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THE UNIVERSITY OF ALBERTA

NATURAL TEACHING STRATEGIES FOR CHILD PRAGMATIC LANGUAGE

BY

CINDEE MAE WIEBE 

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Abstract

This research project examines the effect of intervention (Natural Teaching Strategies) on child pragmatic language development during parent-child interactions, and child-parent interaction behaviors measured during parent-child play interactions. Children in the study were 3 to 4 years old, enrolled in Head Start in the City of Edmonton. The number of children and families in this study totaled 46 (12 in Natural Teaching Strategies group, 20 in the Comparison group, and 14 in the Cooperative Family Learning group - a second Comparison group). Measures of pragmatic language include Linder's (1994) Transdisciplinary Play-Based Assessment, a turn-taking measure, and a parent-child interaction measure (adapted from Hemmeter & Kaiser, 1993). Results indicated Natural Teaching Strategies were effective in increasing child pragmatic language skills of *commenting on object*. Possible explanations for the findings and implications for further study are discussed.

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Chapter 1

Introduction

The influence of environment on human development has received much attention from both the theoretical perspective (Bronfenbrenner, 1979) and from the empirical standpoint (Kaiser, Yoder, & Keretz, 1992; Stewart, 1987; Hart & Risley, 1968; Warren, McQuarter, & Rogers-Warren, 1984; Halle, Marshall, & Spradlin, 1979; Alpert & Kaiser, 1992). Over time, studies focusing on the factors influencing a child's development have changed from a belief that the course of development is innately preprogrammed (Chomsky, 1957; Stewart, 1987).

In the last fifteen years, the role of social bases has been recognized as an important influence on child language development. The literature has suggested that through social interactions with the environment, including significant others, the child learns the necessary building blocks for the development of language, such as communicative intent, meaning implied by their behavior, the function communication fulfills, and discourse skills (Linder, 1994).

A child's first communicative interactions exert a strong influence during the early language development stages (Miller & Yoder, 1972; Bates, Camaioni, & Volterra, 1975; Dore, 1975; Halliday, 1975; Stewart, 1987). Perhaps this is why the study of pragmatic functions of young speakers, developing their skills, has

been widely explored within the area of language acquisition (Stewart, 1987).

The role of the linguistic environment of the developing child has also received attention in the area of parent-child communication. Research has revealed naturalistic teaching utilized by mothers, while in interaction with their young children, is central to the child's development (Kaiser, Yoder, & Keretz, 1992; Stewart, 1987). Naturalistic teaching includes techniques such as incidental teaching (Hart & Risley, 1968), mand model (Warren, McQuarter, & Rogers-Warren, 1984), time delay (Halle, Marshall, & Spradlin, 1979), and child-cued modeling (Alpert & Kaiser, 1992). In addition, variations of this naturalistic language teaching exist where some, or all, of these above listed components are included. Hart and Risley (1968) designed incidental teaching strategies to give the child opportunities to practice a communication skill between adult and child which arise naturally in an unstructured setting (e.g., free play).

The focus of the current research project will be an examination of the effectiveness of natural teaching strategies on child pragmatic language and parent-child interaction behaviors during a videotaped play situation. In the next section, a discussion of the development of pragmatic language, and the social context of the development of language will be presented, as will a section about parent-implemented language intervention. The statement of the problem will be further explained.

Chapter 2

Literature Review

During the last decade, "pragmatics" has become a familiar term in discussions of child language development. Its current use in child language can traditionally be traced to the field of semiotics, where pragmatics is the study of the relationship between signs or linguistic expressions and their users. Currently and traditionally, the word "pragmatics" still carries its original meaning, which is derived from the Greek word "pragmatikos," meaning "deed," implying that pragmatics is a "deed" or an action (Kaiser & Warren, 1988). Thus, pragmatics can be viewed as the method in which a person uses language in psychosocial situations. It includes speaking politely among others, turn-taking, defusing conflict, and gaining personal goals (Dreher, 1987).

The Development of Pragmatic Language

Language exists as not an end in itself, but as a means to achieve a specific communication or social function (Stewart, 1987). Children use language because they have something to say, a way to say it, and most importantly, a reason to say it (Miller & Yoder, 1972; Stewart, 1987).

In the literature, "pragmatics" has come to be known as the study of why children communicate, and the focus of related studies is primarily on the language children use to communicate (Stewart, 1987). Bruner (1975) defined

pragmatics as the "directive function of speech through which speakers affect the behavior of others in trying to carry out their intentions" (p. 283). Requests made that are verbal or nonverbal messages through facial expressions or sentences are pragmatic (Foster, 1985; Stewart, 1987).

To understand how language is acquired, one must understand how it is initially used (Bruner, 1975). Bruner (1975) has reasoned that the most primary function of pre-verbal children's communications is their achievement and regulation of joint attention and joint action. Early in a child's life, the caregiver and child share attention towards people, events, and objects. This joint attention is achieved through what Bruner calls joint referencing (Bruner, 1975; Stewart, 1987). The purpose of joint referencing is to reliably indicate to another "...which among an alternative set of things or state or actions is relevant to the child's and mother's shared line of endeavor" (Bruner, 1977, p. 275).

To discuss this further, Bruner presented three aspects of early referencing procedures; (a) indicating, (a) diexis, and (c) naming. Indicating is the postural, gestural, and idiosyncratic vocal procedures bringing another's attention to a given object, action, or state. Diexis is the use of temporal, spatial, and interpersonal contextual features of situations to assist in the management of the joint reference. Finally, naming refers to associating lexical items with extra-linguistic events shared by the child and the caregiver (Bruner, 1977; Stewart, 1987).

Bruner points out joint referencing leads to, and is, an elaboration of joint action. The object of focus of joint referencing becomes the object of joint action. Joint referencing begins at a simple level, and increases in complexity as the child develops (Bruner, 1977; Stewart, 1987). Halliday (1975) has outlined several pragmatic functions to a child's communications beyond joint attention and joint action (Linder, 1994):

1) Instrumental: goal is to satisfy the child's needs and desires ("I want milk").
2) Regulatory: goal is to control and influence the behavior of others ("No talk").
3) Interactional: goal is to both define and participate in a social interaction event ("Daddy and John go").
4) Personal: goal is to inform others of own personal opinion or feelings ("Me angry").
5) Imaginative: goal is to participate in make-believe play ("Pretend you are the Daddy").
6) Heuristic: goal is to obtain information ("Who's that?").
7) Informative: goal is the provision of information ("This is my room").

Halliday explains these simple forms of the pragmatic functions are developed by the age of 2 years. Linder (1994) points out intentions and grammatical structure are separate. Where one structure may convey many intentions, one intention may have its expression in different grammatical forms.

Linder (1994) discusses several aspects of pragmatics which are especially important in development of language in children, including intentionality, meaning, functions, and discourse. Communicative intent occurs in infant language long before the first word is uttered. Researchers have suggested that there exists a progression of the development of intentions to communicate as a child moves from pre-linguistic to multi-word communication (Bates, Camaioni, & Volterra, 1975; Linder, 1994). Bates, Camaioni, and Volterra (1975) have outlined a three-stage sequence of the development of intentionality comprised of the *perlocutionary stage*, *illocutionary stage*, and *locutionary stage*.

The *perlocutionary* stage occurs approximately from birth to approximately 8 months of age. In this stage of early infancy, the child's sounds and movements are primarily reflexive in nature, with the caregiver interpreting these behaviors to have certain meanings. For example, when a baby cries, the parent determines the child is hungry or is uncomfortable due to a wet diaper. With development of motor control, the child gains the ability to interact more with objects such as looking, reaching, and manipulating. These behaviors are not viewed as being directly communicative, rather they are more for the child's benefit (Owens, 1988; Linder, 1994).

At approximately 8 to 9 months of age, the child starts to consistently use various non-verbal behaviors displaying an intent for communication. Such behaviors represent the onset of the *illocutionary* stage. Characteristics

including the child displaying or presenting objects to the adult, or motioning towards an object which is desired. A large range of vocalizations and gestures are utilized in communicating intentions (Linder, 1994).

The final stage, the *locutionary* stage, occurs when there is an emergence of using words to communicate the child's intentions which were previously expressed non-verbally. At first, words are used in conjunction with gestures, and are tied closely to the context of the situation. However, typically throughout the preschool years, the words become less bound to context. True decontextualization can be seen when reading skills emerge (Bates et. al., 1979; Linder, 1994).

Another area of pragmatics is the meaning children exhibit at different stages and levels of their pragmatic development. Examination and identification of the intent of children's communication, as well as their method of communication of this intent, provides valuable information about the child's level of cognitive and communicative understanding of their world (Linder, 1994). Categories have been developed describing the meaning children generate at various stages and levels of age (Dore, 1975; Prutting, 1979; Coggins & Carpenter, 1981; Roth & Spekman, 1984).

For the outline of the expected age ranges for the communicative behaviors discussed above, please see Tables 1, 2, and 3.

Table 1

Communicative Intentions Expressed in Pre-linguistic, One-Word, and Multi-word Utterances

Intention	Definitions	Pre-linguistic	One Word	Multi-word
Attention seeking 12-18 months	Solicits attention to self or aspects of the environment: has no other intent.	Child tugs on his or her mom's skirt.	"Mommy" as he or she tugs on skirt.	"You know what?"
Requests objects 13-17 mo.	Demands desired tangible object: includes requesting consumable and non-consumable objects.	Child points to a dog he or she wants.	"Dog," while pointing to dog.	"Give me dog."
Request action 13-17 mo.	Commands another to carry out an action: includes requesting assistance and other actions involving another person or between another person and an object.	Child puts adult's hand on jar while looking at the adult.	"Open," while giving jar to adult.	"Mama, open bottle."
Request information 24 mo.	Finds out something about an object or event: includes "wh-" questions and other utterances having the intonation contour of an interrogative.	Child points to shoe, and with intonation of question, says "uh?"	"Shoe?" while pointing to the shoe box.	"Where shoe?"

Comment on object 13-17 mo.	Directs another's attention to an object: pointing, showing, describing, informing, and interactive labeling.	Child holds up toy car toward the adult and smiles while looking at the adult.	"Car," said while pointing.	"My car."
Comment on action 12-18 mo.	Calls listener to the movement of some object or action of others or self.	Laughs and looks at adult while adult falls down.	"Down" as adult falls.	"Bobbie fall down."
Greeting 13-17 mo.	Communicates salutation and offers conversation rituals: "hi," "bye," "please," and "thank you."	Child waves as mother leaves.	"Bye."	"Bye, Mom."
Acknowledge other's speech 9-18 mo.	Acts or utterances used to indicate that the other's utterance was not received, not in response to a question; includes repetition of an utterance.	Child acknowledges another's speech by turning head and smiling.	Child says "yea" when favorite song is mentioned.	"My song."
Other 9-18 mo.	Tease, warn, alarm, exclaim, or convey humor.	Child giggles as he or she takes a turn in a tickle routine.	Child says "no" as he or she sticks out tummy.	"No tickle me."

Note. From Transdisciplinary Play Based Assessment, by Tony Linder, 1994, p. 196-197.

Table 2

Expected Discourse Skills According to Age Level

Age	Discourse Skills	Content
By 1 year	Initiates a topic by combination of glances, vocalizations. Maintains one or two turns One-half utterances on topic, extended topic maintenance in routines.	Limited to topics that are physically present.
2 - 3 years	Can introduce topic. Engages in short dialogue of a few turns	Topic does not have to be physically present Uses attention-getting words, rising intonation (more, chat, mine).
3 - 4 years	Can engage in dialogue beyond a few turns. More aware of social aspects of discourse. Acknowledges partner's turn, can determine how much information listener needs.	Action is a common topic. Uses direct requests (May I, Could you).
4 - 5 years	Modified language when talking to younger child.	Discusses state, feelings, emotions, attitudes.
5 - 6 years	Can sustain topic through a dozen turns. Conversation much like an adults'.	Indirect requests increase. Uses most varieties of English sentences.

Note. From Transdisciplinary Play Based Assessment, by Tony Linder, 1994, p. 198.

Table 3
Semantic- Knowledge Levels Reflected in Words

Age	Knowledge Type	Description
9 - 15 months	Referential knowledge	A particular word represents a specific item (e.g., "bankie" refers to the child's blanket only).
15 - 18 months	Extended Knowledge	A word represents various kinds of objects (e.g., "chair" can mean several types of chairs).
18 months +	Relational Knowledge	A word understood to relate to itself or something else. Categories of relational words include: (Reflexive relational) (mark existence, nonexistence, disappearance, and recurrence: "this," "all gone," "more"). (Action relational) (movement implied: "up," "down," "bye-bye," "do"). (Location relational) (direction or spatial relationship - where object is located). (Possessional relational) (object associated with a person: "mine").
2 years +	Categorical Knowledge	The semantic category of words demonstrating the awareness of common aspects among objects (e.g., the word "toys").
4 - 5 years	Metalinguistic knowledge	The ability to think about language and comment on it as well as produce and comprehend it (e.g., the child states the "ball" begins with 'b').

Note. From Transdisciplinary Play Based Assessment, by Tony Linder, 1994, p. 199.

Where Communication Develops: The Social Context

Children's social context plays an important role in their acquisition of language. Bronfenbrenner's (1979) ecological model of child development uses systems theory to explain that development occurs within the multiple levels of interactive social context. Most of the emphasis focuses on children's proximal microsystem, their family, and their corresponding daily activities, roles, and interpersonal relationships within the family. A child's development is reasoned to be influenced by the many systems in their surrounding environment, other microsystems such as daycare settings or schools, and the interactions between microsystems (the mesosystem). More generally, children's development is influenced by external systems. For example, events occurring in the parent's place of work may have indirect effects on children's development through their financial, emotional, or physical impact on parents. Further, events occurring in the larger societal sphere (e.g., neighborhood violence, health care availability, or child services availability) may somehow effect children's development (Black, 1995).

The study of language as it develops within this system has underscored the importance of the influence of natural interactions (Bronfenbrenner, 1979; Bruner, 1983). Research has shown that children do learn language through natural interactions and reciprocal turn-taking. Snyder-McLean, Solomonson, McLean, and Sack, (1984) outlined interaction characteristics critical to communication development. Interaction characteristics include a ritualized

interaction pattern involving joint action, a central theme or goal following a logical sequence, each participant playing a recognized role, and specific response expectancies (Stewart, 1987). In addition, joint attention and action routines have been demonstrated to serve as "scaffolding" of the child's early language (Ninio & Bruner, 1978; Ratner & Bruner, 1978; Tomasello & Farrar, 1986; Stewart, 1987).

Turn-taking within joint routines can be a vehicle for learning, whereas the joint routine provides a structure within which a child can increase his/her response repertoires (Kaye, 1977; MacDonald & Gillette, 1984; Stewart, 1987). It is the dynamic give-and-take elements of conversation, the method of effecting another and being effected by their behaviors, and acts of communication which facilitate language acquisition (Snyder-McLean et al., 1984).

Play routines of parents and their children provide the basis for the development of language where children learn to regulate parents' attention and action. One basic feature of game playing is *joint referencing*. Joint referencing begins pre-linguistically with a mother's visual regard following her infant to ensure that he or she is focusing on what holds the child's attention. This mutual focus of attention leads to joint action where the dyad engages in an activity with the object to which the focus of attention originated. In other words, what is occurring is an expansion of joint referencing where reciprocal activity

between the parent and child with that object. This activity often includes commenting on that object (Bruner, 1977).

A framework for the rules of communication exchange is provided by these joint action routines. Ratner and Bruner (1978) found that joint action routines with pre-verbal children aged 5 to 9 months are able to develop communication strategies. Further, learning occurred in those situations where the interaction was highly ritualized, and the role of each individual was reversible and delineated (Stewart, 1987).

Snyder-McLean et al. (1984) revealed joint activities to be important with older children in the pre-linguistic state of development as well. Joint activities can begin simply and can progress to more complex levels with respect to the enrichment of the action and length of interaction. Engaging in verbal or non-verbal behaviors which capture the interest of the child can be an important tool in the development of language.

Engaging in play activities, such as games, can help children learn when they must take their turn (Snow, 1981). This skill, called "slot-filling", is when the child must learn to take their turn, or "fill the slot," at the appropriate time (Snow, 1981). Snow outlines several possible effects of engaging in game playing for development of communicative abilities:

1) Contribute to the child's understanding of conversational rules;

2) Frequent game playing and game playing in well practiced routines

can help develop a child's ability to use language with a social function (e.g., saying hello or bye bye), and to vocalize their desires for objects and/or attention from adults (Nelson, 1973).

3) Children can learn about combining words with actions in situations where words or actions fill in the predictable slots (e.g., peek-a-boo games).

In early games, infants begin turn-taking by using only gestures to communicate rather than vocalizing. More gestural signals than vocal signals are revealed by both the ontogony of turns in games, and from several other sources as well: (a) the fact there is more precocity of first language signers versus speakers; (b) hearing children having limited vocal development use gesture in a widespread and sophisticated manner; (c)children in later stages of language acquisition use gesturing along with verbal communication; (d)mothers with children who are at the pre-linguistic stage use gesturing more with their children and with other children on a widespread basis; and (e)children with limited access to auditory input, or those who are autistic, effectually learn language through sign, as do children with a specific language deficit (Snow, 1981).

Considering how natural gesture and action are a method of communicating for children, it is logical that obtaining experience in game playing could contribute to communicative development. Skills enabling the

child to communicate can be practiced through games including taking turns during social interaction, following the rules to know when it is the child's turn, and varying the content of the turn within the limits which are prescribed by the rules of the game (Snow, 1981). Experiences with games and routines lead to learning and create an environment which leads to the development of more complex communication skills than may otherwise been developed without the experience. Thus, experience of this type of interactive situation may help facilitate learning the generalization of social ways of communicating, like turn-taking, using behavior to communicate, and "filling in slots" in discourse in an appropriate manner (Snow, 1981). Therefore, any intervention focusing on the child's language should be ecologically based and relevant to the child's needs within his or her environment. The following section presents a review of the literature on parent implemented language intervention.

Parent-Implemented Language Intervention

For over 20 years, interventions that are parent-implemented have been used to increase language skills in children with language delays (MacDonald & Gillette, 1984; Alpert & Kaiser, 1992; Hemmeter & Kaiser, 1994). The rationale behind teaching parents to facilitate language with their child has been built around two assumptions; parents are usually the first people teaching language to their child, and the context of the parent-child relationship allows many opportunities to teach the child language skills during naturalistic interactions (Hemmeter and Kaiser, 1994).

Experimental studies on parent-implemented interventions have found parents to be proficient at providing interventions that have been shown to increase child language skills. Alpert and Kaiser (1992) studied parent-implemented milieu language intervention and found mothers could be taught to correctly implement this teaching approach with their children during play interactions. The researchers also found these teaching strategies generalized to non-training situations and that three months after training, mothers were able to sustain acceptable levels of frequency and percentage of correct use of techniques (75% accuracy and above).

