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## Training Parents to Facilitate Language Through Storybook Reading.

Linda K. Crowe

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**TRAINING PARENTS TO FACILITATE  
LANGUAGE THROUGH STORYBOOK READING**

**A Dissertation**

**Submitted to the Graduate Faculty of the  
Louisiana State University and  
Agricultural and Mechanical College  
in partial fulfillment of the  
requirements for the degree of  
Doctor of Philosophy**

**in**

**The Department of Communication Sciences and Disorders**

**by**

**Linda K. Crowe**

**B.S., Southeast Missouri State University, 1978**

**M.S., University of Nebraska-Lincoln, 1986**

**December 1996**



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## ABSTRACT

Six parent-child dyads participated in a single subject, multiple-baseline study evaluating the effectiveness of storybook reading as a context for parent training. Six children, ages 3;2 to 3;5 with specific language impairment, and their primary caregivers completed three-to-five baseline, eight-to-ten training, and two follow-up sessions.

Parents were taught to use a complete reading cycle (CRC) based on a typical parent-child storybook reading format described by Ninio & Bruner (1978). The CRC consisted of four steps: (a) an attentional vocative to establish joint focus or topic for discussion, (b) a query to elicit a verbal response about the topic, (c) a response to reply to the query, and (d) feedback to provide information regarding the accuracy or clarity of the response. Parents also were taught to use language facilitating techniques, such as balancing communicative turns, matching the child's language level, responding contingently to the child's story initiations, and elaborating on the child's topic of interest.

Changes in parent interaction style and child language productivity were obtained during each study session. A  $R_n$  Test of Ranks was used to analyze the parent and child data for significant change across subjects. Significant changes occurred in parents' number of CRCs completed, percent of turns taken, mean length of utterance (MLU), and difference between parent and child MLU. Child language measures reached levels of significance for number of communicative turns, verbal turns taken, number of story initiations, and semantic diversity of utterances. Two measures, parent responses to child story initiations and child MLUs, did not reach levels of significance. However, analysis of within subject changes showed generally positive trends across parent and child behaviors.

Results of this study showed that parent training using the CRC procedure for storybook reading produced positive changes in parent interaction style. These changes were reciprocated by child increases in

language productivity. Although parents varied in the degree and types of changes, the children who completed follow-up sessions maintained training levels of change or continued to show improvements in communicative behaviors after training was completed.

## INTRODUCTION

Children acquiring language have a complex constellation of processes to coordinate and organize during development. They must learn to interpret objects and events within the environment, engage in social interactions with others, use conversational strategies to initiate and maintain topics, and use words to refer to information (Bruner, 1967; Mahler, 1979; Piaget, 1969; Vygotsky, 1978). The importance of the role of parents in facilitating this learning is increasingly recognized. Parents support and guide children throughout the acquisition process, enabling children to participate in complex communicative interactions long before they are able to manage the constellation of abilities independently (Bruner, 1967; Vygotsky, 1978). But when a language delay is present, the synchrony between parents and children often becomes disrupted, resulting in limitations rather than enhancement in learning. In response, parent training programs have been developed to increase awareness of facilitative patterns of interaction and strategies that can be used to maximize the child's successful participation in communicative events.

The purpose of this study was to assess the efficacy of a parent training program based on the routine event of parent–child storybook reading. Storybook reading was selected because it represents a context where verbal interaction is required for participation. Storybook reading thus provides multiple ongoing opportunities to learn to interpret events, engage in social interactions, initiate and maintain topics, and use words to refer to information. It also is an activity that occurs as part of a daily routine in many homes, and therefore is perceived as natural and relevant to parents. Storybook reading also provides a context where change is easy to measure, since storybook reading itself has a routine structure. This routine optimally comprises complete reading cycles (CRCs) composed of evoking attention, requesting information, responding to the query, and acknowledging the accuracy of information through feedback (Ninio & Bruner, 1978).

This study measured behaviors for both parents and their children with specific language impairment (SLI) for changes in the patterns of interaction and language use occurring during storybook reading as a result of parent training. These changes were measured by comparing the number of complete reading cycles produced, the information talked about, ratio of turns taken by each participant, the communicative initiations produced by the child and responded to by the parent, and the mean length of utterance produced by each participant. Positive changes would suggest that storybook reading can be used to learn facilitative interaction patterns in a relatively short time frame, and thus serve as a productive context for training parents to enhance children's language learning.

### Domain-Specific Theories of Development

Learning to interpret events, engage in social interactions, initiate and maintain topics, and use words to refer to information is a complex, multifaceted process. It involves the integration and coordination of cognitive, social, semiotic, and sensory motor processes that continuously refine and reorganize a child's understanding of the social and physical world, and the language used to refer to these aspects of meaning (Bloom, 1970). The refinements and reorganizations that occur as children construct a mental representation of the social, linguistic, and physical environment result in both quantitative and qualitative changes throughout development.

### The Cognitive Domain

Theorists in different discipline areas have developed models to describe the quantitative and qualitative changes and to explain the process by which these changes occur. For example, Piaget's account of cognitive development traces the path of thought through six Sensori-motor substages that yield to a new equilibration marked by the emergence of symbolic abilities during the Preoperational stage. Preoperational thought in turn yields to a qualitative advance in the ability to coordinate,

reverse, and in other ways transform experience during the Concrete Operational stage. Transformations of abstract concepts mark the final qualitative change during the Formal Operational stage (Piaget, 1954, 1974).

Piaget further described the mechanism by which these changes occurred within his theory. He proposed that the child constructed schemata to mentally represent meaningful experiences. Whenever a new object is encountered, a process of assimilation is used to integrate the new information into similar, existing schemata. To the extent that the new information does not fit, accommodations are made, ranging from slight variations of old schemata through the creation of a new, separate but related schemata. In this manner, children build a representational network of interrelated concepts that can be used to adapt quickly and productively to an ever changing external environment (Piaget, 1954). Using this system of representations, an activity such as crossing a new street is not a novel experience, but rather a variation of a task that the child has already learned to navigate. The ability to use existing schemata in new situations enables the child to make rapid adaptations to changing environmental demands.

### The Social Domain

In the domain of social development, theorists such as Mahler have proposed similar stage models. Mahler (1979) describes how socialization begins with a stage termed "Normal Autism" where infants perceive no separation of self from others, and no attachment of meaning to their own cries or movements. Qualitative changes are seen as children first begin to separate from their mothers, and then gradually learn to include others in their activities and actively participate as members of progressively more complex social groups. An increasing need for communication skills is observed with each qualitative change in social expectations and demands.

Mahler describes how social relationships develop through a process of reciprocal responding between a child and others in the social environment. Mothers socialize their babies by responding to any behavior produced by the child, including random movements, grunts and cries, or burps as if they are meaningful and communicative. The child in turn responds to the mother's attention, producing eye gaze, additional movements, sounds, and facial reactions. These reactions produced by the child are, in turn, interpreted and treated as socially communicative acts by the parent. In this manner, parents engage in conversations with their children, building a relationship of communication, trust, and support that the child will depend on throughout development. Development progresses as children continuously seek to be like the parents and others in their social environment, learning to separate and become an individual while at the same time learning to become interdependent and function as a member of a social group. Communication is a critical aspect of this process.

#### The Communication Domain

Communication development includes a stage of prelinguistic functioning, where cries, gestures, and body language serve as the means of communication, followed by a stage of rapid language acquisition that unfolds with the advent of symbolic representation. Brown (1973) proposed five stages of symbolic language development, ranging from the emergence of simple, two-word combinations, and progressing toward mastery of complex, multiply embedded sentences. For most children, the majority of adult language forms are mastered before the fifth birthday.

Numerous theories have been proposed to explain how this rapid acquisition of a complex, symbolic system can occur in children with limited reasoning abilities. One of the most prominent theories is one proposed by Chomsky (1965), who suggested that all children are genetically endowed with a specific mechanism for learning language, referred to as a Language Acquisition Device, or LAD. As neurological

development progresses, the LAD becomes systematically sensitive to different aspects of grammar, such as marking time or number. Such a mechanism could account for linguistic universals, or properties of language that are seen across all languages and cultures, and that emerge in approximately the same sequence and at similar ages across children. The role of the environment in this model consists primarily of sufficient exposure for the LAD to discover how a specific universal is realized in a language. The importance of social interaction and cognitive development is minimal in this viewpoint.

### Integrated Theories of Development

Increasingly, however, models of language acquisition and use are viewed more holistically, with interactions between and integration among social, cognitive, linguistic, and sensory motor processes considered critical to development. Bruner (1967) provided an early model of reciprocal processes, recognizing the importance of parents to language acquisition. Bruner viewed language acquisition as a transactional process, or one in which parents exhibit sensitivity to the communication abilities of their children, and consequently tailor their interactions to be appropriate to successful communication. Thus, parents may reduce the grammatical complexity of sentences used with their child to a level only slightly above the child's productive capabilities, or may restrict vocabulary use to concrete words that refer to objects or actions present within the environment.

Parents also use strategies to enable their children to be successful communicators with other people, and to help them talk about their environment. Bruner (1967) refers to this as providing a scaffold, or assistance during communication that enables children to succeed at a level higher than their independent level of communicative performance. Scaffolds include behaviors such as gestures, models, verbal repetitions, expansions, questions, and intonational patterns that serve to engage the child in joint focus with the adult on the same topic, and to enable the



child to use words and word order to express meaningful, purposeful ideas regarding that topic.

Vygotsky (1978) proposed a similar role of adults in the learning process. Vygotsky proposed that social mediation, a concept similar to scaffolding, provided by an individual with more skill to one attempting to acquire a behavior maximizes learning. To be effective, the social mediation best occurs within a "Zone of Proximal Development," or ZPD. The lower limit of this zone is defined as the level of independent functioning, where no assistance or social mediation is required for a child to engage in successful learning and task performance. The upper limit of the ZPD is defined as the level of task difficulty where the child can no longer learn because of lack of prerequisite knowledge and skill, no matter how much assistance is provided through social mediation. Vygotsky considered working near the upper limit of the ZPD to be an optimal learning context when social mediation was readily available.

Working at this more complex level provides children with exposure to and experience with functioning at more abstract levels, that lays the foundation for behaviors expected to emerge in the near future while refining abilities at lower levels of the ZPD. For example, talking about what a doll baby might eat, and then helping to prepare that food during play exposes the child to methods for using language to create a possible future at a time when the child can only independently talk about the immediate present. Without socially mediated experiences, the child has avenues for discovering how language works to create a future. Thus, Vygotsky views cognitive, social, and linguistic processes to be interdependent and unified within learning (Vygotsky, 1967).

#### SDS: An Integrated Model of Development

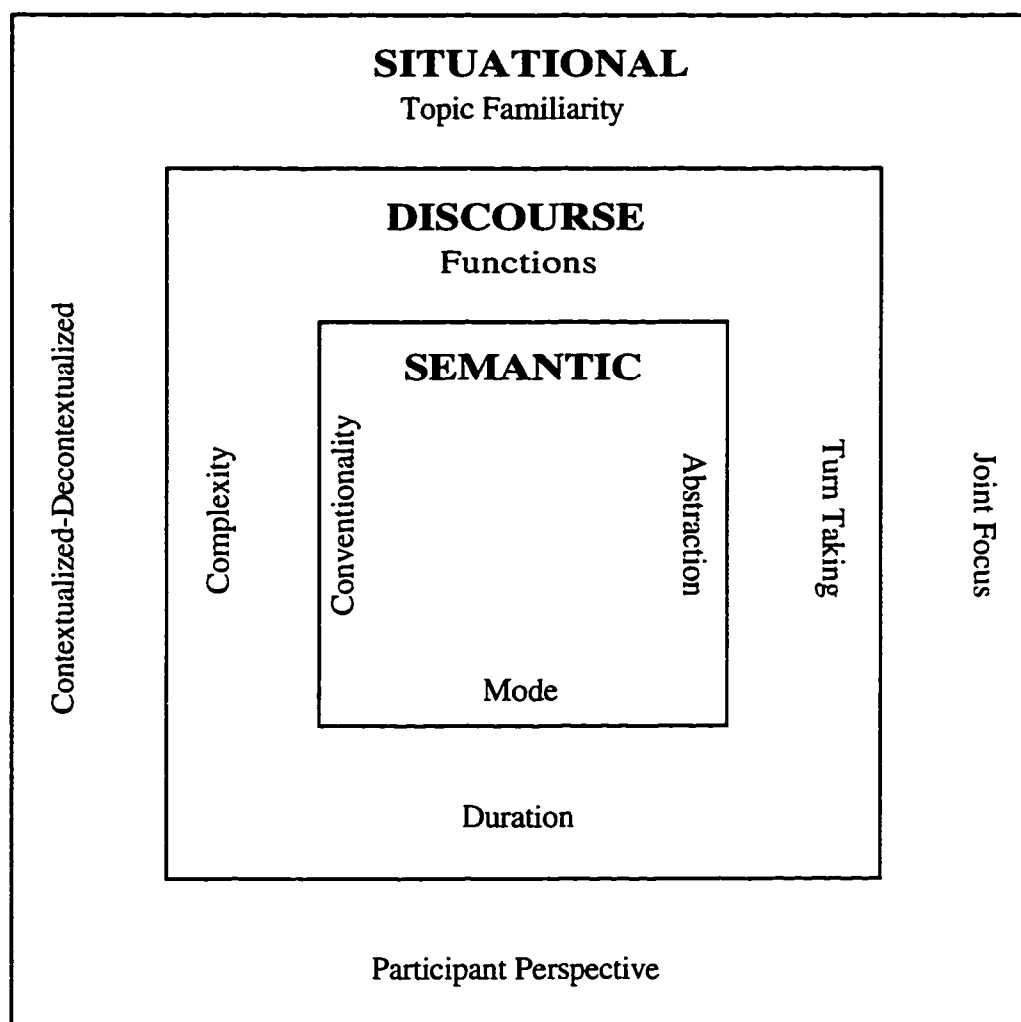
Holistic theories of language acquisition require that integrated models be adopted to unify developmental processes. One such model is the Situational–Discourse–Semantic, or SDS model proposed by Norris and Hoffman (1993) (see Figure 1). In this model, language acquisition

and use can be described according to contexts that integrate, rather than separate, cognitive, social, linguistic, and sensory motor processes. The derivation of the Situational, Discourse, and Semantic contexts from the cognitive, social, linguistic (i.e., semiotic), and sensory motor domains is shown in Figure 2.

The Situational context results from an integration of the four domains to reflect properties of a situation that are present during language acquisition and use. For example, the linguistic ability to represent knowledge enables thought to displace from direct sensory input. Instead of talking only about objects and events present within the environment, language can be used to create a completely new, decontextualized context such as dinosaurs that roamed the earth in prehistoric times, or the cruise that will be taken in the future. Similarly, the linguistic property of representation combined with the development of a network of cognitive schemata enables thought to progressively displace from an understanding of oneself through a focus on objects, pictures, and experiences within the environment. Integration with the social domain indicates the level at which others can be included in the context.

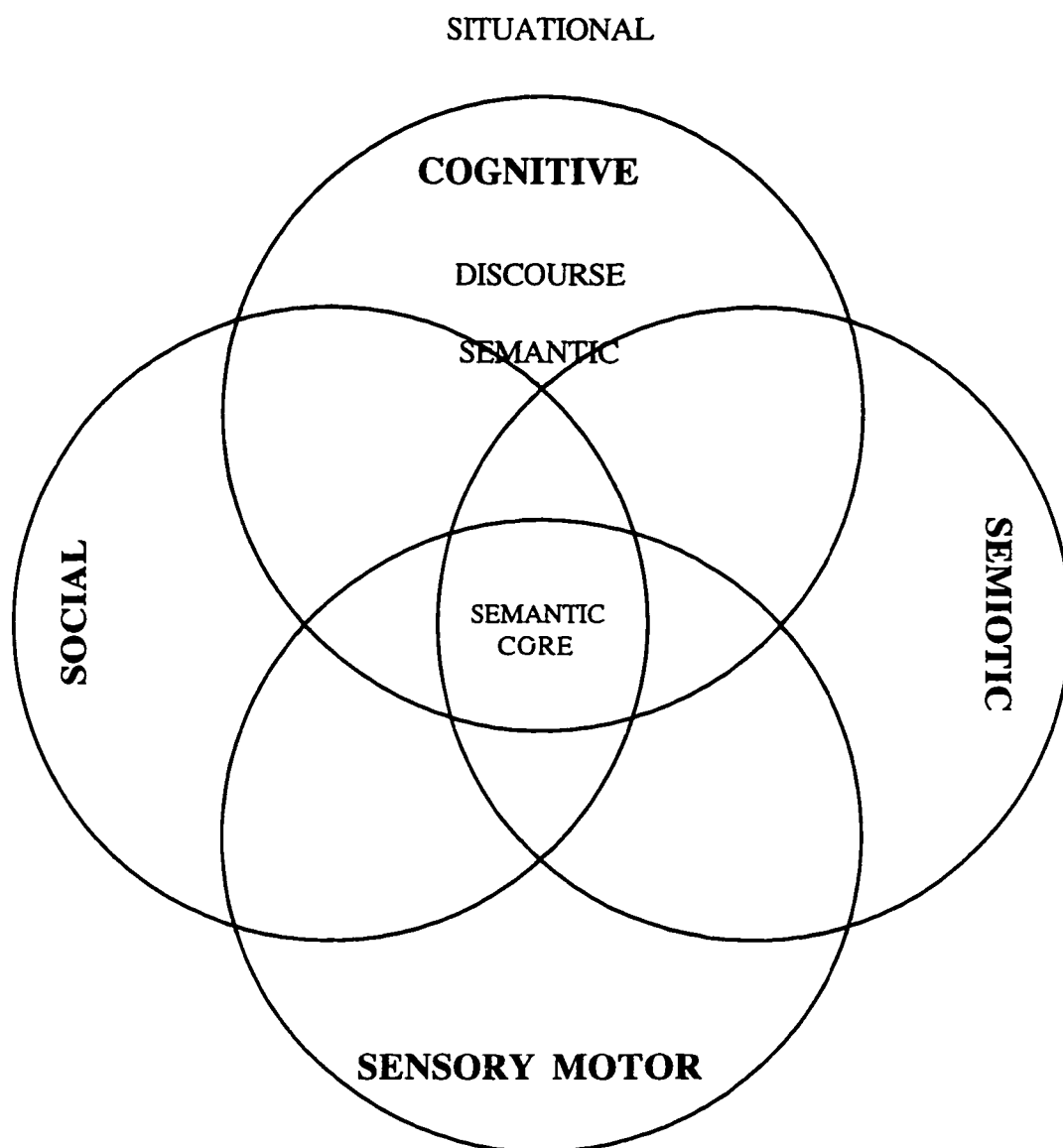
The Discourse context results from an integration of the four domains to reflect the organization and maintenance of interactions ongoing within the communicative event. For example, an integration of social interaction and linguistic abilities results in the turn-taking patterns found within extended discourse, ranging from primarily a listener's role, through a shared dialogue, and at the opposite end of the continuum, a monologue. Similarly, an integration of cognitive schemata for events and the linguistic ability to use words to establish relationships (i.e., next, first, because, if, when, and so forth) results in the ability to organize experiences according to structures such as temporal sequences or causal episodes.

The Semantic context results from an integration of the four domains to reflect the representational properties of symbols, including



**Figure 1.** Situational-Discourse-Semantic Context Model of language development.

Note. From Whole Language Intervention for School-Age Children (p. 33), by J. A. Norris and P. R. Hoffman, 1993. Copyright 1993 by the Singular Publishing group. Adapted with permission of the author.



**Figure 2.** Situational-Discourse-Semantic Context as a derivational model of cognitive, social, semiotic, and sensory motor domains.

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**Note.** From Whole Language Intervention for Preschool Children, by J. A. Norris and P. R. Hoffman, 1996a. Unpublished Manuscript. Reprinted with permission of the author.

linguistic symbols such as phonemes, words, morphemes, and syntax. Such symbols enable meaning to be expressed along a continuum from concrete (i.e., reference to information perceived directly through sensory input) to abstract (i.e., reference to concepts created by combining symbols, such as house + family = home; home + neighborhood = community; community + laws = government). The sensory motor domain combined with social contexts of interpretation and use enables a range of verbal and nonverbal behaviors to refer to meaning, including symbolic modes such as speaking and writing, as well as gestures, eye contact, intonation, and proxemics.

Such an integrated model enables the interactive effects between cognitive, social, linguistic, and sensory motor domains to be easily observed. The focus becomes the integrated Situation, or social, linguistic, and physical context of the communication, the integrated Discourse, or the structure and organization of the communication across extended discourse, and the integrated Semantic context, or the characteristics of the language and the information it refers to within the context. Each of these will be discussed in relationship to the measures used by this study to evaluate the efficacy of parent training, that is, the storybook reading context, the information talked about within the bookreading event, the ratio of turns taken by each participant, the communicative initiations produced by the child and responded to by the parent, and the mean length of utterance produced by each participant to share meaningful information.

#### Language and Reading within the Situational Context

Storybook reading is an activity in which social, cognitive, communicative, and sensory motor processes function synergistically to make sense of the pictures and words found in the book (Sulzby, 1985). Storybooks as a context for learning provide challenges to young children. For example, the child is required to focus attention and impart meaning to two-dimensional illustrations, rather than real objects or

characters. Furthermore, the pictures capture a moment in time, but must be interpreted as ongoing action, not only within a picture (i.e., a character giving a dog a bath) but also across pictures (i.e., looking angry because the dog rolled in the mud). The pictures might depict experiences familiar to the child, such as bathing a dog, but often storybooks picture completely novel events, as in a character stranded in the ocean following a shipwreck. The words that accompany the pictures may provide overlapping information, as in "Sam gave his dog a bath," or the pictures and text may present related but different information, as in "'Maybe my dog needs to go to obedience school', thought Sam." (Golden, 1990).

To learn from storybook reading, the social, linguistic, and physical properties of the situation must be within the child's Zone of Proximal Development (Vygotsky, 1962). This zone can be defined according to the Situational Context of the SDS model. Figure 3 depicts a continuum that emerges developmentally, and that can be used descriptively to define the characteristics of the activity or situation. One property of the continuum is the change in the physical and social world that can be attended to with increasing cognitive–social–linguistic development. Piaget (1955) described this continuum as a process of gradual decentration, or cognitive displacement that distances thought from an egocentered perspective.

#### Contextualized–Egocentered

At birth and through the first four months of life, children are egocentered, with little distancing or separation of the self from their immediate surroundings (Piaget, 1954). Few schemata exist, and without a means of representation, stimuli are only apparent when they are directly impacting the child's sensory motor system. Object permanence does not exist, because when an object is not present in the child's visual or sensory motor field, no representation exists to recall it. The child therefore is not separated from the physical environment, because whatever is seen or heard at that moment constitutes the child's

SITUATIONAL CONTEXT		DISCOURSE CONTEXT		SEMANTIC CONTEXT	
C O N T E X T  L I Z E  D	Level X LOGICAL - hypothetical - mental objects - abstractions - principles	T R A N S A C T I O N A L F U N C T I O N  E X P R E S S I V E F U N C T I O N	Level X INTERACTIVE - multiple plots or topics - reciprocal - integrated	P O E T I C X P E R I E N T I A L E R D I T E	Level X METALANGUAGE - linguistic properties - separate from meaning or use
	Level IX SYMBOLIC - linguistically created - possible event		Level IX COMPLEX - multiple sub- topics/episodes - diverge/converge		Level IX ANALOGY - indirect meaning - figurative expression
	Level VIII RELATIONAL - relationships within event - scripts, schema		Level VIII COMPOUND - series of sub- topics/episodes - each concludes		Level VIII EVALUATION - reflection on significance - judgment/ value
	Level VII DECENTERED - recreate event - perspective of observer		Level VII COMPLETE - overall moral or objective - compare/contrast		Level VII INFERENCE - meaning beyond what is stated - draw conclusions
	Level VI EGOCENTERED - recreate event - perspective of participant		Level VI ABBREVIATED - plans, intents - problem, goal, solution		Level VI INTERPRETATION - psychological response - perceptual cues
	Level V LOGICAL - representation - logical reason - concrete		Level V REACTIVE SEQUENCE - cause-effect - no intent/plan - logical order		Level V ATTRIBUTION - characteristic qualities - state relations
	Level IV SYMBOLIC - substituted objects - illustrations		Level IV ORDERED SEQUENCE - temporal order - no causality - arbitrary		Level IV DESCRIPTION - unify objects, events, agents - action relations
	Level III RELATIONAL - relational actions - real functions		Level III DESCRIPTIVE LIST - topic related - categorical organization		Level III LABELING - name wholes - label parts - match perception
	Level II DECENTERED - sensori-motor exploration - discovery		Level II COLLECTION - associations - no structure - change topics		Level II INDICATION - nonlinguistic communication - context meaning
	Level I EGOCENTERED - sensori-motor stimulation - own body		Level I DISCRETE EVENTS - disconnected - momentary		Level I REACTION - nonconventional - no communicative intent, purpose

**Figure 3.** Developmental continuum of the Situational-Discourse-Semantic Context model.

Note. From *Whole Language Intervention for School-Age Children*, by J. A. Norris and P. R. Hoffman, 1993, (p. 33). Copyright 1993 by Singular Publishing Group. Adapted with permission of the author.

knowledge of the environment. Mahler (1979) described a similar initial state of "normal autism," or an inability to view other people as being separate from the self. When people are physically holding the child, they are part of the child's sensory motor experience. When they are not, the child has no representation of others, and so their absence cannot be noticed. Communicative sounds at this stage consist of nonmeaningful sound sequences received through the sensory system, as well as undifferentiated sounds produced reflexively by the child's motor system.

