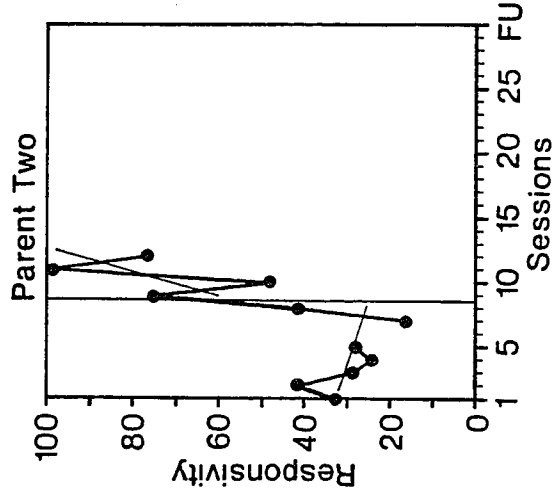
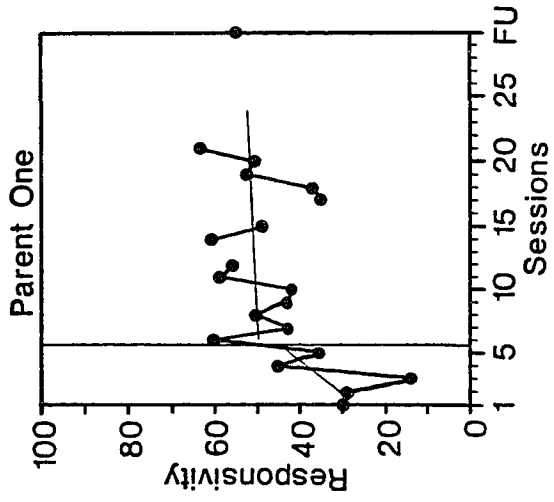


Figure 9

Percent of turns by parent. Percent of turns by infant.



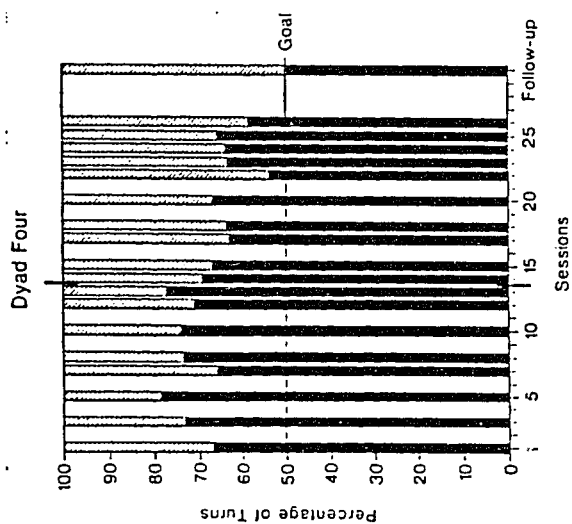
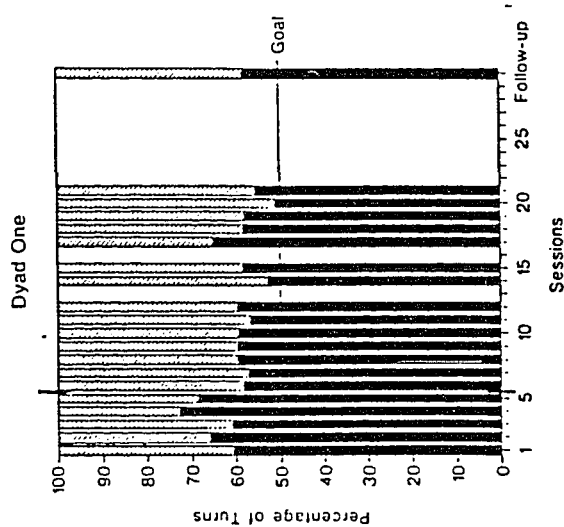
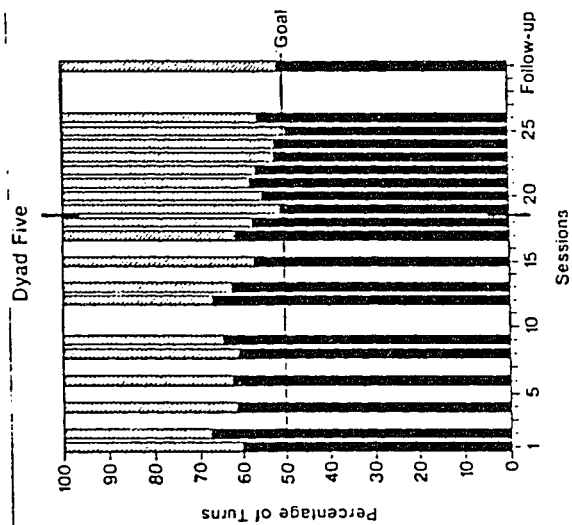
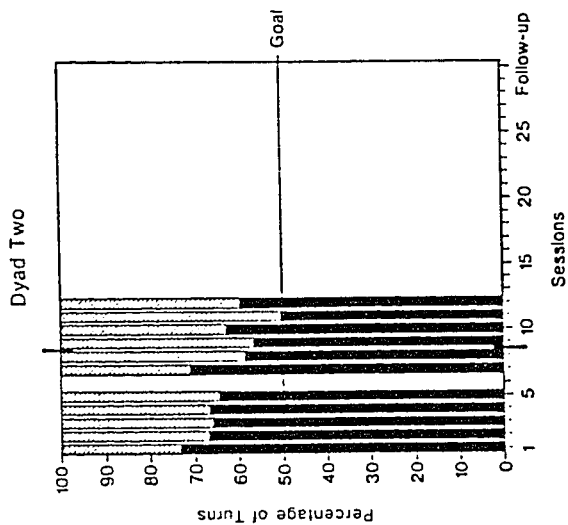
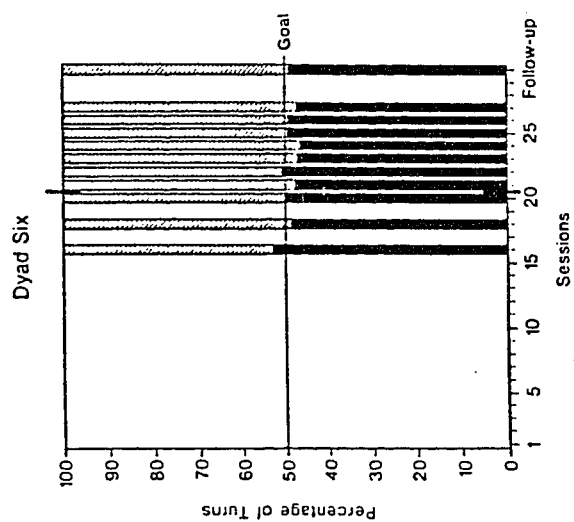
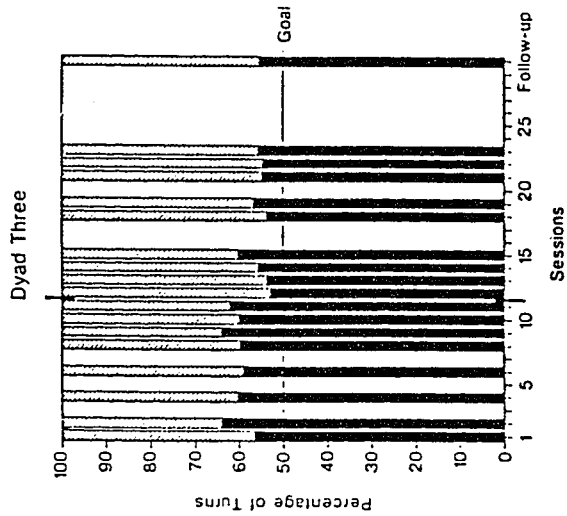


Table 8
Mean Percentage of Turns During
Baseline, Intervention, and Followup

	Baseline		Intervention		Follow up	
	Parent	Infant	Parent	Infant	Parent	Infant
Dyad 1	65.7	34.3	57.8	42.2	58.2	41.8
Dyad 2	66.7	33.3	57.3	42.7	-	-
Dyad 3	60.7	39.3	55.4	44.6	55.4	44.6
Dyad 4	72.6	27.4	63.4	36.6	50.0	50.0
Dyad 5	61.9	38.1	53.8	46.2	51.5	48.5
Dyad 6	50.6	49.4	48.4	51.6	49.3	50.7

Turnabouts. Turnabouts (Kaye & Charney, 1980, 1981) are turns in which a partner both responds to the other partner and also sends the turn back to the partner (a response-mand). Turnabouts are a means of linking turns together. Thus, an increase in turnabouts may lead to an increase in topic length.

Data for turnabouts were graphed. Means (dashed horizontal line) are indicated in Figure 10 and trend lines are given in Figure 11. All parents showed upward changes in means from baseline to intervention. The change for parent Subject 1 was minor. Changes in means are also shown in Table 9.

Figure 10

Percent of parents' turns which are turnabouts.
Means are included.