Hemmeter and Kaiser (1994) outline two conceptual approaches for teaching language found in the literature on parent implemented language intervention. The first approach teaches language within naturally occurring interactions, and is referred as a milieu intervention approach. Milieu language

intervention is defined as the application of operant teaching strategies within the context of everyday communicative interactions (Kaiser & Warren, 1988). Based on the following eight assumptions from Kaiser, Alpert, Hemmeter, and Ostrosky (in press), milieu language intervention should;

1) occur in the natural environment;

2) be implemented by significant others;

3) follow the child's attentional focus;

4) teach functional language;

5) focus on the simultaneous training of linguistic forms, their functions, and strategies for learning language;

6) have learning experiences that are brief and positive;

7) include incidental learning which is critical to effective training;

8) train for generalization to other situations and settings.

Two studies have analyzed a parent implemented milieu teaching approach, Alpert and Kaiser (1992) and Laski, Charlop, and Schreibman (1988). Child outcomes for Laski, Charlop, and Schriebman, (1988) included increases in the number of child vocalizations. Alpert and Kaiser (1992) found developmental changes (e.g., greater increases in mean length of utterance, requesting, and total number of words and novel words spoken) occurring more

so for those children receiving the milieu language intervention than those not receiving the intervention (Hemmeter & Kaiser, 1994).

The second type of studies on parent implemented language intervention are those adopting an interactionist approach, with the primary focus being to facilitate parent-child interactions to increase the development of language acquisition (Bruner, 1975; Mahoney & Powell, 1988; Warren & Yoder, 1994). Interventions focusing on response interactions are based on describing interactions between the child and their caregiver. Facilitation of parent-child interactions for this type of study usually include goals such as increasing the responsiveness of the parent, decreasing directives, and achieving a balance between parent and child in their conversations and interactions. Parents are taught to follow their child's attentional lead, be responsive to their child's attempts at communication, and to increase the number of contingent responses of the parent to the child (Hemmeter & Kaiser, 1994; Warren & Yoder, 1994).

A review of studies of parent-implemented responsive interaction interventions (Hemmeter & Kaiser, 1994) have found that after training, mothers;

1) increased speech relevant to their child's interest (compared to a control group) (Weistuch & Lewis, 1985; Tannock, Giralometto, & Seigel, 1992);

2) expanded more often to their child's utterances (Weistuch & Lewis, 1985);

3) provided a greater number of opportunities for the child to take turns (Giralometto, 1988);

4) increased their responsiveness to their children (Mahoney & Powell, 1988; Tannock, Giralometto, Seigel, 1992).

Regarding child outcomes for the studies on parent implemented responsive interaction interventions, Yoder (1992) found responsive interaction to be more effective than milieu teaching for children with a mean length of utterance less than 2.5. Response interaction intervention was less effective for children having a mean length of utterance greater than 2.5. The intervention being less effective for those children with a mean length of utterance greater than 2.5 was reasoned to be perhaps due to the possibility that elicited production prompts such as elicited information, or "test questions" (questions to which the child knows the answer) are avoided in a response interaction approach. Warren et al. (1984) reason, during the period of language development where the child is at a level where their mean length of utterance is less than 2.5, elicited prompts may exert a strong positive influence on language development.

Statement of the Problem

The evidence indicating a positive relationship between teaching parents to implement these intervention strategies and child language development has been limited. Comparing child outcomes from implementing language intervention approaches is difficult due to the great number of child outcome measures which are employed in the various studies (Hemmeter & Kaiser, 1994).

Milieu teaching and responsive interaction interventions have been found, in some way, to increase child language development. In the present study, aspects of milieu teaching and responsive interaction teaching, including environmental arrangement, are included to create a Natural Teaching Strategies (NTS) program with the goal of improving parent-child interactions and child language development. The NTS program also includes parent modeling appropriate language to the child, talking at the child's developmental level, and parent expansion of the child's utterances (Hemmeter & Kaiser, 1994). These techniques are suggested to be the most powerful at increasing child's language learning in naturalistic interventions (Hemmeter, 1991).

There is also a lack of research examining the effects of a naturalistic intervention to improve child pragmatic language development as displayed through parent-child interaction for those children who are considered to be at-risk for communication and behavior difficulties. This lack of research is particularly evident in studies utilizing NTS, which are taught to the parents with the intention of the parent being able to implement these strategies in their own

home during direct interaction with their child on a day to day basis (Hemmeter & Kaiser, 1994).

The purpose of this study is to examine the development of dyadic interaction styles, concerning pragmatic language functioning, in families with children who are identified as being at-risk for communication and behavior difficulties. The families were divided into one of three groups. Although all three groups were receiving Head Start, the first group receives in addition, Natural Teaching Strategies intervention, while the other two groups serve as comparison groups. The two comparison groups include one group receiving Cooperative Family Learning (CFL) and the other receiving only Head Start (the Comparison group). Pragmatic functioning was observed in the child's' use of linguistic and non-linguistic communication in a parent-child interaction during a natural play situation in their home. Pragmatic functioning also included parent-child interaction behaviors.

Rationale and Research Questions

Rationale

As discussed in the previous sections, great importance is being attributed to the roles of linguistic environment and the social context within which a child develops. The communicative relationship that exists between the parent and the child acts as a facilitator to the development of language and communication (Bruner, 1975; Snyder-McLean, et al. 1984).

It has been argued that facilitating features of pragmatic language development through parental training can be effective with children who may be at risk for developmental delay. In particular, the use of routines that were consistent and familiar can provide a framework that can support new language acquisition.

The purpose of the present study is to examine the effects of a natural teaching strategy intervention presented to parents to promote development in the area of pragmatic language for their at-risk child and parent-child interaction behaviors. The identification of families that are included in the study is discussed in the Participants section of Methods and Procedures.

Research Questions

This study examines the relationship between groups, specified as Natural Teaching Strategies (NTS), Cooperative Family Learning (CFL), and Comparison, to the development of child pragmatic language and parent-child interaction behaviors. The specific research questions address child pragmatic language, parent-child interaction behaviors, and turn-taking.

Child Pragmatic Language

Research Question #1 Is there a difference among the groups (Natural Teaching Strategies, Cooperative Family Learning, and Comparison) for pragmatic language use over the course of the study?

Parent-Child Interaction:

Research Question #2 Is there a difference among the groups (Natural Teaching Strategies, Cooperative Family Learning, and Comparison) for number of child initiations over the course of the study?

Research Question #3 Is there a difference among the groups (Natural Teaching Strategies, Cooperative Family Learning, and Comparison) for number of child responses over the course of the study?

Research Question #4 Is there a difference among the groups (Natural Teaching Strategies, Cooperative Family Learning, and Comparison) for number of parent initiations over the course of the study?

Research Question #5 Is there a difference among the groups (Natural Teaching Strategies, Cooperative Family Learning, and Comparison) for number of parent responses over the course of the study?

Research Question #5a Is there a difference among the groups (Natural Teaching Strategies, Cooperative Family Learning, and Comparison) for number of *follow the child's lead* parent responses over the course of the study?

Turn-taking

Research Question #6 Is there a difference among the groups (Natural Teaching Strategies, Cooperative Family Learning, and Comparison) for number of turns over the course of the study?

Research Question #7 Is there a difference for median length of turns in interaction between group (Natural Teaching Strategies, Cooperative Family Learning, and Comparison) over the course of the study?

Research Question #8 Is there a difference between length of time spent in interaction (measured in seconds) for groups (Natural Teaching Strategies, Cooperative Family Learning, and Comparison) over the course of the study?

Chapter 3

Methodology and Procedures

The purpose of this study was to examine the relationship between NTS intervention and child pragmatic language. Child behaviors and parent-child interactions were observed and coded. The subjects were randomly assigned to one of three groups; NTS, CFL, or a Comparison group using a table of random numbers. The data from the CFL group and the group receiving only Head Start (the Comparison group) served as comparison groups allowing for a greater degree of confidence concerning causal inferences of the effects of the interventions. The information obtained from observing these three groups was statistically analyzed to determine whether differential effects on child pragmatic language for the three groups were occurring.

Research Design

The design of the project is a randomly assigned control group design with repeated measures which allows for each family and child to be measured and compared to themselves over the course of one year. For this study, the measures included for analysis were for baseline and at three months. The design involves collection of data from the families and children in their homes via videotape of parent-child interactions during play vignette.

The observational method of obtaining data for the present study resulted in quantitative data for analysis. Obtaining data utilizing observational methods to measure child pragmatic language through parent-child interactions is advantageous for many reasons. Observation allows the assessment of difficult-to-test behaviors and skills, to identify functional relationships between environmental stimuli and child behavior, and to monitor intervention effectiveness (Bailey & Woollery, 1989). In addition, when the participants were observed in a natural and comfortable setting, such as their home, they would be more likely to display spontaneous behaviors which may not occur if the observation was to take place in an unfamiliar setting. One caution of using observation in a natural setting is that the researcher must define the discrete categories of behavior, which is challenging when observations of interactions are usually without distinct beginnings and endings (Fleming, 1996).

Participants

Information regarding the participants in this study, as well as the procedures and protocol for obtaining data during family visits, was obtained from Fleming's (1996) University of Alberta unpublished masters thesis which utilized the same subject pool. For the demographic information on the participating families, refer to Appendix A. See Appendix B for the participation consent form.

The participants in the study were families involved in an ongoing research project, The Child and Family Resiliency Project. A minimum of 12 children and their families were selected from each of the three Head Start Centers in the Edmonton, Alberta area. There were 47 families with children ranging in age from 3 to 4 years that have been identified as meeting the inclusion criteria for the Head Start program. A total of 20 families were in the Comparison group, 14 families were in the CFL group, and 12 families were in the NTS group. Therefore, 34 families were utilized for a comparison to the NTS intervention.

To enter any Head Start program in the area of Edmonton, Alberta, the Student Admission Policy has outlined four criteria that must be met:

I. Age of child

The child must be a minimum of 3 years and 6 months in age by September 1 of the program year. The child can not be older than 5 years and 6 months by the first day of September.

II. Grant eligibility - Level of need/delay:

Alberta Education: As outlined in the Alberta Education Manual for Special Needs Funding, the child must meet the criteria for Special Needs Funding (mild-moderate disability, specifically emotional/behavioral disability, learning disability, or speech and language impairment) or Program Unit Funding (severe disability, specifically emotional/behavioral disability). For a complete listing of the requirements for eligibility for Special Needs Funding and Program Unit Funding, see Appendix C.

Brighter Futures (Health Canada): The priority target group, at-risk pre-school children, are defined by Health Canada as the following:

1. Children from low income families;
2. Aboriginal children who are off-reserve, as well as other minority children determined to be at risk.
3. Children from single parent homes, and/or parents who are young.
4. Children from families having a combination of risk factors including:

   (a) Homelessness and/or family poverty;

   (b) parents who are inexperienced or young;

   (c) neglect or abuse;

   (d) poor health or poor nutrition (including low birth weight);

   (e) parental substance abuse;

   (f) family breakdown;

(g) lack of access to social, medical, early educational, mental health, or respite services;

(h) lack of support from the community;

(i) parents with chronic mental illness.

III Family income level

Income Guidelines are based on data from Statistics Canada (dated February 9, 1996) for Low-Income Cut-Offs. The income figures are gross annual income and Family Size is the total number of children and adults.

Family Size	Income Cut-Off
2	$21,092
3	$26,232
4	$31,753
5	$35,494
6	$39,236
7	$42,978

IV. Involvement of parents:

For each child, a minimum of one parent or guardian must be willing and available to participate in a weekly parent group, or agree to an alternative form of parental involvement, such as visiting the child's classroom.

Children selected for inclusion in the study, in addition to qualifying for inclusion in the Head Start program, exhibited mild to moderate delays in two or more developmental domains as measured with the McCarthy Scale of Children's Abilities.

Each of the families were randomly assigned to one of the 3 groups (NTS, CFL, and Comparison group). In the present study, the Natural Teaching Strategy intervention is the independent variable and the CFL and Comparison group were comparison groups. The group receiving only Head Start was called the Comparison group. The Natural Teaching Strategy intervention is based upon a manual developed and written by McDonald, Kysela, Martin, & Wheaton (submitted).

The focus of the NTS manual is to present and discuss several strategies for parents interactions with their young child having special needs. The five chapters are entitled: *Follow your child's lead through imitation and turn taking; Keeping the action going (extending turn taking interaction); Expansion of children's response-adding something more; Incidental Teaching Strategies, A new look at problem behavior;* and a *Wrap-up session*. Please see the NTS manual for the full details (McDonald et al, submitted). The titles of the above

segments in the manual provide for the 12 sessions which were followed by three months of follow-up with the families to ensure they were able to use these strategies within their child rearing practices. The schedule for NTS intervention is presented in Appendix D. It was hypothesized these strategies would enhance pragmatic performance and interaction between a parent and their child. Studies in the literature have found parents reported these strategies useful in assisting with their child's development of communication (McClellan, 1990; McDonald et al., 1984).

Data Collection of Dependent Measures

The parent-child play interactions were videotaped in the familys' homes. For each visit to the familys' homes (baseline and three months), a 15 minute episode of play was videotaped. Each of the three data collectors were trained regarding the proper procedures for data collection, as well as use and maintenance of the video camera (See Appendix E for the home visit protocol). Each data collector was then randomly assigned to each family using a table of random numbers. Appointments for videotaping were made via telephone by the data collectors. If the family did not have a telephone, the data collector made the appointment in person. A script for the initial telephone contact is in Appendix F. When the data collector arrived at the family's home, he or she collected demographic information and explained the purpose of the session. The video camera was then set up and the instructions for play were given (see

Appendix G). The family's play interactions were videotaped for 15 consecutive minutes with toys provided by the data collector. At the end of the 15 minute session, the data collector turned off the video camera and informed the family the videotaping of the play session was over. The data collector then thanked the families for their participation and arranged for the next visit.

One random three minute session was analyzed from each video tape for baseline and three-months using the Interactive Language Measure adapted from Hemmeter and Kaiser (1994), the Transdisciplinary Play Based Assessment (Linder, 1994), and a turn-taking measure created by the present author. Both the Interactive Language Measure and the turn-taking measure are continuous-observation systems where the behaviors of the parent and child were coded while the coder watches the video playback of the play session. In the time sampling method, the observer records the frequency of the behavior over time. This method involves observing the behavior in a person, or persons, and recording whether it is present or absent. Advantages of time sampling included expending less time and effort as compared to narrative recording. An additional advantage is that time sampling is increased objectivity and control due to the fact the behavior is specified and limited allowing the observer to collect data regarding number of behaviors simultaneously. It provides useful information on frequencies and intervals of behavior. Finally, time sampling

provides for quantitative results which are useful for statistical analyses (Beaty, 1990).

The Interactive Language Measure includes three main types of behavior: *initiations, responses,* and *non-engaged* behaviors with sub-types defined in each of the three categories for both parent and child. Parent initiation behaviors include *instruction, question, prompt, recruiting child's attention*. Parent response behaviors include *repeating, mirroring, expansion,* and *clarification seeking, acknowledgment /praise, following the child's lead,* and *negative feedback*. Non-engaged parental behavior includes *comment, no response,* and *unintelligible*. See Appendix H and I for the operational definitions of these constructs, and the Interactive Language Code Scoring sheet, respectively.

Child response behaviors in the Interactive Language Measure include *obligatory correct, unrelated response, related but incorrect, unintelligible,* and *imitative*. Child initiation behaviors comprise *unintelligible initiations, verbal requests, nonverbal requests,* and *questions*. Non-engaged behaviors include *comments, nonverbal behaviors,* and *losing interest*. See Appendix I for the operational definition of these constructs.

The turn-taking measure is an extension of the Hemmeter and Kaiser interaction measure. It includes *parent initiations and responses, child initiations and responses, terminations, activity engaged in, total number of turns for the three minute behavior sample,* and *a tally of the type of turns per interaction.*

See Appendix J for the operational definitions of these constructs, and Appendix K for the turn-taking coding sheet. The turn-taking summary score-sheet is presented in Appendix L.

An additional measure of pragmatic language used in this study was Linder's (1994) Transdisciplinary Play Based Assessment (TPBA). The same three minute segment of the parent-child interaction used in the Hemmeter and Kaiser and the turn-taking measure, was also used for the TPBA in a similar fashion where the coder observed the interaction and coded the pragmatic language behaviors as they occur. The child's pragmatic language level is determined through the examination of qualities of interaction such as the *pragmatic level of intention demonstrated, the meaning implied by the child's gestures, vocalizations, verbalizations, functions the child's communication fulfills,* and *the discourse skills demonstrated.*

To be more descriptive in the definitions of the dependent variable, each of the aspects of pragmatic language functioning will be examined. The pragmatic level of intention demonstrated will be measured by determining which stage the child is demonstrating (e.g., *perlocutionary, illocutionary, and locutionary*) (Linder, 1994).

The meaning implied by the child's gestures, vocalizations, and verbalizations was examined by observing whether or not behaviors such as *seeking attention, requesting an object, requesting action, requesting information, protesting, commenting on an object, greeting, answering,* and

acknowledging anothers' speech occurred during the three minute behavior sample (Linder, 1994).

The functions the child's communication fulfills were determined through observing whether or not aspects of the child's communication such as *instrumental, regulatory, interactional, personal, imaginative, heuristic,* or *informative* were demonstrated (Linder, 1994).

The discourse skills of the child were measured through the observation of whether the child was *attending to the speaker, initiating conversation, turn-taking, maintaining a topic, volunteering/changing a topic, responding to requests for clarification,* or *questioning* (Linder, 1994). See Appendix M for the Transdisciplinary Play Based Assessment Pragmatic Language coding sheet.

Observer Training and Reliability

Reliability for the Interactive Language Measure (adapted from Hemmeter and Kaiser, 1994) measure, the turn-taking measure, and the Transdisciplinary Play Based Assessment was determined utilizing three graduate students who had coded the videotapes. All coding of the videotapes were completed within three weeks so ongoing assessments of reliability were not necessary. Coefficients of agreements were used to calculate the inter-rater reliability for the measures. The following formula was utilized:

$$\frac{\text{Number of Agreements}}{\text{Number of Agreements + Disagreements}} \times 100$$

For the Interactive Language Measure, agreement was scored when both observers coded the behavior the same. Disagreement was scored when the observers categorization of a behavior differed. Because disagreement on behaviors that do not occur frequently can artificially decrease the overall reliability score, the behaviors rarely occurring were dropped from the original coding form (Fleming, 1996). The overall reliability for the Interactive Language Measure was 81%.