In this initial state of development, defined as "Contextualized–Egocentered" on the SDS model, a storybook is perceived by the child as a collection of colors, sights, and sounds. The pictures are not understood as representations of objects or characters engaged in action, but rather only as perceptible lines, shapes, and colors. No meaning or purpose is attached to the event of looking at the pictures or reading the text (Norris & Hoffman, 1996b). Older children attending to a book at this level may engage in behaviors such as looking at the book briefly as an object when the book is brought to the child.

#### Contextualized–Decentered

Both Piaget (1955) and Mahler (1979) describe a change as the child begins to separate self from the physical and social environment, or the beginning of the process of decentration. Mahler notes that when children are wet, hungry, or in other states of discomfort, caregivers appear and relieve their malaise. The change in state from discomfort when alone, to relief in the mother's presence enables the child to begin to separate and discriminate self from others. Piaget described a similar process as infants interact with objects. Through repeated exposure to objects brought to the infant, schemata begin to form that enable the infant to begin to recognize them as being familiar and to discriminate between them. The mental representation, or schemata, allows infants to look at and attend to an object held a short distance from their bodies, or a



separation of self from others. This distancing begins to emerge by the third month of life and continues at this state through ten months of age.

In this state of development, termed "Contextualized–Decentered" on the SDS model, a book is looked at as an object, separate from the child. The picture is interpreted as a whole, with little regard to details. For example, cardboard books where each page is a picture of a different animal or object are interesting to children at this stage. The child engages in book–related actions, such as producing the sound of the depicted animal, or touching and petting the animal. Communications are here–and–now, produced from the child's perspective to refer to the child's own insights or interests, with little regard for the listener's needs (Norris & Hoffman, 1996b). Adults often "follow the child's lead" when engaged in storybook reading at this level, talking about whatever the child points to or shows an interest in. The adult also might perform an action or in other ways model how to respond to the book (Snow & Goldfield, 1981).

#### Contextualized–Relational

These experiences with shared interaction provide the child opportunities to regulate and control the social and physical world. Socially, two distinct tracts of development become apparent, one being independence, or the development of a sense of self that is individual and separate from others, and the second dependence, or the establishment of a group identity, or being related to and part of the social groups of the culture (Mahler, 1979). Similarly, Piaget (1955) describes an understanding of how objects within the environment are viewed as separate entities. At the same time the objects can be viewed as functioning meaningfully in relationship to other objects (e.g., a bowl used to hold cereal retrieved with a spoon during eating).

The ability to see both objects and people as separate or independent and yet related or dependent, results in the ability to coordinate both in the child's own actions. This ability to coordinate

people and objects in the child's attention marks the emergence into truly socially intentional behavior, beginning at approximately ten months of age, and lasting developmentally through eighteen months (Bates, 1976). That is, the child might point to the bowl while looking at the caregiver, expecting the adult to put cereal in the bowl for the child. The emergence of intentionality is critical to the further development of communication at the symbolic level, and is referred to as Contextualized–Relational on the SDS model.

In storybook reading, the child begins to attend to pictures with many characters and objects depicted, and to see the relationships of action between them. Words and two–word combinations may be used to refer to someone doing something shown in the picture. A role of the person shown as doing an action is better understood than the role of the recipient, and the language is highly contextualized to the immediate character or event in focus (Sulzby, 1985). The ability to share joint focus and intentionally share information results in a child who is receptive to hearing about events pointed out by the adult, and who may attempt to imitate or recommunicate this new information. Opportunities to reenact the events using toys or through role playing help this internalization process (Norris & Hoffman, 1996b).

#### Contextualized–Symbolic

The two social strands of independence and dependence continue to create conflict for children between two and three years of age. Better motor skills, greater knowledge of the world, and less reliance on the mother's body for survival enable the child to explore the world more independently and at greater distances from caregivers. But this increased independence creates fear as the child faces new situations alone and encounters a wider range of adults and peers, necessitating the development of new strategies to function in these larger contexts (Mahler, 1979). The use of language assists the child, providing a means

for sharing information across distances of time and space, and for gaining control over the social environment.

Piaget (1955) viewed this emergence into true symbolic functioning as a qualitative change in thought. Symbolic thought frees the child from the immediate here-and-now by allowing for the manipulation of the symbols, rather than the physical environment. For example, language can be used to recreate an event that occurred in a different place at an earlier time, or to create a future before it exists, as in talking about what will happen tomorrow or next week. The representation of the environment becomes the information that is acted upon. But thought using symbols at this stage is preoperational and consequently has limits. Logic is bound to perceptions, and therefore is imperfect. The child will reason based on what objects look like, rather than on their representational properties alone. Thus, equal numbers of objects, one tightly grouped and one spread out, will be considered unequal because the child will perceive the spread out group to be "more."

In storybook reading, the language used to talk about the pictures functions to shape the interpretation of the pictures. At this stage, true stories are told, with only remnants of talking about objects or actions outside of a plot appearing (Sulzby, 1985). Language is critical to understanding true stories, because it is the primary means for sequencing the actions and specifying the relationships between actions and states. Futures are created using language, as in stating a plot-related problem, and then developing a plan to solve the problem. Thus, pictures and words are equally important to the storybook reading event. Story retelling and reenactment provide repeated opportunities to learn how to use language to talk about story-related events and to distance the linguistic symbols even further from the pictured symbols (Norris & Hoffman, 1996b).

These four levels of the SDS model represent the primary forms of storybook reading that emerge during the early preschool years. It is

children's development through these stages that are integrated in this study. Above this level, bookreading becomes an increasingly more language-based activity with less support provided by pictures or other nonverbal symbols. For example, first grade reading books provide a single picture to accompany several lines of text, only some of which are pictured. By third grade, reading books may be devoid of pictures, or include only a small illustration at the beginning of a chapter. Thus, the Situational context increasingly depends on language to establish a topic and to provide all of the information necessary to share that context with others in the social environment (Westby, 1985).

#### Parent-Child Interactions within the Situational Context

Successful parent-child storybook reading is a process of presenting the story at a level(s) along the Situational continuum that is appropriate to the developmental needs of the child, or within the ZPD (Vygotsky, 1978). If the presentation of information is at a level higher than the child can process, then a state of what Piaget (1969) terms "disequilibrium" occurs. Disequilibrium is a necessary state for learning because it creates cognitive dissonance that must be resolved. The process for resolving this mental conflict involves assimilations and accommodations to existing schemata, or the creation of new structures to accommodate new information. Vygotsky believes that social mediation, or helping the child learn what to attend to and how to talk about it, is critical to resolving the conflict. Success, in Piagetian terminology, would be achieving equilibrium.

Within a transactional model, parents expect their children to attend to the environment at increasing cognitive and social distances from the egocentered perspective and use strategies to enhance this distancing (Newson, 1977). They attend to the level of focus exhibited by their child and talk about whatever is in the child's focus at a level slightly more complex than the child's present level (Snow, 1984).

However, when a child neither attends to information at a level that the parent considers to be appropriate, nor initiates reference to this information, the parent begins to take on that role. The parent becomes more directive, gives commands, and requests nonverbal and verbal behaviors from the child. The situation worsens if the parent presents information at a level of displacement that is beyond a child's ZPD, in which case no equilibration can be reached. With no means for resolving the conflict, children disengage from the interaction by either acting out, or by becoming passive and nonresponsive. In SDS terminology, the child creates a different Situational environment within which successful functioning can occur. For example, if the parent begins to read the storybook as written (Level IV) to a child whose ZPD ranges from Levels II–III, then the child might begin rapidly turning the pages of the book while saying "Turn the page." This reduces the complexity of the bookreading experience to Level II where the child performs actions on the book as an object, and views the pictures on each page as an undifferentiated whole. The child resolved the disequilibrium by reducing the complexity of the Situational context. However, in this state the opportunities for social learning and interaction will be minimized, and the child will function at the lower levels of the ZPD. If the dynamics can be changed and the parent can create a Situational context in which the child can participate and remain engaged, a state conducive to enhancing assimilation, accommodation, and a higher level of equilibration is achieved.

In summary, the Situational Context represents an integration of cognitive, social, linguistic, and sensory motor processes. The dynamics between these domains are observed to help determine what factors within the Situational Context serve to enhance or limit learning. Understanding the continuum of social and cognitive advances that occur developmentally can provide insights into how and why children fail to learn within an event such as storybook reading, and how progression along the

continuum can either be supported by or inhibited by the transactional relationship between the child and a parent or caregiver.

However, the situation is only one aspect of the language–learning context for the child. The structure of the language used within the events also plays an important role in the child's language development.

### Structuring Language and Reading through the Discourse Context

A situation provides a context for talk to occur. Within that context, the activity and the accompanying talk have to be maintained. The duration of the talk, or discourse, related to any topic may be very brief, consisting of a single conversational turn, or it can be extended, continuing for an hour or more. The discourse may be conducted as a monologue, as when delivering a lecture, or as a shared dialogue between participants. The function of the discourse may be to exchange factual information, to change beliefs or behaviors using fiction, or just to maintain social interaction for pleasure (Britton, 1982; Norris & Hoffman, 1993). There are situational contexts where brief topic maintenance produced as adult monologues with children in listening roles are appropriate. But children need opportunities to learn how to structure and maintain discourse by functioning as an active participant in an ongoing communicative exchange. Parents assist children to function in this participant role from early infancy.

Structuring discourse requires the integration of cognitive, social, semiotic, and sensory motor processes. That is, children must be able to attend to the same topic within the Situational context for an extended period of time, maintain awareness of the information shared by other participants versus information that must be given to develop the topic, know how to take turns and use turn–taking strategies to maintain social interaction, and use language to structure the information to communicate the intended meaning and to accomplish the intended purpose (Grice, 1975).

Storybook reading is an activity in which two Discourse contexts exist and operate simultaneously. The first Discourse context is the one provided by the book, including its pictures and text. The book discourse is presented as a monologue of a fixed duration (i.e., the amount of written text) that may be fictional or factual. The text discourse is structured according to some form or organization, such as a temporal sequence of events, or cause–effect relationships between characters, events, and actions. The second Discourse context is the one comprised of the parent–child dyad engaged in reading the book. This dyadic discourse can overlap closely with the book discourse, as when the parent reads the book as written to the child. Or it can be independent of the book discourse, as when the parent and child talk about the pictures without regard to developing a story or reading the text.

The characteristics of the parent–child discourse engaged in during storybook reading has been described by Ninio and Bruner (1978). Observation of mothers and their typically developing children revealed a fairly stable and repetitive interactional sequence occurring during storybook reading. This storybook reading routine had the effect of supporting and advancing their child's ability to talk about the story, its pictures, and action–related events. The sequence included four key elements: an attentional vocative (i.e., a word or gesture used to focus a child's attention), a query (i.e., a question or gesture used to request information) initiated either by the parent or the child, a label or response to the query, and feedback, or an acknowledgement or statement of accuracy regarding the response. Each step in the sequence allowed for either the mother or child to contribute the next element.

The resulting co–constructed discourse could be organized at any level of complexity along the Discourse continuum of the SDS model, as profiled in Figure 3. These discourse structures are general in their organizational patterns, and therefore apply to conversations, play sequences, oral stories, fictional text, or expository text, and so forth.

They evolve developmentally as parents engage the child in social interactions that serve to impose patterns of organization on events experienced by the child. Ranging from discrete, unorganized events through complex, interrelated and overlapping events, the child gradually learns to impose a progression of organizational features on experience. These features are topic, time, causality, intentionality, and conditionality (Norris & Hoffman, 1993).

### Discrete Events

The newborn's first experiences with the world are perceived as discrete events of short duration. Because no mental representations or interconnected networks of concepts exist for experiences such as eating, diapering, dressing, or bathing, each action or object within the sequenced routines is perceived as unique and unrelated. Within these events the child is the center of focus, but has no awareness of the self as a separate entity from the external world or event (Mahler, 1979). Events are understood and organized as disconnected and momentary instances of stimulation (Norris & Hoffman, 1993). Caregivers impose the organization on the events, maintaining the sequence of actions and goal-directed behaviors, and include the child as an active participant. That is, the child is not treated as an object within the routine, but rather as an important contributor to the event. The parent accomplishes this by fine-tuning interaction patterns to accommodate the infant's primitive cognitive schema (Duchan, 1986).

These fine-tuning behaviors begin as the mother establishes a routine of attending to the child's physical needs while providing redundant verbal and physical behaviors that facilitate the child's organization or mental representations for events (Dunst, Lowe, & Bartholomew, 1990). The mother talks about what she is doing or what the child is doing throughout the caregiving activities (Van Riper & Emerick, 1984). These recurring events, sometimes termed scripts (Schank & Abelson, 1977) or generalized event representations (Nelson,



1986), provide frames for learning the temporal and spatial ordering of events that later serve as organizational devices for structuring discourse (Duchan, 1986).

During the child's waking periods, the adult also begins teaching social patterns of interaction by modeling turn-taking behaviors (Bruner, 1967) and primitive dialogues (Mahler, 1968). For example, the mother jiggles the baby between sucking bursts (Kaye, 1977) or assumes initiator and responder roles (Snow, 1984) in one-sided conversations (e.g., "Are you sleepy?" "Yes, you are." "You're a sleepy baby.").

However, the infant is not a passive recipient of the caregiver's actions within these routines, but rather engages in primitive social interactions that result from developing perceptual and motor abilities (Bell, 1968). The infant moves or cries, and the adult responds by elaborating on the child's "turn," or reflexive behavior, with an interpretation (Trevathan, 1977). Feeding, bathing, and dressing activities also provide opportunities for teaching discourse functions, as the infant and mother engage in rhythmic sequences of vocal play accompanied by mutual gaze and changing facial expression (Westby, 1994).

In the context of storybook reading, Discrete Events are seen when the child fails to impose any organization on the bookreading event. The child may look at the book momentarily, and then reject further attention and struggle to leave or to reach for other objects. The book, like other objects, is merely a source of disconnected and momentary stimulation for the child. But with repeated exposure, schemata begin to form for the book and behaviors associated with it, directing the child to explore the book at the level of a Collection.

### Collections

With increasing alertness and lengthening periods of activity, the child recognizes objects, people, and actions associated with these early scripts (Mandler, 1984). In doing so, the child also begins to anticipate

portions of the script and participates by vocalizing or gesturing to take a turn or fill in a portion of the script (Schank & Abelson, 1977). For example, on seeing a bottle, the child increases the level of activity in anticipation of being fed, or during dressing routines the child holds up a foot for shoes or socks. At this level of discourse, termed Collections (Norris & Hoffman, 1993), the child attends to and expresses information by associations organized around the child's object of focus at any given moment in time (Vygotsky, 1978).

In storybook reading, the perceptual and physical characteristics of the book, that is, a collection of bound pages, enables the child to extend attention. But attention to any one picture or page is momentary, and the order in which pages are viewed is random. Children may open to a random page, flip to the back cover, and then rapidly turn a sequence of pages with only momentary attention to information on any one page. But the child is showing some understanding of the patterns associated with book handling, and the total amount of time spent with the book increases. Communicative initiations made by the child at this level follow this random attention, and thus often serve to rapidly change, rather than maintain and extend topics.

### Descriptive Lists

Routine events continue to provide a forum for learning to impose organization on experience. Specific objects reliably occur with frequency in the context of a particular routine, and form a primitive topic. For example, spoons and bowls and milk occur within the eating routine but not the bathing routine; towels and bath tubs and shampoo occur within the bathing routine but not the dressing routine (Nelson, 1986). Children begin to form networks of association between these related objects, so that seeing the shampoo might cause the child to begin pulling off clothes or to look for a towel. The child does not understand the temporal sequence involved, or the cause–effect relationships between actions, but does recognize that associations exist between these objects.

In storybook reading, children begin to identify associations between objects depicted within an illustration or across pages. For example, the child might point to a dog and label it, and then identify three more dogs on that or successive pages. Or the child might list all of the body parts shown on a human figure, and ask for names of unknown parts. Each picture in the book may be viewed independently, so that a character on two successive pages is seen as two different characters. The child does not understand the depiction of temporal information in successive scenes. At this level no story is told, but the child is beginning to see how information in the book can be organized according to a topic, and will list many entities that fit the child's category. Initiations are often made to obtain labels for unknown pictured objects.

### Ordered Sequences

As children signal readiness for more advanced levels of organization through increased attention to ongoing activities, adults engage them in a greater number of social games. Games such as peek-a-boo and pat-a-cake (Camaioni & Laicardi, 1985) provide predictable frames for teaching sequencing and turn-taking. The adult initially organizes the activity by taking both initiator and responder roles, but gradually relinquishes portions to the child who completes the sequence, such as pulling the blanket off while saying "peek-a-boo" (Duchan, 1986). Similar contributions are made by the child in the context of routines, as the child recognizes the sequence of socks before shoes, or cereal before milk (Nelson, 1986). From simple, two sequence actions, complexity increases as the child is able to internally represent more of the script and to put these temporal relationships into words.

Similar developments are seen in the context of repeated readings of favorite storybooks (Sulzby, 1985). The child first organizes information about the sequence of the story by listening to and watching the adult who points out important information and asks the child questions about the actions. During subsequent readings, the adult gradually engages the

child in a co-construction of the story by asking predictive questions (i.e., "What happened to the bear?") or encouraging the child to tell familiar parts of the story. The child also begins to recognize portions of the text and initiates telling a greater number of action sequences that fit the temporal structure of the story.

### Reactive Sequences

In early development, children view themselves as the cause of actions and events. Means-ends behavior, or an understanding that action on one object, such as banging a stick, causes a second activity, such as music to play on a keyboard. Instead, children may hold the stick while banging on the keyboard with their hands. Gradually, children begin to understand the observed causal connections between other objects and people in relationship to events or outcomes, as in knowing that a boy tripped because his shoes were untied. Increasingly, the causal connections are established through representations, rather than direct actions. The child can make predictions about cause-effect relationships, drawing simple logical conclusions about outcomes before they occur (Piaget & Inhelder, 1969).

Language plays an increasingly important role in developing these organizational structures. Language enables the child to view sequences of action in new ways as parents code the relationships using words such as "because" or "if-then." Children begin to use these words to respond to "why" questions and to describe events they perceive to be causally connected (Brown, 1973). This language also is heard in the context of repeated storybook readings. The child begins to understand the pictured consequences of actions on successive pages, and gradually learns to use language to talk about these causal outcomes.

The Discourse Context continues to refine as psychological causality, intent, and morally-based goals are internalized. The structure of discourse further becomes more elaborated as topics are maintained across unified events that become organized in episodic hierarchies.

There is no upper limit regarding the number of discourse episodes that can be embedded, as judged by epic novels or government reports.

As children internalize more knowledge about the structure of discourse, they become more successful participants within it. They have information to share, and so become more active participants who initiate comments more frequently and who provide more relevant responses and feedback to adult comments. Predictable discourse structures such as complete reading cycles are used by parents to assist the child to make relevant contributions. Attention is maintained to the same topic, including the same page of a storybook, for extended time periods, and more information is sought as the child learns to expect meaning and coherence. Children's language begins to incorporate words that refer to more abstract relationships, such as time and causality. Thus, greater discourse structure both enables and is enabled by refinement in the child's ability to express meaning semantically. The Semantic Context is the final component of the SDS model.

#### Learning to Mean through the Semantic Context

Words can be thought of as functioning like relay stations of the mind. Using input received from the sensory motor system, they select aspects of meaning from the mentally represented concepts or schemata available to the child. Learning words is a process of associating the sound sequences that comprise the word with elements of meaning that are relevant in a context of use. The more refined the meaning that the speaker intends, the more strategies that must be used to specify the correct meaning in the appropriate relationships. In English, these strategies include lexical items, or words, morphological forms, such as prefixes and suffixes, and syntactic structures, including word order strategies that establish the intended relationships of meaning. The intended relationships are those that express specific meanings to accomplish specific purposes or goals. Thus, aspects of language form,

including phonology, morphology, the lexicon, and syntax are semantic in their content and pragmatic in their function (Brown, 1973).

The Semantic Context is represented as embedded within the Situational and Discourse contexts of language in the SDS model because meaning, or semantics, underlies all three contexts. Thus, words such as "because" or "when" that refer to relationships of causality or time within the Discourse context themselves are expressions of semantics. Similarly, words that refer to meaningful information are used to comment during an event, or in decontextualized contexts, to create the entire Situational context. Development is a process of learning to use words, including vocabulary, word order (i.e., syntactic strategies) and morphological forms to refer to intended meanings.

A child's ability to express meaning and to refer using symbols follows a predictable pattern of development. Meaning is constructed as the child adds information about the physical world (i.e., perceptions) to a conceptual knowledge base (i.e., internal representation) while continually reorganizing information already available (Hoffman, Schuckers, & Daniloff, 1989). Semantic development proceeds along a continuum from responding reflexively to environmental stimuli to talking about what can be created or imagined (Norris & Hoffman, 1993). The meaning changes as the child's perceptions are altered through experience and as the child gains knowledge about the world and events in the world (Crais, 1990).

### Reactions

The child's first semantic representations develop out of actions (Bruner, 1967). Initially, the actions of the child are reflexive and occur as responses to internal states and reactions to external stimuli. The sensory input received by the child serves to develop perceptions about the physical world. These action-based sensory events provide the foundation for developing and internalizing concepts that can later be represented and talked about symbolically.

### Indications

Prior to the emergence of first words, children produce intentional communication through gestures and vocalizations that refer to objects, people, and events in the immediate environment. At this level of referencing, termed Indications (Norris & Hoffman, 1993), the adult interprets the child's preverbal behaviors in an attempt to identify what the child perceives and intends to communicate.

### Labeling

Throughout the preschool years, language development is characterized by a close match between what the child perceives and the language or words the child uses to refer to those perceptions (Blank, Rose, & Berlin, 1978). When the child's coding of perceptual features includes the wholes (i.e., people and objects) or only a few constituent parts of the whole (e.g., foot or wheel), the child uses Labels to talk about them (Norris & Hoffman, 1993). Children continue to use labels to convey deeper levels of meaning, but due to linguistic constraints one word must represent relationships or more complex ideas (Brown, 1973). For example, to express "Pick me up," the child may say only "Up" accompanied by a reaching gesture. Although the child exhibits a growing lexicon, there continue to be limitations between what the child perceives and the words available to talk about those perceptions. This results in overextensions whereby the child applies the best available word for what is perceived (e.g., The child calls all men "daddy.") (Hoffman, Schuckers, & Daniloff, 1989).

### Descriptions and Attributes

The process of conceptualization occurs as children learn to parse objects, people, and events into their discrete constituent parts (Nelson, 1985). The child not only attends to the physical properties that can be seen or touched, but also attends to elements of language that are used to talk about the objects, people, and events. Perceptual input for the phonological, morphological, and syntactic aspects of language are

conceptually coded and then used to talk about the relationships that exist between objects and people. Refinements to accommodate the changes in perceptions include emergence of word endings and other morphemes to express changes in time, number, and possession (Brown, 1967).