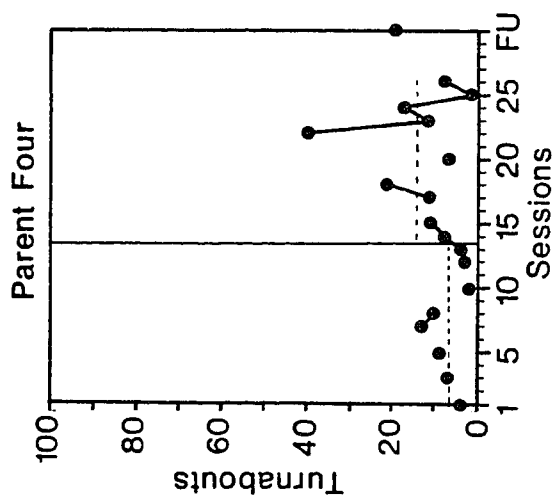
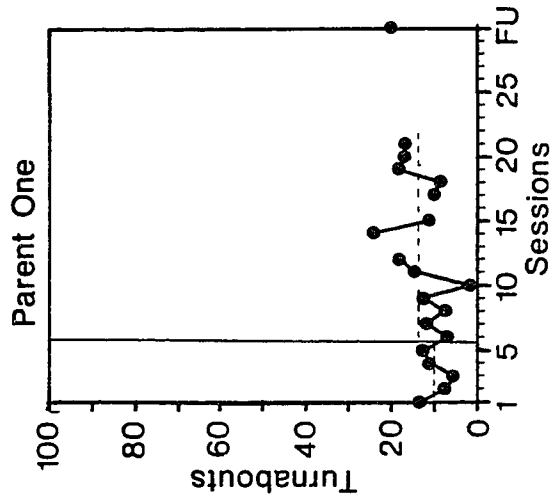
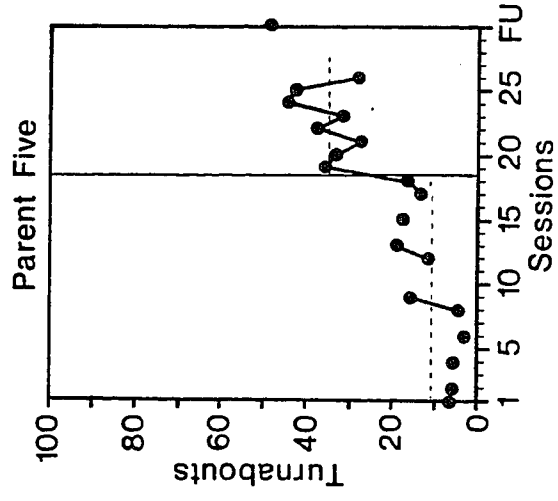
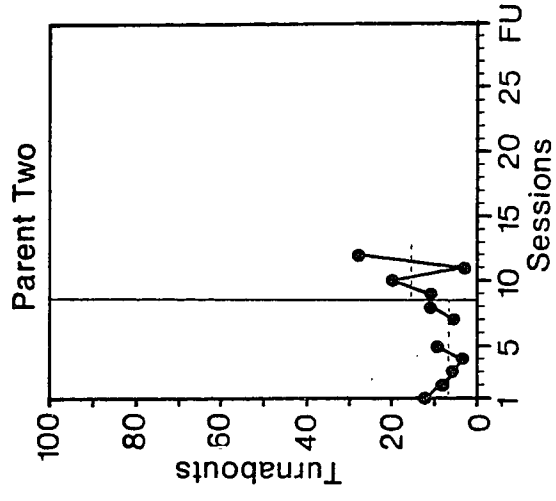
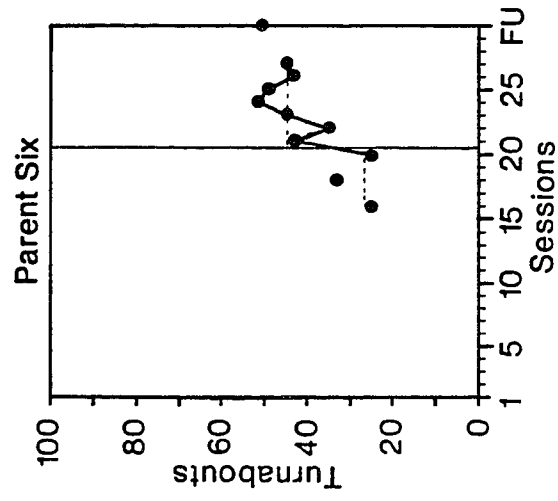
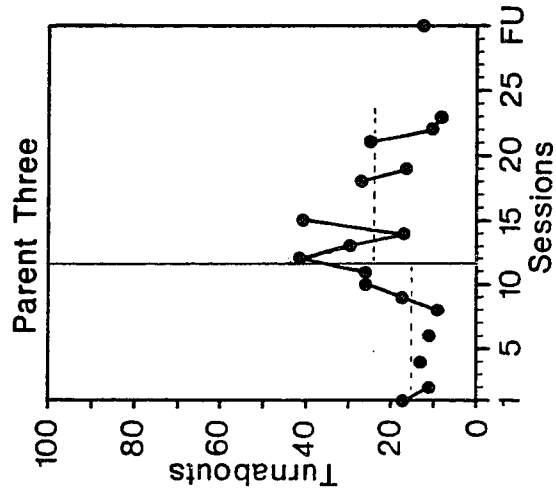


Table 9
Mean Percent of Parent Turns that were
Turnabouts During Baseline, Intervention and Follow-up

	Baseline	Intervention	Follow-up
Parent 1	10.0	12.8	20.0
Parent 2	7.9	15.3	-
Parent 3	16.2	24.0	12.5
Parent 4	6.4	13.6	19.4
Parent 5	10.7	35.0	48.5
Parent 6	27.8	44.4	50.7

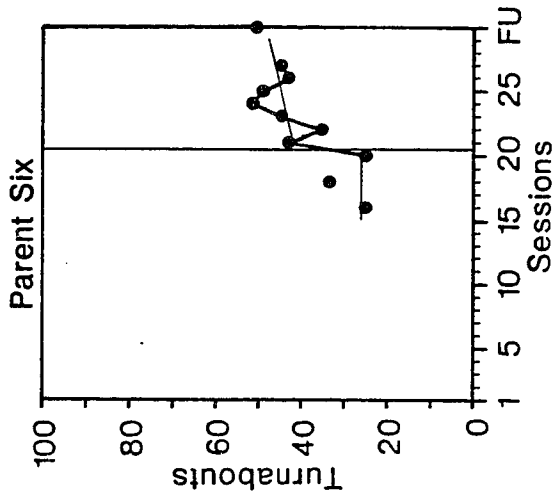
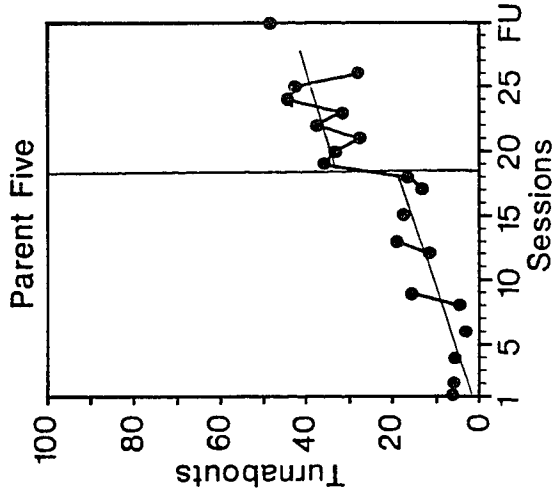
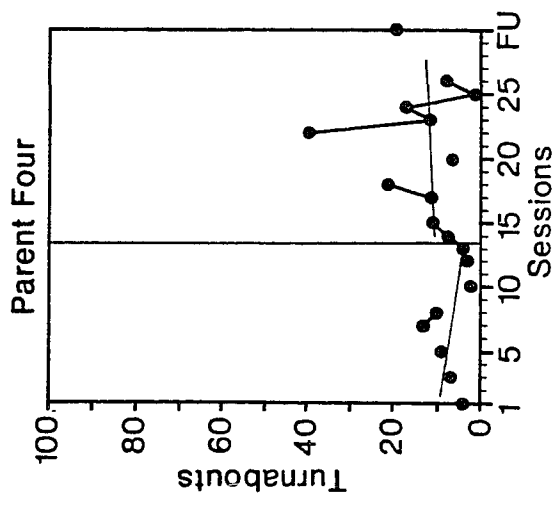
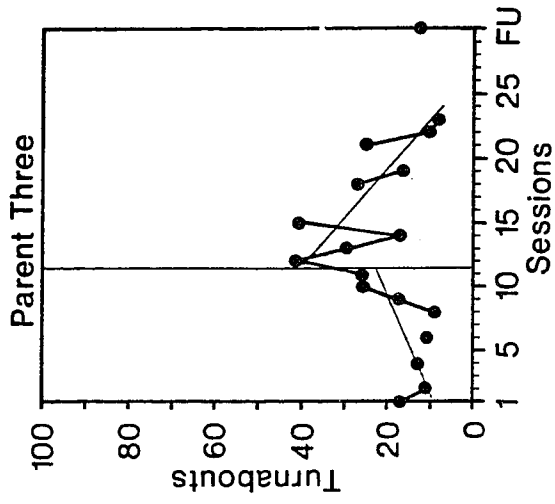
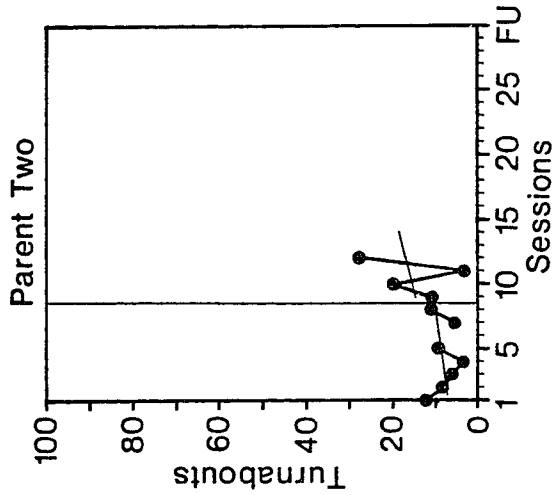
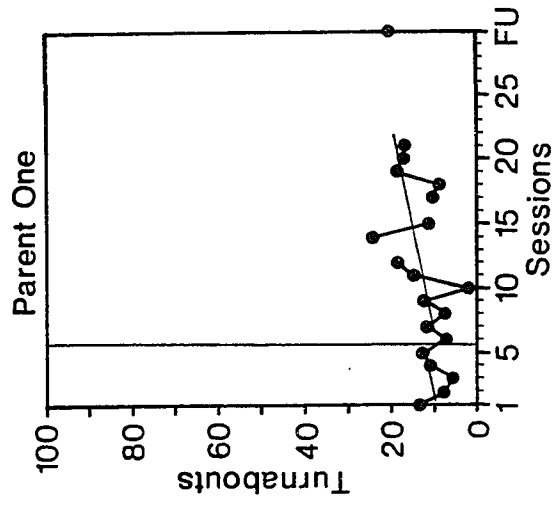
Level changes were also examined. Immediate upward shifts are noted for parent subjects 3, 5, and 6. Since turn-taking was not the emphasis in the first training session it is not unexpected that there were not immediate level changes across all subjects.

The trend lines shown in Figure 11 are more informative. Accelerating trend lines during intervention are observed for Parents 1, 2, 4, 5, and 6. These are at elevated levels from baseline trends for all but Parent 1. A negative trend was found for Parent 3 during intervention. This followed a positive trend during baseline, although an immediate level change was noted.

Figure 11

Percent of parents' turns which are turnabouts.

Trend lines have been drawn.



Elicitation tasks. The infants' performance on the elicitation tasks are shown in Table 10. Session data were collapsed to show typical (or modal) level of performance during baseline and intervention, and optimal (highest level) of performance during baseline and intervention. These data show that for those tasks designed to elicit declaratives, only one infant (Subject 6) changed her typical level of performance from baseline to intervention. Three infants (subjects 1, 3, 5) changed their optimal performance. For the imperative tasks, one infant (Subject 5) increased his typical level of performance, and three infants (Subjects 1, 2, 6) increased their optimal performance.

Table 10
Response of Infants to Elicitation Tasks
During Baseline Intervention and Follow-up

	Declarative					Imperative				
	Base-		Interven-		Follow-	Base-		Interven-		Follow-
	line		tion			line		tion		
	T	O	T	O	0	T	O	T	O	0
Infant 1	N	N	N	4	4	1	2	1	4	4
Infant 2	N	1	N	1	-	1	3	1	4	-
Infant 3	N	1	N	3	1	1	3	1	3	3
Infant 4	N	4	N	3	1	1	4	1	4	3
Infant 5	N	1	N	4	1	1	4	2	4	4
Infant 6	1	4	4	4	3	2	3	2	4	4

T=Typical

O=Optimal

Scores

N=no notice or no response

5=most sophisticated response

Ordinal Scales of Psychological Development. The Ordinal Scales were given prior to and following intervention. Correlated t-tests were performed on each of the subscales. Results (for 5 infants) are shown in Table 11. Statistically significant differences were achieved

on two subscales (object permanence and object relations). Examination of the raw data indicated that with one exception all infants either maintained or increased their scale step scores on each of the subscales from preintervention to postintervention.