Reliability for the turn-taking measure was determined similarly to the Interactive Language Measure (Hemmeter & Kaiser, 1994). The number and length of turns (e.g., total of 5 turn sequences being 2 turns in length), the total number of turns, who terminated the interaction (parent, child, or other), the toy the dyad was playing with, and the length of time (in seconds) the dyad was interacting were considered when determining agreement or disagreement between the raters. The overall reliability for the turn-taking measure was 90%.

Reliability for Linder's Transdisciplinary Play Based Agreement was calculated by examining the total number of agreements divided by the number of behaviors that could be observed (in this case 24). The reasoning

whether a behavior was demonstrated by the child or not. The scoring of the data also supported this method of calculating reliability in that for each of the 24 behaviors, the child received a score of either '1' for demonstrating the behavior, or a '0' for not demonstrating the behavior. The overall reliability for the TPBA was 85%.

Refer to Appendix N for the summary of reliability for the interactive language assessment, the turn-taking measure, and for Linder's Transdisciplinary Play Based Assessment (1994).

Rationale for Choice of Dependent Variables

The dependent variables were measured using the Transdisciplinary Play Based Assessment (Linder, 1994), the turn-taking measure, and the Interactive Language Measure (Hemmeter & Kaiser, 1994). These measures were chosen because they provide the best measure of the changes in pragmatic language development resulting from NTS Intervention. In other words, the measures are sensitive to the pragmatic language skills which were the focus of NTS Intervention. In the Transdisciplinary Play Based Assessment , the pragmatic portion of the communication and language development segment, provided the measure for pragmatic language. Both the Interactive Language Measure and the turn-taking measure provided an assessment of turn-taking in pragmatic language.

Validity

Internal Validity. The Internal Validity of a study refers to the degree in which results of that study were attributable to the variables which were manipulated, measured, or selected in the study and not from other variables that were not systematically treated (Shavelson, 1988).

Threats to internal validity include *history, maturation, testing, statistical regression, instrumentation, and experimental mortality.*

History. *History* refers to the possibility an event outside the study has influenced the results. Studies longer in duration are more prone to the threat of history. Randomization of subjects to one of the three groups helped to control for the effects of history.

Maturation. *Maturation* refers to the performance of the participants in the study being the result of maturation rather than the treatment. The fact that this study spanned three months meant that history and maturation posed a threat to internal validity. However, randomization of subjects to one of the three intervention groups helped to control for the effects of maturation.

Testing. *Testing* refers to a gain on the posttest due to experience on the pretest where sensitization to the treatment might occur due to having the pretest experience. There is also the threat of *statistical regression* occurring when a change in performance may be due to regression to the mean. Participants who tend to obtain extreme scores were most prone to regression with the mean (Shavelson, 1988). The re-testing of subjects and the possibility the

participant population has developmental delays identifies testing as a possible threat to internal validity.

Instrumentation. Measurements lacking in reliability can pose a threat to internal validity. The threat to internal validity is especially true when data collection is obtained by human observers. To ensure a reliable measure for the current study, all parent-child interactions were videotaped to help ensure objectivity, and all scoring was performed in a reliable and consistent manner. The scoring of the behaviors is considered result in accurate representations of the activities taking place during the videotaped play sessions (Tuckman, 1994). The section on reliability provides an in-depth discussion of the manner in which reliability of instruments was measured.

Experimental Mortality. When experimental participants drop out of the experiment before it is completed, the statistical comparisons and the conclusions drawn from that are effected (Babbie, 1992). Those withdrawing from an experimental study may be somehow different from those participants remaining. The small subject size of the group in the current experiment may have decreased the internal validity somewhat.

External Validity. External Validity refers to the extent to which the findings in the study can be generalized to persons or situations other than those in the study (Shavelson, 1988). Four categories of factors affecting external validity are outlined by Tuckman (1994) including *reactive effects of testing, interaction*

effects of selection bias, reactive effects of experimental arrangements, and *multiple treatment effect.*

Reactive Effects of Testing. *Reactive effects of testing* refer to pre-testing which may sensitize the experimental participant to the treatment being used where the effect of the treatment may be partially due to the pretest (Tuckman, 1994). The use of control groups in this study has attempted to decrease the likelihood of this threat to external validity.

Interaction Effects of Selection Bias. If participants in the study were not representative of the population to which the results will be later generalized, a threat to external validity occurs. The current study utilizes an "at-risk" population of children and their families reasoned to be most in need, and most benefiting from the intervention. It is exactly this population that the results are being generalized to. Therefore, this threat to external validity is considered to be minimal. In addition, the participants in the study were randomly assigned to one of three groups (NTS, CFL, Comparison) which increased control of internal validity.

Reactive Effects of Experimental Arrangements. The arrangements of the experiment can create an artificial environment resulting in the decreased generalizability of results to a non-experiment setting (Tuckman, 1994). One such example of this is the Hawthorne Effect. This threat to external validity occurs when merely being included in an experiment results with increases in performance. In the present study, the use of control groups has attempted to

decrease this threat to external validity. Observations in the home increase external validity because the home is more comfortable, likely promotes more natural responses and is therefore more generalizable.

Multiple-Treatment Interference. Participants in the study concurrently engaged in additional treatments, experimental or otherwise, may account for a resulting change in behavior (Tuckman, 1994). In this experiment, random assignment of participants to one of three groups (NTS, CFL, and Comparison) decreased the threat of multiple-treatment interference. In addition, even though all participants were enrolled in Head Start, the Comparison groups (CFL, and Comparison) reduce this threat.

Chapter 4

Results

The purpose of this study was to investigate the effects of NTS intervention in comparison to a CFL intervention group and a comparison group on child pragmatic language skills and parent-child behaviors during a videotaped play vignette for children identified as at-risk. The results of the investigation are presented in the same order as the research questions. An alpha level of 0.05 for statistical significance was chosen for all statistical tests. In other words, there is a 5% chance of making a Type I error, or finding a relationship when there really is no relationship (Shavelson, 1981).

Rationale for Choice of Statistical Analysis

The data derived from the observation of the parent-child play vignettes produced two types of variables. The data from Linder's Play Based Assessment (1993) was dichotomous in nature. In other words, the subjects were rated as either displaying the behavior (receiving a rating of "1") or not displaying the behavior (receiving a "0"). Due to the dichotomous nature of the variables, between-group comparisons were completed using chi-square analysis, while the within-group statistical analysis was completed using the Wilcoxon test for related samples. The Wilcoxon is a non-parametric method based on a statistic calculated from signed ranks of differences. It compares the distribution of two

related variables to test the hypothesis that the two variables have the same distribution. The test makes no assumptions about the shapes of the distributions of the two variables. It takes into account information about the magnitude of differences between pairs, giving more weight to pairs showing large differences compared to pairs showing small differences. The test statistic is based on the ranks of the absolute values of the differences between the two variables. Wilcoxon test controls the probability that Type I errors will occur, and distributions that were normal, it is only slightly less powerful than the paired-samples t test (Zimmerman, 1996).

The data from the interaction measure and the turn-taking measure was considered to yield interval data. Interval variables measured on a numeric scale in which distances between the points on the scale can be compared meaningfully. They have numeric values, rather than coded values. For both measures, between-group analysis was calculated using the Kruskal Wallice H test, a non-parametric alternative to the one way analysis of variance (ANOVA). The Kruskal Wallice H test compares the distribution of a variable between groups. Within-group differences were calculated using the Multivariate Analysis of Variance (MANOVA). The MANOVA allows for the examination of whether an interaction effect is occurring. An interaction among two or more variables is a relationship involving all of them. In analysis of variance, an interaction among factors means that the effects of the factors are mutually dependent.

Child Pragmatic Language

Research Question #1: Is there a difference among the groups (Natural Teaching Strategies, Cooperative Family Learning, and a Comparison group) for pragmatic language as measured by TPBA over the course of the study?

As discussed previously, the TPBA measure of pragmatic language encompasses four areas rated from interaction analysis of videotapes of parent-child play vignettes. The first area is the stage or level of intention having three sub areas: *perlocutionary, illocutionary, and locutionary*. All the participants in this study were found to be at the same level of intention (locutionary), therefore no statistical analysis was carried out.

The second skill area of pragmatics (the meaning implied by gestures, vocalizations, and verbalizations) consisted of nine sub skills; *seeking attention, requesting object, requesting action, requesting information, protesting, commenting on object, greeting, answering,* and *acknowledging other's speech*. A chi-square analysis revealed no significant differences between the NTS, CFL, and the Comparison group at baseline and three months for the following skills; *seeking attention, requesting object, requesting action, requesting information, protesting, answering, greeting, commenting on object,* and *acknowledging other's speech*. Table 4 presents a summary of the chi-square analysis results for all behaviors having to do with the meaning implied by gestures, vocalizations, and verbalizations.

Table 4

Between-Group Comparisons for Meaning Implied by Gestures, Vocalizations and Verbalizations at Baseline and Three Months

Meaning Implied	Baseline				3 Months			
	df	n	X^2	p	df	n	X^2	p
Seeking attention	2	46	3.02	0.221	2	42	1.32	0.518
Requesting object	2	46	1.89	0.388	2	42	2.99	0.224
Requesting action	2	46	5.41	0.067	2	42	0.81	0.667
Requesting information	2	46	0.43	0.806	2	42	0.99	0.609
Protesting	2	46	2.53	0.282	2	42	3.17	0.205
Commenting on object	2	46	2.62	0.270	2	42	5.64	0.059
Greeting	2	46	1.17	0.557	2	42	0.90	0.638
Answering	2	46	3.36	0.186	2	42	0.69	0.708
Acknowledging other's speech	2	46	0.01	0.994	2	42	5.68	0.059

As can be seen in Table 4, *commenting on object* at three months and *acknowledging other's speech* at three months were the only skills in this area displaying differences between the three groups. However, it is important to note that the differences found were not significant. For *commenting on object* at three months, 82% of the children in the NTS group displayed this behavior, while only 33% of the CFL and 52% of the children in the Comparison group

were observed engaging in this behavior. Figure 1 represents the percentage of NTS, CFL, and Comparison groups displaying *commenting on object* at baseline and three months.

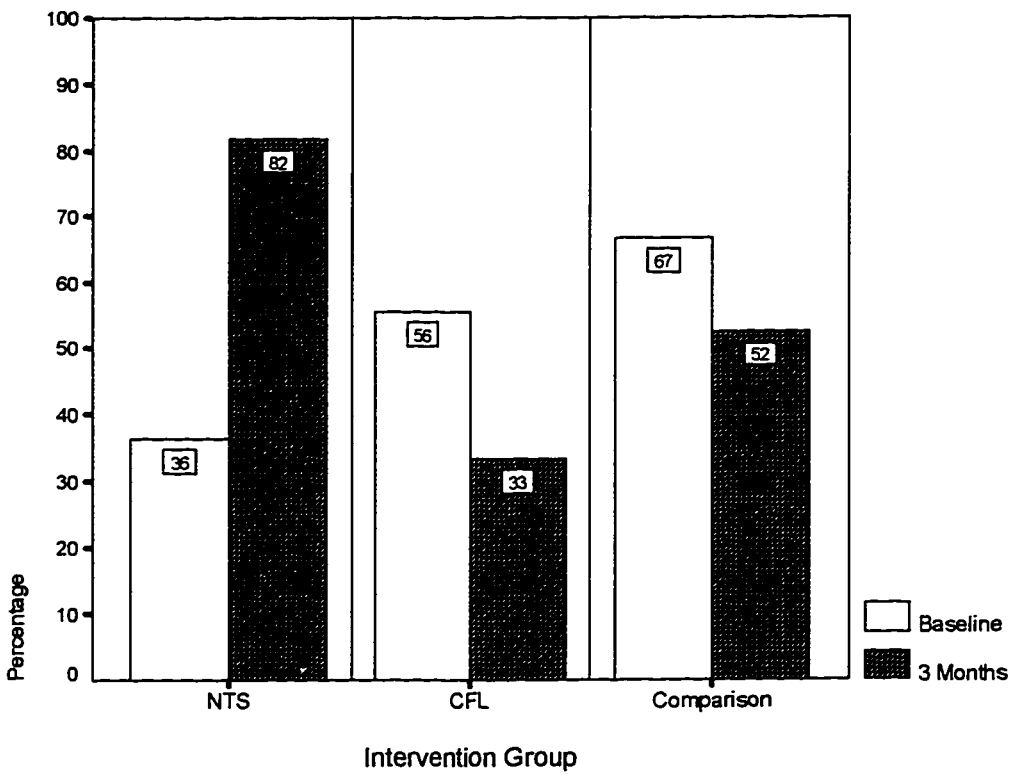

Figure 1. Percentage of CFL, NTS, and Comparison Groups Displaying *Commenting on Object* Meaning Skill at Baseline and Three Months

For *acknowledging other's speech*, the difference among the three groups is likely a result of the NTS group having 0% of the children displaying the behavior at three months, while 33% of the CFL group and 10% of the

Comparison group displays the behavior at three months. Although the difference observed for *acknowledging other's speech* at three months is not significant, the decrease for the NTS group should not necessarily be viewed as negative. One of the goals of NTS is to increase the participation of children in behaviors that would usually result in the initiation of interactions. Figure 2 represents the percentage of NTS, CFL, and Comparison groups displaying *acknowledging other's speech* at baseline and three months.

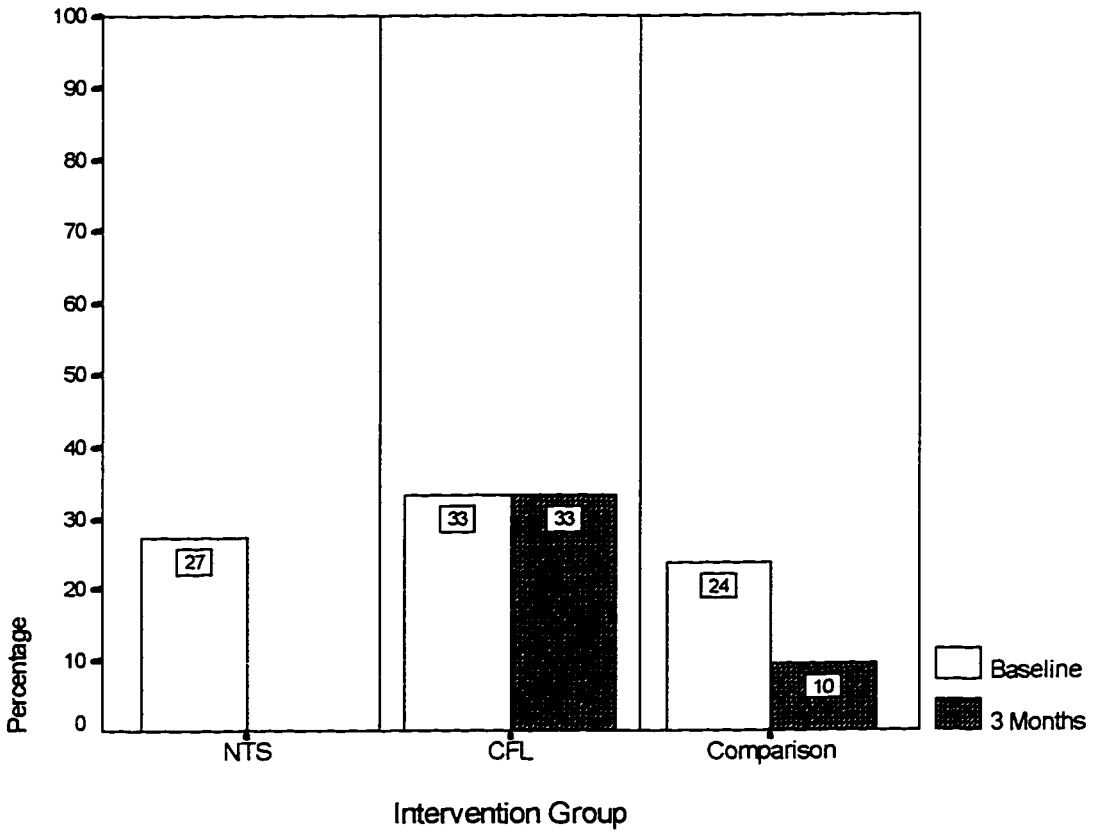

Figure 2. Percentage of CFL, NTS, and Comparison Groups Displaying *Acknowledging Other's Speech* Meaning Skill at Baseline and Three Months

Within-group comparisons of baseline and three months were completed using the non-parametric Wilcoxon Test. Examining each intervention group (NTS, CFL, and Comparison) separately from baseline to three months for *seeking attention, requesting object, requesting action, requesting information, protesting, greeting, answering,* and *acknowledging other's request for clarification behavior* revealed no significant changes. The only significant change was for the NTS group where *commenting on object* significantly increased from baseline to three months with a $Z = -2.24$ ($p < 0.05$). See Table 5 for the summary of results from the statistical analysis.

Table 5

Within-Group Comparisons for Meaning Implied by Gestures, Vocalizations and Verbalizations for NTS, CFL, and Comparison groups at Baseline and Three Months

Meaning Implied	Baseline			3 Months			Wilcoxon Signed-Ranks Test	
	n	M	SD	n	M	SD	Z	p
Seeking attention								
NTS	13	0.23	0.44	12	0.00	0.00	-1.73	0.083
CFL	12	0.00	0.00	9	0.11	0.33	-1.00	0.317
Comparison	21	0.19	0.40	21	0.09	0.30	-0.82	0.414

Requesting object								
NTS	13	0.15	0.38	12	0.25	0.45	-1.00	0.317
CFL	12	0.00	0.00	9	0.11	0.33	-1.00	0.317
Comparison	21	0.09	0.30	21	0.05	0.22	-0.58	0.564
Requesting Action								
NTS	13	0.46	0.52	12	0.08	0.29	-1.63	0.103
CFL	12	0.08	0.29	9	.022	0.44	-0.58	0.564
Comparison	21	0.19	0.40	21	0.14	0.36	-0.45	0.655
Requesting Information								
NTS	13	0.15	0.38	12	0.17	0.39	-0.57	0.564
CFL	12	0.17	0.39	9	0.33	0.50	-1.41	0.157
Comparison	21	0.09	0.30	21	0.19	0.40	-1.00	0.317
Protesting								
NTS	13	0.15	0.38	12	0.42	0.51	-1.34	0.179
CFL	12	0.00	0.00	9	0.22	0.44	-1.41	0.157
Comparison	21	0.19	0.40	21	0.14	0.36	-0.45	0.655
Commenting on Object								
NTS	13	0.38	0.50	12	0.83	0.39	-2.24	0.025
CFL	12	0.58	0.51	9	0.33	0.50	-1.41	0.157
Comparison	21	0.67	0.48	21	0.52	0.51	-0.90	0.366
Greeting								
NTS	13	0.00	0.00	12	0.83	0.29	-1.00	0.317
CFL	11	0.00	0.00	9	0.00	0.00	0.00	1.000
Comparison	21	0.48	0.22	21	0.95	0.30	-0.58	0.563

Answering								
NTS	13	0.92	0.28	12	0.50	0.52	-0.63	0.102
CFL	12	0.12	0.29	9	0.67	0.50	-1.00	0.317
Comparison	21	0.71	0.46	21	0.62	0.50	-0.71	0.479
Acknowledging Other's Speech								
NTS	13	0.23	0.44	12	0.00	0.00	-0.73	0.083
CFL	12	0.25	0.45	9	0.33	0.50	0.00	1.000
Comparison	21	0.24	0.44	21	0.09	0.30	-1.13	0.257

As can be seen in Table 5, *commenting on object* for the NTS group increased significantly from baseline to three months. Other skill areas that changed, although not significantly, include the NTS group decreasing in *seeking attention* and *acknowledging other's speech.* The graphical representation of *commenting on object* can be seen In Figure 1, where the percentage of members of NTS displaying the behavior increases from baseline to three months. CFL and the Comparison groups were found to decrease in their display of this behavior. Although decreases of the behavior was noted for the CFL and the Comparison group, the change was not found to be significant.