Abstract modifiers also occur to allow reference to concepts for quantity, size, and color. These refinements are then produced as multiple word combinations that express relationships such as Descriptions (i.e., functions or action relations) and Attributes (i.e., characteristic qualities or state relations) about the whole (Norris & Hoffman, 1993).

### Interpretations

As children gain more experiences with the world, they begin to reorganize their perceptions to mark similarities and differences between and among objects or situations (Blank, Rose, & Berlin, 1978). This reorganization results in a greater perceptual-language distance. The child can make Interpretations that describe underlying psychological states associated with observed attributes and actions (Norris & Hoffman, 1993). For example, children at this stage of semantic development begin to add pronouns to mark gender, prepositions that indicate comparative positioning (e.g., next to, behind, and under), and negatives in contracted form (e.g., doesn't, didn't, and won't) (Brown, 1967). Children also develop the ability to define words that require organization and expression of meaning based on prior experience and stored knowledge (Blank, Rose, & Berlin, 1978).

### Inferences and Evaluations

At even higher levels of symbolic representation, background knowledge and prior experiences support the child's ability to reason using language (Blank, Rose, & Berlin, 1978). Transmission of meaning requires accessing internally organized knowledge and concepts and applying that information to what is presently observed. Inferences develop as predictions regarding past and future events, while Evaluations and judgments are made based on abstract concepts of fairness and



morality that develop out of cultural experiences (Norris & Hoffman, 1993).

### Analogies and Metalanguage

The constant input of perceptual information continues to alter the child's concepts, whereby old information gains new features and greater depth of understanding while new information is coded more globally (Nelson, 1985). Through the reordering and reconfiguring of the child's concepts and knowledge base there is maximum distancing between the perceptions and the words (Blank, Rose, & Berlin, 1978). Words can now be used in Analogies, such as idioms and metaphoric expressions, or language can be used to refer to words and their properties, such as initial sounds of words or a word's syllabic structure (i.e., Metalanguage) (Norris and Hoffman, 1993).

Semantic development does not occur in isolation, but is in many respects a product of the environment in which the meaning is created. In a transactional relationship there is an interplay of factors, and the child is either facilitated or inhibited by the adult and the environment in the quest for greater meaning. With increasing alertness the child engages in a greater number of activities that provide increasing opportunities for the adult to teach the child language. The regularity, frequency, and consistency with which events occur affect the child's perceptions of the event. The perceptual development, in turn affects the concepts that develop to support the child's lexical acquisition.

In summary, semantic development is the ability to refer to what one knows or comprehends. Meaning proceeds along a continuum from the concrete and literal to the abstract and figurative. At birth, the infant neither comprehends nor conveys meaning, but instead reacts reflexively to environmental stimuli. The first intentional communications have little or no distancing between the child's mental representation and what the child internally perceives. However, with maturation, cognitive decentering, and social mediation, children learn to express meaning

through symbols that are far removed from the physical world (i.e., perceptions) but serve to link mental representations with an external form such as a spoken word, that can be shared.

### Summary

Symbolic representation undergoes transformations as the child's schemata configure and reconfigure through experience and feedback from the environment and from those individuals in the child's environment. As the child learns that language is rule-governed (i.e., discourse structures and functions) and categorical (i.e., semantic context) (Bruner, 1967), the symbolic function of language shifts from talking about the here and now to speaking about places and events removed in time and space. It is this cognitive distancing supported through social mediation that allows the child to represent information in abstract and novel ways.

As the child signals growth and readiness, the parent shifts the level of language used from concrete to abstract, from loosely organized to tightly structured, and from contextualized to decontextualized. Within these interactions the adult judges the child's communicative competence and supports the child's learning and function within the ZPD by altering the contextual support provided, the discourse level used, and the semantic level of information presented.

However, children with language impairments interact differently from typically developing children. They often are unable to signal readiness, and they respond atypically to environmental stimuli, persist in less complex discourse structures, and exhibit difficulty in expressing information beyond what is present in the immediate environment. In response, parents utilize strategies that elicit predictable or stereotypic behaviors, such as directing or commanding and requesting minimal responses from the child. By maintaining interactions at lower discourse and semantic levels, the child experiences fewer opportunities to expand language abilities. This also means fewer opportunities for assimilation and accommodation. Because the parent determines what is important and

to what the child should attend, a perpetuating cycle develops in which the parent directs and the child responds.

Studies have shown that the interplay of the Situational, Discourse, and Semantic contexts for language acquisition can be either language facilitating or language inhibiting. Typical development proceeds in simultaneous progression along all three contexts. However, asynchronous development can exist. When this occurs, there is a resultant mismatch between and among the characteristics of the physical environment, social mediation provided, and linguistic complexity attained.

### Parent-Child Transactional Relationship

Parent and child behaviors are influenced in a bidirectional fashion (Dunst, Lowe, & Bartholomew, 1990) that in turn are supported and reciprocally influenced by the environment (Hubbell, 1981). Hubbell (1981) called the conceptual frame for this triadic relationship a “transactional model” (p. 111). The continual interplay between and among the changing child, the changing environment, and the changing caregiver(s) promotes development. For children to attain their learning potential, the relationship between and among the caregiver, child, and environment must be at optimal levels. A child with a different language-learning system may encounter barriers to language acquisition not experienced by typically developing children. These barriers may take the form of ignored communicative attempts or diminished opportunities for communication.

It is often assumed that parents are natural teachers, and that they readily engage in activities that support communication and language development with their children. It is generally agreed that parents want their children to communicate and make attempts to promote language growth. Studies in child development suggest that caregivers interpret the child’s reflexive and involuntary behaviors as communicative (Tronick, 1982), recast the child’s sentences in more complete forms (Nelson,

1981), provide contextual support for their own utterances by referring to actions and objects in the immediate environment (Bruner, 1982), and adapt and simplify their utterances to match the perceived developmental level of the child (Newson, 1977). Unfortunately, research also indicates that children with communicative impairments do not benefit similarly from transactional experiences and often find interactions nonsupportive or stifling to language acquisition.

Dunst, Lowe, and Bartholomew (1990) described the pattern that often develops between caregivers and their children with communicative impairments. When the child is unresponsive to caregiver interaction attempts, the adult may feel rejected or inadequate. This in turn may cause the adult to reduce initiation attempts or diminish responses to communicative bids by the infant, or the opposite may happen. The adult assumes the initiator role and continuously attempts to prompt the child, often at a level that is more consistent with the adult's expectations rather than at the child's developmental level. A study by Nelson (1973) indicated that language developed more slowly when the mother's speech did not match the child's cognitive level and when the mother attempted to control the child's verbal output. Other studies found that assuming a commanding, directive interaction style, dominated by questions, also hampered the child's language use (Brooks-Gunn & Lewis, 1984; Mahoney & Powell, 1988), while commenting, expanding, and reflecting on the child's utterances facilitated language growth (McDade & Varnedoe, 1987).

A comprehensive review of the literature by Cross (1984) concluded that there is a strong effect of child language-impairment on parental language use. Most studies indicated that parents in response to children with language delay used fewer semantically contingent utterances than parents of typically developing children. This suggests that parents of children with language delay do not use "here and now" utterances to respond contingently to their children's communicative attempts. This

type of contingency has been cited (Bruner, 1982) as important to normal language acquisition. Cross's review also reported that parents of children with language delay were less positive and less accepting of their children's utterances, as indicated by their failing to acknowledge or reinforce communicative behaviors of their children.

Haynes (1994) suggested that the parent's interaction style with a child exhibiting language impairment either may be a precipitating factor for, or effect of, the child's communicative delay. Despite the controversy, it is fairly clear that different communicative patterns exist and persist between parents and their children with communicative impairments. By establishing and maintaining these aberrant interactions with their children, a circular pattern develops that often results in parents limiting the language presented and used with their children. Because the children lack the language skills to signal readiness to attempt higher levels of interaction, parents continue to engage in social exchanges in which the adult directs and maintains the conversation.

Speech-language pathologists (SLPs) are trained in procedures for remediating communicative disorders; therefore, a logical extension of the profession is to share expertise with those who spend the most time with the child exhibiting a language impairment. By developing collaborative relationships with parents and families, remediation efforts are accelerated. The need for viewing remediation as a family systems change has been recognized in recent legislation and research.

#### Factors Influencing Intervention for Preschoolers with SLI

There are several factors influencing the nature and practice of delivering speech-language services to the preschool population. Federal mandates (i.e., PL 99-457, Part H) have directly impacted special education service delivery by recognizing the family and home environment as generally affording the least restrictive and most appropriate environment for language intervention with preschool-aged children. Parents increasingly are asserting their roles as the first and

primary teachers for their children with disabilities. Parents desire more direct involvement in the education of their children with disabilities and have advocated for improved and alternative service delivery options. One such option involves training parents to provide direct speech-language services to their children; thereby, assigning the SLP the role of consultant to the parent.

### Public Policy and Speech-Language Therapy

Public policies from the federal, state, and local levels have influenced the provision of services to children with speech-language impairments. Section 504 of the Rehabilitation Act of 1973, a landmark piece of legislation, prohibited discrimination against individuals with disabilities. This provided the impetus for passage of other laws protecting the rights of adults and children with disabilities.

In 1975, soon after the passage of Section 504, Public Law (PL) 94-142: the Education for All Handicapped Children Act was passed. PL 94-142 guaranteed the rights of all children in the United States to a free appropriate public education in the least restrictive environment. Individuals from five to 21 years of age were the primary targets of this legislation. However, children below age five could be served on a voluntary basis as determined by each individual state.

As states voluntarily began intervention services with the birth to age five population, the trend was to use service delivery models consistent with training institution practices. Speech-language services for preschoolers targeted the child as the focus of intervention (McDade & Varnedoe, 1987) while providing limited opportunities for parents to participate in the therapy process. One of the assumptions of these early models was that the clinician was the “expert,” and by working with the child in isolation, the clinician could make significant changes in the child’s behavior (Donahue-Kilburg, 1992). Language intervention for preschoolers occurred primarily in clinical or school settings. Those children exhibiting phonological problems received instruction and drill in

producing the correct articulatory gestures for speech. Children who exhibited problems with syntactic components of language received instruction and drill for grammatical forms such as is + verbing or plural -s. However, these programs often resulted in short-term or limited improvement with little generalization or carryover to other contexts (Fey, 1988). Service delivery changes were needed.

In 1990 PL 94-142 was reauthorized under the new name of Individuals with Disabilities Education Act (IDEA) PL 101-476. A major change in the law included an increased emphasis on education and training of parents. The changes mandated by the passage of IDEA made it necessary to reevaluate the manner in which early intervention services were provided. This law recognized parents as primary teachers and advocates for their children. It also recognized parents and children as functioning within a larger system, the family unit. Parent training and consultation models of language intervention provided natural progressions for service delivery options.

A family-centered model of language intervention considers the needs of the client as he or she functions within the family unit (Donahue-Kilburg, 1992). This focus on and involvement of the family differs from how clinicians are typically trained and requires the SLP to relinquish some of the intervention control. However, including parents in the therapy process has many advantages over the traditional clinical model for speech-language intervention with preschool children. Parents provide the first teaching experiences for their children, and their assistance in the treatment process promotes generalization of skills across settings. Parents spend the most time with their children, and therefore, can capitalize on naturally occurring language opportunities throughout the day. These naturally occurring communicative events during a child's day are not easily replicated in the clinical setting.

### Parent Training Efficacy

Since the 1960's, parents and significant others have been involved in model parent training programs (Baker & Ward, 1971; Knox & McConnell, 1968; Luterman, 1971; Mira, 1972). These early programs primarily focused on language intervention for children with hearing impairments. Then during the 1970's early childhood special education followed suit and developed several home-based (Baker & Heifetz, 1976; Hanson & Schwarz, 1978; Shearer & Shearer, 1976) and center-based (Benson & Ross, 1972; Haynes, 1976; Rose, 1974; Watson & Bassinger, 1974) programs in which parents participated in direct intervention. The approaches utilized by the various programs included distribution of self-help instructional manuals (Baker & Heifetz, 1976), instruction in direct parent teaching (Horton, 1976), and transdisciplinary collaboration and consultation with parents (Haynes, 1976).

After reviewing the parent training literature, McDade and Varnedoe (1987) concluded that programs involving parents in the intervention process produced greater gains than those that did not. For example, Baker and Heifetz (1976) found that training parents as primary change agents for their children with developmental disabilities resulted in increased parent knowledge regarding intervention and also produced greater child changes in programmed and unprogrammed self-help skill training than observed in child controls who received no parent intervention. Children in the home teaching Portage Project (Shearer & Shearer, 1976) showed greater gains in mental age, language, academic, and socialization skills than did a group of children who only received classroom instruction. Finally, Topping (1986) reviewed the various formats and service delivery models of parent intervention and found that parents were more satisfied with programs incorporating direct professional contact with parents than with those relying solely on dissemination of information or observation.



Despite theoretical and empirical support for parent training in the fields of deaf education and early childhood special education, the nature and extent of parent involvement in therapy for preschool children with speech-language impairment has been slow. Parents often become spectators rather than direct participants when working with speech-language pathologists. Parents typically receive informational handouts, reading lists, and suggested activities under the rubric of parent training.

Because parents generally have the motivation and opportunity to become primary intervention agents for their preschool-aged children (Tannock & Girolametto, 1992), they should be included in direct intervention. The practical considerations for parent training are twofold. First, the child is a central part of the family unit, and the greatest facilitator of change lies in strengthening the family system (Barber, Turnbull, Behr, & Kerns, 1988). Second, the family and home environment afford educational opportunities that are not easily replicated in the clinical setting.

Parent training programs that utilize the home environment often begin during the child's formative years of development when patterns of interactions are being established, but typically before negative cycles or severe difficulties emerge (Gray & Wandersman, 1980). By working in the child's natural environment, the parent-child transactions can continue beyond therapy sessions with ongoing intervention occurring. Providing therapy in the home environment also allows for individualization of intervention to meet the specific social and cultural needs of each family served. Parents' direct and constant access to communicative opportunities with their child facilitates generalization and maintenance of newly acquired skills (Shearer & Shearer, 1976).

The stimulus world created by the adult caregiver and made available to the developing child will promote or inhibit the child's cognitive, social, and communicative abilities. It is the sights, sounds, objects, people, movements, and interplay of these factors that facilitate

or inhibit the child's growth in cognitive, social, and semiotic domains. Therefore, there is increasing interest in parent-child interactions and its contribution to child growth. Parent responsiveness and acceptance of the child's communicative attempts have been investigated in typically developing children and children with SLI. The interplay of the child's cognitive, social, and language abilities are affected developmentally by the parent's support or lack thereof as the child matures. The impact of a child's atypical development reciprocally affects the family unit.

Language acquisition is one of the hallmarks of early childhood. For most children language develops easily and naturally in a transactional interplay between and among the child, the caregiver, and the environment. Unfortunately, some children do not develop language given the typical amount of parental input that proves sufficient for the majority of the population. When this occurs, parents are often ill-equipped to modify the interaction process to be more facilitative to the child's needs, and a SLP is asked to assist.

Traditionally, the SLP has acted as an expert who isolated the child from the family and treated the child with minimal consideration of the family as a whole. However, legislative changes increasingly required special education services to consider the family unit in all aspects of programming. This paved the way for considering parent training as a viable option for language intervention.

A variety of parent training programs have been developed with varying degrees of success. A good parent training program for young children needs to consider naturally occurring contexts for intervention, time and availability of families to complete the training, and ease with which families can carry out the activities. Using these criteria as a guide, Chapter II provides a review of various treatment approaches in early intervention for children with SLI, including limitations and weaknesses.

## LITERATURE REVIEW

Early intervention has been shown in theory and in practice to be important to the language development of children with specific language impairment (SLI) (Fey, 1986; Lahey & Bloom, 1977; MacDonald, 1989; McLean & Snyder-McLean, 1978). Increasingly, the importance of the interaction patterns between parents and their children with SLI is being recognized (Conti-Ramsden & Friel-Patti, 1983; Cross, 1978, 1984). Development is viewed as transactional, so that communicative behaviors exhibited by the parent and by the child, are both affected by and create an effect in the communications of the reciprocal participants. To maximize development in the child, the interactions produced by the parent should function to increase the level, frequency, and variety of child utterances and to minimize limitations.

During the past two decades, considerable knowledge has been acquired about patterns of interaction occurring between parents, particularly mothers, and the development of language and communication in their child. This chapter will review this research, leading to implications for parent training when a child exhibits SLI.

First, a description and characteristics of SLI will be presented. Second, the research will be reviewed that outlines characteristics of parent and child interaction patterns. How these characteristics interact to affect the child's language development will be examined. Third, methods, techniques, and contexts of early intervention will be reviewed. Specific strategies found to be facilitative will be defined, and concerns or problems that remain will be presented. Fourth, a number of parent training studies will be described. The observed parent changes, child changes, and continued training needs will be addressed. Fifth, literature examining the oral language learning that occurs for normally developing children in the context of parent-child storybook reading will be explored. Elements of emergent literacy that evolve from the interactions will be described. Strategies that parents use to encourage their children to use

language in this context will be reviewed and critiqued. The few studies examining parent-child storybook reading for children with SLI will be used to look at similarities and differences compared to those dyads with no language impairment. Finally, the chapter will close with a review of recent investigations in which storybook reading was used as a context for parent training. The effects of parent training in this context will be examined for facilitative strategies adopted by the parents and concomitant changes observed in their children.

### Specific Language Impairment

Attempts to reliably define SLI have evolved over a number of years. The earliest definition for SLI emerged from the 1962 Proceedings of the Institute of Childhood Aphasia. At that time, SLI was defined as a delay in acquiring language skills not attributable to intellectual deficit, social-emotional disturbance, or hearing loss.

Since the 1960s, a number of investigators have offered alternative definitions for SLI. Generally, SLI has been defined by exclusionary, rather than inclusionary, criteria (Watkins, 1994). Stark and Tallal (1981) provided the most widely accepted definition for SLI. Children with SLI were described as those children exhibiting at least 12 months delay on standardized language tests when compared to chronological or mental age. Children with SLI could not exhibit any of the following: (a) demonstrated hearing thresholds greater than 25 dB HL, (b) reported emotional or behavioral problems, (c) assessed IQ greater than 1.0 standard deviation below the mean for chronological age, (d) documented or observed neurological deficit, and (e) demonstrated severe articulation or phonological disorder. Although widely accepted for empirical research, variations of this definition continue to be used and debated (Aram, Morris, & Hall, 1993).

Despite efforts to categorize and define the population of children with SLI, these children do not constitute a homogeneous group (Leonard, 1994; Watkins, 1994). They do, however, share some differences in

language acquisition and development when compared to typically developing children. Children with SLI demonstrate consistent difficulty in acquiring and using grammatical morphemes (Johnston & Kamhi, 1984; Leonard, 1989; Rice & Oetting, 1993), in developing complex syntax (Chiat & Hirson, 1987), and in establishing and maintaining a main verb lexicon (Rice, Oetting, Marquis, Bode, & Pae, 1994). Leonard (1988) also found children with SLI often exhibited late acquisition of first words and a restricted accumulated vocabulary by school entry. Also of interest in studying children with SLI are their social interaction skills. Preschool children with SLI are more likely to be ignored in peer conversations and less often chosen as preferred playmates by typically developing peers (Hadley & Rice, 1991). The combined effects of the various deficiencies exhibited by children with SLI are far-reaching.

Some longitudinal research examined the long-term effects of SLI. These included the effects of early language impairment on later reading and language-based academic achievement. Some of these relationships were demonstrated in predictive studies, while others were identified retrospectively. Levi, Capozzi, Fabrizi, and Sechi (1982) found that 3-year-old children who obtained depressed scores on measures of semantic, syntactic, and phonological abilities exhibited reading and writing difficulties at ages six and seven. Silva, McGee, and Williams (1983) found 45% of 3-year-olds in their study who demonstrated poor language comprehension, exhibited reading difficulties or depressed IQ scores by age seven. Bashir and colleagues (1983) reviewed several longitudinal studies that tracked preschool children with language impairments into their school years. Their survey supported the conclusion that during their school years children identified early with language impairment continued to exhibit language-related learning difficulties, primarily in the areas of reading and writing.

### Patterns of Parent-Child Interaction

Research indicates that the communicative delays exhibited by children with disabilities may be maintained or even exaggerated by patterns of parent-child interaction. The reasons for this are not well understood but appear to be related to both the patterns produced by the parent and by the child. The interaction patterns that are established have a reciprocal, transactional effect that appears to change across time. The child's ability, age, and other dynamics, such as environment and conversational participant, also are contributing factors.

#### Parent Interaction Style

Parents of children with disabilities, including specific language impairment, often communicate less with their children and use a more directive, commanding speech style than parents of typically developing children (Brooks-Gunn & Lewis, 1984; Lojkasek, Goldberg, Marcovitch, & MacGregor, 1990; Mahoney & Powell, 1988). Weistuch, Lewis, and Sullivan (1991) reported that mothers of children with language delays often provided less information to their children and did not expand or interpret their children's communicative attempts. This less responsive, more directive communicative style may be a consequence of the child's limited language and poor conversational abilities. The reciprocal nature of the interaction patterns between the parent and child contributes to the establishment of a perpetuating cycle whereby the adult initiates and directs the conversation, as the child assumes a passive or responding role.

The available research is inconclusive in examining parental speech style with children exhibiting specific language impairment. Some studies have reported that parent communicative style with children exhibiting SLI is different from that of same-age peers acquiring language typically (Bondurant, Romeo, & Kretschmer, 1983; Wulbert, Inglis, Kriegsmann, & Mills, 1975), while other investigations have described parent interaction style with children exhibiting SLI to be similar to parent

interactions with younger, typically developing children at the same language stage (Conti-Ramsden & Friel-Patti, 1983; Cramblit & Siegel, 1977; Lasky & Klopp, 1982; Whitehurst, Fischel, Lonigan, Valdez-Menchaca, DeBaryshe, & Caulfield, 1988). Still other investigations (Conti-Ramsden, 1990; Millet & Newhoff, 1978) found qualitative differences in caregiver interaction patterns when comparing children with SLI to typically developing controls matched for language level.

Wulbert, Inglis, Kriegsmann, and Mills (1975) compared the home language environment of preschool children exhibiting SLI to that of age-matched, typically-developing controls. Inventories of the mothers' interactions with the children were obtained through direct observations in the homes and through parent reports. Analysis of the inventories showed significant differences in the two groups of subjects. Results of this study indicated that mothers of children with SLI interacted less frequently with their children, provided fewer emotional and verbal responses to their children's communicative attempts, and provided a narrower scope of experiences for their children than did mothers of the typically developing preschoolers.

Bondurant and colleagues (1983) also used chronological age-matched peers when comparing maternal speech patterns with typically developing children to parent-child interactions with children exhibiting language impairment. They found the mothers of children with SLI used a higher frequency of utterances that served to control and direct their children's behavior. Similar findings were reported by Mahoney and Powell (1988) in examining the interaction patterns between parents and their preschool children who exhibited varying degrees of handicap. These authors reported parents were turn dominant, with a high percentage of mands and a low percentage of responses to their children's communicative bids.

Cramblit and Siegel (1977) examined the interaction patterns of a father, mother, and babysitter of a preschooler with SLI, as each engaged

in conversations with the child and with his same-age, typically developing cousin who served as a control. Results of this investigation indicated that when interacting with the subject exhibiting SLI, the adults simplified their speech by shortening their utterance length and limiting their vocabulary diversity; they used a high frequency of one-word utterances, primarily nouns referring to objects in the immediate environment or to deliver one-word commands. The adults also used a greater number of words during interactions with the subject exhibiting SLI than with the typically developing control. This finding was attributed to the adults' "filling in" for the frequent pauses and fewer vocalizations exhibited by the subject. The authors concluded that the adults presented a consistent profile of simplification when interacting with the child exhibiting SLI. This simplification profile closely resembled the communicative patterns used by parents with younger, typically developing children.