Table 11
Means and Standard Deviations
for Pre- and Postintervention on
Ordinal Scales of Psychological Development

Variables	Preintervention	Postintervention	t-statistic
Object	5.00	8.80	3.28*
permanence	(0.707)	(3.114)	
(n=5)			
Means-ends	8.20	9.20	2.24
(n=5)	(1.095)	(0.447)	
Vocal imitation	4.20	5.40	2.06
(n=5)	(0.837)	(1.140)	
Gestural	3.40	4.60	1.24
imitation	(2.302)	(2.510)	
(n=5)			
Object	3.60	4.20	2.45
causality	(0.894)	(0.837)	
(n=5)			

Table 11 continued

Object	6.00	8.20	2.75*
relation	(1.414)	(1.643)	
(n=5)			
Schemes	5.00	7.00	2.45
(n=4)	(0.816)	(1.414)	

*p <.05

Changes in stage placements were also examined. Three infants made slight changes in stage placements. Subject 1 changed from performance at the III-IV level to solid performance at stage IV. Subject 5 changed from performance at Stage III to performance at the III-IV level. Subject 3 changed from stage IV to stage V. Subjects 4 and 6 remained at the same stage. Length of time from pre- to post-test was 12 weeks for Subject 6, and ranged from 21 to 26 weeks for the remaining subjects.

Receptive and Expressive Emergent Language Scale. Correlated t-tests were also performed on the language measure. Results are shown in Table 12. Statistically significant differences were obtained for receptive age, expressive age, and combined language age. Examination of the individual infant data showed that each of the 5 infants increased their combined language score on a parent report measure. Subjects 1, 3, and 5 made increases that were consistent with the time from the onset of the study to the end of the intervention phase. That is they made gains equal to the length of time in intervention.

Table 12
Means and Standard Deviations for
Pre- and Postintervention on
Receptive and Expressive
Emergent Language Scale

Variables	Preintervention	Postintervention	t-statistic
Receptive	9.80	14.60	3.45*
Language Age	(3.633)	(1.342)	
Expressive	8.40	11.80	3.03*
Language Age	(2.408)	(2.168)	
Combined	9.00	13.20	3.93*
Language Age	(2.806)	(1.754)	

*p < .05

Maintenance. A maintenance session was held for five of the six dyads. Dyad 2 was not available. Parents and infants were videotaped in a free-play situation. This session was held in a studio. Similar toys were available as in baseline and intervention. Maintenance probes were held 5-6 weeks following the end of the intervention phase. During this intervening period of time parents and infants were involved in the early intervention program for 3 to 4 weeks. The dyads came in for maintenance probes following 2 weeks of vacation.

Results of these maintenance probes for each of the measures are shown as the last data point on the graphs. Frequency of social-communicative behaviors matched or exceeded intervention means for infant Subjects 1, 4, and 5. These are shown on Figure 1. Infants 1, 4, 5, and 6 demonstrated use of social-communicative behaviors above their intervention trends (see Figure 2).

For infant initiations of "conversational" topics, elevated levels of initiations which matched or exceeded intervention means were found for infant Subjects 1, 3, and 5. Infant Subject 6 maintained the high percentage of initiations displayed during intervention. Subject 5 did not initiate any "conversational" topics during the maintenance probe session. These data are found in Figure 3. Performance above intervention trends were observed for infant Subjects 1 and 6.

Parent data are considered next. All five parents imitated their infants more frequently during the maintenance session than during the initial baseline. Parents 1, 4, 5, and 6 continued to use imitations at a level at or above intervention mean. These data are found in Figure 5. Parents 1, 4 and 5 demonstrated use of imitation at or above their intervention trends.

On the measure of parental responsivity, as shown in Figure 7, three parents (1, 5, and 6) showed maintenance of levels of responsivity relative to their intervention means. These parents also maintained trends established during intervention. Parent 4's responsivity was similar to means for both baseline and intervention.

Maintenance of turn balance is shown in Figure 9. These data show that the percentage of turns taken by the parent was maintained at a level below initial baselines. Dyads continued toward the objective of equally balanced turns.

Elevated levels of turnabouts during intervention were achieved by Parents 5 and 6. Both of these parents maintained elevated levels of turnabouts at the maintenance probe. They also maintained trends established during intervention. Parents 1, 4, 5, and 6 showed increased levels of turnabouts relative to their intervention means. These data are shown in Figure 10.

The elicitation tasks were also administered at the end of the maintenance session. As indicated in Table 10, only infant Subject 1 maintained optimal level of performance on the declarative tasks at follow-up. However on the imperative tasks, four infants (1, 3, 5, 6) maintained optimal performance at follow-up.

CHAPTER V

Discussion

This chapter provides an interpretation of the results. Each hypothesis will be discussed separately. The conclusions to be drawn for each of the major questions will then be presented.

Social-Communicative Behaviors

The first hypothesis stated that the infant's use of social-communicative behaviors will increase as a result of the intervention. The data for five of six infants support this hypothesis. The data for three of the infants (1, 2, 3) strongly support this hypothesis. The data for Subjects 5 and 6 are also supportive although less strong. Both of these subjects show decelerating trend lines during intervention. However, for Subject 5 all data points in the intervention phase exceeded the trend line during baseline. For Subject 6, all but two data points exceeded the baseline trend. The data for Subject 4, while showing initial changes, do not support the ongoing effect of the intervention. Four of five infants maintained their increased production of social-communicative behaviors at follow-up.

There are at least three reasons related to the intervention to account for changes in the infants' use of social-communicative behaviors in the free-play setting. First, identification of the infant's target behavior which was included in the information packet,

may have caused some parents to alter or modify their own behavior in order to elicit the target behavior from their child. Cheseldine and McConkey (1979) found that some parents did this quite easily. However, Dunst (1980) reported that parents who were given an objective without an intervention strategy increased their use of directives with their children.

Second, the intervention provided immediate consequences to the infant's signals. These consequences, whether an imitation or an acknowledgement, may have reinforced the infant's use of social-communicative behaviors like requesting and commenting.

Third, the intervention was designed to increase the infant's opportunities to produce social-communicative behaviors. All of the infants were capable of producing the target behavior prior to intervention as indicated by the elicitation tasks, yet production was at relatively low levels during the baseline phase for all but Infant 6. Simply allowing the infant more time to behave may have resulted in increased production of social-communicative behaviors in a free play situation.

Initiations

The second hypothesis proposed that the percentage of "conversational" topics initiated by the infants will increase as a result of the intervention. The results are mixed, and thus do not present overall support for this hypothesis. The data for the three infant Subjects 2, 3, and 5 do lend some support. However, the

fluctuations in the data in both phases of the study are troublesome. What might account for these fluctuating data in addition to the downward trends noted for Subjects 1, 4, and 6?

It should be repeated that this measure reported on who started a "conversational topic" (e.g., peek-a-boo, or playing ball), not what happened within a topic. The fluctuating data suggest that while the parents may have been responding to or imitating their infant within a topic, the parents were, on many occasions, starting the topic. In fact, in some instances, the parent trainer suggested that the parent use a specific game or toy as a means of establishing turn-taking. Thus, decreased infant initiations would be expected.

The decelerating trends for Subjects 1, 4, and 6 are disappointing. A plausible reason was observed upon review of the videotapes. Changes in ability and motivation to move (i.e., crawl or walk) were observed for each of these subjects during the intervention phase. A behavior problem may have confounded the effects of intervention for infant Subject 4. Parents were observed to start new games or to bring out a new toy when their infants began to move away from them. Given the method by which data were collected it is not known whether parents would use this controlling technique at home. It is possible that without the limits of the camera's range, parents would simply move or wait to observe the infant's next focus of interest.

Imitations

The third hypothesis stated that parents will increase their imitation of their infant. This hypothesis is supported by the data of five of six of the parent subjects. The data are interesting in that they show the differential use of this strategy by the parents. This strategy was introduced early. Parents were encouraged to use it. No level for use of imitation was set. In contrast, Field (1977, 1980) had mothers imitate all of their infant's behaviors for a shorter time period in a one-time-only manipulation.

Parents increased their use of imitation as measured by changes in mean. For Parents 3 and 6 this change was a gradual increase in use over time. For Subjects 1, 2, and 5, data were variable across sessions and downward trends were observed (see Figure 6). However, performance on observation sessions during the intervention phase met or exceeded baseline trends.

It is arguable that Parents 3 and 6 warmed to the notion of copying their infants. They did increase their use of this strategy from baseline levels. The upward trends during intervention suggest that they found this strategy useful. They were continuing to use it at the study's end.

In contrast, Parents 2 and 5 showed marked increases in use of imitation from baseline to intervention. Their data along with that of Parent 1 show variability. It may be that these parents used the imitation strategy in a "trouble-shooting" fashion. That is if the parent observed that the infant was not taking turns or requesting or

commenting, the parent might use imitation as a means of keeping the interaction intact. The downward trends observed for these parents during intervention may indicate a progression towards an optimal or comfortable level in the use of imitation.

Parents of handicapped children have been reported to be more directive (Buium, et al., 1974; Cardoso-Martins & Mervis, 1985; Cunningham et al., 1982; Greenberg, 1971; Jones, 1977, 1980; Marshall et al., 1973; Tyler et al., 1974; Walker et al., 1982). Mahoney and Robenalt (1986) argue that while directiveness may seem to be a logical procedure for keeping a child engaged, it may have the opposite effect of reinforcing a child's passivity. In the present study, an alternative to directiveness was imitation of the infant. Four of five parents demonstrated continued elevated levels of imitation at follow-up, suggesting that this strategy was becoming naturally incorporated into their interactional styles.

Responsivity

It was hypothesized that parents will become more responsive to their infants as a result of intervention. For this study, parental responsivity was the use of a response or response-mand following the infant's turn. Responses and response-mands are linked to the infant's previous turn. Overall the data of four parents support this hypothesis. Two parents (4 and 6) showed little change from baseline to intervention. Parent 6 showed high levels of responsivity prior to intervention and maintained high levels during intervention.

The data of parents 1, 3, and 5 require careful examination before discussion. The responsiveness of Parent 1 was increasing prior to intervention. The trend line flattened and slowed after intervention, but at a level above the baseline mean. This suggests that responsivity of this parent was at least supported by the intervention. The trend lines for Parents 3 and 5 show a downward slope during intervention. However, all data points during intervention exceed the trend line established during baseline. Further, these parents as well as Parents 1 and 6 maintained their intervention levels of responsivity at the follow-up session. This suggests that these parents continued to use responsive behaviors and consequently fewer mands when interacting with their infant in a free-play situation.

Turn balance

It was hypothesized that the turns of parents and infants will become more equally balanced as a result of intervention. Equally balanced turns would, of course, yield a 50:50 ratio. Kaye and Charney (1980) reported that mothers and their normally developing children generally engaged in interaction on a 50:50 turn-taking basis. Mahoney and Robenalt (1986) also found this ratio of turns for their normally developing group in a comparison study. The data from the present study support this hypothesis. However, Dyad 6 demonstrated balanced turn-taking prior to intervention. The intervention did not account for a change, but did provide continued support for turn-balance for this dyad.