The third pragmatic skill area is the functions fulfilled by the child's behavior which is comprised of seven skill areas including *instrumental, regulatory, interactional, personal, imaginative, heuristic,* and *informative.* Chi-

square analysis revealed no significant difference between the NTS, CFL, and the Comparison groups from baseline to three months. See Table 6 for results of the chi-square analyses on the seven skills representative of the functions fulfilled by the child's behavior.

Table 6

Between-Group Comparisons for Functions Fulfilled by the Child's Behavior at Baseline and Three Months

	Baseline				3 Months			
	df	n	χ^2	p	df	n	χ^2	p
Heuristic	2	46	0.39	0.821	2	42	2.70	0.259
Imaginative	2	46	0.10	0.949	2	42	2.04	0.361
Informative	2	46	0.44	0.803	2	42	0.14	0.930
Instrumental	2	46	2.89	0.236	2	42	5.25	0.072
Interactional	2	46	1.99	0.369	2	42	0.11	0.946
Personal	2	46	0.01	0.994	2	42	2.86	0.239
Regulatory	2	46	0.44	0.804	2	42	0.47	0.792

As can be seen in Table 6, no significant differences were found among the three groups (NTS, CFL, and Comparison) at baseline or three months in any of the seven skill areas comprising functions fulfilled by the child's behavior.

The within-group analysis of baseline to three months for *heuristic, imaginative, informative, instrumental, interactional, personal,* and *regulatory* behaviors revealed no significant differences. See Table 7 for the summary of results from the statistical analysis.

Table 7

Within-Group Comparisons for Functions Fulfilled by the Child's Behavior for NTS, CFL, and Comparison groups at Baseline and Three Months

Function Fulfilled / Group	Baseline n	Baseline M	Baseline SD	3 Months n	3 Months M	3 Months SD	Wilcoxon Signed-Ranks Test Z	Wilcoxon Signed-Ranks Test p
Heuristic								
NTS	13	0.54	0.38	12	0.25	0.45	-0.58	0.563
CFL	12	0.08	0.29	9	0.33	0.50	-1.73	0.083
Comparison	21	0.09	0.30	21	0.09	0.30	0.00	1.000
Imaginative								
NTS	13	0.31	0.48	12	0.33	0.49	0.00	1.000
CFL	12	0.25	0.45	9	0.56	0.53	-1.00	0.320
Comparison	21	0.29	0.46	21	0.29	0.46	0.00	1.000
Informative								
NTS	13	0.23	0.44	12	0.25	0.45	-1.00	0.317
CFL	12	0.17	0.39	9	0.22	0.44	-1.41	0.157
Comparison	21	0.14	0.36	21	0.29	0.46	-1.13	0.257

Instrumental								
NTS	13	0.23	0.44	12	0.17	0.39	0.00	1.000
CFL	12	0.08	0.29	9	0.00	0.00	-1.00	0.317
Comparison	21	0.48	0.22	21	0.00	0.00	-1.00	0.317
Interactional								
NTS	13	0.85	0.38	12	0.67	0.49	-0.82	0.414
CFL	12	1.00	0.00	9	0.67	0.50	-1.73	0.083
Comparison	21	0.86	0.36	21	0.71	0.46	-1.00	0.317
Personal								
NTS	13	0.23	0.44	12	0.50	0.52	-1.13	0.257
CFL	12	0.25	0.45	9	0.00	0.00	0.00	1.000
Comparison	21	0.24	0.44	21	0.24	0.44	0.00	1.000
Regulatory								
NTS	13	0.15	0.38	12	0.33	0.49	-0.82	0.414
CFL	12	0.25	0.45	9	0.33	0.50	-1.00	0.317
Comparison	21	0.24	0.44	21	0.24	0.44	0.00	1.000

As can be seen from the summary of results in Table 7, none of the three groups (NTS, CFL, and Comparison) increased or decreased to a statistically significant degree from baseline to three months in their display of any of the functions fulfilled by the child's behavior.

The fourth skill area of the pragmatic language measure is discourse skills demonstrated by the child. The skills include *attending to speaker, initiating*

conversation, turn-taking, maintaining topic, volunteering/changing topic, responding to requests for clarification, and *questioning.*

Table 8

Between-Group Comparisons Discourse Skills Demonstrated at Baseline and Three Months

Discourse skills	Baseline				3 Months			
	df	n	X^2	p	df	n	X^2	p
Attending to speaker	2	46	1.64	0.441	2	42	0.42	0.810
Initiating conversation	2	46	1.94	0.378	2	42	1.66	0.436
Turn-taking	2	46	3.82	0.148	2	42	0.28	0.867
Maintaining topic	2	46	3.26	0.196	2	42	7.57	0.023
Volunteering/changing topic	2	46	0.49	0.780	2	42	2.10	0.349
Questioning	2	46	0.37	0.830	2	42	1.94	0.378
Responding to requests for clarification	2	46	0.20	0.904	-*	-*	-*	-*

* Chi-square analysis could not be generated for the 3 month data for "responding to requests for clarification" because none of the children participating in the study displayed this behavior at three months.

As can be seen in Table 8, the between-group comparisons were completed using chi-square analysis which revealed no significant differences between groups for baseline or three months for all discourse skills. However, this list excludes *maintaining topic* where the 3 month data revealed a X^2 (2, N=42)

= 7.57, p = 0.023. This finding implies that intervention group is related to whether or not the behavior *maintaining topic* is displayed. The behavior *maintaining topic* at three months was displayed by 73% of the participants in the NTS group and 33% of the CFL and 19% of the Comparison group. Graphical representations of the percentage of individuals from each of the three intervention groups displaying *maintaining topic* for baseline and three months can be seen in Figure 3.

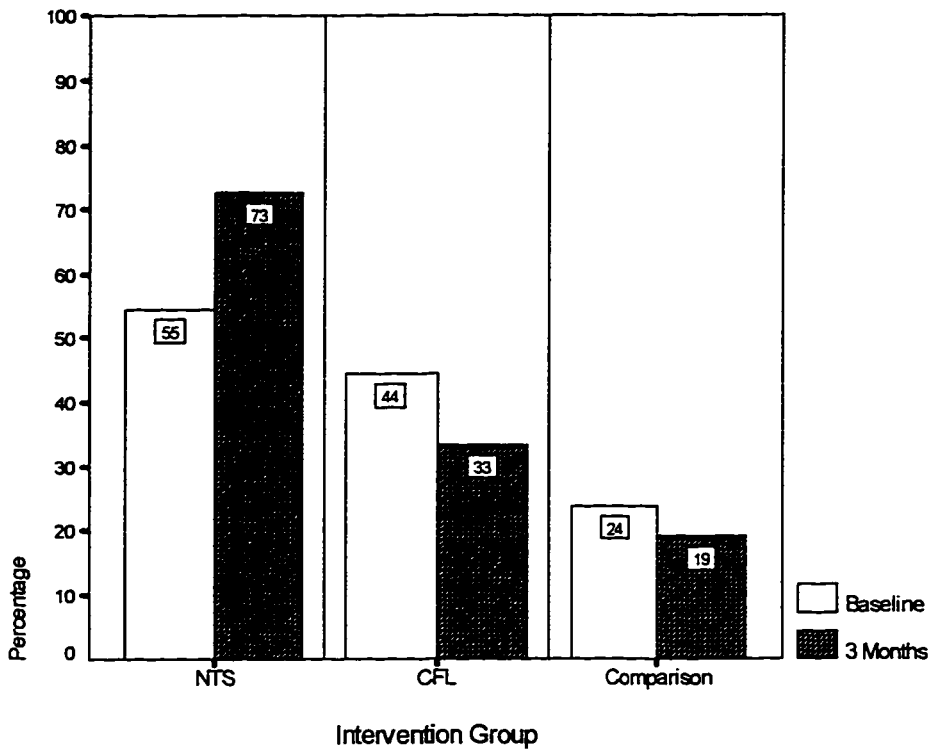

Figure 3. Percentage of NTS, CFL, and Comparison Groups Displaying *Maintaining Topic* Discourse Skill at Baseline and Three Months

The within-group analysis from baseline to three months for discourse skills *attending to speaker, initiating conversation, turn taking, maintaining topic, volunteering/changing topic, questioning,* and *respond to requests for clarification* were not significant. See Table 9 for the summary of results from the statistical analysis of the discourse skills for the three groups.

Table 9

Within Group Comparison for Comparisons for Discourse Skills Demonstrated for NTS, CFL, and Comparison groups at Baseline and Three Months

Group	Baseline			3 Months			Wilcoxon Signed Ranks Test	
	n	M	SD	n	M	SD	Z	p
Attending to Speaker								
NTS	13	0.69	0.48	12	0.42	0.51	-0.71	0.479
CFL	12	0.50	0.52	9	0.44	0.53	-0.45	0.655
Comparison	21	0.48	0.51	21	0.33	0.48	-1.00	0.317
Initiating Conversation								
NTS	13	0.31	0.48	12	0.17	0.39	-0.82	0.414
CFL	12	0.08	0.29	9	0.00	0.00	-1.00	0.317
Comparison	21	0.24	0.44	21	0.09	0.30	-1.34	0.179
Turn-Taking								
NTS	13	1.00	0.00	12	0.83	0.39	-1.00	0.317
CFL	12	1.00	0.00	9	0.78	0.44	-1.41	0.157
Comparison	21	0.86	0.36	21	0.86	0.36	0.00	1.000
Maintain Topic								
NTS	13	0.55	0.52	12	0.73	0.49	-1.00	0.317
CFL	12	0.44	0.51	9	0.33	0.50	-0.58	0.564
Comparison	21	0.24	0.44	21	0.19	0.40	-0.45	0.655

Volunteering/ Changing Topic								
NTS	13	0.08	0.28	12	0.33	0.49	-0.34	0.179
CFL	12	0.17	0.39	9	0.33	0.50	-1.00	0.317
Comparison	21	0.14	0.36	21	0.14	0.36	0.00	1.000
Questioning								
NTS	13	0.46	0.52	12	0.83	0.39	-1.89	0.059
CFL	12	0.58	0.51	9	0.55	0.53	-0.38	0.706
Comparison	21	0.52	0.51	21	0.71	0.46	-1.41	0.157
Respond to Request for Clarification								
NTS	13	0.08	0.28	12	0.00	0.00	-1.00	0.317
CFL	12	0.08	0.03	9	0.00	0.00	-1.00	0.317
Comparison	21	0.05	0.22	21	0.00	0.00	-1.00	0.317

As can be seen in Table 9, the only skill to increase, although not significantly at alpha = 0.05 level, was *questioning* for the NTS group. Figure 4 presents a graphical representation of the percentage of individuals displaying *questioning* across the three intervention groups (CFL, NTS, and Comparison). As displayed in Figure 4, *questioning* increased from baseline to three months for all of the three intervention groups (NTS, CFL, and Comparison), with the greatest increase occurring for the NTS group, although significantly at alpha = 0.05.

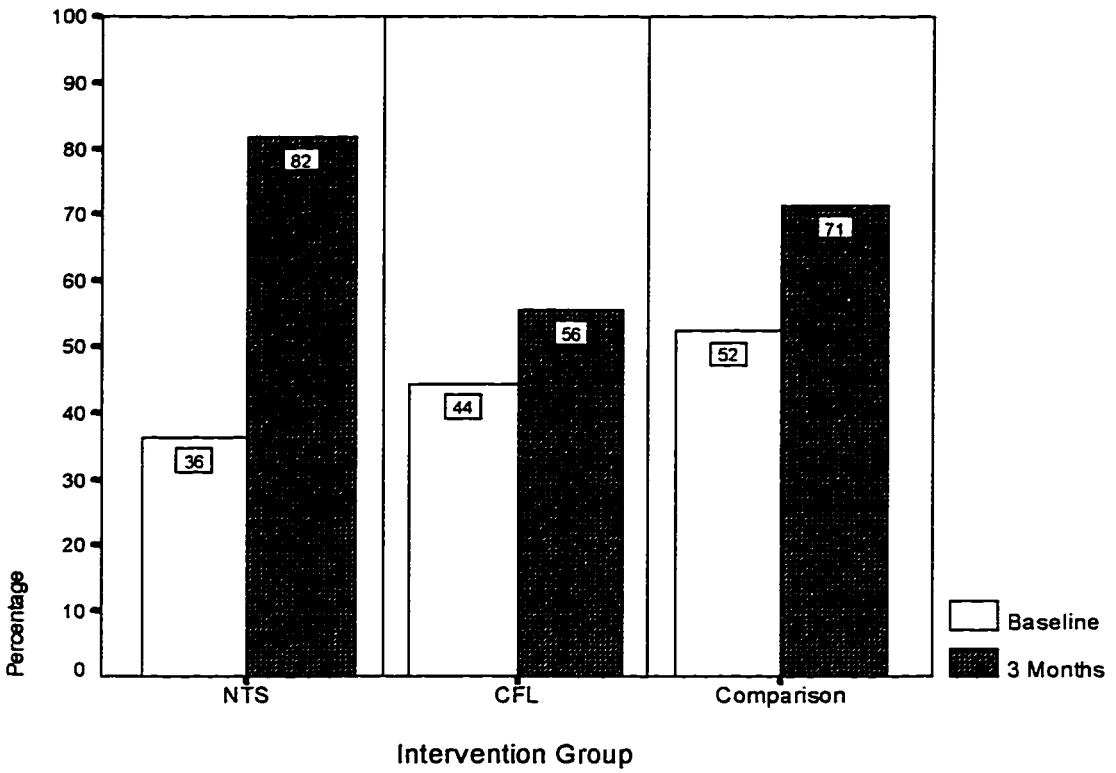

Figure 4. Percentage of NTS, CFL, and Comparison Groups Displaying *Questioning* Discourse Skill at Baseline and Three Months

To summarize, for the between-group analysis of the child pragmatic language skills, the only significant finding was for *maintaining topic* where the groups were found to be different from one another at three months. This result was most likely due to there being a much greater proportion of those in the NTS group displaying the behavior at three months as compared to the CFL, and the Comparison groups. For the within-groups analysis, *commenting on object* was the only child pragmatic language skill with significant findings where the

demonstration of the behavior increased from baseline to three months and for the NTS group only.

Parent-Child Interaction:

Research Question #2 Is there a difference among the groups (Natural Teaching Strategies, Cooperative Family Learning, and Comparison) for frequency of child initiations from baseline to three months?

The Kruskal Wallice H test, was used to examine between-group differences for group (NTS, CFL, and Comparison) and number of child initiations. The analysis indicated no significant differences in variance among the groups (NTS, CFL, and Comparison) for baseline or three months for number of child initiations with $F = 0.70$ (2, 37), $p = 0.501$ and $F = 0.22$ (2, 32), $p = 0.803$, respectively. The Levene Test for homogeneity of variances is a test for violations of the equal variance assumption. The Levene Test indicated the variances for all three groups at baseline and three months were homogeneous. See Table 10 for results from the Kruskal Wallice H test for the number of child initiations, as well as the other parent-child interaction skills examined including *child responses, parent initiations, parent responses, follow the child's lead parent responses, number of turns, median length of turns* in interaction, and *length of time* (in seconds) in interaction. Each of the parent-child interaction behaviors will be discussed in the corresponding sections where the research question addressing that behavior is discussed.

Table 10

Between-Group Comparisons for Parent-Child Interaction Behaviors at Baseline and Three Months

Parent-Child Interaction	Kruskal-Wallace H Test			
	Baseline		3 Month	
	H	p	H	p
Child Initiations	0.70 (2,37)	0.501	0.22 (2,32)	0.803
Child Responses	0.72 (2, 37)	0.494	0.11 (2, 32)	0.893
Parent Initiations	1.72 (2, 37)	0.193	0.83 (2, 32)	0.444
Parent Responses	0.94 (2, 37)	0.400	0.40 (2, 32)	0.677
Parent Follow the Child's Lead	0.03 (2, 37)	0.970	1.68 (2, 32)	0.202
Number of Turns	3.42 (2, 37)	0.043	0.33 (2, 32)	0.720
Length of Turn	1.80 (2, 37)	0.179	0.46 (2, 32)	0.634
Length of Time in Interaction	6.96 (2, 37)	0.003	3.45 (2, 32)	0.044

All of the baseline to three months within-groups analysis for the parent-child interaction data was performed using the Multivariate Analysis of Variance (MANOVA) which generalizes the paired-samples t-test, testing the sources of variation among a group of related dependent variables that represent different measurements of the same attribute. The frequency of child initiations from

baseline to three months for NTS, CFL, and Comparison groups was not found to be significant. See Table 11 for the results of MANOVA within-group analysis, and the means of all three participant groups.

Table 11

Within-Group Comparisons of Child Initiation Behaviors for NTS, CFL, and Comparison Groups at Baseline and Three Months

Intervention Group	Frequency of Child Initiation Behaviors				
	Baseline	3 Months	MANOVA		
	M	M	df	F	Sig. of F
Natural Teaching Strategies	11.00	14.78			
Cooperative Family Learning	9.43	13.29	2,31	0.29	0.749
Comparison Group	12.67	14.00			

As can be seen in Table 11, the mean frequency of *child initiation* behaviors increased from baseline to three months for the NTS, CFL, and Comparison groups. However, these changes were not significant at the alpha = 0.05 level. The within-group effect was not significant indicating that there was no interaction between group and time (baseline and three months).

Research Question #3 Is there a difference among the groups (Natural Teaching Strategies, Cooperative Family Learning, and Comparison) for number of *child responses* over the course of the study?