Several researchers completed follow-up investigations of the Cramblit and Siegel (1977) study. These studies compared parent interactions with children exhibiting SLI to parent interactions with younger, typically developing controls matched for linguistic ability. Qualitative differences in the patterns of interactions with children exhibiting SLI were observed in some studies, while others reported no differences. Millet and Newhoff (1978) found that despite similarities in the child subjects' mean length of utterance (MLU), the mothers of children with SLI provided fewer semantically related responses to their children and used more directive speech acts, such as questions and commands, when interacting with their children. Contrary to these findings, other investigators (Conti-Ramsden & Friel-Patti, 1983; Lasky and Klopp, 1982) found little difference in parent-child interactions when children with SLI were matched with younger typically developing controls at the same language stage. Mothers in the two groups demonstrated similar use of commands, directives, behavior-controlling



utterances (Conti-Ramsden & Friel-Patti, 1983), and recasts (Lasky and Klopp, 1982). These results led Conti-Ramsden and Friel-Patti (1983) to conclude that mothers of children with language impairment demonstrate the ability to modify their verbal behavior to match the perceived language level of their child.

Whitehurst et al. (1988) attempted to further affirm the findings that parents of children with SLI adjust their language to match the perceived language level of their child. They used a three-group design to compare 28-month-old children with SLI to two control groups: same-age peers with similar receptive language abilities, and younger children (i.e., 17 months) matched for expressive language skills. Parent-child interactions were measured along dimensions of pragmatic interaction. This included parents' use of directives, wh- questions, repetitions, corrections, and expansions. No significant differences were found between groups in any of the areas analyzed. The authors concluded that parents of children with SLI were systematically altering their speech behaviors to match the linguistic level presented by the child.

Another study by Conti-Ramsden (1990) focused on recasts used by mothers during parent-child interactions. A recast was defined as an adult utterance that incorporated the child's focus of attention or topic of conversation. Children with SLI were matched with younger language-matched controls. Consistent with previous investigations, no differences were found in number of parent-child turns, simple recasts (i.e., expansions of the child's previous utterance), and continuations (i.e., utterances to keep the topic going); however, significant differences emerged in adult contingencies and adult contingency functions. Mothers of typically developing children used a greater number of complex recasts (i.e., utterances that retained partial meaning expressed by the child but expanded the child's utterance in two or more aspects) and demonstrated different functions for their simple recasts, continuations, and complex recasts. Functions for these mothers' utterances were frequently coded as

responsive and regulative to acknowledge the child's utterance or to request clarification when the child's utterance was unclear. In contrast, mothers of children with SLI used far more requests, assertions, and directives, with fewer responsives and regulatives evident. They also produced more meaning illocutions (e.g., yes/no and wh- questions, descriptions, and directives) and fewer cohesion illocutions (e.g., acknowledgements, answers to questions, "attention getters," and requests for clarification) when replying to their children than did mothers of the typically developing children. The areas investigated in this study clearly identified differences in parent interactions with children exhibiting SLI.

A number of investigators have examined parent interaction styles with children exhibiting SLI. The available studies have often produced inconsistent or conflicting results. Some research suggests that when control children are matched for chronological age, parents of children with SLI interact differently with their children than do parents of typically developing children (Bondurant et al., 1983; Mahoney & Powell, 1988; Cramblit & Siegel, 1977; Wulbert et al. 1975). Other studies have found that parents of children with SLI demonstrate interaction patterns consistent with those exhibited by parents of younger typically developing children (Conti-Ramsden & Friel-Patti, 1983; Lasky & Klopp, 1982).

The studies reviewed thus far have focused on the speech behaviors exhibited by parents, primarily mothers, during interactions with their children exhibiting SLI. Additional research has investigated the child's role in the parent-child dyad. Johnston (1982) proposed that less sensitivity from the parent does not cause the language delay, but that a reverse relationship may exist whereby the poor communication of the child alters the parent's interaction pattern. The parental response confounds the problem by providing the child with SLI a less rich linguistic environment.

### Child Interaction Characteristics

Few investigations have examined the communicative skills exhibited by the preschool child with language impairment during parent-child interactions. Despite contentions of a bidirectional effect of parent on child and child on parent, specific characteristics of the communicative skills of the child with SLI during ongoing parent-child interactions rarely have been reported. More often research has focused on the communicative skills of children with SLI during interactions with adult researchers or peers. The studies that do report on child characteristics during parent-child exchanges have provided limited information.

A study by Peterson and Sherrod (1982) compared the effects of children's language levels on their parents' interaction style. Thirty preschool-aged (25 to 48 months) child subjects were matched for MLU. Ten children with Down syndrome, 10 children with SLI, and 10 typically developing children comprised the sample groups. Within each group were 5 children with high MLU and 5 children with low MLU. The parent-child dyads were audio recorded in the home during free play. An observer was present to record ongoing nonverbal information. Results of this investigation indicated that children who relied on gestures to carry the communicative load received more requests from mothers to perform nonverbal acts. However, once a child reached the two-word stage, oral language became the primary means of communication between the parent and child. Mothers for all groups provided similar amounts of information through labels and elaborations, but mothers of children with SLI and Down syndrome used a greater number of semantically unrelated utterances than did mothers of typically developing children. The authors suggested that mothers continued to comment on an activity even though the children with SLI and Down syndrome were no longer attending to the activity and had moved on to a new object of focus.

A small sample investigation by Van Kleeck and Frankel (1981) examined discourse devices used by preschool children with SLI. Three

subjects with SLI ranging in age from 3 to 4 years were audio recorded during unstructured play with each child's mother and also during unstructured play with a chronologically age-matched peer. Samples were analyzed for children's abilities to maintain ongoing discourse through the use of two discourse devices, focus operations (i.e., complete or partial repetitions of the preceding utterance) and substitution operations (i.e., word substitutions, expansions, and negative alternatives). No noteworthy qualitative differences were identified between normally developing children and children with SLI in the use of the discourse devices analyzed. Additionally, the children with SLI interacted equally well with peers and parents, except for one subject who would not interact with other children. The authors cautioned that the small sample size limited the significance of the findings and prevented drawing conclusions regarding discourse skills of children with SLI.

An investigation by Conti-Ramsden (1990) also found no differences in the number of conversational turns taken by children with SLI and language-matched peers. However, differences were observed in interaction style between the two groups of 14 parent-child dyads. The children with SLI made significantly fewer initiations and appeared more passive than did typically developing language-matched peers during free-play interactions with their mothers. The authors also reported an intelligibility effect. Children with SLI who were more intelligible received more simple recasts from their mothers than those who were less intelligible. Thus, it could be argued that as the child with SLI used more conventional and interpretable communicative devices, the mother altered her discourse style to be more language expanding. The key findings of this study supported the bidirectional influence of mother and child in discourse situations.

To reduce confounding variables, such as differences in language levels of subjects and controls and variation in interaction style between subject parents and control parents, Hutcheson and Conti-Ramsden

(1992) compared the conversational skills of children with SLI to their younger siblings at comparable language levels. Each of the 12 children (6 subjects and 6 siblings) were video recorded in their homes as they played with their mothers. Analysis of the parent-child conversations indicated the two groups of children performed similarly in number of conversational turns. However, conversational turns for two of the children with SLI were primarily responses to adult questions or imitations of the adult utterance resulting in significantly fewer initiations than their typically developing siblings. The remaining pairs of children exhibited similar conversational patterns. Therefore, the authors concluded that individual variation may contribute significantly to differences observed in the conversational abilities of children with SLI.

Gallagher and Darnton (1978) investigated the revision behaviors employed by preschool children with SLI when the communicative partner misunderstood the child's message. Twelve preschool children (ages 42 to 64 months) with SLI engaged in an hour of ongoing play with an adult investigator, not the parent. Throughout the play session the investigator indicated a request for revision by asking, "What?" several times. The strategies used by the children with SLI were noted and compared to those obtained from children in a separate investigation (Gallagher, 1977). Analysis of the children's use of revision strategies revealed that typically developing children used increasingly more sophisticated revisions as a function of language stage, while the children with SLI made uniform revisions regardless of language stage. The authors recognized that the two groups of children were equally sensitive to listener needs, but the children with SLI were not systematic in the repair strategies employed.

From the available literature, it can be surmised there is much individual variation among children exhibiting SLI. Whether these children rely on nonverbal communication, provide ambiguous feedback, initiate less, or use revision strategies that differ significantly from typically developing children has not been proven. However, some

studies suggest that children with SLI affect how parents interact with them. When the interaction patterns cannot be altered by the child, changes must be made in how the parent and others interact with the child.

Because preschool children who exhibit early language impairment do not “grow out” of their communicative difficulties, a number of investigators began to explore potential avenues of remediation for these young children. Utilizing theoretical models of language and cognitive development, researchers in the field of speech-language pathology developed programs targeting the specific deficit areas exhibited by these children.

### Early Intervention for Children with SLI

During the past three decades numerous studies have shown that children with SLI make gains in language development as a result of direct intervention. These early intervention programs were based primarily on either operant learning theory or social learning theory, but more recently have reflected the influences of linguistic and interactionist perspectives (Fey, 1986; Nelson, 1993). Language intervention programs currently present a continuum of procedures, from highly structured operant approaches to naturalistic, child-oriented approaches (Fey, 1986; Yoder, Kaiser, & Alpert, 1991).

#### Structured Approaches

Some of the earliest language intervention programs for children with SLI utilized behaviorist theory (Skinner, 1957) as the basis for teaching the form and structure of language independent of normal function (Fey, 1986). These “didactic,” or operant, approaches were characterized by massed trial training that occurred in one-to-one highly structured settings, relied heavily on differential reinforcement, and emphasized precision and specificity of training procedures (Warren & Kaiser, 1988). Therapy was clinician-controlled and usually took place in a contextually-stripped therapy room. Intervention targeted specific aspects of vocabulary, syntax, and morphology.

Other structured approaches have used modeling procedures to train various aspects of language. Modeling, based on social learning theory (Bandura, 1977), differed from the didactic, imitation procedures found in behaviorist theory. Fey (1986) described the differences between operant and modeling approaches. In modeling, the child must attend to the adult model for several trials before attempting the modeled behavior. Many different stimuli are used to represent the language structure being trained. The child is not required to immediately imitate the adult model, nor does the child's utterance need to precisely match the modeled utterance. Finally, reinforcement is often vicarious, as the child watches others receive rewards for producing the target constructions. However, differential feedback (Ellis Weismer, & Murray-Branch, 1989) and token reinforcement (Leonard, 1974, 1975) also have been used.

Several studies have documented the success of behavioral approaches and modeling in training young children with SLI to produce longer and syntactically more complex utterances when compared to pre-intervention measures. Case study (Gottsleben, Tyack, & Buschini, 1974) and single-subject designs (Hegde, Noll, & Pecora, 1979; Hester & Hendrickson, 1977) have been utilized to study the effectiveness of didactic procedures in effecting change in children's use of grammatical rules. Other researchers have investigated the use of operant procedures in facilitating lexical acquisition (Olswang, Bain, Dunn, & Cooper, 1983) and training semantic roles (Connell, 1986). Investigators using a modeling approach have targeted grammatical forms (Courtright & Courtright, 1976; Ellis Weismer & Murray-Branch, 1989; Leonard, 1974, 1975) grammatical constructions (Wilcox & Leonard, 1978), and lexical acquisition (Schwartz & Leonard, 1985).

Unfortunately, many of the structured approaches failed to demonstrate generalization and transfer of trained forms and constructions to spontaneous interactions. Most studies reported generalization as a function of the task whereby the subjects were able to produce the target

behavior during “training-like” activities. The limited success with these procedures have led many investigators (Camarata, Nelson, & Camarata, 1994; Hubbell, 1981; MacDonald, 1989; Yoder, Kaiser, & Alpert; 1991) to question the “ecological validity” (Fey, 1986) of these approaches for intervening with young children.

### Milieu Approaches

Milieu approaches represented a progression toward more naturalistic methods for early intervention. Milieu teaching includes a number of procedures that require careful arrangement of the environment so desirable materials are within the child’s view but out of reach. Milieu teaching utilizes modeling and reinforcement techniques common to the structured approaches but emphasizes the functional use of language during ongoing interactions (Yoder, Kaiser, & Alpert, 1991).

Two common milieu approaches are incidental teaching and mand-model (Fey, 1986). Incidental teaching involves selecting child language targets, manipulating the environment so needed or desirable materials are within the child’s view but out of reach, waiting for the child to initiate an interaction, prompting the child to produce the target form, and providing the child feedback (Hart & Risley, 1986). Mand-model procedures are consistent with incidental teaching; however, the adult does not wait for the child to initiate an interaction. Instead, the adult identifies the child’s focus of attention and prompts the child to verbalize (Hart & Risley, 1986).

Several studies have investigated the efficacy of the milieu teaching model as an approach for facilitating language growth. A series of investigations by Hart and Risley (1968, 1974, 1975, 1980) found that incidental language teaching increased specific language targets (i.e., new vocabulary, compound sentences, semantic relations, initiations, and responses) used by disadvantaged preschoolers outside the trained setting. Rogers-Warren and Warren (1980) used mand-model procedures with preschoolers exhibiting developmental disabilities and language delay.



Results of their investigation indicated increases in the children's frequency of vocalizations, responses to mands, and use of new vocabulary and word combinations. Using mand-model procedures Warren, McQuarter, and Rogers-Warren (1984) taught single and multi-word utterances to three preschoolers exhibiting language delay. Two of the three subjects in their investigation showed significant gains in frequency of verbalizations to the teacher, the rate of nonobligatory speech, and the responsiveness to others' initiations.

More recent investigations using milieu teaching have combined procedures to facilitate generalization of skills to other settings and people and to promote long-term changes in children's communicative interactions. Warren and Bambara (1989) combined the mand-model and incidental teaching approaches to teach the action-object form to three children exhibiting developmental delays. Although the three subjects in their investigation learned the target construction and used the target in nonobligatory contexts, only one of the three subjects demonstrated generalization of the trained target across settings and people. Kaiser and Hester (1994) used an enhanced milieu teaching procedure that combined mand-modeling and incidental teaching with child-cued modeling and time delay. The child-cued and time delay components added to the procedures involved presenting a model related to the child's focus of attention and adding an expectant pause as a prompt to elicit child verbalizations. The six subjects in their investigation learned the target skills (i.e., increase in total utterances, use of target, vocabulary diversity, and MLU) but exhibited considerable variation in generalization across settings and people.

From their findings, Kaiser and Hester (1994) constructed a profile to describe those children most likely to benefit from enhanced milieu teaching. Children included in the profile were those who talked frequently, demonstrated good play skills, and readily engaged in adult-child interactions. Surprisingly, this is in contrast to the profile

suggested by Yoder, Kaiser, and Alpert (1991) at the conclusion of their study in which they compared incidental teaching to a structured approach. These authors reported that milieu teaching would be more appropriate for children who demonstrate limited verbalizations (fewer than 1 utterance in 2 minutes), few self-initiations, type-token ratios below 0.40, MLUs less than 3.67 morphemes, and poor speech intelligibility.

There is limited research in the use of milieu teaching as a language intervention strategy for children with specific language impairments. Kaiser, Yoder, and Keetz (1992) reviewed 19 studies conducted between 1968 and 1990 in which milieu teaching was used as a language intervention procedure. Subjects within the various studies ranged in age from 2 to 15 years and presented a diverse range of abilities and disabilities. Fourteen subjects were identified as either preschoolers at risk for language impairment or preschoolers exhibiting language delay. The clinical implications from their review indicated milieu teaching (a) promotes positive language change in the training context, (b) results in some generalized language changes, (c) may be a more appropriate language intervention context for children exhibiting certain characteristics of language impairment, and (d) produces high levels of treatment fidelity with continued application of intervention.

#### Child-Oriented Approaches

In contrast to the structured and milieu procedures that view a child's language impairment as a problem residing within the child, the child-oriented approaches take into account the broader social environment of the child that encompasses the child's language impairment and its effect on the behavior of others (Fey, 1986). These significant others (i.e., parents, siblings, teachers, speech-language pathologists) become a part of the child's language impairment as they alter their own behaviors in response to the child. Child-oriented approaches focus on adjusting the reciprocal aspects of communicative interactions between the child and

significant others. The child provides the stimulus to which others respond positively and meaningfully to support increases in the number of opportunities for developing communication and language.

Child-oriented intervention primarily has taken two forms: facilitative play and joint action routines, sometimes termed scripts. Fey (1986) described facilitative play as a context in which the child selects the materials and determines the manner in which the materials will be used. Principles of facilitative play include waiting for the child to initiate interaction, interpreting the child's behavior as communicative and meaningful, responding sensitively to the child's communicative bids, and matching the child's communication level (MacDonald, 1989). Joint action routines are highly predictable patterns of activity or play sequences focusing on a common goal or theme in which the participants have clearly defined, yet reversible, roles (Snyder-McLean, Solomonson, McLean, & Sack, 1984). Both types of activities, facilitative play and joint action routines, have been implemented as intervention techniques for young children with language impairments.

Weiss (1981) used facilitative play as a language treatment procedure for preschool children in an integrated classroom. Typically developing children and children with language impairments received intervention. A language screening test was administered to the children in the classroom receiving facilitative play and to a control group classroom that did not use facilitative play. The experimental group scored significantly better than the control group; however, the scores for the children with language impairment were not reported separately, limiting the significance of the findings. A follow-up investigation 3 years posttreatment indicated that fewer experimental group children with identified language impairments were receiving speech-language services than were children with language impairments from the control group. Because the study contained several methodological flaws (i.e., no separation of typically developing children from children with language

impairments and possible sampling error) little definitive information could be ascertained from these results.

Norris and Hoffman (1990a) compared a didactic teaching approach to a facilitative play procedure to determine which context, adult-initiated or child-initiated interactions, resulted in different communicative behaviors from the child subjects. Child subjects were five children (ages 2;6 to 2;10) at the prelanguage level with multiple disabilities of varying degrees. The same set of toys was used for both treatment conditions. Results indicated the prelanguage children exhibited a greater number of communicative behaviors and more developmentally sophisticated interaction behaviors in the child-initiated condition than in the adult-initiated context. However, the study only examined immediate differences in the two intervention styles and did not evaluate long-term treatment effects.

Snyder-McLean, Solomonson, McLean, and Sack (1984) used the joint action routine approach in a group preschool intervention program. Seven preschoolers with disabilities were enrolled in the program. Four of the seven children fit the profile of children with specific language impairment. The preschool program incorporated several joint action routines into the daily schedule. These included a morning circle time, snack time, and a thematic play activity. Comparison of pretreatment to posttreatment measures indicated the children, as a group, increased the number of intelligible utterances, increased MLU, and increased total number of utterances produced. Because a control group was not used and gains for individual subjects were not reported, the authors could not support the effectiveness of joint action routines as primary intervention procedures for children with SLI.

Other investigators have used script training (Goldstein, Wickstrom, Hoyson, Jamieson, & Odom, 1988; Goldstein & Cisar, 1992) to facilitate peer interaction between typically developing children and children with disabilities. Three successive scripts (e.g., going

shopping, working at a hamburger stand, or buying a pet) were taught to triads of children in an integrated preschool setting. Use of scripts was monitored during play periods during which time the adults prompted interactions and encouraged exchange of script roles among the children. Children with disabilities increased their communicative interactions with peers, expanded the thematic content of scripts, and exchanged roles and expanded scripts more quickly with the introduction of successive scripts.

There are a number of authors who advocate the use of facilitative play (Fey, 1986; Hubbell, 1981; Norris & Hoffman, 1990b; Owens, 1991) and joint action routines (Culatta & Horn, 1982; Goldstein & Cisar, 1992; Goldstein, et al., 1988; Snyder-McLean et al., 1984) for facilitating language development of preschoolers with SLI. However, these procedures are primarily theory driven and have few sound experimental studies to support their use as primary intervention approaches in clinical and center-based settings.

Structured, milieu, and child-oriented treatment approaches represent three primary methods for early language intervention. Research examining the effects of early intervention based on these approaches has demonstrated that preschool children with SLI make significant gains in language development. Specific areas of improvement have included gains in language form (e.g., correct verb tense, complete and complex sentence constructions, and wh- questions), language content, (e.g., vocabulary and two-word semantic relations), and language function (e.g., increased initiations and conversational turns). However, the sometimes poor generalization of skills, contextual limitations, and time constraints inherent in clinic and center-based treatment programs led investigators and early interventionists to seek alternative methods of service delivery. Parent training was a natural and desirable extension of intervention for young children who exhibited communicative impairments.

### Parent Training in Early Intervention

There are distinct advantages to including parents in the intervention process for young children with specific language impairments. Parents often are motivated to actively participate in their child's treatment program (Howlin, 1984). By training parents as direct interventionists, the speech-language pathologist can assume a consultative role and serve more children at a lower cost per child (Bailey & Bricker, 1985; Barnett, Escobar, & Ravsten, 1988; Eiserman, McCoun, & Escobar, 1990; Fey, Cleave, Long, & Hughes, 1993). Because parents spend more hours of the day with their child than is possible for the SLP, there also are more opportunities for facilitating language growth. Finally, the naturally occurring communicative opportunities afforded by the home environment are not easily replicated in the clinic setting.

As researchers identified the advantages and importance of including the family in the intervention process (Cross, 1984; Hubbell, 1981; Peterson & Sherrod, 1982; Wulbert et al., 1975), a number of parent training programs were developed. These parent training procedures had theoretical foundations in the structured, milieu, and child-oriented interventions. Unfortunately, the structured parent intervention programs either focused on parent behaviors to be changed or placed parents in an instructional role to train specific linguistic forms to the child. Remediation of language impairment in this manner missed the important contributions made by each partner in the dyad (Conti-Ramsden, 1985). In contrast, the milieu and child-oriented approaches utilized more naturally occurring contexts and attempted to account for the interactive and transactional aspects of the parent-child interaction.

### Structured Parent Training Programs

Parent training during the 1970s and early 1980s reflected the prevailing intervention methods of the period. Highly structured behaviorist approaches were taught to parents who implemented the procedures with their children exhibiting communicative impairments.

Carpenter and Augustine (1973) presented their program in a workshop plus homework assignment format. MacDonald, Blott, Gordon, Spiegel, and Hartmann (1974) used role-playing and coaching to teach parents imitation, conversation, and play strategies. Variations of MacDonald and colleagues' (MacDonald et al., 1974) program included a behavior management component (Manolson, 1979), video reviews (Manolson, 1979; Kemper, 1980), clinician-mother role play only (Nickols, 1976), and group training procedures (Kemper, 1980). MacDonald (1978) found group training to be as effective as individual parent training and was more time efficient for the clinician. Other parent training programs taught parents to use expansions to increase their child's productions of two-word semantic relations (Scherer & Olswang, 1984) or facilitated parents' use of intervention strategies for improving their child's language form (i.e., MLU, syntax, morphology) and pragmatic skills (i.e., turn-taking, attending, topic maintenance) (Spiegel, Meline, & Gorski, 1982).

Howlin (1984) summarized the effectiveness of parent training based on behaviorism. Parents could be trained to use modeling, prompting, reinforcement, and correction as language intervention techniques with resultant child advances in target language skills. Unfortunately, child improvements appeared short-term and treatment effects dissipated over the long-term. The somewhat disappointing results of these early parent training attempts were similar in nature to the disadvantages associated with the behaviorist approaches in general. Gray and Wandersman (1980) pointed out that home-based programs should take into account the individuality of the clients and their families, and that assigning people to treatment conditions and testing for treatment effects is neither desirable nor realistic.

#### Interactive Parent Training Models

In contrast to the highly structured teaching format of the early parent training models, more recent programs have utilized naturally occurring language opportunities as contexts for parent-delivered

intervention. The naturally occurring contexts and interactive procedures of the milieu and child-oriented approaches (Fey, 1986) transferred the focus of parent training to the bidirectional influences of parent-child interactions. Major training goals for parents included (a) attending to the child's object of focus, (b) responding to the child in a manner that was both developmentally appropriate and semantically contingent on the child's object of focus, and (c) providing feedback to the child using natural consequences directly related to the child's communication or interest (Tannock & Girolametto, 1992).