What accounts for the reduction in the percentage of parent turns for the other five dyads? As part of the intervention, parents were encouraged to take a turn and wait. It was suggested that parents watch their infant, imitate or respond in some way, wait for the infant to take another turn, then respond to that turn, and so forth. The intervention was effective in reducing the parent's dominance within turn-taking exchanges. The baseline ratio of parent turns to infant turns for the group was 63:37. During intervention this ratio was reduced to 56:44. This latter ratio is similar to that reported by Mahoney and Robenalt (1986) for mothers and their older (2- and 3-year-old) children with Down syndrome. In the present study, the improved balance of parent to infant turns was maintained or reduced further at maintenance.

It is argued that this reduction in parental turns allowed the infants to be more active participants in the interactions. As more active partners, infants may have opportunities to learn and practice skills which naturally occur during these interactions.

Turn length

To test the hypothesis that the intervention will result in increased length of turn-taking episodes, response-mands or turnabouts were counted. The use of turnabouts implies that the partner is intentionally trying to link turns together. The results are mixed. Thus, the data do not offer clear support for this hypothesis. Three parents (4, 5 and 6) did show changes in magnitude and rate from

baseline to intervention. Three parents showed either no change from baseline (Parents 1 and 2) or a downward trend in intervention following an upward baseline trend (Parent 3). Four of five parents did show an increased percentage of turnabouts at follow-up.

What accounts for these mixed results? Parents were not specifically instructed to use turnabouts. It was hypothesized that such an increase would be a result of the intervention. That is, a second-order effect was sought. There was such an effect for three parents. Two parents had already begun to increase their percentage of turns coded as turnabouts prior to intervention. So, while the intervention did not account for the change, it did appear to support the use of turnabouts by these parents.

Parent 3 decreased her use of this category of turns during the intervention. Careful examination of this parent's data shows that she did increase her use of responses during intervention. This strategy (respond to the infant's turn) was a specific part of the intervention.

Other attempts were made to measure turn length on topic. For example, number of turns per "conversational" topic were counted. These results showed essentially no difference between baseline and intervention. Yet review of the videotapes indicates changes for at least some of the dyads. It is suggested that any changes will not be captured as a measure of number of turns on topic or time on topic. Rather, changes were observed for turn balance as previously noted. Further, some parents reduced the size of their turns. That is, they

used fewer words during their turns. In the coding scheme used for this study, a turn could be several utterances strung together without a distinct pause. Thus, changes in the size of a partner's turn were not specifically assessed.

It is also possible that the intervention was detrimental to the objective of increasing turn length on topic. For example, parents were asked to follow the child's lead. If an infant switched from topic to topic, and the parent followed this changing focus of interest, then turns taken on a topic might decrease. While increasing the number of turns that parent and infant stay on a topic is an important objective, it may have greater importance later in the intervention. It may be useful to think of following the child's lead and balancing turns as beginning objectives, and increasing the number of turns on a topic as a later objective. The data from four of five parents at follow-up lend some support to this argument.

Before moving to a broader discussion of the questions, the relatively poor showing of Dyad 4 on most measures must be explained at least in part. The parent in this dyad was a single mother of four children under 5 years of age. While she eagerly agreed to participate in the study, her energy level wavered from week to week. She remained enthusiastic during the observation and training sessions. It was unclear just how much time she devoted to the intervention at home in view of the heavy demands on her time. Further, the infant in this dyad, began wearing glasses on Day 20. This was midway through the intervention phase. Decreases in

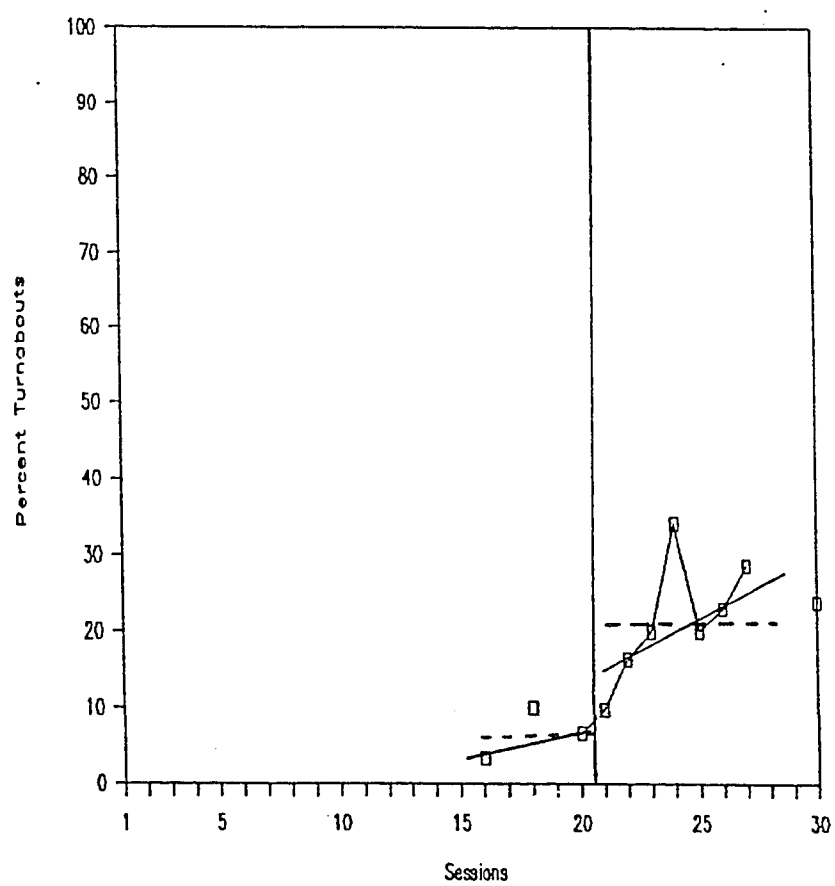
performance are noted from this day. The infant wore his glasses with protest. This resulted in confrontations between parent and infant. The parent made some recovery in later sessions. Despite these difficulties this dyad did successfully change their turn balance ratio. They, in fact, achieved a 50:50 ratio at follow-up.

Dyad 6 also present interesting data patterns. This infant was the most skilled prior to intervention. During intervention she showed changes in levels, but decelerating rates are indicated by trend lines. Mother, although the most responsive parent during baseline, did make changes in her use of imitation and response-mands as a result of intervention. The lack of reliable changes for this infant may be due to 1) the already high level of the behavior, as in initiations, or 2) the brevity of the intervention phase. This infant's data were examined further to identify possible changes in mode of communication (i.e., gestural vs. gestural-vocal) or type of turns used. No differences were found in mode of communication. However, changes were found in this infant's percent of turns which were turnabouts or response-mands. Performance data were graphed. These are shown in Figure 12. Changes in both mean rate of performance and trend suggest that during intervention this infant used a more sophisticated type of turn, one which links turns together. The increased use of turnabouts reflects interest in the parent's turn by responding while at the same time eliciting a continuation of the topic. Use of turnabouts indicates the development of conversational and more sophisticated social behavior.

Figure 12

Percent of turns by Infant 6 which are turnabouts.
Means and trend lines have been drawn.

Infant Six



Question 1: Does a parent-implemented intervention produce increases in the social-communicative behaviors of prelinguistic handicapped infants?

When gauged by changes in magnitude, the data support the effectiveness of the parent-implemented intervention. All infants showed changes in mean rate of production of social-communicative behaviors from baseline to intervention. Further, change in level of production was immediately apparent. Less consistent positive changes were shown when trend lines were drawn.

Variability or changes are not desired within experimental conditions. Variability was found in the present study. Such variability calls into question the internal validity of the study.

Of the types of threats to internal validity (Cook & Campbell, 1979), maturation is perhaps the strongest competing argument in any study of infants. In the present study dyads began the intervention phase without regard to the infants' age or overall developmental level. This, along with the multiple-baseline design, was intended to control for the possible confounding influence of maturation.

The issue of variability of performance by very young children cannot be discounted. The behavior of young handicapped children may be even more variable. Every effort was made to ensure that the infant was comfortable at the beginning of an observation session. The infant was fed, diapered, and allowed to rest if necessary. However, it was not always possible to predict an infant's state. Occasionally the infant would become fussy or tired. Taping was

discontinued if the infant cried and could not be easily comforted. One observation session was lost in this manner. Taping was continued and the data were used for other sessions that were less than optimal. Given the vagaries of infant state, mean levels of performance are meaningful as a measure of change.

It is also plausible that factors inherent in the assessment procedure account for variability in infant behavior from session to session. The assessment situation was a "free-play" situation. That is, while the parent came to the situation with strategies to use, he or she was not instructed to behave in predetermined ways. Rather, the parent was to "follow the child's lead." Thus, this situation may not result in equal opportunities to produce social-communicative behaviors. Some activities or games may offer more opportunities to request or comment. Others may promote more solitary interest and consequently less interaction. As the infant's focus of interest and attention could not be predicted, it is not surprising that their production of the targeted social-communicative behaviors was variable.

As a response to this issue, a set number of elicitation-type situations could be interjected into the "free-play" situation. For example, tasks such as those used by Bruder (1984), Dale (1980), and Synder (1978) could be inserted into the observation session. This procedure was not used in the present study for two reasons. First, the focus of the interaction would change from a child-led one to a parent-led (or even experimenter-led) interaction. Second, asking the parents to act in specific ways conflicts with the overall message of the intervention to follow the child's lead.

Changes in mean level of production of social-communicative behaviors during the investigation were found. The positive changes found in this investigation are notable. Infants increased their spontaneous production of social-communicative behaviors during the intervention phase. During intervention infants had more opportunities to behave. These opportunities may have been the important factor in the overall changes in production of social-communicative behaviors.

Production of social-communicative behaviors was measured in an elicitation setting as well. Few changes were observed in typical (or modal) performance. The measure of optimal performance showed positive changes for 3 infants on the declarative tasks and 3 children on the imperative tasks. One child made changes in optimal performance on both the declarative and imperative tasks.

Why were changes observed in the free-play situation and not during the elicitation tasks (especially at the typical level)? First, the parent was the conversational partner in the free-play setting, whereas the experimenter was the conversational partner in the elicitation setting. This alone may account for the difference. Second, the tasks themselves may not have elicitation value for children of this age and developmental level. This is of particular interest with regard to the declarative tasks. Note in Table 10 that most of the infants were typically scored no response or no notice. These tasks involved changing one element with the expectation that the child will notice and comment on the change. For example, the

child plays a xylophone with a hammer-stick, then the experimenter gives the child a spoon. At the highest level of response, a child would say "spoon." At a midlevel of response, a child would look at the spoon, then show it to the experimenter. The infants in this study typically showed no measurable notice of difference. They would bang the spoon on the xylophone. These tasks were originally designed for preschoolers (Snyder, 1978) and have been used with normally developing one- and two-year-olds. Further study is needed to determine the validity of these tasks with handicapped children who are functioning below the two-year level.

The imperative tasks were at least scorable, but again no change was observed in typical level of performance from baseline to intervention. These tasks have been validated on developmentally delayed infants and toddlers (Bruder, 1984). However, the majority of children in Bruder's study were toddlers and thus chronologically and developmentally older than the children in the present study.