The Kruskal Wallice H test for differences between group (NTS, CFL, and Comparison) for number of *child responses* indicated there were no significant differences in variance between the groups for baseline or three months for number of child responses with $F = 0.72$ (2, 37), $p = 0.494$ and $F = 0.11$ (2, 32), $p = 0.893$, respectively. The Levene Test for homogeneity of variance revealed that the variances for all three groups at baseline and three months were homogeneous. See Table 10 for the results of this analysis.

Baseline to three months within-group analysis was performed using the MANOVA. The within-group effect for the frequency of *child response* behaviors from baseline to three months for NTS, CFL, and Comparison groups was not significant. See Table 12 for results of this analysis, and means for all three participant groups.

Table 12

Within-Group Comparisons of Child Response Behaviors for NTS, CFL, and Comparison Groups at Baseline and Three Months

Intervention Group	Frequency of Child Response Behaviors				
	Baseline	3 Months	MANOVA		
	M	M	df	F	Sig.
Natural Teaching Strategies	10.33	10.44			
Cooperative Family Learning	12.86	11.71	2,31	0.06	0.938
Comparison Group	11.39	11.50			

The results of the MANOVA, as displayed in Table 12, indicate minimal fluctuation in the frequency of *child response* behaviors from baseline to three months for all three groups (NTS, CFL, and Comparison). The within-subject analysis indicated no significance in the relationship between group and time (baseline and three months). In other words, none of the three groups changed significantly in their display of *child response* behaviors from baseline to three months.

Research Question #4 Is there a difference among the groups (Natural Teaching Strategies, Cooperative Family Learning, and Comparison) for number of *parent initiations* over the course of the study?

The Kruskal Wallice H test for differences between group (NTS, CFL, and Comparison) and number of *parent initiation* behaviors indicated there were no significant differences between the groups for baseline or three months for number of *parent initiations* with $F = 1.72$ (2, 37), $p = 0.193$ and $F = 0.83$ (2, 32), $p = 0.444$, respectively. The Levene Test for homogeneity of variance revealed the variances for all three groups at baseline and three months were homogeneous.

Baseline to three months within-groups analysis of number of *parent initiation* behaviors for NTS and Comparison groups was not significant. Figure 5 presents a graphic representation of the mean frequency of *parent initiations* for each intervention group across baseline and three months. See Table 13 for specific results of this analysis, including means for all three participant groups.

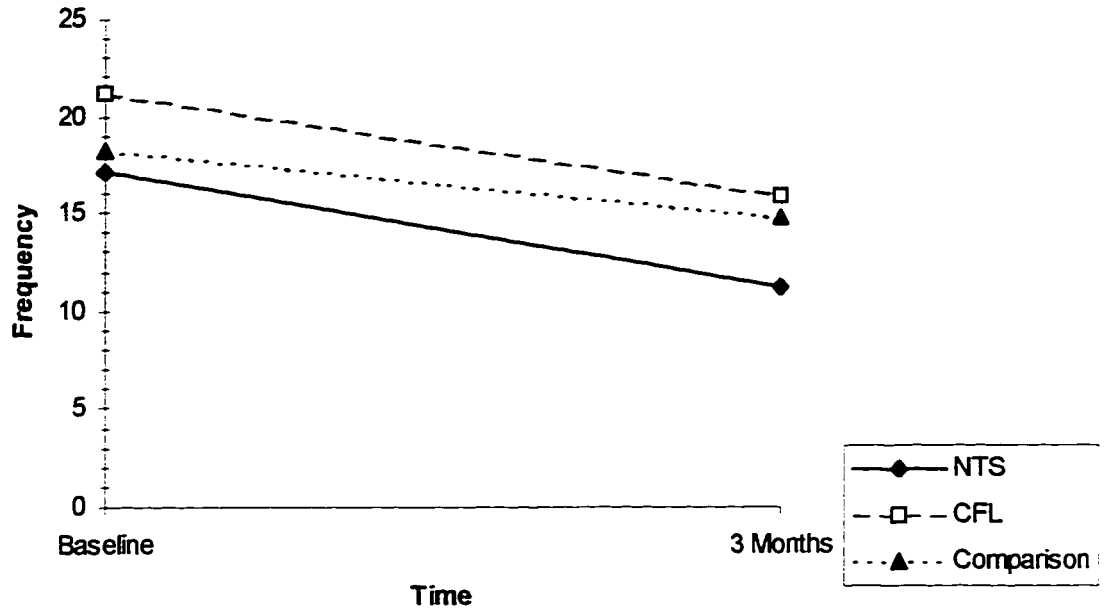

Figure 5. Mean Frequency of Parent Initiation Behaviors for NTS, CFL, and Comparison Groups at Baseline and Three Months

Table 13

Within-Group Comparisons of Parent Initiation Behaviors for NTS, CFL, and Comparison Groups at Baseline and Three Months

Intervention Group	Frequency of Parent Initiation Behaviors		MANOVA		
	Baseline	3 Months			
	M	M	df	F	Sig. of F
Natural Teaching Strategies	17.11	11.22			
Cooperative Family Learning	21.14	15.85	2,31	0.18	0.838
Comparison Group	18.22	14.77			

As can be seen in Table 13 and Figure 5, the mean frequency of *parent initiation* behaviors decreased from baseline to three months for the NTS, CFL, and Comparison groups. Although all three groups decreased in the frequency of *parent initiation* behaviors, there were no significant interaction effects within the subjects for group (NTS, CFL, and Comparison) for time (baseline and three months).

Research Question #5 Is there a difference among the groups (Natural Teaching Strategies, Cooperative Family Learning, and Comparison) for number of *parent responses* over the course of the study?

The Kruskal Wallice H test for differences between group (NTS, CFL, and Comparison) and number of *parent response* behaviors indicated no significant differences between the groups for baseline or three months for number of *parent responses* with $F = 0.94$ (2, 37), $p = 0.400$ and $F = 0.40$ (2, 32), $p = 0.677$, respectively. The Levene Test for homogeneity of variance revealed the variances for all three groups at baseline and three months were homogeneous.

Baseline to three months within-group analysis for number of *parent response* behaviors for NTS and CFL groups was found to be not significant. The means of all three groups increased from baseline to three months with no interaction effect emerging between the groups (NTS, CFL, Comparison) for time (baseline, 3 months). Figure 6 presents a graphic representation of the mean frequencies of *parent response* behaviors for all three intervention groups across baseline and three months. See Table 14 for results of this analysis, and the means of all three subject groups.

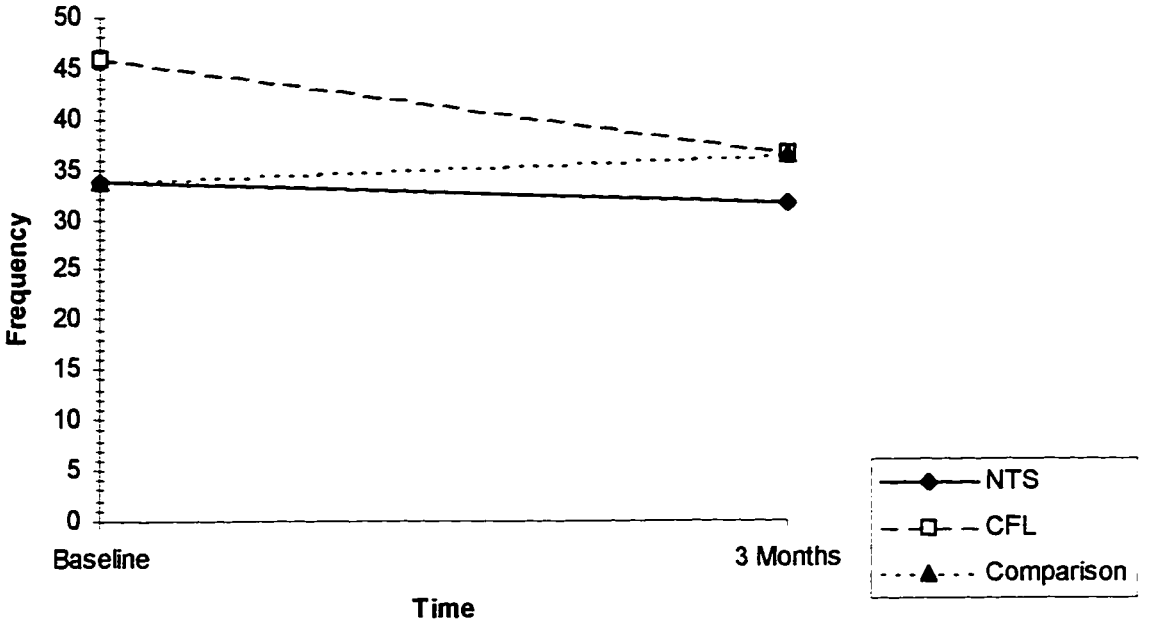

Figure 6. Mean Frequency of Parent Response Behaviors for NTS, CFL, and Comparison Groups at Baseline and Three Months

Table 14

Within-Group Comparisons of Parent Response Behaviors for NTS, CFL, and Comparison Groups at Baseline and Three Months

Treatment Group	Frequency of Parent Response Behaviors		MANOVA		
	Baseline	3 Months			
	M	M	df	F	Sig of F
Natural Teaching Strategies	7.00	10.56			
Cooperative Family Learning	8.14	9.71	2,31	0.32	0.728
Comparison Group	8.44	11.67			

Research Question #5a Is there a difference among the groups (Natural Teaching Strategies, Cooperative Family Learning, and Comparison) for number of *parent responses* that were categorized as *following the child's lead* over the course of the study?

The Kruskal Wallice H test for differences between groups (NTS, CFL, and Comparison) for number of *following the child's lead parent response* behaviors indicated there were no significant differences between the groups for baseline or three months for number of *follow the child's lead* parent response behavior

with F = 0.03 (2, 37), p = 0.970 and F = 1.68 (2, 32), p = 0.202, respectively. The Levene Test for homogeneity of variance revealed that the variances for all three groups at baseline and three months were homogeneous.

Baseline to three months within-group analysis for frequency of *follow the child's lead* parent response behaviors in the CFL group was not significant. See Table 15 for results of this analysis, and means for all three subject groups. In addition, Figure 7 presents a graphic representation of the mean frequency of *follow the child lead parent response* behavior at baseline and three months for the three groups (NTS, CFL, and Comparison).

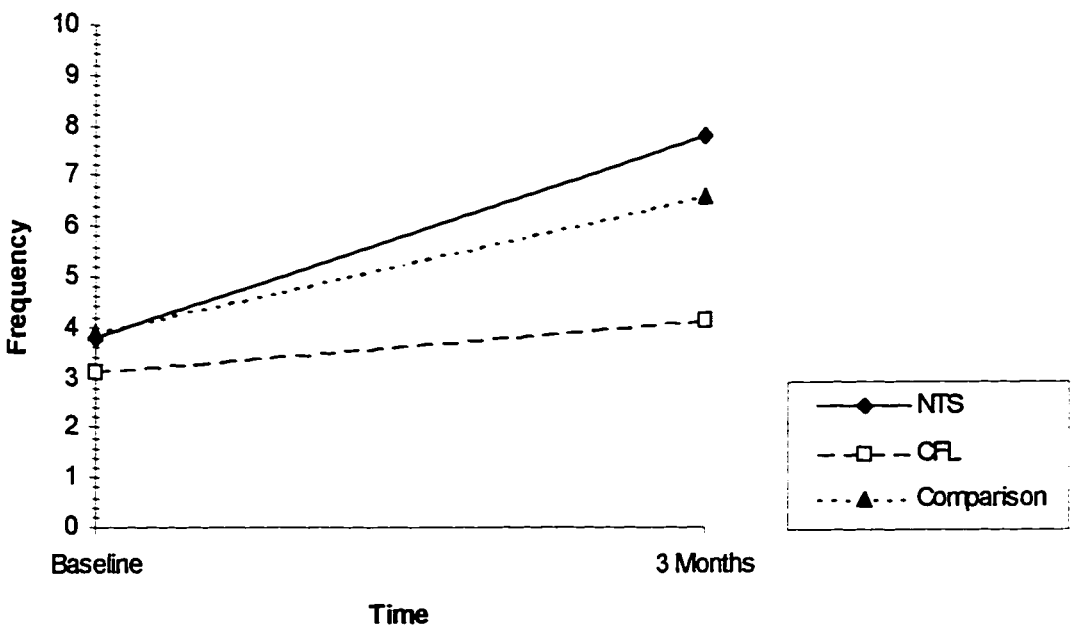

Figure 7. Mean Frequency of *Follow the Child's Lead* Parent Response Behaviors for NTS, CFL, and Comparison Groups at Baseline and Three Months

Table 15

Within-Group Comparisons for *Follow the Child's Lead* Parent Response Behaviors for NTS, CFL, and Comparison Groups at Baseline and Three Months

Group	Frequency of Child Response Behaviors				
	Baseline	3 Months	MANOVA		
	M	M	df	F	Sig of F
Natural Teaching Strategies	3.78	7.77			
Cooperative Family Learning	3.14	4.14	2,31	0.06	0.938
Comparison Group	3.89	6.61			

As can be seen from Figure 7 and Table 15, all three groups increased in their display of follow the child's lead parent response behaviors. There was no significant within-group effect for groups (NTS, CFL, and Comparison) and time (baseline and three months).

Turn-Taking

Research Question #6 Is there a difference among the groups (Natural Teaching Strategies, Cooperative Family Learning, and Comparison) for *number of turns* over the course of the study?

The Kruskal Wallice H test for differences between the NTS, CFL, and Comparison groups for *number of turns* indicated none of the three groups were significantly different for baseline or three months for *number of turns* with $F = 3.42$ (2, 37), $p = 0.043$ and $F = 0.33$ (2, 32), $p = 0.720$, respectively. The Levene Test for homogeneity of variance revealed the variances for all three groups at baseline and three months were homogeneous.

Within-group analysis for the *number of turns* occurring between parent(s) and child during the three minute play vignette for baseline to three months revealed no significant changes for the NTS and Comparison groups. See Table 16 for results of the within-group analysis, and for means of all three participant groups. In addition, refer to Figure 8 for graphic representation of the mean *number of turns* at baseline and three months for the NTS, CFL, and Comparison groups.

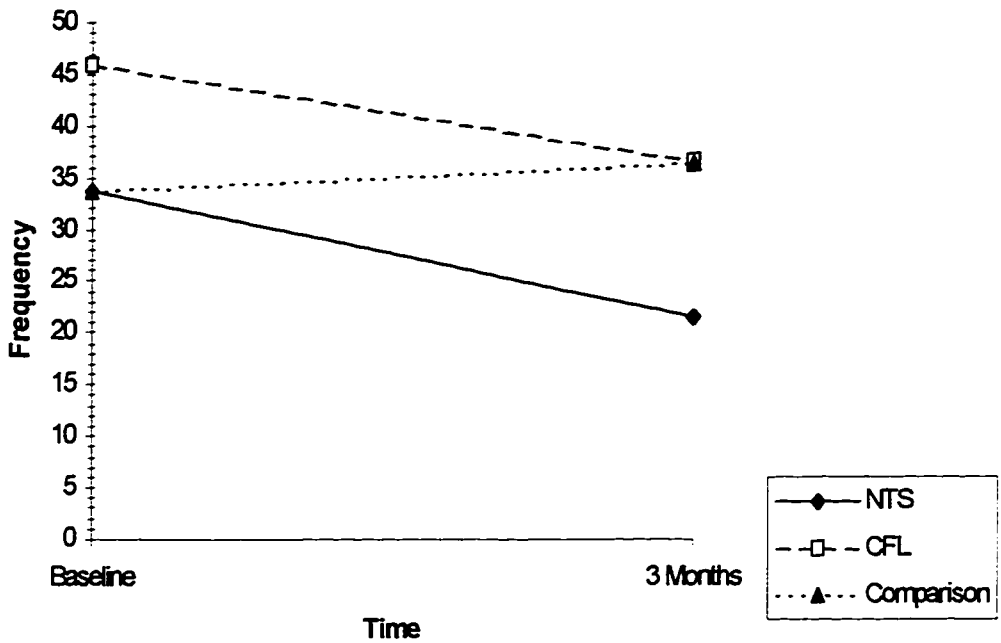

Figure 8. Mean Frequency of Turns for NTS, CFL, and Comparison Groups at Baseline and Three Months

Table 16

Within-Group Comparison of Frequency of Turns for NTS, CFL, and Comparison Groups at Baseline and Three Months

Intervention Group	Frequency of Turns				
	Baseline	3 Months	MANOVA		
	M	M	df	F	Sig of F
Natural Teaching Strategies	33.77	31.56			
Cooperative Family Learning	46.00	36.71	2,31	1.66	0.207
Comparison Group	33.83	36.33			

As can be seen in Table 16 and Figure 8, mean *number of turns* for both NTS and CFL groups decreased from baseline to three months. The Comparison group, on the other hand, increased in frequency of turns from baseline to three months. These changes from baseline to three months for CFL, NTS, and Comparison groups were not significant at the 0.05 alpha level. The within-group analysis revealed no interaction effect between groups (NTS, CFL, and Comparison) and time (baseline and three months) for mean *number of turns*.

Research Question #7 Is there a difference between *Median Length of Turns* in interaction and group (Natural Teaching Strategies, Cooperative Family Learning, and Comparison) over the course of the study?

The Kruskal Wallice H test for differences between the NTS, CFL, and Comparison groups for *median length of turns* in interaction indicated no significant differences between the groups for baseline or three months for *median length of turn* in interaction with $F = 1.80$ (2, 37), $p = 0.179$ and $F = 0.46$ (2, 32), $p = 0.634$, respectively. The Levene Test for homogeneity of variance revealed the variances for all three groups at three months was homogeneous while the baseline data was significantly different with a statistic of 4.17 (2, 37), $p = 0.023$.

Baseline to three months within-group analysis for *median length of turn* revealed no significant interaction effects for the three participant groups from baseline to three months. See Table 17 for results of this analysis, and for means for all three subject groups. Also, see Figure 9 for graphic representation of the *median length of turn* in interaction at baseline and three months for NTS, CFL, and Comparison groups.