Alpert and Kaiser (1992) extended the use of milieu teaching for language intervention to a parent training format. A multiple-baseline across subjects design was used in which mothers were trained to use four milieu training procedures: model, mand-model, time delay, and incidental teaching. These techniques were taught individually over four clinic-based sessions that included a 30- to 60-minute lecture followed by a discussion of each technique and its language facilitating effects. Target goals were identified for each technique, and procedures were explained for implementing the technique. Following the lecture and discussion, each mother viewed a videotape of the experimenter using the target technique with three different preschool children, one of which was the mother's child. Mothers were encouraged to use the target strategy incidentally throughout the day to facilitate language development as it naturally occurred. After each clinic-based session, the mother participated in home-based training, occurring either two or three times per week, with a minimum of six sessions for each technique. If a mother exhibited difficulty learning a strategy, an intensive training session was scheduled at the clinic. Once a technique was mastered, a new technique was introduced. The number of sessions for mothers to reach criterion for all four milieu techniques ranged from 28 to 86 sessions. Three monthly follow-up probes indicated mothers maintained satisfactory levels of correct technique use posttreatment. Measures of child change were



increases in MLU, requesting, vocabulary, and frequency of words used. At the end of the investigation the mothers completed a questionnaire addressing their satisfaction with the training program. Half of the mothers indicated the intervention lasted too long, and a third of the mothers thought the milieu techniques were unnatural styles of parent-child interaction.

Fey, Cleave, Long, and Hughes (1993) compared a parent-administered intervention to a clinician-administered intervention to determine which treatment was more effective in improving grammatical development of preschoolers exhibiting SLI. Twenty-six subjects were assigned to clinician-administered treatment, parent-administered intervention, and no treatment control groups. Parents and clinicians used focused stimulation and cyclical goal-attack strategies as language facilitation techniques. A focused stimulation approach was used in which a target form was presented frequently within semantically and pragmatically appropriate contexts. This was combined with a cyclical goal-attack strategy in which new targets were introduced each week until all targets had been presented; then the cycle started over with the first goal. Parents were trained to use the strategies in a combination of group and individual training sessions. Parents met as a group once a week for 2 hours during the first 12 weeks and once monthly during the last 2 months of intervention. In addition, a certified SLP made three visits to each subject's home during the first 12 weeks. During the last 2 months, each parent-child dyad made a 1-hour visit each month to the clinic to ensure proper use of the procedures. Posttest measurements obtained during free play indicated the children made similar gains in the clinician-administered and parent-administered intervention groups. Both groups of children receiving intervention made significantly greater gains than the no treatment control group. Children in the treatment group made noticeable changes in correct main verb usage and percentage of grammatically well-formed sentences used, while the children in the no

treatment group exhibited no such gains. There were no differences among the three groups in use of personal pronouns. Fey and colleagues (1993) also examined the time costs for the SLP in the two treatment conditions and found a considerable savings in the parent-administered intervention. During the 20 weeks of the program, the time commitment for the SLP was 40 hours per child in the clinician treatment and 21 hours per child in the parent-implemented intervention.

Tiegerman and Siperstein (1984) trained mothers to modify their utterances while interacting with their preschoolers exhibiting SLI. The 6-week training program included group and individual training sessions to increase the mothers' use of semantically related utterances. The mothers attended weekly group meetings at which time they viewed a video of a clinician-child interaction illustrating a technique, and received homework assignments designed to increase their understanding and use of the strategy. Homework included transcribing language samples of interactions between father and child, identifying the strategies that occurred in the samples, and maintaining data sheets to record semantically related utterances and the contexts in which they occurred. The data sheets were discussed in the weekly class sessions. Follow-up video tapings of mother-child interactions indicated mothers increased their use of semantically related utterances, produced a broader range of communicative behaviors, and appeared more responsive to their children's initiations. This, in turn, provided the children increased communicative opportunities, a greater number of communicative turns, and greater control over the parent-child interaction. The mother-child dyads demonstrated positive changes in their communicative exchanges as a result of intervention. Furthermore, the separate dyads were able to maintain individualized styles of interacting rather than adopting highly structured or identical patterns of communicative exchange.

MacDonald and Carroll (1992) reported wide range success in training parents to use interactive conversational procedures consistent

with the ecological communication (ECO) model (MacDonald, 1989). The ECO model focused on the natural interactions between parents and children and taught parents to match the child's language level, respond sensitively and contingently to the child's subtle behaviors, follow the child's lead, and establish emotional attachment with the child. First, a parent was observed in play or conversation with her child; then, an individualized program was outlined for the parent depending on the nature and extent of the interactional breakdowns between the parent and child. Each program was designed to address aspects of the parent-child interaction that were facilitating or inhibiting the child's competencies in the areas of social play, turn-taking, nonverbal communication, language, and conversation. The program has been implemented with children exhibiting a variety of developmental and communicative delays. MacDonald and Carroll (1992) highlighted several case studies in their review of the ECO program. Included in the review was a 3-month program developed for the parent of a 6-year-old with language and learning disabilities. Prior to intervention, the interactions between the mother and child were described as a teacher-pupil partnership in which the mother dominated the conversation by posing numerous questions and making frequent topic shifts. By teaching the mother to respond to the child's initiations and provide semantically contingent utterances to extend the child's topic, a better conversational balance was achieved. This resulted in the child assuming a more active, rather than passive role in their interactions.

Giles (1994) used a consultative coaching approach to train primary caregivers in the use of language facilitation strategies (i.e., contingent responding, parallel talk, self talk, open-ended questions, expansions, and extensions). The clinician/coach completed 16 intervention sessions with two primary caregivers and their children. The intervention sessions were held alternately in the caregivers' homes or in the clinic. During the initial intervention session, the caregiver and coach viewed a videotape of

facilitative caregiver-child interactions. Coaching sessions involved a review of the rationale for a specific strategy, role-play between the coach and caregiver in the use of the strategy, a demonstration of the strategy by the coach while interacting with the child, and a caregiver-child practice period. The coach provided feedback regarding correct implementation of the strategy during the practice sessions. Throughout the training period the primary caregiver and coach jointly determined when to implement a new strategy. Other factors also were considered in determining when to implement a new strategy; these included positive changes in primary caregiver and child variables, and caregiver motivation. Primary caregivers successfully increased their use of target language facilitation strategies, except for use of open-ended questions. These changes were positively associated with child increases in MLU, total number of words, and number of different word roots. Additionally, these reciprocal caregiver and child changes were stabilized and retained two weeks post intervention.

The available research consistently reports positive effects from training mothers and caregivers as primary intervention agents for their preschoolers with SLI. Following training, caregivers exhibited improvements in their use of trained behaviors, used a greater number of semantically related utterances, and were more responsive to their children's communicative bids. These caregiver changes were positively correlated with children's higher percentage of turns taken, increased conversational initiations, and overall increased active participation in caregiver-child interactions.

Despite positive group changes in parent-child interactions as a result of intervention, the reported studies indicate great variability among individual mothers and their children in the use of target behaviors. The structured approaches demonstrated that parents could successfully implement modeling, prompting, reinforcement, and correction procedures, but the contrived activities for these procedures failed to

produce generalization to naturally occurring contexts and gains were not maintained over the long-term. However, the less structured nature of the interactive approaches posed challenges for some caregivers in maintaining a focus for interaction during ongoing activities. Finally, many of the parent training programs lasted several months, requiring a significant time commitment from the caregivers.

Ideally, a parent training model of intervention would incorporate the aspects of previous parent training programs that resulted in positive parent and child changes, would maintain ecological validity, and would accommodate a family's busy schedule. The intervention program would be short in duration, would employ strategies facilitative to ongoing interactions, and would take place in naturally occurring, but focused, contexts. One such context of parent-child interaction that has been shown to facilitate language development in typically developing children is storybook reading.

#### Language Development in the Context of Storybook Reading

Reading to children has been shown to facilitate oral language development (Flood, 1977; Snow, 1983; Snow & Goldfield, 1983). The pictures and text provide a stable context that allows for repeated exposure to the same people, objects, and events. The adult can add new information by modeling appropriate language. Adult strategies such as pauses for vocal turns, points to focus attention (Panofsky, 1986; Strickland & Morrow, 1989; Sulzby, 1991), and extensions of child utterances (Bruner, 1980) facilitate semantic, syntactic, and pragmatic language development. When parents talk about what is read, point to the pictures, and ask questions, it creates saliency in the text by guiding and directing the child's attention. By encouraging the child's active participation in the reading process, the adult facilitates the child's development of language and thinking abilities (Roser, 1989). The adult interaction style used during storybook reading can facilitate or repress the child's communicative attempts and potential language development.

### Typical Development

Since the 1950s, researchers have recognized the contributions of a child's home environment and the important roles parents play in a child's literacy development. A number of investigators have observed mothers while reading with their children. Based on these observations, the researchers identified specific parent and child behaviors that occurred during storybook reading episodes.

### Parent Behaviors

Arnold, Lonigan, Whitehurst, and Epstein (1994) analyzed parent behaviors that occurred during parent-child storybook reading and found the behaviors could be categorized as evocative techniques, feedback, and progressive change. Evocative techniques were defined as verbal and gestural cues used to focus the child's attention and strategies for actively engaging the child in storybook reading. Feedback included discourse devices such as expansions, verbal models, corrections, and praise. Progressive change represented the parent's "fine-tuning" adjustments that served to facilitate the child's progressive development of more sophisticated levels of language. These verbal and nonverbal strategies parents used to establish a language-learning environment during parent-child storybook reading have been examined in the literature.

The nonverbal behaviors used by parents during storybook reading have been investigated. Panofsky (1986) identified specific functions for a mother's use of pointing while reading with her preschooler. Points served to direct the child's attention to salient features in the pictures, to establish relationships between the text and pictures, and to initiate or guide dialogue sequences. Dialogue sequences were described as conversational units that served to extend the topic and elaborated on some aspect of the text. A mother's use of gaze also was observed. Gaze typically did not occur during reading episodes but was used to check a child's comprehension following the mother's question. It was further

observed that parents reduced their use of pointing behaviors as the child increased in age.

Ninio and Bruner (1978) identified four key elements a mother used to facilitate her child's development of labeling behavior. These four elements included an attentional vocative (i.e., a word or gesture to focus the child's attention), a query (i.e., a question or gesture used to request information), a label (i.e., a naming response to the query), and feedback (i.e., an acknowledgement or statement of accuracy regarding the child's label). The four elements occurred with great regularity during the storybook reading, beginning with the attentional vocative. The attentional vocative was followed by or combined with the query that took the form of a question, such as "What is that?" or "What are they doing?" The child or parent provided the label in response to the query. When the child provided the label, the mother gave the child feedback to confirm the accuracy of the child's label or to correct an inaccurate response. During these interactive storybook readings, the mother almost always focused on whole objects or whole persons depicted rather than concentrating on isolated attributes that may have led to ambiguous referencing. Additionally, the mother consistently responded to the child's initiations whether verbal or gestural. The authors concluded this supportive, early parent-child storybook reading served a language teaching function.

Diehl-Faxon and Dockstader-Anderson (1985) examined the discourse intonation patterns of mothers as they read to their young, typically developing children. They found many of the mothers' vocal quality changes were similar to "motherese" characteristics associated with early parent-infant interactions. Mothers elevated their pitch, exaggerated their intonational contours, used word elongations, and added emotive qualities (e.g., whispering or crying) to their reading. The intonational changes appeared to serve primary functions of attracting and maintaining the child's attention or conveying meaning. Specific strategies included emphasizing vocabulary and concepts that the parent

perceived as new or unfamiliar to the child, stressing a referent to link it to previous information, and using elongations to emphasize context. The authors termed these reading discourse techniques, “readerese,” and described them as finely-tuned adjustments made to facilitate comprehension and actively engage the child in the storybook reading.

Altwerger, Diel-Faxon, and Dockstader-Anderson (1985) identified various levels of storybook reading behavior. The primary goal for the mother appeared to be one of constructing a meaningful and understandable event for the child. During the child’s early encounters with storybook reading, the mother typically used a conversational style in which she related personal experiences to establish a knowledge base for the child. As the child gained knowledge about books and story structure, the mother paraphrased the print or read portions of the text. Within this gradual process the mother embedded text within a conversational framework, facilitated text comprehension with prosodic features and dialogue, and continued to adapt, extend, clarify, and disregard the print. The mother’s reading style continually changed in response to the child’s questions, linguistic level, and literacy background.

Mason and Allen (1986) summarized the literature on parent-child storybook reading. They concluded adults act as scaffolds to support and facilitate their child’s language development during bookreading episodes. Initially, the adult provides most of the information while affording opportunities for the child to contribute to the discourse. These initial storybook interactions generally focus on the obvious people, objects, and actions depicted. As the child demonstrates advances in linguistic skill, the parent expects more complex and less picture-supported information. The parent continues to provide enough information for the child to be successful, but avoids providing too much information. Thus the child is allowed to learn about what is present, relate it to his or her own experiences, and become familiar with story structure.



### Child Behaviors

As parents engage their child in language facilitating exchanges during storybook reading, the child exhibits predictable patterns of responding to the interactive social context. The child actively participates in joint meaning construction through a variety of verbal and nonverbal behaviors. These behaviors have been examined and reported by a number of investigators.

Ninio and Bruner (1978) found that even the very young child contributed equally to conversational turns during storybook reading. The child used a variety of vocalizations and gestures to take a turn, to signal a turn, and to direct the adult's attention. Snow and Goldfield (1983) observed that in addition to taking turns, the typically developing child spontaneously imitated adult utterances. The child also responded to adult questions and comments and demonstrated other conversational devices, such as avoiding interruptions and using "filling up" pauses.

Altwerger, Diel-Faxon, and Dockstader-Anderson (1985) called this interactive storybook reading a negotiation process. The negotiation process evolved and changed over time as the child developed more sophisticated levels of language use. The child directed the adult's attention to something of interest and asked questions or commented on the people, objects, and events depicted. The child related personal experiences that served to expand the topic. With repeated readings and repeated exposure to stories, the child internalized information about the story events and developed a greater understanding of the story and text relationship. When the story or story structure became familiar and internalized, the child participated in the actual reading of the story.

Roser and Martinez (1985) found that a child's response to literature was influenced by the roles the adult served during the storybook reading. When the adult assumed the role of co-responder, the child contributed equally to the story construction through turn-taking, recounting parts of the story, and sharing personal reactions to the story.

Adults who acted as informers and monitors explained different aspects of the story and provided information to broaden the child's story-related, world knowledge. Those adults who assumed the roles of directors maintained management or leadership roles. By doing so, the adult determined what was important and controlled all aspects of the storybook discussion, while placing the child in a respondent role. This investigation emphasized that adults should use a variety of interaction styles when reading with children. The flexibility allows for achieving a better match with the child's language needs at any given point in time.

Storybook reading experiences for parents and their typically developing children have been investigated and found to produce a supportive environment for oral language development. Snow and Goldfield (1983) called book reading an ideal routine for developing situation-specific language in young children. However, children with language disabilities have fewer opportunities to engage in storybook reading, and often interact differently than their typically developing peers during parent-child reading episodes. Parents of children with language impairments also report providing reading experiences for their children that differ from what is observed with and reported by parents of typically developing children.

#### Nontypical Development

Marvin and Mirenda (1993) surveyed parents of typically developing preschoolers and parents of preschoolers with disabilities to compare the home literacy experiences of the two groups. Both groups of parents reported similar types of adult reading behaviors, such as pointing to pictures, reading the text, and asking the child to label pictures. Similarities in child participatory behaviors included use of questions, comments, and pretend reading episodes. However, the children with disabilities had fewer story-related interactions in which the parent asked the child to retell parts of the story or to make predictions about the story. This served to limit the length and complexity of the language required of

the child. Finally, parents of children with disabilities engaged in reading episodes less frequently and identified reading as a lower priority for their child than did parents of typically developing children.

As a follow-up investigation to the Marvin and Mirenda study, Marvin (1994) compared literacy activities for parents of children with single versus multiple disabilities. The single disability group consisted primarily of children exhibiting speech-language impairment (79%). Surprisingly, there was relatively little difference between the two groups surveyed. Both groups reported similar parent and child reading behaviors. Approximately 74% of each group of parents reported reading the text to their child, but less than half in each group told the story in their own words. About 85% of parents indicated they pointed to or labeled pictures, while less than half pointed to the words. The primary strategy for engaging the child in the storybook reading included asking the child to point to or label pictures with about a third of the parents indicating they asked the child predictive (i.e., "What will happen?") or causal (i.e., "Why did that happen") questions. While less than half the parents reported reading daily to their child, about half indicated reading at least weekly. In addition, both groups of parents gave lower priority to reading than communication, self-help, or social skill development. The results of this study were significant in that parents of children with a disability were reportedly providing fewer early literacy experiences for their children than are reported by parents of typically developing children. Also the types of interactions that occurred between parents and children with disabilities during storybook reading appeared to be less supportive to language development.

A case study by Norris and Hoffman (1991) demonstrated that parents of children with SLI can be trained to engage in more language facilitating behaviors during storybook reading. Both the mother and child in the study received assistance from a speech-language pathologist for a period of eight weeks. During that time the mother completed nine

readings of the same storybook with her child. Initially, the child was unable to maintain attention to the book and participated little in the actual storybook reading. As a consequence, the mother assumed a directive role and attempted to focus the child on specific aspects of the pictures. With each successive reading of the story, the child watched and listened for longer periods of time and began to contribute to the story construction by telling parts of the story before it was read. This resulted in a more collaborative storybook reading experience for the mother and child. Significant findings in this study illustrated the language facilitating nature of parent-child storybook reading. The child increased her productive vocabulary, produced more complex syntactic constructions, and demonstrated more advanced storybook reading behaviors (i.e., moved from labeling to following the action). The mother decreased the use of directive behaviors and increased in responding to the child's story-related initiations. This investigation illustrated the reciprocal influences of parent and child behaviors during storybook reading. It further demonstrated that interactive parent-child storybook reading was a highly facilitative context for promoting the oral language development of a child with SLI.

A pilot investigation by Norris, Hoffman, and Crowe (1993) examined the efficacy of training 13 parents as language facilitators in the context of parent-child storybook reading. Thirteen parent-child dyads participated in this investigation. Children were 3- and 4-year-olds enrolled in a university preschool program for children with language impairments. All 13 children were identified with some degree of language impairment. Four exhibited characteristics of SLI, three displayed characteristics of autism, four demonstrated overall developmental delays, one had cerebral palsy, and one child was learning English as a second language. The parents, 12 mothers and 1 father, participated in 30-minute storybook reading sessions with their children. Training was scheduled for one session each week for six consecutive

weeks. However, only four dyads completed all 6 weeks of training. Sessions included a video recorded parent-child storybook reading, followed by a parent-clinician videotape review, and ended with the clinician modeling storybook reading or coaching the parent in storybook reading with the child.

Results of the investigation indicated that parents initially presented reading behaviors that were managing or directing in nature. Parents attempted to read the text, were turn-dominant, demonstrated a high frequency of managing or directing behaviors, and used a high number of yes/no questions and requests for nonverbal responses (i.e., “point to the \_\_\_\_”). The children responded to the parent reading behaviors by passively listening, by fussing, by attempting to turn the pages of the book, or by providing indications (i.e., nodding or shaking their heads for “yes” or “no” and pointing to the page). Observable changes in parent-child reading behaviors were noticeable after three sessions. Parents began to wait for their child to initiate a topic, to engage in greater elaboration of the events occurring on each page, and to demonstrate a more conversational style in which the parent and child made contributions to the story construction. Considerable differences were observed across dyads with the most noticeable improvements in parents who completed all six sessions. Child changes were most positive for children exhibiting SLI than for the children with multiple disabilities. Specific changes noted in children included increased vocabulary, improved phonological skills, more complex syntactic constructions, and increased responsiveness to storybook reading (e.g., talking about the pictures, retelling parts of the story, making predictions, and interpreting information depicted).

### Summary

Past and recent research has shown that early intervention is important to the language development of preschool children with SLI. However, studies indicate children with SLI exhibit problems with

generalization and maintenance of newly acquired skills. Attempts to make intervention more natural for preschoolers with SLI also presented inherent difficulties in that it focused only on the child and failed to account for the transactional influences of home and family on the child's language development.

Consistently, the research documents the reciprocal effects of parent and child interactions. Some studies have shown that children with SLI experience a different language-learning environment than that of typically developing children. Parent training programs have been developed to assist parents in promoting language development for their preschoolers with SLI. Unfortunately, many of the programs focused on changing parent behaviors or placed parents in roles as teachers. Some parents found this teaching role unnatural. However, those programs that attempted to train parents in more natural communicative situations, also posed challenges for some parents. It was often difficult for parents to use facilitative techniques during ongoing activities. In addition, these programs frequently lasted for long periods of time and required extensive additional time commitments from the parents.

A more ideal parent training program would facilitate reciprocal parent and child changes rather than focusing on half of the parent-child dyad. The parent training would utilize a focused context for intervention that allowed for flexibility in its implementation, yet has been proven to facilitate language development. The context must allow for natural interactions to occur. Finally, the program would be relatively short in duration and result in rapid changes in parent and child behaviors.

Storybook reading is a natural context for language teaching and learning. Recent studies have shown that storybook reading facilitates many semantic, syntactic, pragmatic, and phonological aspects of language. The purpose of this investigation was to determine whether a naturally occurring parent-child routine such as storybook reading could serve as a parent training and language intervention context. This study

was completed to answer the following questions: (a) can parents of children with SLI be trained to use a more language supporting interaction style during parent-child storybook reading, (b) do changes in parents' interaction style result in increased language development for children with SLI, and (c) do parent and child changes continue once training is completed?

## METHOD

A single-subject, multiple baseline across subjects design was utilized to answer three research questions. (a) Can parents of preschool children with specific language impairment (SLI) be taught to alter their interaction style to be more supportive during storybook reading? (b) If so, does altering the parent's interaction style during storybook reading result in improved language productivity from her preschool child? (c) Are there continuing positive effects occurring from parent training following training? Parents were taught to use a supportive reading cycle during storybook reading using "scaffolding" (Bruner & Haste, 1987, p. 22). This complete reading cycle (CRC) was based on a typical parent-child "reading format" (Bruner, 1983, p. 78). Measurements of child behavioral changes included (a) number of conversational turns taken (b) number of story initiations made, (c) semantic level of utterances during storybook reading, and (d) mean length of utterances (MLUs) in morphemes.

The literature supports the use of a multiple baseline design for analyzing the effectiveness of intervention (Barlow & Hersen, 1984; Hegde, 1987), especially when treatment is expected to produce rapid changes in behavior. This design allowed for (a) comparison of each subject's behaviors from baseline to treatment/training and follow-up and (b) comparison of treated subjects' behaviors to those behaviors of untreated subjects. Five of six dyads completed a total of 15 sessions, while one dyad completed 13 sessions. The five dyads completing all 15 sessions participated in 3-5 baseline, 8-10 training, and 2 follow-up sessions. The number of baseline and training sessions for each dyad depended on the subjects' points of entry for training. One dyad completed 13 sessions, 4 baseline and 9 training sessions.

This design was selected because it is reported to be both clinically useful and controls for history and maturation effects. Subjects in the baseline phase served as their own controls and also as controls for the



untreated subjects. Parent and child discourse measurements during scaffolded storybook reading in the treatment condition were compared to their own baseline measures to determine within subject changes. Degree of change in measures of treated subjects' behaviors were compared to degree of change in baseline measures of untreated subjects to determine across subject changes. The design allowed for determining whether parents of children with SLI could be trained to be more supportive in their interactions during storybook reading, and if these parent changes resulted in increases in the child's language productivity. The design also allowed for determination of continued positive effects of the intervention.

### Subjects

Subjects for this study included 6 parent-child dyads. The child subjects were preschool-age children previously verified by their local school district as exhibiting speech-language impairments in the area of language. The following criteria were used to define the child population:

1. Ranged in age from 3;0 to 3;6 years at the time of the initial training session;
2. Spoke English as the primary language and language spoken in the home;
3. Exhibited normal hearing sensitivity as verified by passing a pure-tone hearing screening for the frequencies of 1,000, 2,000, and 4,000 Hz presented at 25 dB HL;
4. Obtained a minimum standard score of 84 on the Slosson Intelligence Test (SIT) (Slosson, 1981);
5. Demonstrated age-appropriate social abilities as reported by teachers or parents;
6. Presented speech-language impairment as the only verification as determined by the local school district using standardized assessment procedures in which the child performed 2.0 deviations below the mean for chronological age on a state approved psychometric language test;

7. Obtained a standard score on the expressive communication scale of the Preschool Language Scale-3 (PLS-3) (Zimmerman, Steiner, & Pond, 1992) at least 1.0 standard deviation below assessed ability (i.e., SIT standard score equivalent) or 1.5 standard deviations below the mean for chronological age;

8. Produced a language sample during interactive play that yielded a mean length of utterance (MLU) at least 1.5 standard deviations below the mean for chronological age.