The increase of the infant's production of social-communicative behaviors during free-play is important. These were actual changes in the infant's intentional signaling behavior. The infants "asked" for objects or activities. They directed their parent's attention to objects or activities. Previous intervention studies report changes in vocalizations or gaze (McCollum & Stayton, 1985) and appropriate toy play, initiations, and responsivity (Moran & Whitman, 1985). In the study by Kelly (1982) no effects on infant initiating and responding behaviors were found although parents in a treatment group

made significant positive changes. The infants in the present study became more active; they took more turns. They also produced more intentional requests and comments.

The findings from the current study lend some support for a parent-implemented turn-taking intervention to promote increases in infants' social-communicative behaviors. This study does not provide support for the Moran and Whitman (1985) finding of increased infant initiations of topics. As noted previously, this finding may be due to instructions from the trainer, increased mobility of the infant, problem behavior, or the method of measurement.

The relationship between an infant and his or her parent is unique. This intervention recognized and responded, at least somewhat, to these individual differences. Although the intervention package was the same for all parents, strategies and activities were suggested based on the parent's and infant's interest, and performance. While parents on average showed less variability in performance than the infants, they did show differential responses to the training procedures.

Question 2: Is the parent training procedure effective in increasing parents' use of the intervention strategy?

Variability within phases was observed for the parent data as well as for the infant data. Once again positive changes in means were observed for all parents during the intervention phase.

The variability of parents' data during the baseline phase (particularly parent subjects 4 and 5) may be due to the extended baseline and to the scheduling of appointments. Parents, on occasion, viewed other dyads involved in the study. Thus, diffusion of treatment may account for some of this variability. Parents may have observed particular strategies (e.g., imitating the child) and tried them out. Without knowledge of the targeted behaviors, or feedback from the trainer, change from session to session was noted.

Variability within the intervention phase may be due to the package-nature of the intervention. That is, the intervention consisted of many elements. Each weekly parent session with the parent trainer would include a review of the three strategies. However, the emphasis might change from one week to the next based on the previous week's sessions, or parental concerns. Further, the parent was free to experiment with these strategies and games, and review their packet of information materials during the intervening week. Thus, the parent's use of a specific strategy might change from session to session.

As with the infants, the actual activity, game, or toy may also account for variability in parent behavior. Some activities may promote greater use of the measured behaviors. For example, playing ball may provide more opportunities for turnabouts, and a reduced need for imitation. In contrast, shaking or banging toys sets up many opportunities for imitating the child and less obvious opportunities for turnabouts. As noted earlier, the assessment procedure was not designed in a way to equalize actual number of opportunities.

Finally, it must be repeated that the intervention was designed to be non-didactic. Parents were typically not asked to act in any rigid manner. Rather, they were given information, suggestions and feedback. A directive approach would conflict with the intervention strategies. Thus positive changes in means indicate that the parents did change their behavior. Positive changes in overall level of performance were observed despite the spontaneous nature of the assessment situation and the non-directive nature of the training.

Both quantitative and qualitative changes were observed. The parents learned and used the imitation strategy. The results also suggest that general patterns of interaction changed. Parents took proportionately fewer turns. The dyadic interaction became more balanced, with each partner contributing more equally to the interactions. These results are in agreement with those of Moran and Whitman (1985). Parents were generally more responsive to their infants during intervention. Similar results are reported by Kelly (1982) and Moran and Whitman (1985). As measured in this study, length of turn-taking episodes did not change.

Differential responses to intervention are revealed by the graphed data. McCollum and Stayton (1985) also report that the mothers in their studies responded differently to the components of the intervention.

In the present study, some parents used the imitation strategy immediately and at much elevated levels, then moderated their use of the strategy over time. Other parents gradually increased their use

of this strategy over time, perhaps trying it out and deciding for themselves whether to use it based on their infant's behavior. For the measure of turnabouts, changes were gradual for most parents, but one parent reduced her percent of turnabouts after an initial elevation. Use of turnabouts was not consistent. This is not unexpected as this was not a strategy specifically shared with parents. The trend toward more equally balanced turns across all dyads is particularly encouraging. By waiting for their infant to take a turn, parents allow their infants more opportunities to behave and to signal their interests and needs.

Thus as a result of training, all parents made progress toward the objective of more equally balanced turns. All parents used imitation as a turn-taking strategy. Some parents gradually incorporated this strategy into their style of interactions. Others appeared to use it in a more trouble-shooting fashion. In general parents were more responsive to their infants, but their use of a particular type of turn (turnabouts) was variable.

That parents responded differently to the training is not discouraging. Rather it adds important information which should be used in future applications of this intervention. In this type of intervention, the parent is the primary change agent. This type of intervention must be viewed within the entire context in which parent-infant interaction takes place. The parent's goals for interaction must be considered in order to achieve success.

Limitations

This investigation presents certain limitations both in design and in measurement problems encountered. A multiple-baseline design was appropriate to the study in order to answer the question, does the intervention work? Designs requiring return to baseline by the infant would not be appropriate as the purpose was to increase and maintain use of purposeful behaviors.

Designs which involve withdrawal of treatment to the parent would be appropriate. However, if the parent finds the intervention effective, reversal to baseline may not result from withdrawal of the parent training. As a consequence of withdrawal, parent behaviors could remain the same, improve, or deteriorate. Phase changes could then be implemented in any of several arrangements to study the effects of the intervention. Lack of reversal to baseline could mean the effects of the intervention are ongoing. In the present study, time between end of intervention and the maintenance probe involved the withdrawal of some components of the intervention. The ongoing effects of the parent training were observed for most of the parents.

The multiple baseline design has been employed previously by McCollum and Stayton (1985) and Moran and Whitman (1985). The advantages of a multiple baseline are 1) the design reduces the possibility of results due to coincidental events and 2) the design approximates clinical practice. As in the Moran and Whitman (1985) study, the use of multiple measures of the effects of intervention adds support for this design. A disadvantage of the multiple baseline

is the length of baseline for subjects who enter late in the study. In the present study both parents 4 and 5 reported that they were frustrated by the lack of "knowing what to do" during the later baseline observation sessions. They were anxious for intervention to begin.

A group design (treatment vs. no-treatment) was used by Kelly (1982). Sufficient subjects were not available to use a group design in the present study. Further, the limitations of a group design are particularly relevant to the study of parent-infant interaction. A group design, whether effects are found or not, may mask important changes within each dyad. These changes could then be used to determine subsequent phase changes. For example, in the present study, the strategy "take a turn and wait" was used to help establish balanced turn-taking. All infant subjects in this study typically filled this pause with their own turn. Some children who have very low rates of behavior may not respond to this strategy. Performance data from a single-subject design would show this and the intervention could be altered and the effects of the alteration observed. With regard to the present data set, the difficulties encountered by Dyad 4 might have been regarded as a no-treatment effect had a group design been used. Yet, even though a behavior problem confounded the results, this dyad achieved an overall improvement in turn balance.

A study of this nature requires that infant, parent, and dyadic variables be measured. Some of the measures used in this study required extensive training of coders. The data collection itself was

expensive. Coding of tapes was time-consuming. These features do not make the measurement aspect attractive to interventionists. Economical yet reliable means of measuring these variables must be found. In the present study, the elicitation tasks which are more economical, were unfortunately not as informative as the data collected from the free-play settings.

While the intervention itself is relatively simple, the measurement system used in this study, as well as the measurement systems used by Field (1977, 1980), Kelly (1982), McCollum and Stayton (1985), and Moran and Whitman (1985) are too costly for many early intervention programs. This means that 1) those settings which can support this type of measurement must provide additional evidence, and 2) alternate assessment methods must be developed.

Future Directions

The present study along with those noted above, achieved changes in parent-child interactional behavior. However, more testing of these procedures is necessary. Evidence of the effects of these procedures is needed with children of different ages, disabilities, and developmental levels. The parent subjects in the present study were volunteers who enjoyed interacting with their infants. The effects or usefulness of these procedures with less motivated caregivers are not known.

Further studies can be designed that would more carefully examine both the effects of the intervention and the relationship between

changes in parent behavior and changes in infant behavior. For example, certain elements within the turn-taking intervention may make it more or less effective. These elements (e.g., imitation, take a turn and wait) could be examined by adding or subtracting elements in studies involving more complex series of phases.

Certain games or activities may offer more opportunities for the production of social-communicative behaviors by young children. Data from the present study will be examined. If these data are suggestive, this issue could be addressed in more detail by a multiple-baseline design across situations (e.g., toy, game or no toy).

In this investigation, a variety of instructional methods were used with the parents (information packets, videotapes, modeling, feedback). These methods are similar to procedures outlined by McCollum and Stayton (1985). Moran and Whitman (1985) used similar methods without videotape with positive effects. Some methods may be more or less effective. Additional studies could be designed which test alternative methods.

Finally, the long-term effects of these intervention procedures on child development are not known. Model programs which incorporate these interventions must collect and share data which show the effects of intervention beyond a short-term period.

Summary

The child's early interactions with a primary caregiver are important for social and language development. Research has shown

that caregiver-infant interaction is complicated when the infant is handicapped. Either the individual characteristics of the infant or the caregiver's response may account for interactional differences.

Recently intervention procedures have begun to focus on caregiver-infant interaction. Recent investigations have begun to study the effects of intervention on infant, adult, and interactional variables.

In the present investigation, a multiple-baseline design was used to study the effects of a parent-implemented turn-taking intervention on the social-communicative behaviors of prelinguistic handicapped infants. The turn-taking intervention consisted of following the child's lead, establishing turn-taking, and elaborating. Multiple measures were used to look at the effects of intervention.

The intervention was effective in enhancing more equally balanced dyadic interactions. Differential effects of parental response to the training procedures were found. Five of six parents increased their rate of imitation. Changes in parental responsivity were observed.

The infants demonstrated changes in their interactive roles and communicative skills. The infants became more active partners in the interaction. Four infants increased their use of social-communicative behaviors. A fifth infant, who already demonstrated productive use of social-communicative behaviors, demonstrated increases in her use of a specific category of turns (turnabouts). This indicated more sophisticated turn-taking.

The results of this research are important for at least two reasons. First, a relatively simple intervention was effective in changing infant, adult, and interactional variables. Second, the results add to our understanding of parent-infant interaction when the infant is handicapped.

Bibliography

- Als, H. (1982). The unfolding of behavioral organization in the face of a biological violation. In E.Z. Tronick (Ed.), Social interchange in infancy: Affect, cognition and communication (pp. 125-160). Baltimore: University Park Press.
- Als, H., & Brazelton, T.B. (1980). Affective reciprocity and the development of autonomy. Journal of American Academy of Child Psychiatry, 19, 22-40.
- Bates, E. (1976). Language and context: The acquisition of pragmatics. New York: Academic Press.
- Bates, E., Camaioni, L., & Volterra, V. (1975). The acquisition of performatives prior to speech. Merrill-Palmer Quarterly, 21, 205-226.
- Bateson, M.C. (1979). The epigenesis of conversational interaction: A personal account of research development. In M. Bullowa (Ed.), Before speech: The beginning of interpersonal communication. Cambridge, England: Cambridge University Press.
- Billingsley, F.F., White, O.R., & Munson, R. (1980). Procedural reliability: A rationale and an example. Behavioral Assessment, 2, 229-241.
- Bricker, D., & Carlson, L. (1980). The relationship of object and prelinguistic social-communicative schemes to the acquisition of early linguistic skills in developmentally delayed infants. Paper presented at the Conference on Handicapped and At-Risk Infants: Research and Application, Monterey, California.