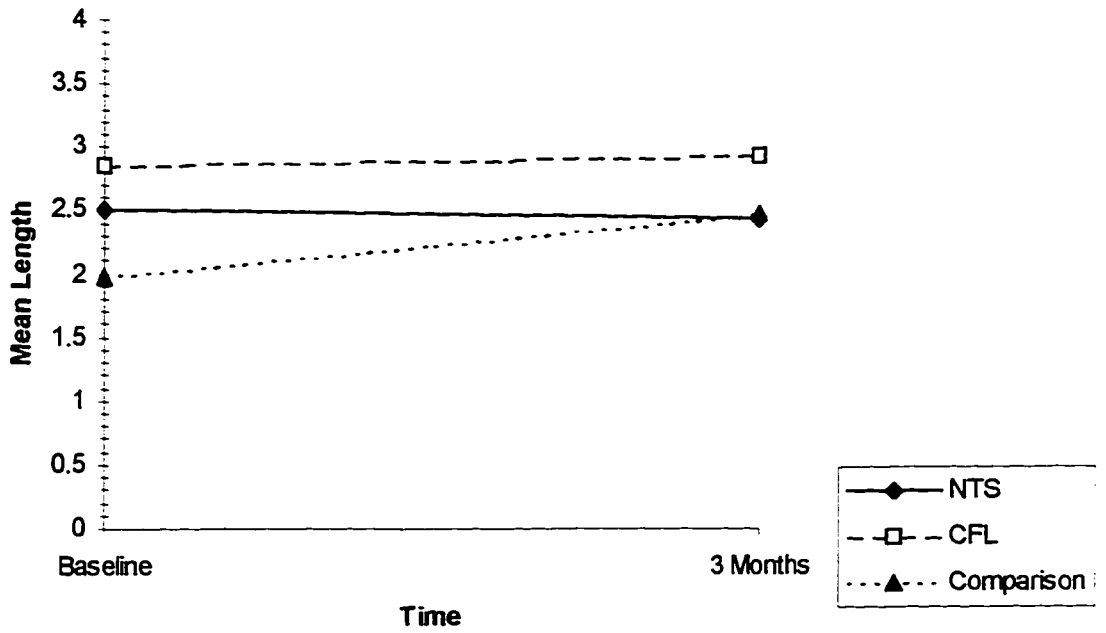

Figure 9. Length of Turns for NTS, CFL, and Comparison Groups at Baseline and Three Months

Table 17

Within-Group Comparison of Median Length of Turns in Interaction for NTS, CFL, and Comparison Groups at Baseline and Three Months

Intervention Group	Median Length of Turns in Interaction				
	Baseline	3 Months	MANOVA		
	M	M	df	F	Sig of F
Natural Teaching Strategies	2.50	2.44			
Cooperative Family Learning	2.86	2.93	2,31	0.64	0.532
Comparison Group	1.97	2.47			

As can be seen from Table 17 and Figure 9, *median length of turns* in interaction for all three groups remain relatively unchanged from baseline to three months with the increase of the Comparison group from baseline to three months being the greatest change. Within-group statistical analysis revealed no significant interaction effects for group (NTS, CFL, and Comparison) with time (baseline and three months).

Research Question #8 Is there a difference among *length of Interaction* (measured in seconds) for groups (Natural Teaching Strategies, Cooperative Family Learning, and Comparison) over the course of the study?

The Kruskal Wallice H test for differences between the NTS, CFL, and Comparison groups for *length of time* (in seconds) of interaction of the parent and child indicated there were significant differences between the groups for baseline and three months with $F = 6.96$ (2, 37), $p = 0.003$ and $F = 3.45$ (2, 32), $p = 0.044$, respectively. Both the significant differences occurred between the CFL and Comparison groups. The Levene Test for homogeneity of variance for all three groups revealed that for baseline, the variances were significantly different with a statistic of 4.33 (2, 27),$p= 0.020$. However, the variances at three months were homogeneous.

Baseline to three months within-group analysis for *length of time in interaction* for the NTS and CFL group was not significant. No significant within-group effects were found indicating that there was no interaction between group (NTS, CFL, and Comparison) and time (baseline and three months). See Table 18 for results of this analysis, and means for the three participant groups at baseline and three months. In addition, Figure 10 presents a graphic representation of the mean *length of time in interaction* at baseline and three months for the three groups.

Table 18

Within-Group Comparison of Length of Time (in Seconds) in Interaction for NTS, CFL, and Comparison Groups at Baseline and Three Months

Intervention Group	Length of Time (Seconds) in Interaction		MANOVA		
	Baseline	3 Months			
	M	M	df	F	Sig of F
Natural Teaching Strategies	157.33	153.22			
Cooperative Family Learning	169.29	164.71	2,31	2.47	0.101
Comparison Group	128.5	140.61			

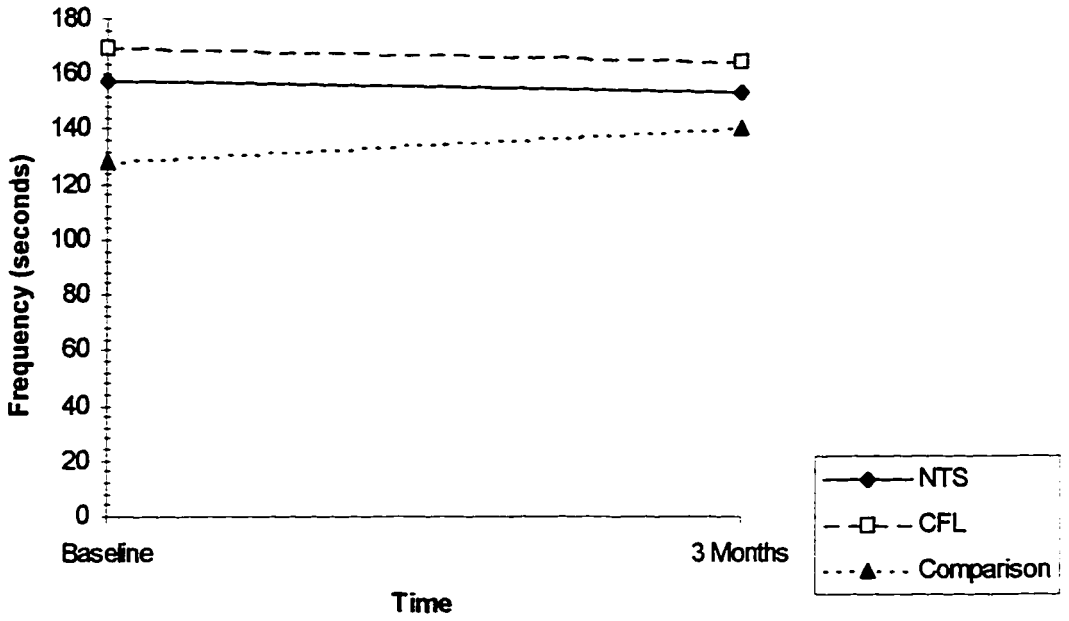

Figure 10. Length of Time (in Seconds) in Interaction NTS, CFL, and Comparison Groups at Baseline and Three Months

The eighth research question referred to whether there would be differences between groups (NTS, CFL, and Comparison) from baseline to three months in *length of time* (in seconds) *in interaction*. This finding was partially supported by the data. The between-group analysis revealed the Comparison and CFL groups were significantly different from each other at baseline and at three months. Because the Levene test of homogeneity of variance revealed the variances for all three groups were not homogeneous at baseline, the means of the two groups are not considered to be comparable. However,

considering the variance for the three month data was homogeneous, one could say the mean *length of time in interaction* was significantly different between the Comparison and CFL groups.

To summarize the findings of the analysis of parent-child interaction behaviors, there were no significant findings for between-group or within-group analyses.

Chapter 5

Discussion

This section discusses the findings of the study and evaluate the effects of Natural Teaching Strategy (NTS) intervention on child pragmatic language and parent-child interaction behaviors, with possible explanations for the effects. This discussion also examines other potentially relevant variables that may have influenced the results of the intervention, and offer suggestions for further research.

The theme the research questions set forth in this study was whether there would be differences between-groups and within-groups (NTS, CFL, and Comparison) for child pragmatic language skills and in parent-child interaction behaviors measured at baseline and three months. Each of the research questions addressed in this study, will be addressed in the order in which they were previously presented.

Child Pragmatic Language Skills

The first research question pertained to whether there would be differences among groups and within-groups (NTS, CFL, and Comparison) over the course of the study from baseline to three months. For meaning implied by gestures, vocalizations, and verbalizations, the presence of the skill *commenting on object* was found to be different between groups only at three months, as

indicated by chi-square analysis. Although these differences were not significant, the analysis of the data for within-group changes from baseline to three months found *commenting on object* to increase significantly for the NTS group only. These findings suggest that strategies involved in NTS intervention may have been effective in promoting a child's initiation of interactions by *commenting on objects.* This finding is supported by previous research (Laski, Charlop, & Shriebman, 1988).

Regarding *acknowledging other's speech*, between-group analysis revealed the frequency of children displaying the behavior in the NTS group was lower in comparison to the CFL and Comparison groups at three months, although not to a significant degree. In addition, the within-group analysis of changes from baseline to three months revealed NTS decreased, but not to a significant degree. The NTS group having less members displaying the skill *acknowledging other's speech,* and the trend of the decrease in *acknowledging other's speech* from baseline to three months, suggests the NTS training may have influenced the likelihood of the children to engage more in activities promoting interaction (e.g., commenting on object) and less on activities which respond to another persons communication (e.g., acknowledging other's speech). The increase of initiative behaviors like *commenting on object* is consistent with past research examining the effects of parent-implemented intervention focusing on the milieu teaching approach (Alpert & Kaiser, 1992; Laski, Charlop, & Shriebman, 1988).

The discourse skill of *maintaining topic* occurred in a significantly greater proportion of those in the NTS group at three months, indicated by the between-group analysis. However, the within-group analysis of the presence of the behavior *maintaining topic* from baseline to three months revealed there to be no significant increase for any of the three groups (NTS, CFL, and Comparison). In other words, although there were a significantly greater proportion of those in NTS engaging in *maintaining topic* behavior, over the course of the study, the NTS group did not increase significantly in the proportion of members engaging in the behavior. Maintaining topic increased for the NTS group and decreased for the CFL and Comparison groups.

Possible explanations for the NTS group not increasing in their *heuristic, imaginative, informative, instrumental, interactional, personal,* and *regulatory behaviors* include possibility that there was not enough time after the parent training of Natural Teaching Strategies for the effects to be manifested in the children's behavior. In other words, the three month data is three months from baseline, not three months from the end of the training session. Since the training session for Natural Teaching Strategies was six months in duration, topics covered towards the end of the training would have less time allotted for practice of the skills by parents with their children. For example, the topics of *incidental teaching* and *dealing with problem behaviors* were not covered until the 10th to 12th weeks in the training (see Table 4). Perhaps the amount of time given to families in the NTS group to practice their skills may provide some

explanation why statistically significant increases in *heuristic, imaginative, informative, instrumental, interactional, personal,* and *regulatory behaviors* among the children were not observed after three months, as other studies have discovered. For example, Alpert and Kaiser (1992) found it took three months after training for mothers to become proficient at the techniques.

Parent-Child Interaction Behaviors

The remainder of the research questions focused on interactive behavior occurring between the parent(s) and child during the videotaped play vignette. The discussion includes an examination of *child initiations and responses, parent initiations and responses, number of turns, mean length of turn* in interaction, and *length of time* spent engaged in interaction. In addition, a discussion of the implications of the results and other possible reasons for pattern of results will be included.

Child Initiations: The second research question pertained to whether there would be differences from baseline to three months for group (NTS, CFL, and Comparison) and frequency of child initiations. The research question was not supported by the data in terms of significant findings for the between-group analysis. In addition, no significant findings emerged for the within-group analysis between group (NTS, CFL, and Comparison) and time (baseline and three months). However, the trend of data for within-group analysis revealed child

initiation of interactions occurring more frequently at three months, as compared to baseline for all of the three participant groups. The lack of significant findings for the Natural Teaching Strategies intervention group was contrary to previous findings on the literature (Alpert & Kaiser, 1992; Laski, Charlop, & Shriebman, 1988). Possible explanations for the lack of findings that support previous research may be due to the within-group statistical analysis utilizing only subjects that provided data for both baseline and three months. There was one family with data missing at baseline, and six families with data missing from three months. From those families excluded, two were from the NTS group, two were from the CFL group, and three from the Comparison group. For NTS and CFL especially, a drop of two families from already low number of families in the participant groups may have effected the outcome of results of the analysis.

Child Responses: The third research question referred to whether there would be differences for groups (NTS, CFL, and Comparison) from baseline to three months in frequency of child responses was not supported by the data. There were no significant differences between-groups for child responses at baseline and at three months. The within-group results also did not support the research question in that there were no significant relationship effects found between group (NTS, CFL, and Comparison) for time (baseline and three months). In other words, the frequency of child responses did not change differentially from

baseline to three months on the basis of group (NTS, CFL, and Comparison). These results are contrary to previous studies in the area of parent-implemented intervention for improving child communication skills. Again, the lack of evidence supporting the effectiveness of the NTS intervention to increase child response behaviors may have been due to the decreased number of participants in the NTS and the CFL groups. In addition, the lack of evidence supporting the effectiveness of NTS to increase child response behaviors may be due to the three month time span from baseline to the 'post-test' measure. As mentioned previously, one possible reason for lack of change in scores of the NTS group, is that one of the goals of NTS is to increase the child's initiation of communication, and not necessarily their response to another person's initiation.

Parent Initiations: The fourth research question pertaining to whether there would be differences for groups (NTS, CFL, and Comparison) from baseline to three months for frequency of parent initiations was not supported by the data. The between-group analysis found there to be no significant differences between the groups at baseline and at three months. In addition the frequency of parent initiations for groups (NTS, CFL, and Comparison) from baseline to three was found to have no interaction effects. In other words, there is no relationship between groups(NTS, CFL, and Comparison) and time (baseline and three months) for number of parent initiation behaviors. These results are not congruent with previous research (Alpert & Kaiser, 1992; Laski, Charlop, &

Shriebman, 1988). A possible explanation for the pattern of results may be that parents were initiating during interactions less frequency because their children were initiating more often. Additional plausible explanations for the lack of supporting results may have been mentioned previously; the decreased number of participants due to the statistical analysis, and the timing of the "post-test" with the intervention schedule.

Parent Responses: The fifth research question referred to whether there would be differences between groups (NTS, CFL, and Comparison) from baseline to three months in frequency of parent responses was supported by the data. The findings from the between-group comparisons for frequency of parent responses was not significant. In addition, the within-group analysis revealed no significant differences for group and time (baseline and three months). Overall, frequency of parent responses increased for all three groups from baseline to three months. Possible explanations for not having significant interaction effect favoring the NTS group could be due to the number of participants in the study and subsequently in the statistical analysis, as mentioned in more detail in previous sections.

The examination of only the parent response of *follow the child's lead*, as outlined in research question 5a, revealed no significant differences between the groups. In addition, no significant within-group findings were discovered. Overall, all three groups increased in their display of *follow the child's* lead from

baseline to three months, with the greatest increase occurring for the NTS group. This finding of the NTS group increasing in their display of *follow the child's lead* parent response behavior is similar to previous findings in the literature in that parents are capable of implementing the intervention. However, it seems puzzling that the increase for the NTS group would not be significant. Possible reasons why the increase was not significant for the number of *follow the child's lead* parent responses could be due to the small number of participants in the study resulting in low power.

Frequency of Turns: The sixth research question, whether there would be differences between groups (NTS, CFL, and Comparison) from baseline to three months for frequency of turns, was not supported by the data. The comparison for between-group frequency of turns was not significant, and the within-group results indicated there was no relationship between group (CFL, NTS, and Comparison) and time (baseline and three months).

A decrease, although not significant, in the number of turns during the three minute play vignette may be due to the either, or both, of the members of the dyad taking longer turns (in terms of length of time). If each member of the dyad were to take turns that lasted longer in terms of seconds, the total number of turns at the end of three minutes would be less then if the dyad were to engage in quick exchanges where a lower number of words were uttered.

Length of Turns: The seventh research question pertaining to whether there would be differences between groups (NTS, CFL, and Comparison) from baseline to three months for length of turns per interaction was not supported by the data. The length of turns for each group (NTS, CFL, and Comparison) remained relatively unchanged from baseline to three months. Possible reasons why the length of turns for the NTS group did not increase could be that the standard deviations were not homogeneous. The variances not being homogeneous violates the assumption of equal variance, and therefore the analysis is not recommended for interpretation.

Summary and Recommendations For Further Research

The data analyses suggested there were some differences in child pragmatic language and parent-child interaction behaviors between the Natural Teaching Strategies (NTS) group, and the Cooperative Family Learning (CFL) and Comparison groups. The NTS intervention appeared to have some influence on child pragmatic language skills. This suggestion is exemplified with respect to child pragmatic behaviors of meaning implied, where at three months, those in the NTS groups displayed *commenting on object* significantly more than the other two groups (CFL, and Comparison). In addition, the three groups were found to be significantly different from each other at three months for the discourse skill of *maintaining topic,* where the greatest proportion of those displaying this behavior were in the NTS group.

The parent-child interaction behaviors examined suggest there were no differences between groups (NTS, CFL, and Comparison) across the course of the study from baseline to three months. For child initiations and responses, there were no statistically significant differences between- or within-group analysis for the three groups. Regarding parent behaviors, no significant differences between groups was found. Parent responses were not found to be significantly different between groups or within-groups. This finding was consistent when only *follow the child's lead* parent response behavior was analyzed.

For turn-taking, the between-group analysis did not suggest any significant differences. In addition, the within-group data also revealed no significant findings. The median length of turn analysis did not produce significant findings in neither within- nor between-group analysis. The length of time engaged in interaction produced findings suggesting the CFL and Comparison groups were statistically different at baseline and three months, with no groups increasing significantly over the duration of the study. However, since homogeneity of variance was not present at baseline, drawing conclusions from this analysis is difficult.

The difficulties with the present study suggest if a replication or an extension of the study were to be employed, several important issues must be addressed. An increase in the amount of time between teaching and implementation of the NTS intervention, and the videotaping of the parent-child play vignettes, would be important if a replication or extension of this study were

attempted. This approach would allow for demonstration of effects of the intervention after the parents had time to practice their newly learned skills with their children. In addition, increased frequency of language samples, which would include a measure of language skills every three months to monitor progress over a much longer period of time, may provide a more detailed understanding of the relationship between the three groups across time for pragmatic language skill and parent-child interaction behavior. Thus providing information regarding the effectiveness of NTS.

Including more participants in the analysis would be beneficial to decrease some of the difficulties that arose as a result of having a small number of participants. In addition, with the participants being involved in the first 6 months in NTS, and the second 6 months in CFL (or vice versa) would allow for a cross-over design that could allow for the examination of differential effects of the two interventions on child pragmatic language, and on parent-child interaction behaviors.

In addition to suggestions for further research discussed above, recommendations for practice for interventionists and intervention is presented. The implications for practice is for interventionists to underscore the importance of, and the role of, the child's environment (including family members and other important figures) in their development. Therefore, it is the people who spend the most time with the child that are the real experts on the child and their abilities. Intervention administered by those most important in the child's life

should have the greatest impact on language development of their child (Dreher, 1987). Observations and interventions need to occur within typically occurring family routines to obtain the highest degree of validity (Dreher, 1987).