#### Criteria Rationale

The age range of 3;0 to 3;6 years was selected because this is a critical period of language development. The targeted child population exhibited characteristics of SLI consistent with the defining criteria advocated by Stark and Tallal (1981). One exception to Stark and Tallal's criteria included using standard deviation scores rather than age equivalencies for the quantitative language measure. An obtained PLS-3 score at least 1.0 standard deviation below assessed ability or 1.5 standard deviations below chronological age satisfied the requirement of significant language impairment. Passage of the pure-tone hearing screen satisfied the criteria for normal hearing thresholds and also ruled out potential language delays attributed to peripheral hearing loss. Performance on the SIT satisfied the criteria for average cognitive abilities and reduced the possibility of language deficits attributed to generalized developmental delays. There were no reports of emotional, behavioral, or neurological problems.

The expressive communication portion of the PLS-3 (Zimmerman, Steiner, & Pond, 1992) was selected as a quantitative measure for identifying SLI. It also provided a standard for comparing the child's current language abilities to a national norm. This standardized measure was selected because it examines a child's use of language structures, concept development, and general vocabulary use. The PLS-3 yields standard scores, percentile ranks, and language age equivalents for

children birth to 6;11 years. Standard scores were used to identify each subject as exhibiting a significant language impairment when compared to chronological age or assessed ability. Administration of the articulation screener portion of the PLS-3 was used as a global measure of articulation abilities to rule out possible phonological delays greater than the language impairment.

A measure of language productivity was obtained by recording and analyzing a language sample elicited from each child during interactive play. The verbal transcript information derived from each interactive play session was analyzed for the child's MLU in morphemes. The analysis was completed by following procedures outlined for the Systematic Analysis of Language Transcripts (SALT) (Miller & Chapman, 1985). The SALT procedures yielded mean and standard deviation scores for MLU that can be used to identify children who exhibit significant delays in productive syntax.

#### Subject Selection

Potential subjects were recruited through local public schools of a metropolitan city (i.e., population greater than 100,000 people) in the Midwest. First, letters were sent to local school district administrators requesting permission to use their schools as recruiting sites. Second, after obtaining administrative approval, only those schools with early childhood special education (ECSE) programs were contacted to be used as recruitment sites for subjects. Third, those schools granting permission to be used as recruitment sites were asked to send invitations to participate to all potential adult subjects whose children met the minimal defining criteria (i.e., 3;0 to 3;6 years old identified with speech-language impairment in the area of language) for the study. A checklist specifying the defining criteria was provided for the school personnel to assist in identifying potential subjects (see Appendix A). The invitations included appropriate informed consent for the parents or guardians to read, sign, and return (see Appendix B). The invitation form also

indicated that some potential subjects would not be selected for the study. Fourth, the primary investigator completed evaluations of those children whose parents or legal guardians returned signed consent forms. The children were evaluated using the specified criteria. Fifth, after evaluating potential subjects, only six of the children met the defining criteria for the study. Therefore, those six children constituted the sample population.

Five of the 6 subjects selected for the study were evaluated at the recruitment site, a public school early childhood classroom. The 6th subject was evaluated in the child's home. Reliability for transcribing language samples was completed through independent analysis procedures. Within a week of each recorded play session, the investigator and a graduate student in speech-language pathology independently viewed and transcribed child language samples. The transcriptions were compared for point-by-point agreement. The total number of agreements was divided by the total number of agreements plus disagreements and multiplied by 100. Criterion for agreement was set at 80%. Interrater agreement for the transcriptions was 84% with a range of 80% to 97%.

### Subject Descriptions

Six parent-child dyads participated in this investigation. Parent and child characteristics will be described in the following two sections.

#### Child Subjects

Six children with SLI ranging in age from 3;2 to 3;5 years were selected for this investigation. Table 1 provides identifying information for each child by age and gender and summarizes each subject's pretreatment assessment performance.

Child Subject 1 was a 3;2 year old female who lived with her mother, father, and 5-year-old brother. She had received speech-language services through the public schools in home-based and center-based programs for approximately two years prior to this investigation. Child 1 was enrolled in a center-based early childhood preschool program at the

Table 1  
Characteristics of Child Subjects

Subject	Sex	CA	IQ		PLS-3 Auditory		PLS-3 Verbal		MLU		PLS-3 Artic
			SS	SD	SS	SD	SS	SD	Morph	SD	
1	F	38	85	-0.99	83	-1.13	62	-2.53	1.00	-3.22	B
2	F	41	98	-0.12	92	-0.53	76	-1.60	2.00	-2.10	T
3	F	38	101	+0.06	83	-1.13	76	-1.60	1.00	-3.22	B
4	F	41	86	-0.87	95	-0.33	70	-2.00	1.00	-3.36	B
5	M	40	87	-0.81	86	-0.93	72	-1.86	1.15	-3.12	B
6	M	38	117	+1.06	97	-0.20	78	-1.47	1.67	-2.31	T

Note. IQ = Intelligence Quotient; PLS-3 = Preschool Language Scale-3; MLU = mean length of utterance; CA = chronological age; SS = standard score; SD = standard deviation based on chronological age; Morph = morphemes; Artic = articulation; B = borderline delayed articulation development ; T = typical articulation development.

beginning of the study. The program met 2 1/2 hours each day, 5 days each week. The ECSE teacher described the subject as socially appropriate with good play skills, but exhibited significant delays in expressive language abilities. Qualitative analysis of Child 1’s pretreatment language sample indicated she used primarily one-word utterances consisting of indications (e.g., “yes” and “no”) and labels.

Child Subject 2 was a 3;5 year old female who lived with her mother, male caregiver, 18-year old brother, and 5-year-old sister. She had received speech-language services in a center-based program in the public schools for at least one year prior to the investigation. At the beginning of the study, Child 2 was attending a public school ECSE preschool 2 1/2 hours each day for 5 days each week. Her classroom teacher reported that Child 2 was socially appropriate, but lacked adequate language abilities to engage in productive communicative interactions with peers. Her play skills were reportedly appropriate for her age.

Qualitative analysis of the pretreatment language sample indicated that Child 2 tended to persevere on utterances by repeating many of them two or three times. She also exhibited extensive use of nonspecific pronoun referents (e.g., “this,” “that,” “here,” and “there”) and several instances of nonverbal indications for “yes” and “no.”

Child Subject 3 was a 3;2 year old female who lived with her grandmother and grandfather, who served as custodial parents, a 16-year-old aunt, and 5-year-old sister. Child 3 had received speech therapy in a public school center-based program for at least one year prior to the beginning of this investigation. She attended a preschool program 2 1/2 hours each day for 5 days each week. Her ECSE teacher reported that Child 3 was socially appropriate, exhibited well-organized play skills, and demonstrated good receptive language abilities. However, Child 3 had limited expressive language and relied on gestures and facial expression to convey her messages. A qualitative analysis of Child 3’s pretreatment language sample supported the teacher’s report. Child 3 used primarily one-word labels, nonspecific pronoun referents (e.g., “here,” “there,” and “that”), and indications for “yes” and “no.” She consistently augmented her verbalizations with points and other gestures.

Subject 4 was a 3;5 year old female who lived at home with her mother, father, and 9-year-old brother. At the beginning of this study she was receiving speech-language therapy two times each week through a public school, home-based program. Child 4 had been enrolled in the program for approximately 6 months prior to the investigation. Her mother reported that Child 4 exhibited good receptive language abilities and socially appropriate behavior; however her vocabulary was extremely limited. Qualitative analysis of Child 4’s pretreatment language sample corroborated the mother’s report, as Child 4 generated few different words during a 15-minute play period. Her utterances consisted primarily of two labels (i.e., “mommy” and “house”), two nonspecific pronoun referents (i.e., “here” and “there”), and indications for “yes” and “no.”

She used these same few words with a variety of intonation patterns to express a number of communicative functions.

Subject 5 was a 3;4 year old male who lived with his mother and father. At the beginning of the study he had been enrolled in a public school ECSE program for approximately 8 months. Child 5 attended the center-based program 2 1/2 hours each day for 4 days each week. His classroom teacher reported that Child 5 appeared socially appropriate and very bright for his age. His restricted expressive language significantly limited his access to communicative interactions with peers. The teacher further indicated that Child 5 primarily used one-word utterances with a very limited vocabulary. Qualitative analysis of Child 5's pretreatment language sample indicated that he used only 15 different words in 60 utterances. His utterances were dominated by VC (i.e., vowel-consonant) and CV (i.e., consonant-vowel) utterances such as "oh," "at," "ow," "no," and "bo." Longer words such as "dad," "broke," and "home" also were present.

Subject 6 was a 3;2 year old male who lived with his mother, father, and 6-year-old sister. At the time of the investigation he attended a public school ECSE program 2 days each week for 2 1/2 hours each day. Child 6 had been enrolled in the center-based program for approximately 7 months. His classroom teacher reported Child 6's receptive language abilities, social skills, and play behaviors were age-appropriate. A qualitative analysis of Child 6's pretreatment language sample indicated he had a diverse vocabulary but low frequency of verbalizations (i.e., 29 words in 15 minutes). Although his sample was short, Child 6 used four different nouns, two different possessive pronouns, two different verbs, and one contracted form. His language challenges appeared to be focused on his productive syntax and morphological development.

#### Parent Subjects

Also included in this study was a parent or primary caregiver of each child subject. Table 2 summarizes parent characteristics according to

Table 2

Characteristics of Parent Subjects

Subject	Sex	Age	Relationship to Child	Education	Occupation	SES
1	F	22	Mother	<HS	Homemaker	Low
2	F	39	Mother	<HS	Homemaker	Low
3	F	43	Grandmother	PHS	Student	Low
4	F	34	Mother	PHS	Homemaker	Middle
5	F	32	Mother	PHS	Secretary	Middle
6	F	34	Mother	HS	Homemaker	Middle

Note. SES = socioeconomic status; HS = high school; PHS = post high school.

gender, age, relationship to child, education, occupation, and socioeconomic status. All of the caregivers were the child's mother, except Subject 3, who was Child 3's grandmother and legal guardian at the time. Only one mother was young (e.g., 22 years), while all others were over 30 years of age (range of 32-43 years). Four were homemakers, and two worked outside the home. Subjects 1 and 2 were not high school graduates; however, Subject 1 was attending classes to obtain a General Educational Development (GED) certificate. Subjects 3, 4, and 5 had training beyond high school. Subject 3 was attending a business school, Subject 4 had a college degree, and Subject 5 had secretarial training. Subjects 1, 2, and 3, were considered low income families, as all three families received public assistance for housing and medical care. Subjects 4, 5, and 6 fell within the middle to upper middle class range.

#### Materials

Two different children's books were used for this study. One book was used for the baseline and follow-up sessions, and a second book was used during the training sessions. The books were matched for contextual



levels, picture-text relationships, and grammatical complexity. Both books depicted information and experiences typically encountered by children from 3;0 to 3;6 years of age, such as fixing something to eat, playing with toys, or going to the park.

### Storybook Selection

Two storybooks by Mercer Mayer were used for this investigation, All by Myself (ABM) (Mayer, 1983) and Little Critter's, This Is My House (LCH) (Mayer, 1993). Both stories contained the same main character, Little Critter, engaged in different events or activities. The publisher indicated the two books were intended for children from 3;0 to 8;0 years of age.

Story ABM told about Little Critter's attempts to achieve independence in self-care and play activities. These activities included getting dressed, fixing something to eat, playing with toys, and getting ready for bed. The LCH story was a narrative by Little Critter in which he took the reader on a guided tour of his house and yard. Throughout the tour Little Critter talked about his toys, his family, and things he does in his house.

### Contextual Analysis

The Situational-Discourse-Semantic Context model (SDS) (Norris & Hoffman, 1993) was used to determine the contextual complexity of each storybook. The characteristics of the events, the discourse structure of the event representations, and the level of language meaning used in the texts were analyzed.

The two stories presented a Situational context that was symbolic and contextualized. This means that the pictures provided similar representations of the agents, actions, objects, and events described in the text. The Discourse structure of the texts related an ordered sequence that served a poetic function. This means that episodes of the stories maintained a temporal order between events, but one event did not cause the next or require that the events unfold in that sequence. The Semantic

content of each story included descriptions of the characters, objects, actions, and events provided by the written text and the pictures.

The pictures allowed for additional labeling and commenting through depicted facial expressions and actions that were not directly stated in the text.

### Picture-Text Relationship

The pictures and text for each story were compared to determine the degree to which the pictures and text contributed to the narrative. Golden (1990) described five types of relationships that may occur between the print and illustrations in picture books. These included the following: (a) the pictures and text are symmetrical, (b) the pictures clarify the text, (c) the pictures enhance or enrich the text, (d) the pictures highlight select aspects while the text carries the meaning, and (e) the text highlights select aspects while the pictures carry the primary meaning.

The books selected for this study were both identified as depicting a text-picture relationship that was symmetrical. The pictures provided redundant information that conveyed essentially the same ideas as those represented in the text. Because the print and illustrations conveyed similar information, the symmetrical relationship was anticipated to facilitate comprehension of the story elements.

### Grammatical Complexity

The CorrecText Grammar Correction System (Houghton Mifflin, 1990), a computerized grammar check, was completed for each book by typing each story verbatim. If a page expressed a new idea through the text or pictures, the text was indented and typed as a new paragraph. Also, text accompanying a change in scene was typed as a new sentence. For example, in All by Myself Little Critter was trimming roses with Dad on one page with accompanying text, “I can help Dad trim a bush....” On the opposite page Little Critter was licking frosting from a spoon while Mom watched, and the text read, “or ice a cake for Mom.” The second part of the sentence was typed as a new paragraph due to the change in

scene. The computer analysis provided information regarding the total number of words per story, total number of sentences per story, average number of words per sentence, and Flesch readability reported in grade levels.

All by Myself consisted of 157 words in 26 sentences with an average of 6.0 words per sentence and below first grade readability. Little Critter's, This Is My House contained 175 words in 33 sentences for an average of 5.3 words per sentence and below first grade readability.

### Storybook Assignments

One storybook was assigned to baseline and follow-up, and the second storybook was assigned to training sessions. By doing so, all dyads used the same storybook for each phase of the study; thereby controlling for stimulus material effects from one dyad to another. The assignments were accomplished through a coin tossing procedure in which the side of the coin that faced up received the baseline/follow-up assignment, and the side of the coin facing down received the training assignment. Story ABM was designated as Heads, and story LCH was assigned Tails. The result of the toss assigned story ABM to baseline and follow-up sessions and story LCH to training sessions.

### Procedure

Parent-child interactions during storybook reading were video recorded over time, transcribed, and analyzed to determine whether training parents to use a CRC produced increases in their children's language productivity. Parent behaviors of interest were measured during all baseline, training, and follow-up sessions. Parent behaviors of interest included number of CRCs, percent of parent turns taken, number of turns representing responses to child story initiations, and changes in MLU. Child behaviors of interest were measured during all baseline, training, and follow-up sessions. Child behaviors included number of

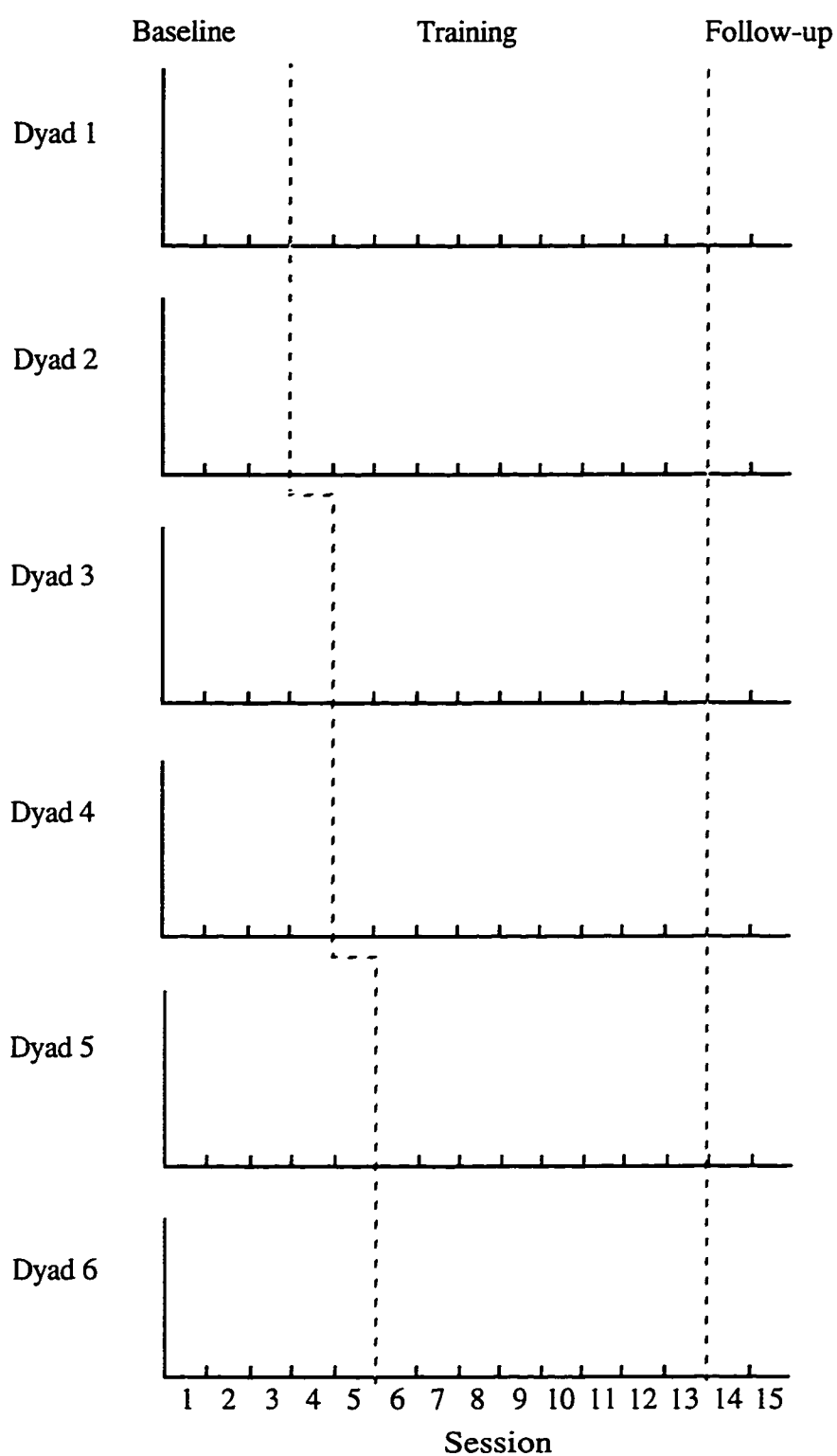
communicative turns, number of story initiations, semantic level of utterances during storybook reading, and changes in MLU.

Dyads 1, 2, 4, 5, and 6 participated in 15 total sessions, while Dyad 3 participated in 13 total sessions. For Dyads 1, 4, 5, and 6 these sessions occurred three times each week with at least one day between sessions for a period of five weeks. Dyads 2 and 3 experienced medical crises during the investigation, and therefore, required adjustments in the training schedule. Dyad 2 had an 8-day break between sessions 3 and 4, and a 6-day break between sessions 4 and 5. Dyad 3 dropped out of the study after Session 13, and therefore completed no follow-up sessions.

All study sessions took place in each subject's home. All dyads except Dyad 3 participated in 3 to 5 baseline sessions lasting five minutes, 8 to 10 training sessions lasting 30 minutes, and 2 follow-up sessions lasting five minutes for a total of 15 sessions for each dyad. Dyad 3 completed 4 baseline sessions and 9 training sessions, but did not participate in the follow-up segment of the study. The number of baseline and training sessions varied for each dyad depending on their point of entry into the multiple baseline design. To expedite initiation of training and minimize withholding of intervention, Dyads were assigned to training phases in pairs based on the order of referral and testing of child subjects. Therefore, Dyads 1 and 2 were paired and entered the training phase at the 4th study session. Dyads 3 and 4 were paired and entered training at the 5th study session. Dyads 5 and 6 were paired and entered the training phase at the 6th study session. Figure 4 illustrates the time-lagged and concurrent assignment of subjects to training segments of the study.

### Baseline

Baseline sessions lasted approximately 5 minutes, or as long as the dyad remained engaged in storybook reading. During the baseline sessions, the parent and child were asked to sit in a comfortable position to read the book assigned to the baseline phase. The investigator



**Figure 4.** Subject dyad pairings and sequencing procedures for experimental sessions (baseline, training, and follow-up).

instructed the parent to “Read this story like you normally would.” No instruction or feedback was provided to the parent regarding the storybook reading. All dyads used the same storybook throughout the designated number of baseline sessions. Each baseline session was video recorded during the first 5 minutes of parent-child storybook reading or until the parent and child had read the book to the end and indicated that they were done or wanted to stop. At no time was the parent given instructions or feedback regarding the storybook reading.

### Training

The primary investigator conducted all training sessions. At the beginning of the first training session the investigator told the parent that she would be shown some ways to increase the child’s talking during storybook reading. The first training session for all dyads lasted approximately 40 minutes and was divided into segments that included (a) a 10-minute instructing/reviewing session, (b) a 5-minute parent-child storybook reading, (c) a 15-minute investigator-parent videotape review, and (d) a 10-minute coaching segment. All four segments of the training were video recorded.

Training sessions 2 through 4 followed the same procedures as session 1, except the instructing/reviewing segment became a 5-minute review. Each subsequent training session included the 5-minute instruction/review, parent-child storybook reading, and investigator-parent video review. Because child subjects were reluctant to engage in a second reading of the storybook during training sessions, the coaching segment was discontinued after the 4th training session for all dyads.

### Instructing/Reviewing

Each training session began with an instructional or review session. During the initial training session, the investigator introduced the CRC to be implemented by the parent. Each subsequent training session involved a review of the reading cycle. During the instructing/reviewing portion of

the training session, the child was allowed to play with toys available in the home or provided by the investigator.

The CRC contained four key elements identified by Bruner (1983) as an attentional vocative, query, label, and feedback. The category designated as “label” was renamed as a Response category for this investigation to more accurately reflect its function. The four elements were defined as follows:

1. Attentional Vocative = any verbal or nonverbal initiation that establishes joint focus or attention to pictured objects, actions, events, attributes, or states, or to the written text to be read;
2. Query = any communicative act that volunteers or requests information to be shared including comments, questions, requests for information, or protests;
3. Response = any semantically contingent response to the query including an expansion, extension, expatiation, verbatim reading, partial reading, or paraphrase;
4. Feedback = any comment that serves as a reply to the response including an acknowledgment, request for clarification, or request for repair or restatement.

Table 3 presents possible adult utterances for each category. Using the assigned training storybook, the investigator demonstrated the CRC for the parent.

First, an attentional vocative established joint focus between the storybook reading participants. The attentional vocative included a word or combination of words such as, “Look,” or “Look here,” that served to establish the topic or picture for discussion. Either the adult or child could initiate the attentional vocative. A child could produce the attentional vocative with a point, a vocalization (intelligible or unintelligible), or both. The child’s point and/or vocalization could be interpreted as both an attentional vocative and the next element in the sequence, the query.

Table 3

Sample Utterances for Complete Reading Cycle Elements

Category	Example
Attentional Vocative	Look! Oh! Look! Look here! Look at that! Let's see what the words say. Look at this page.
Query	What's that? What do you see? What did he/she do? What are those? What's happening here? What else do you see? What is he/she doing? Tell me about that.
Response	It's an X. That's an X. He/she's X-ing. They're X-ing. I see an X and a Y. It's a _____. It says here... The words say... (Partial or verbatim reading)
Feedback	Yes. Yes, that's right. Yes, it is an X. He/she is X-ing. No, it's not an X, it's a Y. No, I don't think it's an X because... You're right. They are X-ing. You think it's a what? How did you know that? You think it looks like X at home? Do you do that?



The query signaled a listener turn. A query could include a request for a label or action. Queries for labels were generally in the form of “What’s that?” or “What is it?” Queries for actions could be more open-ended, “What’s he doing?” or “What’s happening here?” Queries also could be introduced as an attentional vocative-query combination. This could include such comments as, “Let’s see what he did,” or “Let’s find out what happened next.” These types of comments served two functions because they established a topic and indirectly requested information.