- Bricker, D., & Schiefelbusch, R.L. (1984). Infants at-risk. In L. McCormick, & R.L. Schiefelbusch (Eds.), Early language intervention (pp. 244-265). Columbus: Charles E. Merrill.
- Bruder, M.B. (1984). The validation of a scale to measure early social-communicative behavior. Journal of the Division for Early Childhood, Fall, 67-75.
- Bruner, J. (1977). Early social interaction and language acquisition. In H. Schaffer (Ed.), Studies in mother-infant interaction (pp. 271-289). New York: Academic Press.
- Bruner, J.S. (1975). The ontogenesis of speech acts. Journal of Child Language, 2, 1-19.
- Bruner, J.S. (1983). Child's talk: Learning to use language. New York: W.W. Norton.
- Buckhalt, J.A., Rutherford, R.B., & Goldberg, K.E. (1978). Verbal and nonverbal interaction of mothers with their Down's syndrome and nonretarded infants. American Journal of Mental Deficiency, 82 (4), 337-343.
- Buium, N., Rynders, J., & Turnure, J. (1974). Early maternal linguistic environment of normal and Down's syndrome language-learning children. American Journal of Mental Deficiency, 79, 52-58.
- Bzoch, K.R., & League, R. (1970). The receptive-expressive emergent language scale for the measurement of language skills in infancy. Gainesville: The Tree of Life Press.

- Cardoso-Martins, C., & Mervis, C.B. (1985). Maternal speech to prelinguistic children with Down syndrome. American Journal of Mental Deficiency, 89(5), 451-458.
- Carpenter, R., Mastergeorge, A.M., & Coggins, T. (1983). The acquisition of communicative intentions in infants. Unpublished manuscript, University of Washington.
- Chapman, R. (1981). Mother-child interaction in the second year of life. In R.L. Schiefelbusch, & D. Bricker (Eds.), Early language: Acquisition and intervention (pp. 201-250). Baltimore: University Park Press.
- Cheseldine, S., & McConkey, R. (1979). Parental speech to young Down's syndrome children: An intervention study. American Journal of Mental Deficiency, 83(6), 612-620.
- Cicchetti, D., & Sroufe, A. (1978). An organizational view of affect: Illustration from the study of Down's syndrome infants. In M. Lewis & A. A. Rosenblum (Eds.), The development of affect (pp. 309-349). New York: Plenum Publishing Corp.
- Coggins, T., & Carpenter, R. (1981). The communicative intention inventory: A system for observing and coding children's early intentional communication. Applied Psycholinguistics, 2, 235-251.
- Coggins, T.E., Carpenter, R.L., & Owings, N.O. (1983). Examining early intentional communication in Down's syndrome and nonretarded children. British Journal of Disorders of Communication, 18(2), 98-106.

- Cook, T.D., & Campbell, D.T. (Eds.). (1979). Quasi-experimentation: Design and analysis issues for field settings. Chicago: Rand-McNally.
- Cross, T.G. (1978). Mothers' speech and its association with rate of linguistic development in young children. In N. Waterson and C. Snow (Eds.), The development of communication. New York: John Wiley & Sons.
- Cunningham, C.E., Reuller, E., Blackwell, J., & Deck, J. (1981). Behavioral and linguistic development in the interactions of normal and retarded children with their mothers. Child Development, 52, 62-70.
- Dale, P.S. (1980). Is early pragmatic development measureable? Journal of Child Language, 7, 1-12.
- Dore, J. (1975). Holophrases, speech acts and language universals. Journal of Child Language, 2, 21-40.
- Dunst, C.J. (1981). Infant learning. Hingham, MA: Teaching Resources.
- Dunst, C.J. (1980). A clinical and educational manual for use with the Uzgiris and Hunt scales of infant psychological development. Baltimore: University Park Press.
- Dunst, C.J. (1980) Developmental characteristics of communicative acts among Down's syndrome infants and nonretarded infants. Paper presented at the Biennial Meeting of the Southeastern Conference on Human Development, Alexandria, Virginia.

- Dunst, C.J. (1983). Emerging trends and advances in early intervention programs. New Jersey Journal of School Psychology, 2, 26-40.
- Emde, R.N., Katz, E.L., & Thorpe, J.K. (1978). Emotional expression in infancy: II. Early deviations in Down's syndrome. In M. Lewis, & L. Rosenblum (Eds.), The development of affect (pp. 351-360). New York: Plenum Press.
- Field, T.M. (1977). Effects of early separation, interactive deficits, and experimental manipulation on infant-mother face to face interaction. Child Development, 48, 763-771.
- Field, T.M. (1979). Games parents play with normal and high-risk infants. Child Psychiatry and Human Development, 10 41-48.
- Field, T.M. (1980). Interactions of high-risk infants: Quantitative and qualitative differences. In D. Sawin, R. Hawkins, A. Walker, & J. Penticuff (Eds.), Exceptional Infant (Vol.4) (pp. 120-143). New York: Brunner/Mazel.
- Field, T.M. (1982). Interaction coaching for high-risk infants and their parents. Prevention in human services (pp. 5-24). New York: The Haworth Press.
- Field, T.M. (1983). High-risk infants "have less fun" during early interactions. Topics in Early Childhood Special Education, 3, 77-87.
- Filler, J., & Kasari, C. (1981). Acquisition, maintenance, and generalization of parent-taught skills with two severely handicapped infants. The Association for the Severely Handicapped Journal, 6, 30-38.

- Goldberg, S. (1977). Social competence in infancy: A model of parent-infant interaction. Merrill-Palmer Quarterly, 23 (3), 163-177.
- Greenberg, H.H. (1971). A comparison of infant-mother interactional behavior in infants with atypical behavior and normal infants. In J. Hellmuth (Ed.), Exceptional infants: Studies in abnormalities, (Vol. 2), New York: Brunner/Mazel.
- Greenfield, P.M., & Smith, J.H. (1976). Communication and the beginnings of language: The development of semantic structures in one-word speech and beyond. New York: Academic Press.
- Greenwald, C.A., & Leonard, L.B. (1979). Communicative and sensorimotor development of Down's syndrome children. American Journal of Mental Deficiency, 84 (3), 296-303.
- Gunn, P., Berry, P., & Andrews, R. (1982). Looking behavior in Down syndrome infants. American Journal of Mental Deficiency, 87, 344-347.
- Gustafson, G.E., Green, J.A., & West, M.J. (1979). The infant's changing role in mother-infant games: The growth of social skills. Infant Behavior and Development, 2, 301-308.
- Halliday, M.A.K. (1975). Learning how to mean. In E. Lenneberg, & E. Lenneberg (Eds.), Foundations of language development (Vol 1). (pp. 240-264). New York. Academic Press.
- Hanson, M.J. (1976). Evaluation of training procedures used in a parent implemented intervention program for Down's syndrome infants. AAESPH Review, 1 (7), 36-52.

- Hersen, M., & Barlow, D.H. (1976). Single case experimental designs: Strategies for studying behavior change. New York: Pergamon Press.
- Hogg, J., & Sebba, J. (in press). Profound retardation and multiple impairment. Rockville, MD: Aspen Publishers, Inc.
- Jones, O.H.M. (1977). Mother-child communication with pre-linguistic Down's syndrome and normal infants. In H.R. Schaffer (Ed.), Studies in mother-infant interaction (pp. 379-401). London: Academic Press.
- Jones, O.H.M. (1980). Prelinguistic communication skills in Down's syndrome and normal infants. In T.M. Field (Ed.), High-risk infants and children (pp. 205-225). New York: Academic Press.
- Kaye, K., & Charney, R. (1980). How mothers maintain dialogue with two year olds. In D. Olson, (Ed.), The social foundations of language and thought: Essays in honor of Jerome S. Bruner. (pp. 144-162). New York: Norton.
- Kaye, K., & Charney, R. (1981). Conversational asymmetry between mothers and children. Journal of Child Language, 8, 35-49.
- Kazdin, A.E. (1982). Single-case research designs: Methods for clinical and applied settings. New York, Oxford: Oxford University Press.
- Kelly, J.F. (1982). Effects of intervention on caregiver-infant interaction when the infant is handicapped. Journal of the Division for Early Childhood, 5, 53-63.

- Krakow, J., & Kopp, C. (1983). The effects of developmental delay on sustained attention in young children. Child Development, 54, 1143-1155.
- MacDonald, J.D., Blott, J., Gordon, K., Spiegel, B., & Hartman, M. (1974). An experimental parent-assisted treatment program for preschool language delayed children. Journal of Speech and Hearing Disorders, 39, 395-414.
- MacDonald, J.D., Gillette, Y., Bickley, M., & Rodriguez, C. (1984). ECO: Ecological communication system. Columbus, Ohio: The Nisonger Center.
- Mahoney, G.J. (1975). An ethological approach to delayed language acquisition. American Journal of Mental Deficiency, 80, 139-148.
- Mahoney, G. (1983). A developmental analysis of communication between mothers and infants with Down syndrome. Topics in Early Childhood Special Education, 3, 63-76.
- Mahoney, G., Glover, A., & Finger, I. (1981). Relationship between language and sensorimotor development of Down syndrome and nonretarded children. American Journal of Mental Deficiency, 86, 21-27.
- Mahoney, G., & Powell, A. (1984). The transactional intervention program: Teacher's guide. Woodhaven, Michigan: Woodhaven School District.

- Mahoney, G., & Robenalt, K. (1986). A comparison of conversational patterns between mothers and their Down syndrome and normal infants. Journal of the Division for Early Childhood, 10(2), 172-179.
- Mahoney, G., & Snow, K. (1984). The relationship of sensorimotor functioning to children's response to early language training. Mental Retardation. 21(6), 248-254.
- Mahoney, G., & Weller, E. (1980). An ecological approach to language intervention. In D. Bricker (Ed.), A resource book on language intervention with children. San Francisco: Jossey-Bass.
- Marshall, N.R., Hogrenes, J.R., & Goldstein, S. (1973). Verbal interactions: Mothers and their retarded children vs. mothers and their non-retarded children. American Journal of Mental Deficiency, 77(4), 415-417.
- Masur, E. (1980). The development of communicative gestures in mother-infant interactions. Papers for Research in Child Language Development, 19, 121-128.
- McCollum, J., & Stayton, V.D. (1985). Infant/Parent interaction: Studies and intervention guidelines based on the SIAI Model. Journal of the Division for Early Childhood, 9, 125-135.
- McCormick, L. (1984). Review of normal language acquisition. In L. McCormick & R.L. Schiefelbusch (Eds.), Early language intervention (pp. 36-83). Columbus: Charles E. Merrill Publishing Co.
- Messick, C., Chapman, K., Brown, B., & Spitz, R. (1983). Communicative intent by Down's syndrome and normal children. Paper presented at the Symposium on Research in Child Language Disorders, Madison, Wisconsin.