Conclusion

The analysis of the differences between the Natural Teaching Strategies (NTS), Cooperative Family Learning (CFL), and Comparison groups throughout the course of the study has indicated some positive results, as well as some results presenting varying support across the three groups. It seems clear that in order to understand the efficacy of NTS intervention training, further investigation is required.

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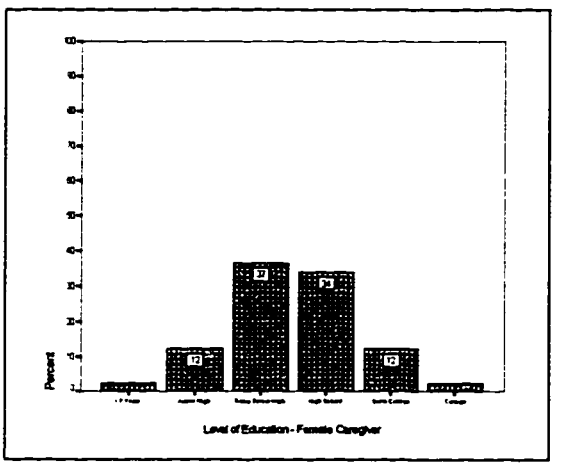
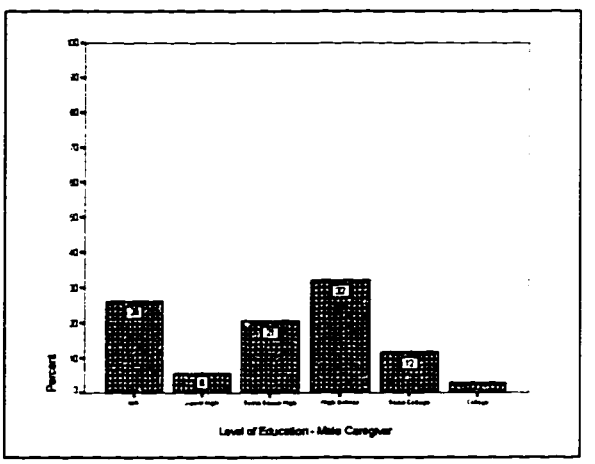
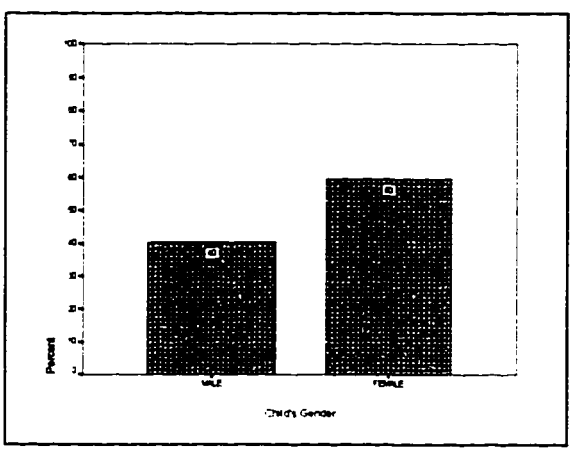
APPENDIX A

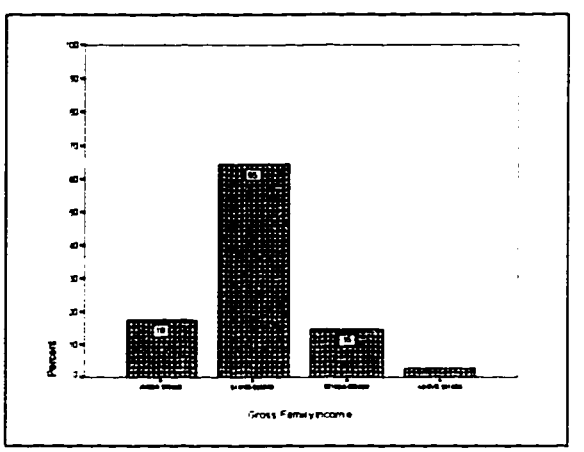
PARTICIPANT DEMOGRAPHICS

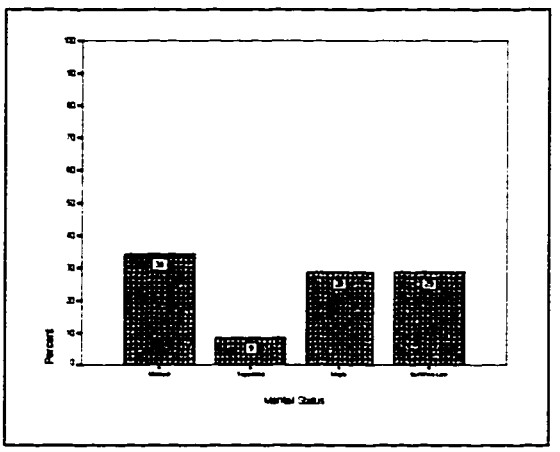
	Mean	Median	Standard Deviation
Number of Adults at Home	1.90	2.00	0.66
Age of Female Caregiver	29.65	27.00	7.22
Age of Male Caregiver	25.93	28.00	15.12

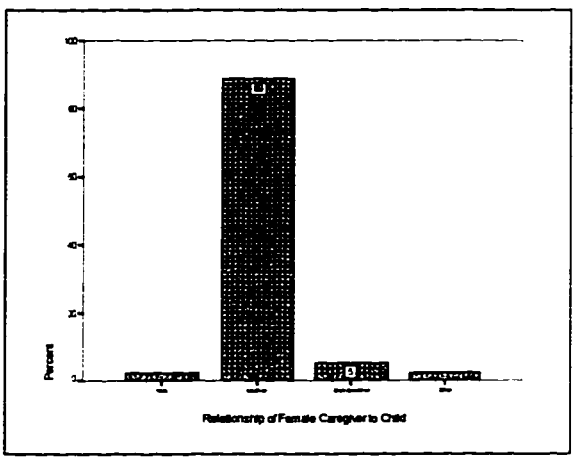

Percent
Level of Education - Female Caregiver

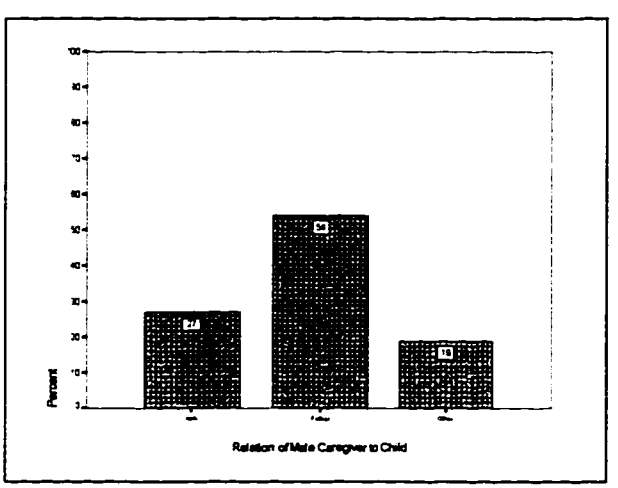

Percent
Level of Education - Male Caregiver


Percent
MALE
FEMALE
Child's Gender


Percent
Gross Family Income


Percent
Marital Status


Percent
Relationship of Female Caregiver to Child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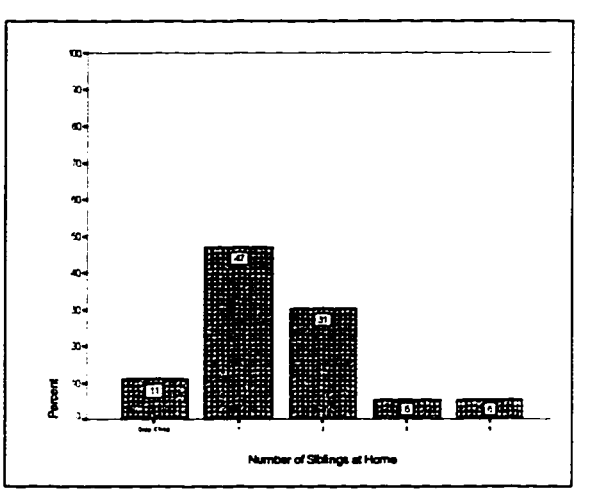
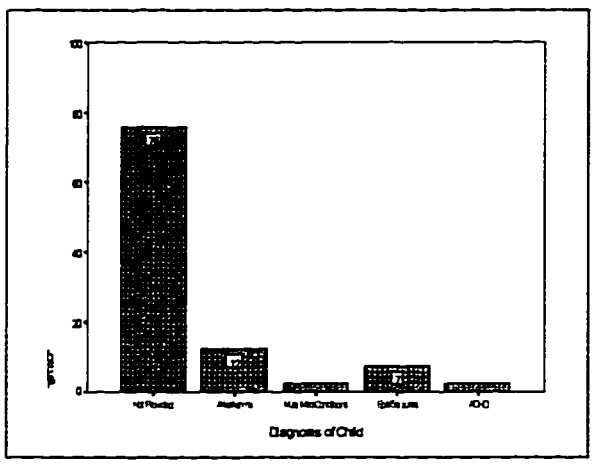
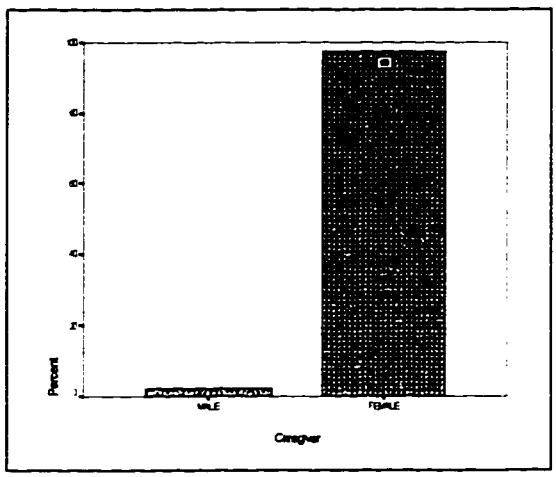
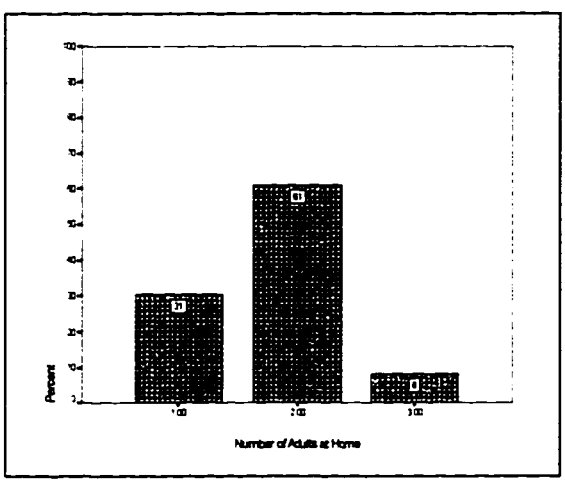
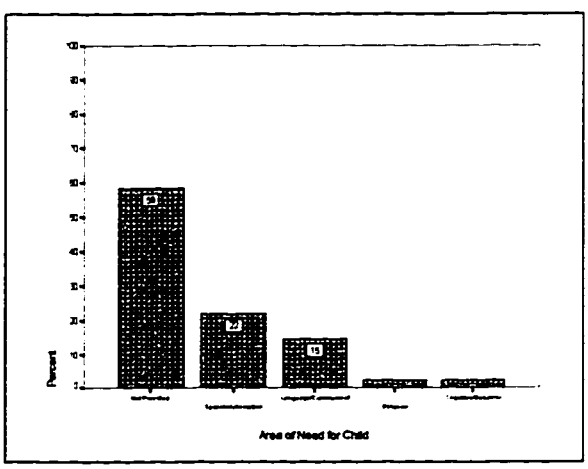
Relation of Male Caregiver to Child

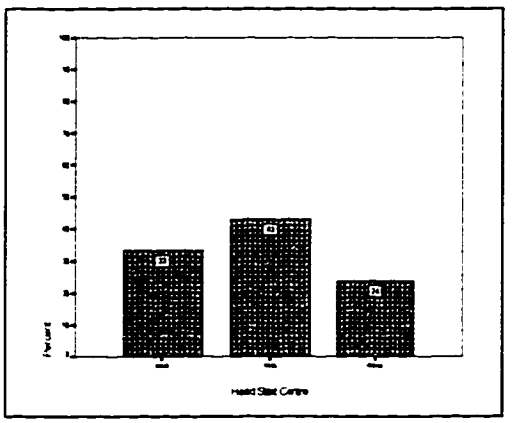

Percent
Number of Siblings at Home

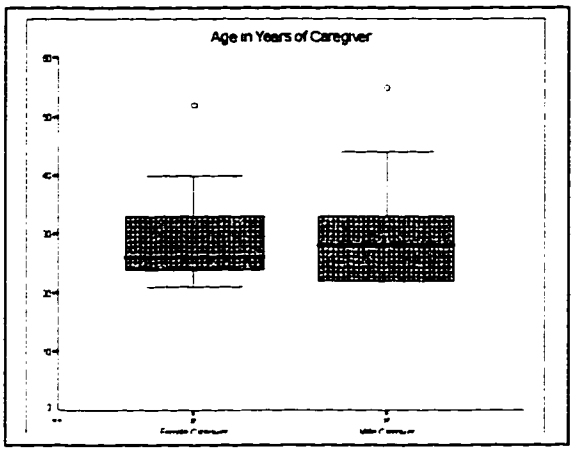

Diagnosis of Child


Percent
MALE
FEMALE
Caregiver


Percent
Number of Adults at Home


Percent
Area of Need for Child




Age in Years of Caregiver

APPENDIX B

CONSENT FORM

University of Alberta
Edmonton
Canada T6G 2G5

and Evaluation
Faculty of Education

3-102 Education Centre North, Telephone (403) 492-3762
Fax (403) 492-3179

Child and Family Resiliency Project

CONSENT FORM

I/We understand that we have been selected to take part in the Child and Family Resiliency Project. I/We expect to be visited at home by the a Research worker every other month for two visits of about 45 minutes duration. We are willing to take part in child-parent play sessions at home, which will be videotaped and analysed by the research team led by Dr. Gerry Kysela. We understand that we will also be asked to problem solve some everyday family situations presented to us and to fill in some questionnaires. The questionnaires will be given at the beginning of the project, after six months and one year in the project and then at the nine month follow up. Team members will also videotape my child at playtimes at the ABC Headstart program every two months during the first year of the project.

I/We understand that all the information gathered in this study will be kept confidential. The names of our child and other family members will not be disclosed at any time or appear in any research document or report.

I/We understand that we are free to withdraw from the project at anytime and that this will not interfere with our full participation in the ABC Headstart program.

.....

I_____ consent to and give consent for my

daughter/son_____ to take part in the project.

I agree to participate in home observation sessions and for my child to be seen

in the ABC Headstart Center. I will complete the questionnaires at intervals during the project.

I understand that I can deny answers to any questions I prefer not to answer and that I can

withdraw from the study at any time without prejudicing current or future treatment.

I know I can contact Dr. G. Kysela, Dr. L. McDonald or Dr. J. Drummond at 492 8185 at

any time if I have concerns about the study.

_____ _____

Signature of parent/guardian Print name here

_____ _____

Relationship to child Date

_____

Signature of Principal Investigator

APPENDIX C

CRITERIA FOR SPECIAL NEEDS FUNDING

Criteria for Special Needs Funding

Criteria for Mild-Moderate Disability

Emotional/Behavioral Disability: Typically, emotional! behavioral disabilities are characterized by demonstration of one or more of the following traits:

1) an inability to establish or maintain satisfactory relationships
2) a general mood of unhappiness or depression
3) inappropriate behavior or feelings under ordinary conditions
4) continued difficulty in coping with the learning situation in spite of remedial intervention
5) physical symptoms or fears associated with personal or school problems
6) difficulties in accepting the realities of personal responsibility and accountability
7) physical violence toward other persons and/or physical destructiveness toward the environment.

Learning Disability: Students with learning' disabilities exhibit one or more of the following characteristics:

* disorganization
* distractibility
* impulsivity
* hyperactivity or hypoactivity
* inflexibility
* perseveration

Speech and Language Impairment:

Speech Impairments: The student who has a speech impairment has speech which deviates so far from the speech of others that it calls attention to itself, interferes with communication or causes maladjustment.

Communication Impairments: A communication impairment refers to disorder in comprehension and / or use of language articulation voice and fluency skills.

Language Disorders: encompass problems in semantics, syntax, morphology and certain aspects of phonology.

Articulation Disorders: are problems with speech sound production and their integration. They are characterized by substitutions, distortions, omissions and additions.

Criteria for Severe Disability:

Emotional/Behavioral Disability: Students with severe emotional and/or behavioral disabilities display chronic, extreme and pervasive behaviors that drastically interfere with their ability to function within existing social, cultural or age-appropriate standards. Their behaviors are so profoundly inappropriate that they significantly interfere with the educational environment and the safety and progress of self and/or others. An assessment or opinion from a chartered psychologist or psychiatrist must be obtained to indicate the nature and severity of the disability.

Eligible students must be exhibiting chronic, excessive and pervasive behaviors such as:

1) Dangerously aggressive, destructive and/or impulsive behaviors, including violence or serious threats of violence to self, others or to property.

2) Autism.

3) Self-stimulation, perseveration, echolalia and/or aphasic behavior.

4) Severe passive or withdrawal behaviors, schizophrenia, manic depression or similar.

5) Severe disorder.

6) Other behavioral emotional disorders of similar nature and consequence.

APPENDIX D

NATURAL TEACHING STRATEGIES INTERVENTION SCHEDULE

Week (Approx.)	Natural Teaching Strategies Intervention Schedule
1	-- Explain what next twelve weeks will be covering: Natural Teaching Strategies and Communication with the Child. - Review contract with family so there is a complete understanding of responsibilities. - Explain what will be done next week and exchange phone numbers. - Answer any questions.
2	Focus: Chapter One "Child's Lead: Turn taking" Introduce: Communication with child; fun aspect; conversations - balanced/imbalanced; following the child's lead; step-by-step guide to conversations; turn-taking.
3	Focus: Review Chapter One from last week regarding communication, conversations, steps. Introduce: Definitions, "but what if..." section of the manual - Summarize the main points thus far. Homework: Turn-taking through Imitation (chart in the manual).
4	Focus: Chapter Two "Keeping Action Going" Review: Turn-taking and communication; imitating child's behavior; homework/questions. Introduce: Balancing turns - Reinforce "natural" - e.g., doing these interactions at normal times in the day. - Match your child's level of communication.
5	Focus: Review concepts in Chapter Two "Keep Action Going" Review: Balancing, natural, matching levels. Introduce: The steps - "Wait", "Signal", " Prompt". Homework: Your Turn (chart in manual), "Wait/Signal/Prompt" (chart in manual).