The response followed the query and provided opportunities for the adult to elaborate on the topic and engage the child in the story construction or prompt the child to enter the reading cycle. Responses included expansions, extensions, or expatiations of the preceding information whether verbal or nonverbal. Expansions included verbatim repetitions of the previous utterance, repetitions of the previous idea with expanded syntax, or a repetition of the previous question. Extensions served to develop the topic by adding new ideas, increasing the semantic level of the information (e.g., from labels to descriptions), or relating personal experiences to the topic. Expatiations developed a topic by cuing the child to provide more information when incomplete or inaccurate information was presented. An expatiation also served to prompt the child to respond when he or she could not do so without facilitation. Responses also included partial or verbatim reading of the text and paraphrasing the text content.

The feedback segment in the reading cycle served to acknowledge a response and provided an opportunity for the parent and child to discuss the accuracy of information presented. Examples included, “Yes, it’s a kitty,” or “No, I think it’s a puppy.” This also provided the adult an opportunity to clarify the accuracy of the child’s previous utterance or response. When refuting the accuracy of a child’s response, more information was provided, such as, “It has long floppy ears, and big

paws. It doesn't have any claws like a cat, and it doesn't have long whiskers like a cat."

These four cycle elements were discussed with the parent. The parent also was instructed to pause after each element to afford the child an opportunity to participate. The parent was told to provide the next element in the cycle following the child's turn. For example, if the child provided a point indicating an attentional vocative and a query, then the adult should follow with a response and expectant pause or prompt.

Appendix C provides a more complete description of the instructing/reviewing sessions and CRC.

#### Parent-Child Practice Storybook Reading

Following the instructing/reviewing session each parent and child completed a practice reading of the training storybook together. The parent was instructed to, "Read the story using the procedure we just discussed." The practice session videotape was used during the investigator-parent review. The first 5 minutes of continuous practice parent-child storybook reading was used for analyzing dependent variables. The decision to use 5-minute segments was based on previous studies (Conti-Ramsden, 1990; Wilcox, Kouri, & Caswell, 1990) indicating samples of this length provide representative information regarding parent-child interactions.

#### Investigator-Parent Video Review

Following each parent-child practice storybook reading, the investigator and parent reviewed the video tape together. The child was allowed to play with available toys in the home or toys brought by the investigator. During the review, the investigator and parent identified:

1. The four elements of the CRC;
2. Parent responses to child initiations, or lack thereof;
3. Possible sources of communication breakdown between parent and child, such as (a) failing to establish joint focus, (b) using long or complex utterances, (c) focusing on isolated objects or their attributes

rather than building an understanding of the represented events, (d) failing to follow the child's lead, and (e) monopolizing communicative turns;

4. Possible remediation techniques for communication breakdowns, such as (a) focusing on the child's object of interest or clearly pointing out an object for discussion, (b) using shorter sentences, (c) talking about aspects of the picture that help build an understanding of the events represented, rather than randomly talking about objects, attributes, or actions, (d) letting the child lead the discussion toward an object of interest and associating that object with the general event, and (e) encouraging the child to take a communicative turn after each adult turn;

5. Episodes of successful interactions.

#### Coaching

The first 4 training sessions concluded with a 10-minute parent-child storybook reading in which the investigator assisted or coached the parent in the CRC. The parent and child were instructed to sit in a comfortable reading position and the parent was told to, "Read this story like we have been practicing." Additional feedback and coaching were provided for the parent or child as needed during these sessions. This included providing potential utterances for the parent to say, cuing the parent to respond to the child's initiations, redirecting the parent to focus on relevant information, and helping maintain a balanced turn-taking exchange. All of the coaching sessions were video recorded.

#### Follow-Up

Follow-up sessions consisted of a 5-minute parent-child storybook reading probe. The parent was given the baseline storybook and instructed to sit in a comfortable reading position. The parent was told to, "Read this story like you usually do now." No additional feedback or coaching was provided to the parent or child during the follow-up sessions. The two follow-up sessions were video recorded in the subjects' homes.

## Measurements

The data were analyzed to determine whether training was effective in (a) altering parents' interaction style to be more supportive during storybook reading, (b) increasing child language productivity as a result of parent changes in interaction style, and (c) producing continued positive changes in parent and child behaviors following termination of training. The dependent variables for parent behaviors included measures for (a) number of CRCs, (b) percent of parent turns taken, (c) percent of parent responses to child story initiations, and (d) changes in parent MLU. The dependent variables for child behaviors included measures for (a) number of communicative turns, (b) number of story initiations, (c) semantic diversity of storybook reading behavior, and (d) changes in child MLU.

### Parent Behavior Measurements

Parent and child behaviors recorded during baseline, training, and follow-up sessions were transcribed, coded, and analyzed. During each baseline session the parent was instructed to, "Read this story like you normally would." During training sessions the parent was instructed to, "Read this story like we have been practicing." During each follow-up session the parent was instructed to, "Read this story like you usually do now." Targeted parent behaviors were quantified to allow a comparison of each subject's baseline behaviors to behaviors during training and to compare training behaviors to behaviors exhibited during follow-up. Treated to untreated subject comparisons were also made for purposes of determining training effectiveness across subjects.

### Complete Reading Cycle Measures

All verbal and nonverbal behaviors identified on the transcripts were coded for purposes of counting the number of CRCs completed during book reading episodes. Either member of the dyad could contribute to the reading cycle, but a cycle was not complete until all four

elements were produced. A CRC included the four key elements: (a) attentional vocative, (b) query, (c) response, and (d) feedback.

A cycle began when the book was opened and the adult or child focused attention to the book by pointing or vocalizing about the contents of the book. Onsets initiated in this manner were categorized as an attentional vocative. This was any word, combination of words, or gesture by parent or child that served to establish the storybook topic for discussion. Context provided support as to the interpretation of nonverbal behaviors. Episodes involving passive gazes at the book or flipping through the book pages were excluded as onsets for cycles of book reading. A child's point could begin a cycle by serving as an attentional vocative. In addition to the attentional vocative, the point could also signal the next element in the sequence, the query.

The query was a request for information and signaled a listener turn. The query could be in the form of a wh question, a point or gesture, or a comment. An adult could produce both the attentional vocative and query through such utterances as, "Let's see what the words say," or "What's happening on this page?" The child could signal both the attentional vocative and query through a point, gesture, word, or combination of gestures and words. Utterances or gestures that directed the child's or adult's attention to the printed words served the purpose of the attentional vocative and query.

Reading the text was categorized as a response. However, the response generally consisted of a statement or comment that was semantically contingent to the query. This included expansion of the child's communication attempts by repeating what the child said or by providing the words for the child's nonverbal attempts. Extensions added description or interpretation to information presented in order to develop the idea along more complete or complex semantic dimensions. Expatiations consisted of adding detail to an idea or providing information to the child to indicate that his or her information was incomplete.

Responses also included partial reading and discussion of the text or paraphrasing of the print.

The feedback segment provided the fourth element of the cycle by affirming or clarifying information provided by the response. This included utterances such as, “Yes, that’s right,” and “No, I don’t think so, because....” When followed by an attentional vocative that signaled a new element of the story, feedback from the adult or child marked the end of the cycle. Feedback also could be followed by queries, responses, and prompts to elaborate on the current topic.

A cycle ended, whether complete or incomplete, when (a) a new picture was introduced to initiate a new cycle, (b) the story or story-related information ceased to be the topic of discussion, (c) the child engaged in an activity unrelated to the story (e.g., fussing, leaving the scene, flipping book pages, lying down, looking at other objects in the room), or (d) the adult attended to environmental information unrelated to book-reading (e.g., managing the child’s behavior, attending to the child’s off topic responses without relating the responses in some way to the story, attending to someone else in the environment). The number of completed cycles was used as a measure to indicate changes in parent storybook interaction style.

### Turn-Taking Measures

All verbal and nonverbal behaviors of parents and children were coded and counted. A nonverbal turn included any point, gesture, or noise that was used to communicate. A verbal turn was any verbalization attempt by the parent or child that was used to communicate an idea through words. Unintelligible utterances that were syllabic in nature and carried the intonation pattern of an utterance were counted as verbal turns. This included single-syllable vocalizations such as, “Uh,” “Wuh,” “Mo,” and so forth. The percent of adult turns taken provided a measure of the parent’s ability to balance interactions with the child during storybook reading episodes.

### Responsiveness Measures

All verbal and nonverbal parent behaviors identified from the transcripts were coded for purposes of counting the number of child initiations that were consequented by the parent. This included adult points, gestures, and vocalizations that were semantically related to the child's immediately preceding bid for attentional focus. Parent consequences to child initiations provided a measure of the parent's ability to respond to the communicative attempts of the child.

### Grammatical Complexity Measures

All parent verbalizations from baseline, training, and follow-up sessions were transcribed using SALT procedures to determine MLU. The difference between parent MLU and child MLU was also calculated. Parent changes in MLU provided a measure of the parent's ability to match the child's language level with regard to grammatical complexity.

### Child Behavior Measurements

Child behaviors recorded during baseline, training, and follow-up storybook reading sessions were transcribed, coded, and analyzed. Targeted child behaviors were quantified to allow comparison of a treated subject's behaviors to the behaviors of untreated subjects. Within subject changes over time were determined by comparing each subject's baseline behaviors to treated behaviors and by comparing follow-up behaviors to training session behaviors. Measures of overall length and complexity of child utterances were used to determine changes in language productivity.

### Communicative Turn Measures

Both verbal and nonverbal turns taken by the child were recorded and coded. All intelligible utterances were transcribed using standard English orthography. All unintelligible verbal turns that were syllabic in nature and carried the intonation pattern of a word or words were transcribed using SALT procedures for phonetically consistent forms, PCF, or unintelligible words x and phrases xxx. Both unintelligible and intelligible utterances were coded as verbal turns. All nonverbal turns

were recorded parenthetically using standard English orthography. Obvious points, gestures, eye gaze, and noises (animal or environmental) were coded as nonverbal turns. Both verbal and nonverbal turns were used to measure the child's changes in language productivity.

#### Story Initiation Measures

Both verbal and nonverbal story initiations from the child were recorded and coded. All intelligible utterances were transcribed using standard English orthography. All unintelligible utterances were coded using SALT procedures for phonetically consistent forms, PCF, or unintelligible words x and phrases xxx. All nonverbal behaviors were recorded parenthetically using standard English orthography. Obvious gestures, eye gaze, and noises (e.g., animal or environmental) were considered for coding. Any verbal or nonverbal behavior by the child that served the function of directing attention to some aspect of the story was coded and counted as a story initiation. Only story-related initiations were used as a measure of the child's change in language productivity for this variable during storybook reading.

#### Semantic Diversity Measures

Overall semantic changes in the child's storybook reading behavior were determined by using the Semantic context scale of the Situational-Discourse-Semantic Context model (Norris & Hoffman, 1993). Each of the child's storybook reading behaviors was assigned to a Semantic Context Level. These levels ranged along a continuum from an Indication (i.e., point, gesture, vocalization, and verbalizations for "yes" and "no") to a Metalinguistic response (i.e., utterance that focuses on some aspect of the printed text). The frequency and range of Semantic Levels (i.e., semantic diversity) exhibited by the child was determined by counting each semantic category assigned to child verbal and nonverbal story-related behaviors.



### Grammatical Complexity Measures

Transcriptions of the child's utterances from baseline, training, and follow-up sessions were prepared following procedures outlined for SALT. Variation in the coding method included glossing, when possible, unintelligible utterances or portions of utterances by the child. Guidelines established by the SALT program were used in all other cases. Measures of the child's MLU in morphemes were obtained to determine changes in the child's language forms.

### Reliability

#### Transcribing and Coding Measures

To determine reliability of transcribing and coding the parent and child behaviors, a graduate student in speech-language pathology was trained in the analysis procedure (see Appendix D). A sample videotape was prepared by the primary investigator for training purposes. The primary investigator used a combination of demonstration, practice, and feedback to train the graduate student. When the student achieved 95% point-by-point agreement in coding the training tape, actual coding began.

The primary investigator prepared the baseline, training, and follow-up tapes for analysis by assigning letters to each dyad (i.e., A, B, C, D, E, and F) and assigning a number 1-15 to each session. Therefore, each tape was coded by a letter and a number. The codings were placed in a pool and 10%, or 9, were drawn at random. The graduate student and the primary investigator each independently analyzed the prepared tapes. The investigator and student transcribed verbatim both parent and child utterances using SALT procedures for all verbal and nonverbal utterances. Standard English orthography was used for all intelligible utterances. Nonverbal information was recorded in braces and included gestures, eye gaze, and noises such as environmental or animal sounds.

The independent coder and the primary investigator coded the transcription for targeted parent and child behaviors. When all the reliability tapes had been coded, the investigator and student compared

their transcriptions and codings for point-by-point agreement. Interrater agreement was determined by dividing the total number of agreements plus disagreements and multiplying by 100. Criterion of acceptance was 85% or greater agreement. Retraining in the coding procedures was initiated when the criterion was not achieved. Interrater agreements for the transcription and dependent variables were as follows:

	% Agreement
Transcription (Parent and Child MLUs)	94%
CRCs	93%
Parent and Child Turns	96%
Parent Responses to Child Story Initiations	86%
Child Verbal Turns	97%
Child Story Initiations	89%
Child Semantic Level of Storybook Reading	93%

This resulted in 93% overall agreement for the combined measures.

Training Procedures

To establish reliability of training procedures used in the study, two colleagues of the primary investigator were asked to independently view 3 randomly selected video recordings of the training sessions. These individuals were university clinic supervisors trained in speech-language pathology. During the viewing of the prepared video, each reviewer completed a rating sheet containing procedural criteria (see Appendix E). The scores of the two ratings were compared for point-by-point agreement of responses. The total number of agreements was divided by the total number of agreements plus disagreements and multiplied by 100. Interrater agreement was 98% for training procedure reliability.

Data Analysis

Measurements were taken during each of the 15 sessions completed by the subject Dyads 1, 2, 4, 5, and 6, and 13 sessions completed by Dyad 3. Measurements used for data analysis were obtained from the video recordings of each parent-child storybook reading during the

following portions of the study: the 5-minute baseline readings, the 5-minute training probes, and the 5-minute follow-up probes. The measurements were quantified and analyzed to determine if training produced significant or observable changes in the targeted parent and child behaviors.

Across subject comparisons were made by comparing baseline measures of untreated subjects to treatment session 1 measures of subjects entering the training phase. A  $R_n$  Test of Ranks (Revusky, 1967) was used to determine whether across subject changes in dependent variables reached levels of significance. This test has been reported (Kazden, 1982) as particularly useful for evaluating data from studies using a multiple-baseline design. The statistical comparison for this test was completed by assigning a rank, with 1 being the highest rank, to each subject's score at the point training was introduced.

However, use of this test required some special considerations. To facilitate detection of change resulting from training, a transformation procedure was performed (Revusky, 1967). The transformation corrects for different response magnitudes that may occur during baseline. By using the transformation, the data can be examined with less likelihood of obscured training effects as a result of baselines that vary markedly across subjects. The following formula was used to transform the data:

$$\frac{B_i - \bar{A}_i}{\bar{A}_i}$$

Where  $B_i$  = the performance level for subject  $i$  when the experimental condition is introduced, and  $\bar{A}_i$  = the mean performance for subject  $i$  across all baseline days (Kazden, 1982).

To complete the analysis, raw scores for each subject were transformed and then ranked when the treatment procedure was introduced to any one subject. Because the dyads in this study were paired, two dyads simultaneously began training. Therefore, rankings also were assigned in

pairs. Two rankings of 1 were assigned, two rankings of 2, and so on, each time subsequent dyads entered the training segment of the study.

Once the transformations were computed and ranks assigned, the ranks for subjects entering the training phase were summed. Then the sums were compared to  $R_n$  values for significance. To determine whether the effects of treatment would have occurred due to random factors, the critical region of rejection was set at a .01 level of confidence for a one-tailed test. For example, in a multiple-baseline study with six subjects, a sum of 7 would be required to permit rejection of the null hypothesis of no training effect with a .01 confidence level.

To examine within subject changes, means and ranges were calculated for each subject's raw data. Then data for each subject's dependent variables were individually graphed for visual inspection. The data were analyzed for changes in means for the three experimental phases, baseline, training, and follow-up. Mean performance levels for all measures were plotted across each study segment to facilitate visual inspection of the data.

### Summary

This study proposed to test the following hypotheses:

Prediction 1. If parents alter their interaction styles as a function of intervention, then the dyads should show stable baselines for the measures obtained during sessions 1-3 for Dyads 1 and 2, sessions 1-4 for Dyads 3 and 4, and sessions 1-5 for Dyads 5 and 6, followed by changes in the expected direction for dependent variable measures during the training phase. The dyads in the training phase should show positive changes for these measures relative to the dyads who are still in the baseline phase.

Prediction 2. If parents are successful in altering their interaction styles to be more facilitative as a result of intervention, then the children in the study should also show stable baselines for the measures obtained during sessions 1-3 for Dyads 1 and 2, sessions 1-4 for Dyads 3 and 4,

and sessions 1-5 for Dyads 5 and 6. Intervention should result in increased child language productivity as evidenced by changes in the expected direction for measures obtained at the first training session when compared to dyads still in the baseline phase.

Prediction 3. If training results in altered parent interaction style with subsequent improvement in child language productivity, then the measures obtained during follow-up sessions (sessions 14 and 15) should show positive change over baseline measures. It is predicted that dyads will show continued changes in the expected direction for dependent variable measures beyond the final training session.

## RESULTS

The present study was undertaken to answer three research questions. (a) Can parents of preschool children with specific language impairment be taught to alter their interaction style to be more supportive during storybook reading? (b) If so, do alterations in the parent's interaction style during storybook reading result in improved language productivity from her preschool child? (c) Are there continuing positive effects occurring as a result of parent training after training is completed? Measurements were obtained at three study phases, baseline, training, and follow-up. Data were analyzed for across and within subject changes. Training effects across subjects will be reported first, followed by individual changes in behaviors of the six parent-child dyads.

### Across Subject Comparisons

To determine whether parent-child storybook reading behaviors changed as a result of parent training, measures for parent and child dependent variables were quantified and analyzed. In the across subject comparisons, average baseline measures were compared to measures obtained at each time training was initiated within the multiple baseline design, resulting in 3 measurement comparisons. Statistical analyses were completed for each of the 3 measurement comparisons. Results of those comparisons are reported below.

### Parent Variables

Parent behaviors of interest included (a) number of complete reading cycles (CRCs), (b) percent of parent turns taken during storybook reading, (c) parent responses to child storybook initiations, and (d) parent changes in MLU. To determine whether parent dependent variables changed as a result of parent training, data from baseline sessions were averaged using a transformation procedure that consisted of averaging all baseline sessions prior to the measurement session (i.e., the point at which training occurred for designated dyads). The average baseline measures were then subtracted from the measurements obtained at

sessions 4, 5, and 6, the points at which training began. The difference was then divided by the baseline average. Because Parent 1 had several baseline averages of zero, a linear adjustment was made in all measures by adding 1 to all raw data obtained for that subject before completing the transformation. Once transformed, the obtained values for dependent variables were compared and ranked (with a rank of 1 being the best possible rank) across subjects at each of the three points in which training was initiated in the multiple baseline design.

Analyses included application of the  $R_n$  Test of Ranks (Revusky, 1967) to the parent dependent variables to determine if training produced significant changes in parent behaviors of interest. Results for the first three parent behaviors are summarized in Table 4. The results reveal that subjects entering the training phase performed significantly better than subjects continuing in baseline for the following variables: the number of scaffolded reading cycles completed ( $\Sigma R = 6, p < .005$ ) and reduction in percent of parent turns taken ( $\Sigma R = 6, p < .005$ ). Results for parent responses to child storybook initiations show immediate changes in the expected direction for Subjects 1 and 2 but suggest that Subjects 3, 4, 5, and 6 did not show the direction of change as expected.

Table 5 presents two sets of data regarding parent changes in MLU, degree of change and difference between parent MLU and child MLU. Parents entering the training phase performed significantly better than parents who were still in the baseline phase for the following tasks: decreasing adult MLU ( $\Sigma R = 7, p < .01$ ) and decreasing the distance between adult and child MLUs ( $\Sigma R = 6, p < .005$ ).

#### Child Variables

Across subject comparisons of child behaviors were also analyzed using the  $R_n$  Test of Ranks (Revusky, 1967) to determine whether significant changes in child dependent variables occurred as a result of parent training. Child dependent variables included (a) number of communicative turns during storybook reading, (b) number of story

Table 4

Degree of Change in Parent Variables: Complete Reading Cycles, Percent Turns Taken, and Percent Responses to Child Story Initiations

Subject	Time 1	Time 2	Time 3	R <sub>n</sub>	ΣR
Increase in CRCs Completed					
1	+6.00b			1	
2	+4.50b			1	
3	-0.50a	+5.57b		1	
4	-0.05a	+1.87b		1	
5	-0.08a	+0.05a	+1.47b	1	
6	+0.29a	-0.18a	-0.10b	1	6**
Decrease in Percent of Turns Taken					
1	-0.26b			1	
2	-0.40b			1	
3	-0.10a	-0.26b		1	
4	-0.07a	-0.15b		1	
5	-0.08a	0.00a	-0.18b	1	
6	-0.06a	+0.20a	-0.02b	1	6**
Increase in Percent Responses to Child SI					
1	+2.00b			1	
2	+1.00b			1	
3	-0.60a	-0.05b		2	
4	-0.29a	-0.10b		2	
5	+0.05a	+0.08a	-0.08b	1	
6	0.00a	+0.15a	-0.08b	1	gns

**Note.** R<sub>n</sub> = rank; ΣR = sum of ranks; CRC = Complete Reading Cycle; SI = Storybook Initiation; a =baseline; b = training session 1. ns = not significant. \*\*p < .005.



Table 5

Degree of Change in Parent Mean Length of Utterance

Subject	Time 1	Time 2	Time 3	R <sub>n</sub>	ΣR
Decrease in MLU					
1	-0.19b			1	
2	+0.04b			2	
3	+0.12a	-0.09b		1	
4	+0.15a	-0.07b		1	
5	-0.03a	+0.07a	-0.44b	1	
6	+0.04a	+0.09a	+0.05b	1	7*
Decrease in Parent-Child MLU Difference					
1	-0.22b			1	
2	-0.19b			1	
3	+0.28a	-0.09b		1	
4	+0.47a	-0.12b		1	
5	-0.05a	+0.03a	-0.56b	1	
6	-0.01a	-0.01a	+0.23b	1	6**

Note. MLU = Mean Length of Utterance in morphemes; R<sub>n</sub> = rank; ΣR = sum of ranks; a = baseline, b = training session 1.

\*p < .01. \*\*p < .005.

initiations, (c) semantic diversity of utterances during storybook reading, and (d) grammatical complexity of utterances during storybook reading. Data were transformed by averaging baseline sessions prior to sessions in which training began. The averages were then subtracted from the measurements obtained at the point when training began at study sessions 4, 5, and 6. The difference was then divided by the average baseline to yield a transformed score for comparison across dyads. Because Child 1 had several baseline averages of zero, a linear adjustment was made by

adding 1 to all raw data for this subject before completing the transformation. Once transformed, the obtained values for dependent variables were compared and ranked (with a rank of 1 being the best possible rank) across subjects at each of the three sessions in which training was initiated in the multiple baseline design.

Examination of child changes in communicative behaviors during storybook reading resulted in significant differences for four of the five variables, indicating positive changes for children when training was initiated compared to children continuing in the baseline phase. As can be seen in Table 6, significant differences occurred for number of verbal turns ( $\Sigma R = 6$ ,  $p < .005$ ), total number of child turns taken ( $\Sigma R = 6$ ,  $p < .005$ ), and increases in storybook initiations ( $\Sigma R = 6$ ,  $p < .005$ ).

Table 7 reports observed changes in semantic diversity and grammatical complexity during storybook reading. Significant positive effects were identified for semantic diversity ( $\Sigma R = 6$ ,  $p < .005$ ) but not for increases in child MLU ( $\Sigma R = 8$ ,  $p > .01$ ).