- Miller, J.F. (1985). Language and communication characteristics of children with Down syndrome. Paper presented at the National Conference, Down syndrome: State of the art, Boston, Massachusetts.
- Moran, D.R., & Whitman, T.L. (1985). The multiple effects of a play-oriented parent training program for mothers of developmentally delayed children. Analysis and Intervention in Developmental Disabilities, 5, 73-96.
- Motti, F., Cicchetti, P., & Sroufe, A. (1983). From infant affect expression to symbolic play: The coherence of development in Down syndrome children. Child Development, 54, 1168-1175.
- Nelson, K. (1978). Early speech in its communicative context. In F. Minifie and L. Lloyd (Eds.), Communicative and cognitive abilities-Early behavioral assessment (pp. 443-473). Baltimore: University Park Press.
- Olson, D. (1980). Some social aspects of meaning in oral and written language. In D. Olson (Ed.), The social foundations of language and thought (pp. 156-186). New York: Norton.
- Osofsky, J., & Connors, K. (1979). Mother-infant interaction: An integrative view of a complex system. In J. Osofsky (Ed.), Handbook of infant development (pp. 519-548). New York: Wiley and Sons.
- Peterson, G., & Sherrod, K. (1982). Relationship of maternal language to language development and language delay of children. American Journal of Mental Deficiency, 96, 398.

- Ratner, N., & Bruner, J. (1977). Games, social exchange and the acquisition of language. Journal of Child Language, 5, 391-401.
- Reed, R.B., Pueschel, S.M., Schnell, R.R., & Cronk, C.E., (1980). Interrelationships of biological, environmental and competency variables in young children with Down syndrome. Applied Research in Mental Retardation 1, 161-174.
- Rees, N. (1978). Pragmatics of language: Applications to normal and disordered language development. In R. Schiefelbusch (Ed.), Bases of language intervention (pp. 192-268). Baltimore: University Park Press.
- Revusky, S.H. (1967). Some statistical treatments compatible with individual organism methodology. Journal of the Experimental Analysis of Behavior, 10 (3), 319-330.
- Rogers-Warren, A.K., & Warren, S.F. (1984). The social basis of language and communication in severely handicapped preschoolers. Topics in Early Childhood Special Education, 4(2), 57-72.
- Rondal, J. (1978). Maternal speech to normal and Down's syndrome children matched for mean length of utterance. In C. Meyers (Ed.), Quality of life in severely and profoundly mentally retarded people: Research foundations for improvement (pp. 193-265). Washington, D.C.: American Association on Mental Deficiency.
- Rowland, C. (1984). Preverbal communication of blind infants and their mothers. Journal of Visual Impairment and Blindness. 78(7), 297-302.

- Schaffer, H.R. (Ed.) (1977). Studies of mother-infant interaction. New York: Academic Press.
- Smith, B.L., & Oller, D.K. (1981). A comparative study of pre-meaningful vocalizations produced by normally developing and Down syndrome infants. Journal of Speech and Hearing Disorders, 46, 46-51.
- Snow, C. (1981). Social interaction and language acquisition. In P. Dale, & D. Ingram (Eds.), International perspectives in language acquisition (pp. 195-214). Baltimore: University Park Press.
- Snow, C.E. (1984). Parent-child interaction and the development of communicative ability. In R.L. Schiefelbusch & J. Pickar (Eds.), The Acquisition of Communicative Competence, (pp. 69-107). Baltimore, Maryland: University Park Press.
- Snyder, L. (1978). Communicative and cognitive abilities and disabilities in the sensorimotor period. Merrill-Palmer Quarterly, 24, 161-180.
- Spradlin, J.E., & Siegel, G.M. (1982). Language training in natural and clinical environments. Journal of Speech and Hearing Disorders, 47, 2-6.
- Stern, D., Beebe, B., Jaffe, J., & Bennett, S.L. (1977). The infant's stimulus world during social interaction: A study of caregiver behaviors with particular reference to repetition and timing. In H.R. Schaffer (Ed.), Studies of mother-infant interaction. New York: Academic Press.

- Stevenson, M.B., Leavitt, L.A., & Silverberg, S.B. (1985). Mother-infant interaction: Down syndrome case studies. In S. Harel, & N.J. Anastasiow, (Eds.), The at-risk infant: Psycho/socio/medical aspects, (pp. 389-395). Baltimore, London: Paul H. Brookes Publishing Co., Inc.
- Stoel-Gammon, C. (1980). Phonological analysis of four Down's syndrome children. Applied Psycholinguistics, 1, 31-48.
- Stokes, T.F., & Baer, D.M. (1977). An implicit technology of generalization. Journal of Applied Behavior Analysis, 10, 349-367.
- Sugarman, S. (1973). A description of communicative development in the prelinguistic child, Unpublished honors thesis, Hampshire College.
- Sugarman, S. (1978). Some organizational aspects of pre-verbal communication. In I. Markova (Ed.), Social context of language (pp. 49-66). New York: John Wiley.
- Tyler, N.G., Kogan, K.L., & Turner, P. (1974). Interpersonal components of therapy with young cerebral palsied. American Journal of Occupational Therapy, 28(7), 395-400.
- Uzgiris, I.C., & Hunt, J.M. (1975). Assesment in infancy: Ordinal scales of psychological development. Chicago: University of Illinois.
- Vietze, P.M., Abernathy, S.R., Ashe, M.L., & Faulstich, G. (1978). Contingent interaction between mothers and their developmentally delayed infants. In G.P. Sackett (Ed.), Observing behavior, Volume 1: Theory and applications in mental retardation (pp. 115-132). Baltimore: University Park Press.

- Walker, J.A., Levine, M.H., Grasse, D.M. (1982). Maternal language in teaching and play interactions with handicapped babies. Journal of the Division for Early Childhood, 5, 86-96.
- White, O.R., & Haring, N.G. (1980). Exceptional teaching. Columbus: Charles E. Merrill Publishing Co.

Appendix A

Elicitation Tasks and Scoring Procedures

TASKS

Requests/Imperatives (Bruder, 1984; Dale, 1980; Snyder, 1978)

1. Give child small stuffed animal. Hold baby blanket, baby hat, and feeding bottle.
 2. Give child a block. Hold pail filled with blocks.
 - *3. Give child part of telephone. Hold receiver.
 - *4. Windup airplane. Put on surface to run down.
 5. Give child an empty plate. Hold clear plastic bag filled with cheerios.
 6. Give child one car. Hold an open box of cars.
 7. Give child a drumstick. Hold a drum.
 8. Give child clear plastic jar of cookies which child cannot open. Stay near child.
 9. Place toy truck near child. Place hand on it.
-

10. Give child clear plastic box of toys which child cannot open.
Stay near child.

*from Dale (1980)

TASKS

Comments/Declaratives (Dale, 1980; Snyder, 1978)

1. Child drops 3 blocks into pail. (May assist.) Then offer doll.
- *2. Roll 3 balls to child. Then roll baby bottle.
- *3. Hit xylophone with stick 3 times. Then offer spoon.
- *4. Roll car to child 3 times. Then roll ball.
5. Push toy car on surface 3 times. Then place toy pig on wheels on surface.
- **6. Hold box. Take out 3 balls. Then take out ring of keys.
7. Blow up balloon. Let air out.
8. Show and shake bells. Out of sight, turn on radio.
9. "Kiss" child with baby doll 3 times. Then offer teddy bear.

10. Model feeding small stuffed dog with spoon. Child feeds dog 3 spoonfuls. (May assist.) Then give child baby bottle.

* from Dale (1980)

** new

Comment/Declarative Scoring Hierarchy

<u>Score</u>	<u>Behavioral Description</u>
N	No or minimal notice of newness (score presupposition).
1	a. Child looks at adult. b. Child physically manipulates adult to get attention.
2	Child "shows off" to get adult's attention (child attention not focused on adult or object).
3	a. Child shows or gives object to adult to get adult to attend. b. Child points to object to get adult to attend.
4	a. Child shows, gives or points to adult <u>and</u> vocalizes. b. Child examines object and vocalizes.
5	Child uses word to get adult to attend to object.

Presupposition (use to refine score of comment/
declarative if that score is N or 1)

<u>Score</u>	<u>Behavioral Description</u>
0	No apparent notice of newness.
1	a. Child looks at object for at least 2 seconds. b. Child performs new action with object.
2	Child attempts to communicate newness to adult.

Request/Imperative Scoring Hierarchy

<u>Score</u>	<u>Behavioral Description</u>
N	No response to needed object or agent.
1	a. Child looks at adult. b. Child looks at object. c. Child removes adult's fingers.
2	a. Child looks at adult <u>and</u> fusses or vocalizes. b. Child extends arm toward object, or reaches, or points, <u>and</u> fusses or vocalizes.

- c. Child looks at and reaches for adult's hand.
 - d. Child removes adult's fingers and fusses or vocalizes.
- 3
- a. Child points to and/or reaches for the object and then looks at adult.
 - b. Child points to and/or reaches for the object and then looks at adult's hand.
 - c. Child gives object to adult without eye contact but does vocalize.
- 4
- a. Child gets adult's attention then points to or reaches for object.
 - b. Child gives object to adult and makes eye contact, may vocalize.
- 5
- a. Child uses a word to express desire for object or action.

Appendix B

Packet of Parent Materials

Part 1: Goal of Intervention

Target objective: (child's name) will increase frequency of production of 1) requests - will point to, reach for, object/activity and look at adult; and 2) comments - will show, or give object/activity to adult and look at adult.

Part 2: Turn-taking Intervention

Strategies:

As a way of helping your child communicate more intentionally, we'd like you to use the following 3 strategies. These strategies take a conversational approach. We'll use the playful, back and forth nature of games to move towards conversations with words.

1. Follow your child's lead.

Watch. See what your child is interested in. Copy your child. Do what s/he says or does. If s/he says "bu-bu" you say "bu-bu;" if s/he bangs blocks together, you bang blocks together. Now you are sharing an activity and the stage is set for taking turns.

If copying doesn't work, you can try giving your child a choice. Put out two toys. Let him/her choose one. See what s/he does, then copy.

Or try gesturing (silently) as if to say "What shall we do?"

2. Take turns

This strategy emphasizes the back and forth nature of shared play and eventually conversation. Try to get the activity or conversation to continue for several turns. Try to balance turns.

Take your turn and wait. Count to 5 (silently) if you need to. After your child takes a turn, then you take another turn.

Remember anything can be a turn--a smile, a grunt, a reach, sounds, or a swipe at a toy.

If your child "forgets" to take a turn, try repeating his/her previous turn. Or, touch, or point to the toy. Or, remind him/her with words.

3. Elaborate

Now you and your child are sharing an activity or topic and taking turns. Add one new element to your turn as a way of getting your child closer to her communication goal. For example, when your child points to the ball, you can take your turn by pointing to the ball and saying "ball."

Try to add just one new thing. Keep your words and phrases simple. Don't use a lot of words.

If you've jumped too far ahead, or your child loses interest, go back to the first strategy. Watch. Then copy what your child does.

Part 3: Games

These are the games we'd like you to use to encourage turn-taking and more sophisticated communication skills. Try to use some of these games everyday. But, also incorporate the "strategies" into other games and routines. If you need any of the toys or materials please let us know.

1. BALL

This is simply the game of rolling a ball back and forth with your child. After you and baby have taken a few turns, try waiting before you roll the ball back. See if your child "asks" for the ball. Take some more turns, then try waiting again.