Week (Approx.)	Natural Teaching Strategies
6	Focus: Chapter Three "Expansion - Adding" Review: Wait/signal/prompt; turn-taking. Introduce: Brainstorming things parents tried with children. - Checklist: part every day routine; turn taking; longer conversations; having fun; type feedback from children; trying strategies with other children; notice changes in child's behavior; notice changes in own behavior. - Expansion: adding to the conversation, make it more interesting (3 steps described in manual).
7	Focus: Review Chapter Three "Expansion-Adding" Review: Expansion – adding to the conversation (3 steps). Introduce: Getting child's attention; solutions for ongoing problems (brainstorm); expectations (finding child's level). Homework: Expansion (chart in manual).
8	Focus: Chapter Four "Incidental Teaching: Review: Get child's attention; solutions for problems, expectations. Introduce: Skills to further child independence, incidental teaching (natural); modeling (imitation, good models, and hints for imitation).
9	Focus: Review Chapter Four "Incidental Teaching" Review: Incidental teaching; modeling. Introduce: Prompting (3 steps in manual); "Things to Remember". Homework: Incidental Teaching (keeping track)
10	Focus: Chapter Five "New Look Problem Behavior" Review: Incidental teaching; prompting. Introduce: General talk about parenting and children misbehavior; behaviors have meaning (interpretation); meaning behind behavior (such as attention, tangibles, self reward, escape); interpreting the message ("message" worksheet in manual). - Discuss parent's examples of their child's challenging behaviors.

Week (Approx.)	Natural Teaching Strategies
11	Focus: Review Chapter Five "New Look Problem Behavior" Review: Meaning in behavior, interpreting behavior Introduce: Behavior that not directly communicate anything ("self reinforcing" behavior); find the meaning (3 steps in manual); finding an alternative behavior and reinforcing it. Homework: Managing behavior.
12	Final thoughts Review: Homework; each chapter reviewed briefly; discussion of trouble areas; answer questions. - Focus on accomplishments Conclude: Thank the family; inform of the next responsibilities in the study; schedule any necessary appointments, etc.

APPENDIX E

HOME VISIT PROTOCOL FOR DATA COLLECTORS

Home Visit Protocol for Data Collectors

APPOINTMENTS

- When setting up your appointments, make sure you ask for directions if you are unfamiliar with that part of town to minimize the chances of getting lost.

- Do not make appointments too far in advance, or if you do, telephone to confirm just before you leave for the appointment.

VISITS

- You will need to see the family on two separate occasions.

- On the first visit, you will take a choice of 3 toys from the toy library with you and encourage mom and child to play, and then select a toy to keep until November. You will videotape their interaction - about 20 minutes (maximum 30 minimum 10). On the second visit you will videotape a family problem solving session (about 15 minutes) followed by a 10 minute play session involving both parents (if applicable) with the same toy selected On the First visit.

SENSITIVITY

- All the families are volunteers in this research project so your schedule will fit around theirs. Be Sensitive to family life and to avoid mealtimes and bedtimes for children when arranging the appointments.

- Make sure the family knows how to contact you if they need to change their appointment - use the 492 - 8185 number. Do not give your home phone numbers out. You will all get project cards at some point in the near future.

PREPARATION

- Before the visit mark up a videotape with the # of your family - do not put names on the tape. Try to be as organized as possible so you can just start filming without any fiddling around. Use a power outlet from a wall plug-in the home if at all possible. Remember to ask.

VIDEOTAPING

- Make sure you are familiar with the machine. You must take some tape and review it before the first visits. Do you know how to set up the microphones? You want to go in and show that you know what you are doing. Data collection must be efficient and slick. Remember to review your first two tapes with GMK or JA before you arrange any more visits. Your tapes will be reviewed at random times during the collection. All tapes must be kept locked in the project office.

- You need to videotape in the family room. All distractions should be removed as far as possible. Ask for the cat/dog etc. to go into to another room. The TV should be turned off, as should the radio or tape player - be aware of noise levels in the room from other children and adults. Remember, we need good sound quality on the tape.

- Make sure you get a really good frame set up with both mom/dad and child clearly visible for facial expressions, speech and body language. If it's too noisy with other children ask them if they can keep it down or play in another room for a few minutes.

- Explain to the parents before you start about the need to get a good clip of just them and their child.

COMMUNICATION

- Do not coach! We are collecting data on the family as they are now so do not tell them what they are 'supposed to do'. You could say something like, "we are just getting about 15 minutes worth of tape of you all playing together with the toys we bring each time".

- For the family problem solving sessions - same rules. do not interfere or offer suggestions. if the family finishes the scenario in 3 minutes because only one person spoke and no one else offered any suggestions, then that is where the family is right now, and that is the data we want.

- Follow the instructions on the assessment instruments to the letter - RELIABILITY and VALIDITY are important, and with so many people involved on the project, we must be sure everyone is doing things in the same way in each home.

CHECKLISTS AND WRITTEN ASSESSMENTS

- Do not overwhelm the parent(s) with things they need to fill in You are making two visits so think about dividing the written checklists to fill in between the visits. Do not get them all out at once so the parent is working through a pile of stuff. You will be asking them to complete the FAM, the shortened questionnaire, and the Hassles and Uplifts scale.

WRITE UP

- Write up any observations/field notes and put them in the computer in your family's folder as soon as possible after the visit.

ABUSE

- Follow the guidelines for suspected abuse which you have been given.

PROBLEMS

- Inform GMK/JA if ANY problems occur as soon as possible, e.g. child sick and will not be in the study, parents moving parent wishes to withdraw from the study, etc.

A REMINDER

- Confidentiality - all data you collect is confidential. You will not discuss any of the children or families with the Head-start Center Staff or with other families or project staff.

APPENDIX F

SCRIPT FOR INITIAL TELEPHONE CONTACT

Script for Initial Telephone Contact

Good morning/afternoon can I speak to .....

My name is ..... I am calling from the Child and Family project at the University. We visited you in the summer and talked with you about working with you while your child is in ABC Head-start this year.

We are starting to collect information from our families this month so I would like to fix up a visit with you and (child's name). The visit would take about 45 minutes. We will be bringing a selection of toys from the project toy library for ..... to choose one. There will be a couple of questionnaires to fill in, and we would like to video ..... playing with you.

When would be a good time to come? It needs to be a time when ..... is not at Head-start because we need to see you both.

OK, I will come on ..... at .....
Can I just confirm your address. I have it as .....
(If you are unfamiliar with that part of town get directions).

If something comes up and this time is no good, you can get in touch with me at 492 - 8185.

Thank you very much. I look forward to meeting you and ..... Good-bye.

Remember to ring just before your visit if you set it up more than 2 or 3 days in advance. You will arrange the second visit at the house after the first visit. You will need to take consent forms with you for the families to sign. MAKE SURE you give the correct forms, i.e. experimental or control.

APPENDIX G

VIDEOTAPING SCRIPT FOR TOY LIBRARY

Videotaping Script for Toy Library

- Set up the camera before you introduce the session or get out the toys because we would like to get your instructions to the family on tape each time as a reliability check.

- SWITCH ON

- "On this visit we would like to get about 15 minutes of tape of you playing with ..... I have brought along a choice of toys from the project toy library. The two of you can look at each of the toys and play with them for a while. When you've tried them all out ..... should choose the one she/he would like to keep until we come back in a couple of months. When we come back we'll give you a new choice of toys. Do you have any questions before I get the toys out? (WAIT) OK here are the toys to tryout.

- ONCE YOU HAVE BEEN TAPING FOR !% MINUTES AND/OR THEY HAVE PLAYED AND CHOSEN THE TOY STOP THE TAPE

- "OK that's great, thanks very much I'm stopping taping now If they have not chosen their toy say "OK time to choose the toy _____ "

- At this point reassure the family they did a good job, collect up the spare toys and talk to the child about the toy they chose.

POINTS TO REMEMBER

- DO NOT tell the family exactly what we are hoping to see - turn-taking, imitation, etc. that would defeat the object of the exercise.
- DO NOT talk to them while they are playing or interfere with what is going on.
- MAKE SURE you can see both parent and child faces and that the microphone is close enough to pick up the sound.
- MAKE SURE you got them to switch off the TV, radio or tape player, put out the cat/dog and keep other distractions to a minimum. Do not be shy about asking people to be quiet if they are not involved in the taping - it's better to tell them now rather than have to go back and do another visit.

APPENDIX H

INTERACTIVE LANGUAGE CODE: OPERATIONAL DEFINITIONS

Interactive Language Code:

(adapted from Hemmeter and Kaiser)

Combined Code Milieu and Responsive - Interactive Language Teaching)

Parent Initiation Behaviors

1) Instruction: A request by the adult to perform a non-verbal behavior.

2) Question: Verbal prompt from the adult requiring a verbal response from the child. Asking why- or a yes/no question (questioning or declarative form with questioning interaction).

3) Prompt: The adult physically cues the child via pointing, directing, or moving toward a particular object of interest; using gestures to encourage the child to perform the operation or task; physically assist the child in performing some operation.

4) Recruiting The Others Attention: An effort is made to gain the child's attention when they are not on task or not taking part in the initiation.

Parent Feedback Behaviors:

1) Repeat: Response to a child's utterance by repeating what they say or something close to what they say.

2) Expansion: Response by repeating the others utterance and adding on syntactic or semantic information to what the other

said. If expansion follows a repeat, code only as an expansion, for example, child: "Picture" Adult: " Picture. You color the pretty picture."

3) Clarification Seeking: Repetition of the others utterance to check to see if that is actually what the other said. This includes rising, questioning, intonation in the adult's utterance. Clarification seeking also occurs when someone says, "What?" in response to a the others utterance because they didn't hear or couldn't understand what the other said.

4) Acknowledgment /Praise : Follows a child's verbal response,

verbal or nonverbal request.

A. The adult acknowledges the child's response (e.g. , "right", hum", "okay.")

B. The adult praises the child's response. e.g. "very good."

C. The adult says nothing , but provides materials or assistance following a child's request.

D. The child requests for attention and the adult responds by looking.

5. Follow Child's Lead: The adult noticed what the child was interested in and the subsequent adult behavior was related to the child's focus of interest. It is also recorded when a parent responds to a child's question.

6. Negative Feedback: When the adult's response indicates that the verbal response or lack of verbal response by the child was wrong or inappropriate. Content and intonation is used to determined whether the adult's feedback is negative. Negative feedback does not specify the correct answer and does not require a further response by the child.

Parent Non-Engaged Behavior:

1. Comment: A statement made by the adult that does not require the child to respond, and is not in response to the child. A comment is coded when:

   A. the adult verbally describes what the child is doing, their thoughts or feelings.

   B. the adult talks about themselves, what they are doing, thinking of, or feeling.

   C. the adult talks about an event that is happening at the time (in the classroom or elsewhere), will happen in the future or has happened in the past.

2. No Response: Is coded following a request/command by the child or adult when the adult has time to respond (at least 3 seconds) but does not respond.

3. Unintelligible: A verbal behavior of the adult that is unintelligible.

Child Initiation Behaviors:

1. Unintelligible Initiation: When the child's initiated utterance is audible but can not be understood by the adult. If the adult responds to the initiation code according to the interred child initiation type.

2. Verbal Request: An intelligible utterance produced that has the apparent intention of getting the other to provide assistance, materials or attention or to stop engaging in some behavior. Successive requests for the same thing with no time between, then code as one request.

3. Nonverbal Requests: Nonverbal behavior and nonverbal behavior accompanied by a unintelligible request that has the apparent intention of getting the other to provide assistance, materials, or attention or to stop engaging in some behavior.

4. Question: A child initiation that asks a why or yes/no question. (Questioning or declarative form with questioning intonation).

Child Response Behaviors:

1. Obligatory Correct Response: A child response that follows a behavior by the adult and is a correct response; both appropriate and accurate.

2. Unrelated Response: The content of the child's response is totally unrelated to the content of the preceding adult behavior. Unrelated response is coded when the child refuses to respond to an adult behavior.

A: What shape is this?	A: What color is this?
C: Me big.	C: I don't know.

3. Related but Correct: The content of the child's response is semantically related to the preceding behavior by the adult, but the response is not correct.

A: What shape is this? (holds up circle)

C: Square

4. Unintelligible Response: The child's response is audible but cannot be understood by the coder.

5. Imitative Response: The child's response to adult initiations or comments is purely imitative. Correct if following a question or an instruction.

APPENDIX I

INTERACTIVE LANGUAGE SCORE-SHEET

Interactive Language Score-Sheet

Child's Name: Date:

Initiations		Responses
Comment		
Instruction/Mand		Obligatory Correct
Question		Related/Incorrect
		Unrelated
Recruit C's Att'n		Unintelligible
Time Delay		Imitative
Feedback		
Repeat		Initiations
Mirroring		Comment
Expansion		Unintelligible
Seeking Clarification		Verbal Requests
Acknow/Praise		Nonverbal Req.
Follow C's Lead		Nonverbal Behavior.
		Question
Negative Feedback		
No Response		Loses Interest

APPENDIX J

OPERATIONAL DEFINITIONS OF THE TURN-TAKING VARIABLES

Turn-Taking Measure of Parent-Child Interaction

Operational Definitions of the Variables

Turn-taking Sequence: "A sequence of socially related behaviors between two participants which are not separated by the occurrence of more than three consecutive codeable behaviors emitted by one participant" (McCarthy, 1986 p. 41). If three or more consecutive codeable behaviors are emitted by a participant without response from the other member, it is considered to be a termination (which is discussed later).

Turn: A behavior that is a direct response to another person, or is initiating contact with that person. It is followed by a similar behavior from the person who is responding.

Termination: An interrupted turn defined by a behavior that is verbal and/or non-verbal immediately following that has any of the following;

1. A pause in the turn-taking behavior sequence of more than five seconds;
2. When one member of the dyad responds three consecutive times without an intervening response from the second member;
3. The utterance of a socially or linguistically unrelated topic of conversation.

Turn-taking Sequence Length: The turn-taking sequence length is determined by totaling the number of turns chained together without interruption. As an example, a 5 turn sequence is as follows:

	parent initiation ----------> child response	(1 turn)
(2 turns)	parent response ---------> child response	(3 turns)
(4 turns)	parent response ---------> child response (terminaton)	(5 turns)

APPENDIX K

TURN TAKING SCORE-SHEET

Turn-Taking Score-Sheet

Child's Name: ______________________ Date: ______________________

Child																							Parent	Time	Activity
(1)																							(1)		
Initiation																							Initiation		
Responses																							Responses		
( )																									
Initiation																							Initiation		
Responses																							Responses		
( )																									
Initiation																							Initiation		
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Initiation																							Initiation		
Responses																							Responses		
( )																									
Initiation																							Initiation		
Responses																							Responses		

	Parent	Child	Parent & Child
Total Initiations			
Total Responses			
Total Terminations			

Turn Sequences	1:	2:	3:	4:	5:	6:	7:	:	
Total Turns									=

Activity Legend	
1	Mr. Potato Head
2	Tea Set
3	Puzzles
4	Puppets
5	Talking
6	Ball
7	Other (specify)

APPENDIX L

TURN TAKING SUMMARY SCORE-SHEET

Turn-Taking Summary Score-Sheet

Child's Name: ____________________ Date: ____________

Parent(s)			Child	Turn Sequences								Total Turns	Termination	Activity	Time
(1)			(1)	1:	2:	3:	4:	5:	6:	7:	:				
Initiation			Initiation												
Responses			Responses												
( )				1:	2:	3:	4:	5:	6:	7:	:				
Initiation			Initiation												
Responses			Responses												
( )				1:	2:	3:	4:	5:	6:	7:	:				
Initiation			Initiation												
Responses			Responses												
( )				1:	2:	3:	4:	5:	6:	7:	:				
Initiation			Initiation												
Responses			Responses												
( )				1:	2:	3:	4:	5:	6:	7:	:				
Initiation			Initiation												
Responses			Responses												
( )				1:	2:	3:	4:	5:	6:	7:	:				
Initiation			Initiation												
Responses			Responses												
( )				1:	2:	3:	4:	5:	6:	7:	:				
Initiation			Initiation												
Responses			Responses												

Activity Legend:

1 Mr. Potato Head
2 Tea Set
3 Puzzles
4 Puppets
5 Talking
6 Ball
7 Farm Set
8 Farm Sounds Pull Toy
9 Other - Specify

Termination:

1 Child terminated interaction
2 Parent terminated interaction
3 Other terminated interaction (e.g., telephone, sibling, camera person)

APPENDIX M

LINDER'S (1994) PRAGMATIC LANGUAGE SCORE-SHEET

Pragmatic Language Score-Sheet

Child: Date:

Pragmatic Language Skill	Observed
Stage or Level of Intent	
Perlocutionary	
Illocutionary	
Locutionary	
Meaning implied by gestures, vocalizations, and verbalization	
Seeking attention	
Requesting Object	
Requesting Action	
Requesting information	
Protesting	
Commenting on object	
Greeting	
Answering	
Acknowledging other's speech	
Functions Fulfilled	
Instrumental	
Regulatory	
Interactional	
Personal	
Imaginative	
Heuristic	
Informative	
Discourse skills typically demonstrated	
Attending to the speaker	
Initiating conversation	
Turn-taking	
Maintaining a topic	
Volunteering/changing the topic	
Responds to requests for clarification	
Questioning	

Note: An adaptation of Chapter 8: Observation Guidelines for Communication and Language Development in Transdisciplinary Play Based Assessment, by Tony Linder, 1994, p. 199.

APPENDIX N

RELIABILITY ASSESSMENTS OF THE INTERACTIVE LANGUAGE ASSESSMENT DEVICE, TURN-TAKING MEASURE, AND LINDER'S TRANSDISCIPLINARY PLAY BASED ASSESSMENT

Reliability Assessments of the Interactive Language Assessment Device, Turn-Taking Measure, and Tony Linder's Play Based Assessment (Pragmatic)

Interactive Language Assessment Device

Date	Reliability	Number of 30sec. Segments
December 2, 1996	80%	2
December 2, 1996	81%	2
December 2, 1996	81%	2

Turn Taking Measure

Date	Reliability	Number of 30sec. Segments
December 11, 1996	100%	6
December 11, 1996	92%	6
December 13, 1996	68%	6
December 14, 1996	97%	6
December 15, 1996	93%	6

Tony Linder's Transdisciplinary Play Based Assessment (Pragmatics) 1993

Date	Reliability	Number of 30sec. Segments
October, 1996	88%	6
October, 1996	83%	6
October, 1996	79%	6
October, 1996	88%	6