2. BUBBLES

This game uses soap bubbles and a wand. Blow some bubbles. Let baby take her turn by looking, or pointing, or popping the bubbles. Then blow some more bubbles. After taking a few turns, try waiting before you blow more bubbles. Baby can "ask" for more bubbles. After baby watches, or points at the bubbles, show her how to "comment." Say "pop" or "oooh."

3. WIND-UP TOYS

This game uses any big or small wind-up toy. Wind-up the toy. Baby takes her turn by looking, pointing, or reaching towards the

toy. When the toy winds down, wind it up again. After a few turns, wait before you wind it up. Let baby "ask" you to wind it up again. After baby looks at, or points at the toy, you can also demonstrate "commenting" by pointing and naming the toy or action.

4. CONTAINER PLAY

This game uses any container (can, box, cup) and a handful of small objects (blocks, peg people, beads). Let baby have the container and 1 or 2 small objects. Do what she does. After a few turns, wait before you give her the next one. Let her "ask" for another one. Take a few more turns. Also try giving her something unexpected. For example, after she's put several blocks in the cup, give her the brush.

5. PEEK-A-BOO GAMES

This game involves taking turns hiding and finding toys or people. In a simple form you might drop a cloth over a doll and say "Where's the baby?" Then your child takes her turn by uncovering the doll. After a few turns, do something unexpected. Try substituting a different toy under the cloth. Does baby "comment" on the change?

6. BOOK READING

This game involves pointing and naming the pictures in a book. In its usual form, the adult points and says "Look", and the baby looks at the picture. Then the adult says "What's that?" and baby looks,

names or points. then the adult names the picture. And they go on to the next page. But baby might also pat the picture, or hold the book in the air. Follow your baby's interests.

Appendix C

Turn-taking Code

Turns

1. Units marked by a pronounced pause in which the partner might or might not take the floor.
2. Single utterance with accompanying gestures.
3. Two or more utterances strung together without a definite full stop between them.
4. Well-defined non-verbal acts
 - pointing, showing, reaching, pushing
 - nodding
 - shaking head
 - "significant" gazes
 - visual orienting to where partner points
5. Acts or utterances which have a potential connection to the other person.
6. Classify turns as response, mand, response-mand, or unlinked.

Responses

1. Answering.
2. Self-repetition when solicited by other.
3. Repetition, imitation of others most recent turn.
4. Requests for clarification ("huh"; "what")
5. Continuation of topic.
6. Responsive expressions ("Yeah," "Uh-huh," "OK").
7. Responsive gestures ("looking;" "taking object").
8. Turns beginning with "and," "but," "because."

9. Continuing a cadence.
10. Commenting on other's behavior.
11. Helpful gestures.

Mands

1. Questions.
2. Commands.
3. Requests.
4. Pointing or calling attention to new topic (But if previous turn was M or R, then changing topic is UT).
5. Offering an object.
6. Expectant looks ("Well;" "Am I right?")
7. Gestures as if "I want it."
8. Gestures as if "You do it."
9. Gestures as if "look at me."
10. "Let's" phrases.
11. Modeling.

Response-Mands

1. A turn that unequivocally both responds to the other (a response) and expects a response from the other (a mand) (i.e., turn is coded as both a response and a mand).

Unlinked turn

1. No explicit or implicit connection to the previous turn.
2. Comments blantly to oneself.

Appendix D

Communicative Intention Inventory

Truman E. Coggins & Robert L. Carpenter

COMMENT ON ACTION: Direction of the listener's attention to some observable referent. An intentional behavior that appears to call the listener's attention to the movement of some object rather than the object per se.

Gestural or Gestural-Vocal

- a. Looks at an entity in action; points toward an entity in action; or is involved with an entity in action; may vocalize.

Verbal

- a. Looks at an entity in action; or points toward an entity in action; or is involved with an entity in action and produces word.

COMMENT ON OBJECT: Direction of the listener's attention to some observable referent. An intentional behavior that appears to call the listener's attention to some object identified by the child.

Gestural or Gestural-Vocal

- a. Extends arm to show entity already in hand; may vocalize.

- b. Picks-up an entity and immediately shows it to adult; may vocalize.
- c. Points to, looks toward or approaches entity; may vocalize.

Verbal

- a. Extends arm to show entity in hand and produces a word.
- b. Picks-up entity and immediately shows it to adult and produces a word.
- c. Points to, looks toward or approaches entity and produces word or word combination.
- d. Produces a word or word combination that refers to an entity not existent in the immediate environment (generally the word/word combination will either have, or require a form of the copula or the word have).

REQUEST FOR ACTION: Solicitation of services from a listener where child awaits a response. An intentional behavior that directs the listener to act upon some object in order to make the object move. The child's interest appears to be in the action of the object rather than in the object per se.

Gestural or Gestural-Vocal

- a. Looks at entity that has ceased moving, has the potential to move or be moved; reaches or leans toward entity; may fuss or whine.

- b. Looks toward entity that has ceased moving, has the potential to move or be moved; and makes ritual gesture.

Verbal

- a. Looks toward entity that has ceased moving, has the potential to move or be moved; may point toward entity or adult; may give entity to adult and produce word or word combination (e.g., turn, go, choo-choo, open it, you do it).

REQUEST FOR OBJECT: Solicitation of services from a listener where child awaits a response. An intentional behavior that directs the listener to provide some object for the child; the object is usually out of reach due to some physical or spatial barrier.

Gestural or Gestural-Vocal

- a. Stretches hand toward entity; whines or fusses while leaning toward the entity.
- b. Stretches hand toward entity with ritual gesture; may vocalize.

Verbal

- a. Looks at or touches entity; points to or reaches toward entity and produces word(s) (e.g., bubbles, more, dog, up).
- b. Produces a word or word combination that directs the listener to furnish entity not existent in immediate environment.

143

REQUEST FOR INFORMATION: Solicitation of services from a listener where child awaits a response. An intentional behavior that directs the listener to provide information about an object, action or location.

Gestural or Gestural-Vocal

- a. Looks at and/or points toward an entity, movement or location; picks up or touches entity; may vocalize (possibly accompanied by rising intonation).

Verbal

- a. Looks at adult and requests additional input about a referent; gesture may accompany request (generally a wh-word initiates the request); possibly accompanied by rising intonation.

ANSWERING: Responding to a request for information with the semantically appropriate data.

Gestural or Gestural-Vocal

- a. Responds to adult's query with affirmative head nod; may vocalize.
- b. Responds to adult's query with negative head nod; may vocalize.

- 144
- c. Provides obligatory gestural response to adult's query where the answer is visually apparent in the immediate environment; may vocalize.
 - d. Provides gestural response to adult query where the answer is not apparent in the immediate environment; may vocalize.

Verbal

- a. Responds to adult's query with affirmative verbal response; may imitate part of adult's preceding question.
- b. Responds to adult's query with negative verbal response; may imitate part of adult's preceding question.
- c. Provides a verbal response to adult query where the answer is visually apparent in the immediate environment; may imitate part of adult's preceding question.
- d. Provides a verbal response to the adult query where the answer is not apparent in the immediate environment; may repeat part of adult's preceding question.

ACKNOWLEDGING: Providing notice that a previous gesture or utterance was received.

Gestural or Gestural-Vocal

- a. Child spontaneously imitates the immediately preceding adult gesture and/or vocalization and awaits response.

- b. Child nods his head to agree or disagree with the adult's immediately preceding action request (e.g., Can you give me a kiss?) or attention request (e.g., Did you hear me?).

Verbal

- a. Child spontaneously imitates the immediately preceding adult utterance and awaits response. Child does not add any new information or modify word order.
- b. Child verbally agrees (e.g., o.k., yeah that's right) with the adult's immediately preceding action request (e.g., Shall we draw daddy?) or attention request (Do you see him?).

PROTESTING: Expressing disapproval of the speaker's action or utterance.

Gestural or Gestural-Vocal

- a. Adult initiates an activity (other than a question) that the child rejects or declines to perform. Child may turn away from adult; may fuss (brief or prolonged); may push adult's hand away or strike out at adult; may scream or vocalize.
- b. Adult initiates an activity (other than a question) that the child rejects or declines to perform. Child uses ritualized gesture to indicate disapproval or disagreement (e.g., shaking head from side to side); may vocalize.

- a. Adult initiates an activity (other than a question) that the child rejects or declines to perform. Child may shake head from side to side or push adult's hand aside; says word(s).

VITA

Name: Susan Rebecka Sandall
Date of Birth: August 12, 1952
Place of Birth: Escalon, California
Address: 718 10th Avenue E., Apt. 1
 Seattle, Washington 98102
Telephone: (206) 322-8334

Education:

<u>Institution</u>	<u>Degree and Major</u>	<u>Year</u>
University of California, Berkeley	B.A. (Physical Education)	1974
University of Oregon	M.S. (Special Education)	1977
University of Washington	Ph.D. (Special Education)	1986

Professional Experience:

1983-present	Coordinator Computer Assisted Program (CAP) Project University of Washington Seattle, Washington
1982-present	Coordinator Infant-Parent Program University of Washington Seattle, Washington
1980-1983	Teaching Assistant College of Education University of Washington Seattle, Washington
1981-1982	Evaluation Specialist Innovative Vocational Models for Deaf/Blind University of Washington Seattle, Washington

1976-80

Preschool Teacher/Research Assistant
 Center on Human Development Preschool
 University of Oregon
 Eugene, Oregon

Publications and Papers:

- Bricker, D. and Sandall, S. Mainstreaming in preschool programs: How and why to do it. Education Unlimited, September, 1979.
- Coggins, T. E. and Sandall, S. The communicatively handicapped infant: Application of normal language and communication development. In S. G. Garwood and R. R. Fewell (Eds.), Educating handicapped infants. Rockville, MD: Aspen Systems, 1982.
- Fewell, R. R. and Sandall, S. R. Assessment of high-risk infants. In K.E. Allen and E. Goetz (Eds.), Early childhood education: Special environmental and legal considerations. Rockville, MD: Aspen Systems, 1983.
- Fewell, R. R. and Sandall, S. R. Curricula adaptations for the young handicapped child. Topics in Early Childhood Special Education, January 1983.
- Fewell, R. R. and Sandall, S. R. Developmental testing of handicapped infants: A measurement dilemma. Topics in Early Childhood Special Education, in press.
- Fink, W. T. and Sandall, S. R. A comparison of one-to-one and small group instructional strategies on a word identification task by developmentally disabled preschoolers. Mental Retardation, February 1980.
- Fink, W. T. and Sandall, S. R. One-to-one vs. group academic instruction with handicapped and non-handicapped preschool children. Mental Retardation, June 1978.
- Fink, W. T., Sandall, S., Gabrielson Krambs, P., Taylor, S., Layton, G., and Schwartz, K. Preschool Curriculum Guide. Eugene: University of Oregon, Center on Human Development, 1979.
- Sandall, S. R., Fewell, R. R., Schlater, A., & Vadasy, P. F. A computer assisted program for underserved families. Journal of the Division for Early Childhood, in press.
- Vadasy, P. F. and Sandall, S. R. Putting computers to work for children with handicaps: Evaluating the delivery of personalized services to rural families. In D. Gentry and J. Olson (Eds.), Monograph III: Research in family involvement practices. Moscow: University of Idaho, 1986.