#### Summary of Across Subject Comparisons

In summary, across subject comparisons indicated that parent training produced significant positive changes in parent-child storybook reading for the following parent dependent variables: number of CRCs, percent of parent turns taken, parent MLU, and parent-child MLU difference. Resultant changes in child dependent variables also reached levels of significance for the number of verbal turns, number of total communicative turns, number of story initiations, and increases in semantic diversity. Parent training did not result in significant differences for the dependent variables parent responses to child storybook initiations and child MLU.

Although eight of the ten dependent variables reached levels of significance for across subject comparisons, there was great variability within individual dyads. To determine the effects of parent training for

Table 6

Degree of Change in Child Communicative Turns and Story Initiations

Subject	Time 1	Time 2	Time 3	$R_n$	$\Sigma R$
Increase in Verbal Turns					
1	+17.00b			1	
2	+ 0.90b			1	
3	- 0.88a	+1.07b		1	
4	+ 0.30a	+0.93b		1	
5	+ 0.75a	+0.26a	+1.50b	1	
6	+ 0.26a	-0.59a	+0.26b	1	6**
Increase in Total Turns					
1	+18.31b			1	
2	+ 0.68b			1	
3	+ 0.16a	+2.67b		1	
4	+ 0.22a	+1.05b		1	
5	+ 0.45a	+0.02a	+0.90b	1	
6	+ 0.23a	-0.44a	+0.18b	1	6**
Increase in Story Initiations					
1	+2.00b			1	
2	+2.43b			1	
3	+1.10a	+0.76b		1	
4	+0.80a	+0.63b		1	
5	+0.40a	-0.11a	+0.14b	1	
6	+0.41a	-0.56a	-0.38b	1	6**

Note.  $R_n$  = rank;  $\Sigma R$  = sum of ranks; a = baseline; b = training session 1.  
 \*\* $p < .005$ .

Table 7

Degree of Change in Child Semantic and Grammatical Complexity

Subject	Time 1	Time 2	Time 3	R <sub>n</sub>	ΣR
Increase in Semantic Diversity					
1	+0.50b			1	
2	+0.50b			1	
3	-0.57a	+0.50b		1	
4	+0.12a	+0.09b		1	
5	0.00a	0.00a	+0.33b	1	
6	0.00a	0.00a	+0.25b	1	6**
Increase in MLU					
1	+1.00b			1	
2	+0.43b			1	
3	-0.32a	-0.06b		2	
4	+0.08a	+0.12b		2	
5	+0.05a	+0.16a	-0.05b	1	
6	+0.08a	+0.16a	-0.09b	1	8 <sup>ns</sup>

Note. R<sub>n</sub> = rank; ΣR = sum of ranks; a = baseline; b = training session 1; MLU = Mean Length of Utterance in morphemes. ns = not significant. \*\*p < .005.

each dyad, closer examination of individual parent and child changes were completed. Comparisons from baseline to training identified the effects of training, while follow-up measures provided measures of generalization and maintenance once training ended.

#### Within Subject Changes

Individual changes for each dyad were analyzed by graphically displaying measurements of the dependent variables for baseline (B),

training (T), and follow-up (F) segments of the investigation. Descriptive statistics (i.e., means and ranges) were computed for dependent variable measurements. To facilitate visual inspection of the data, the means for all measures except semantic diversity were plotted as solid straight lines across each study phase. For determining the effects of parent training on dependent variables, mean baseline results were compared to mean training results. It was also important to this investigation to determine whether training had continuing effects once parent training stopped. Therefore, mean results for baseline and training were compared to mean follow-up measures. Obtained results for each of the six parent and child dyads will be reported separately.

### Dyad 1

To determine whether parent training effected change in the storybook reading behaviors of Dyad 1, measurements of the dependent variables for Parent 1 and Child 1 were graphically displayed for visual inspection. Mean performance levels are indicated on each graph with solid straight lines across each study phase completed by Dyad 1.

#### Parent 1 Measures

Throughout all three baseline sessions, Parent 1 dominated the storybook reading, resulting in little variability of dependent measures. In contrast, significant changes emerged at the onset of training with follow-up measures showing notable changes from baseline levels for all dependent variables.

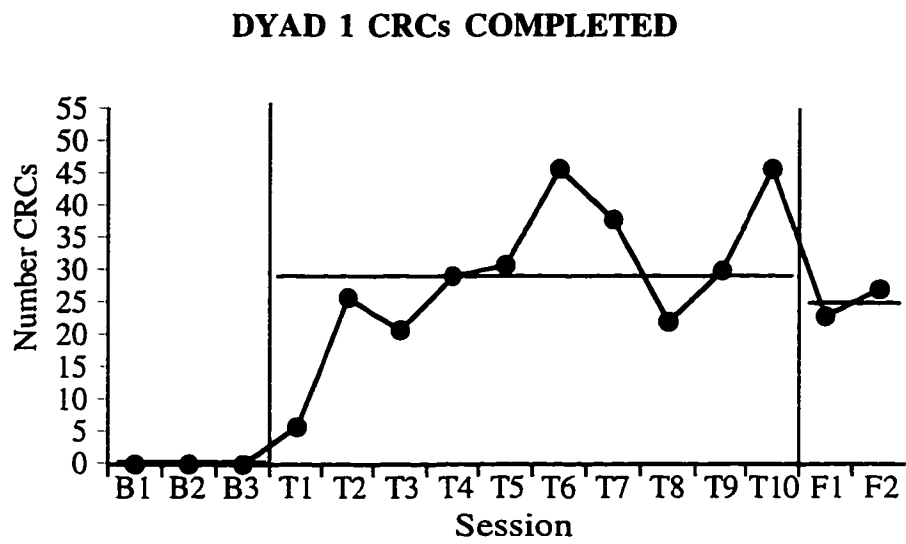
Number of Complete Reading Cycles. As can be seen in Figure 5, there was a dramatic change in the number of CRCs for Dyad 1. There were no mean CRCs at baseline, but mean CRCs for training were 29.5 (range = 6-46) with an average of 25 (range = 23-27) CRCs maintained at follow-up. Overall CRC changes for Parent 1 were +29.5 CRCs from baseline to training, -4.5 CRCs from training to follow-up, and +25 CRCs from baseline to follow-up.

Percent of Parent Turns. Similar results occurred for ratio of parent to child turns (see Figure 6). During the baseline phase of the investigation, Parent 1 was turn-dominant and allowed only one child turn throughout the 3 baseline sessions. However, the parent made rapid changes in this pattern when parent training was initiated. The parent's percentage of turns dropped from a baseline mean of 98.7% (range = 96%-100%) to a mean of 60.9% (range = 52%-73%) during training sessions. The more balanced turn-taking pattern became well-established and was maintained (mean = 63.5% parent turns) during follow-up sessions.

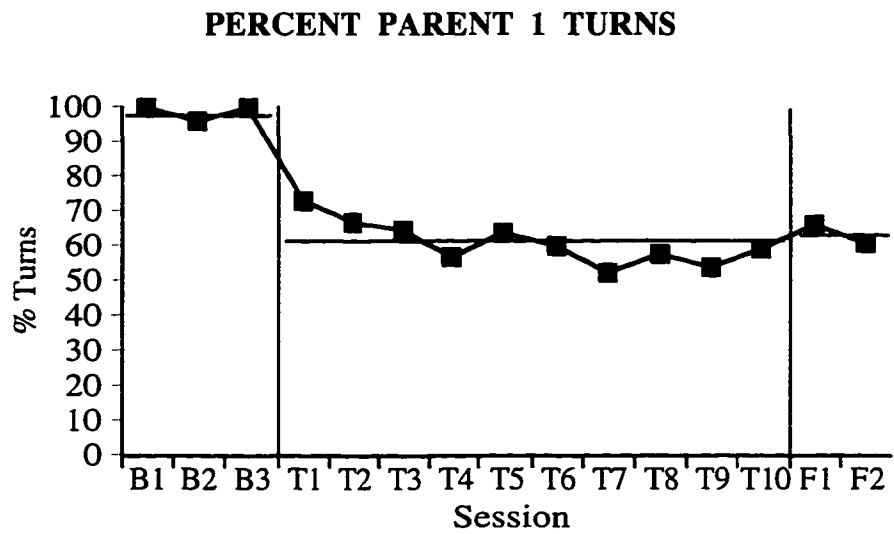
Parent Responses to Child Story Initiations. Inspection of parent percent of responses to child storybook initiations (see Figure 7) also illustrates a rapid positive change in parent behavior with the onset of parent training. At T1 the parent responded to 100% of the child's story initiations and maintained an average of 81% (range = 50%-100%) responding throughout treatment and 75% (range = 50%-100%) during follow-up. There was a drop in parent responding at T8 and F2, but at no time did training or follow-up measures fall to baseline levels.

Parent Changes in MLU. Figure 8 shows a steady decline in parent MLU from baseline to training. There was a notable change beginning with T1, at which time the parent decreased MLU from a baseline average of 5.79 (range = 5.63-5.89) to 4.52 morphemes at the first training session. The mean parent MLU throughout training was 4.33 (range = 3.67-4.96) and at follow-up was 4.17 (range = 3.87-4.46) morphemes. Overall decreases in MLU were calculated at -1.46 morphemes from baseline to training, -0.16 morphemes from training to follow-up, and -1.62 morphemes from baseline to follow-up.

Difference in Parent-Child MLU. To determine whether parent changes in MLU were more closely matched to the child's MLU, differences in parent-child MLUs were also examined. Figure 9 illustrates those changes. Because the child had no verbalizations during



**Figure 5.** Number of complete reading cycles (CRCs) for Dyad 1 across baseline, training, and follow-up sessions.



**Figure 6.** Percent of turns taken for Parent 1 across baseline, training, and follow-up sessions.

PARENT 1 RESPONSES TO CHILD SI

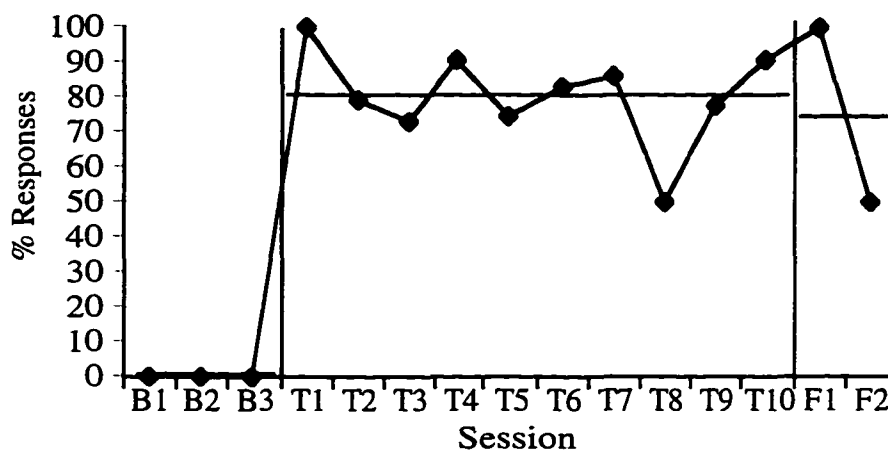


Figure 7. Percent of responses to child story initiations (SIs) for Parent 1 across baseline, training, and follow-up sessions.

PARENT 1 MLU

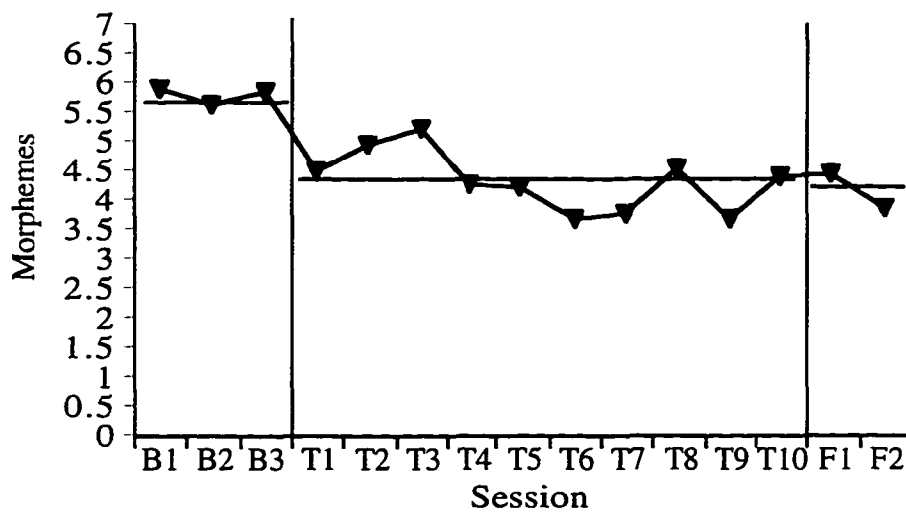
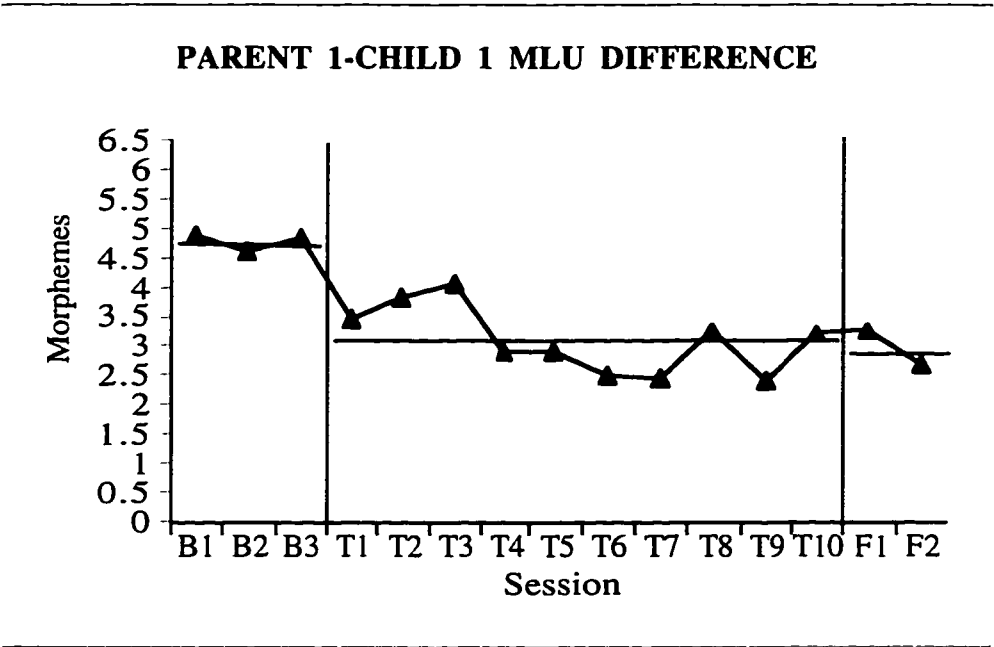


Figure 8. Mean length of utterance (MLU) in morphemes for Parent 1 across baseline, training, and follow-up sessions.





**Figure 9.** Morpheme difference between Parent 1 and Child 1 mean length of utterance (MLU) across baseline, training, and follow-up sessions.

the baseline phase, parent-child differences in MLU at baseline were determined by subtracting the child's pre-study MLU (1.00) from the parent's baseline MLUs. Parent baseline MLUs were high, yielding an average parent-child MLU difference of 4.79 (range = 4.63-4.89). With the onset of training, the parent-child MLU difference significantly declined to an average 3.11 (range = 2.41-4.07) morpheme difference and showed a continued decrease in gap at follow-up (mean = 2.99 morpheme difference).

### Child 1 Measures

To determine whether changes in Parent 1 storybook reading behaviors resulted in simultaneous changes in Child 1 communicative behaviors, data for Child 1 dependent variables were graphed for visual inspection. Mean dependent measures were marked with solid straight lines across each study phase completed by Dyad 1. During the baseline phase of the study, Child 1 had only one measurement, a nonverbal response. Therefore, training and follow-up phases showed marked changes in child communicative behaviors for all dependent variables of interest.

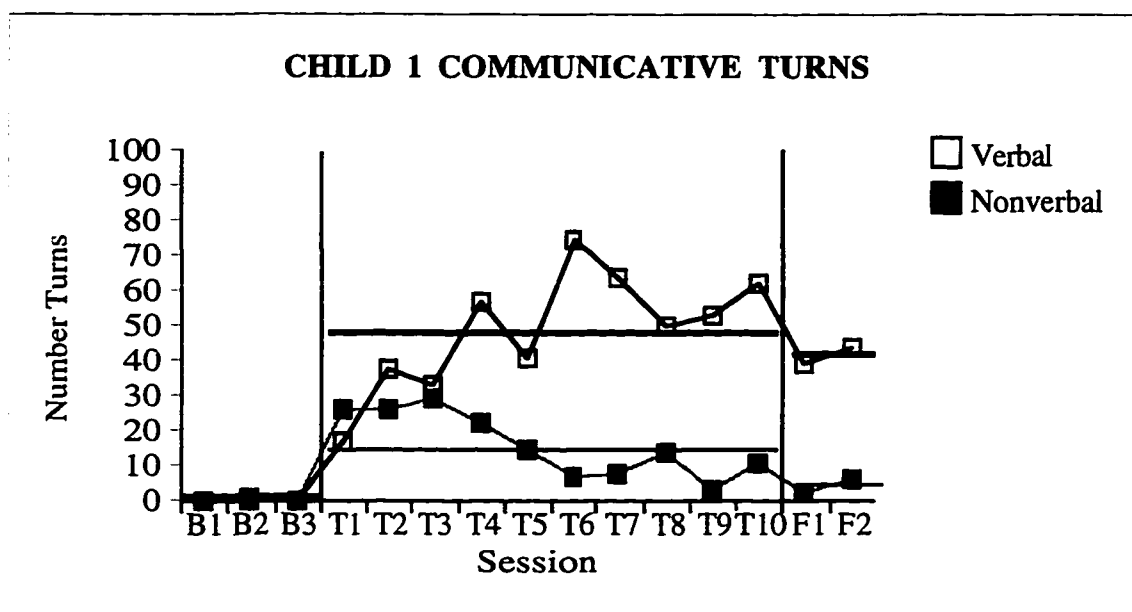
Number of Communicative Turns. Child 1 exhibited a rapid rise in communicative turns during storybook reading for verbal and nonverbal turns taken (see Figure 10). The data show a peak of 29 nonverbal turns during training session 3 followed by a gradual decline. Nonverbal turns comprised 25% of turns during treatment and 9% of communicative turns at follow-up. This drop in verbal turns corresponded to an increase in verbal turns, beginning with session 4. As the child produced more verbalizations, less reliance on gestures and nonverbals was exhibited. Verbal behaviors peaked at 75 during training session 6, but remained higher overall than baseline levels. In Figure 10 the mean for verbal turns are represented by thick straight lines, while the mean for nonverbal turns are marked by thin straight lines. The mean for communicative turns during training was 49 (range = 17-75) for verbal turns and 16.1

(range = 3-29) for nonverbal turns. Follow-up measures yielded means of 41.5 (range = 39-44) and 4 (range = 2-6) for verbal and nonverbal turns respectively, with verbal turns accounting for 75% of training and 91% of follow-up measures for Child 1.

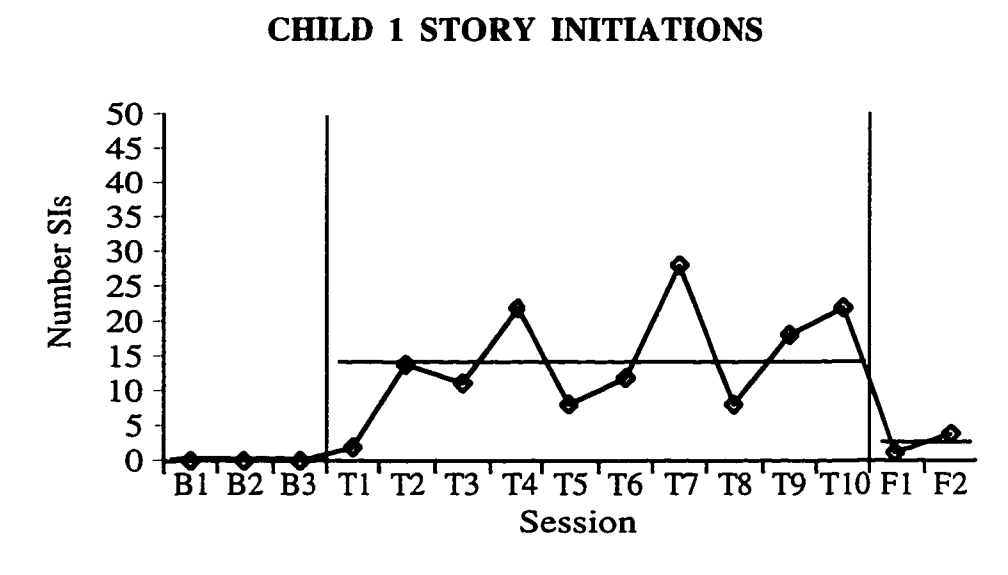
Number of Story Initiations. Figure 11 illustrates the child changes in story-related initiations. Although Child 1 demonstrated an increase in initiations throughout the training period, the number of initiations declined during follow-up. The mean for story initiations during training was 14.5 (range = 2-28) with an average of 2.5 (range = 1-4) initiations observed at follow-up.

Semantic Diversity of Utterances. The semantic diversity of Child 1's verbal and nonverbal communicative attempts also increased over time (see Figure 12). At baseline, indications constituted 100% of the child's communicative attempts. A high incidence of indications continued during training sessions T1 and T2 (33 and 43 respectively). Beginning with T3 and continuing into T4, the child used an increasing number of labels (23 and 41 respectively) while reducing the number of indications used. Mean use per session for indications was 0.33 at baseline, 26.10 (range = 13-44) during training, and 10.50 at follow-up, accounting for 100% of baseline, 20% of treatment, and 14% of follow-up story-related communications. The average number of labels used was 0 at baseline, 33.40 (range = 15-54) during training, and 31 (range = 29-33) at follow-up. Labels constituted 68% of storybook communications during parent training and 69% at follow-up. The use of descriptions emerged during T2 and were maintained at an average of 4.4 (range = 1-8) occurrences per session. This accounted for 15% of storybook utterances during the training period. However, descriptions occurred only 2 times in each follow-up session.

Child Changes in MLU. Child 1 evidenced small changes in MLU over the course of the study. Figure 13 illustrates those changes. As mentioned previously, Child 1 produced no verbalizations during the

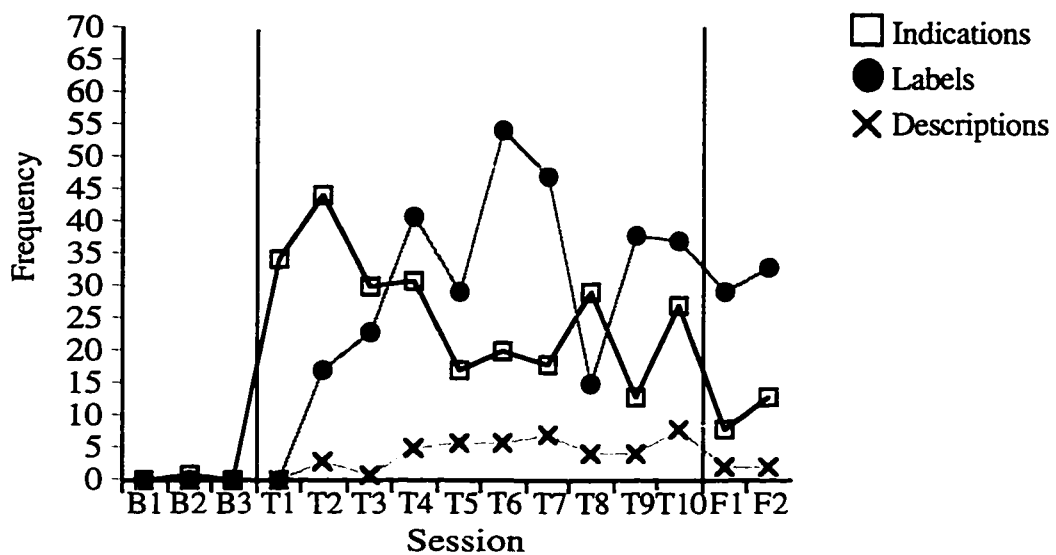


**Figure 10.** Number of verbal and nonverbal turns for Child 1 across baseline, training, and follow-up sessions.



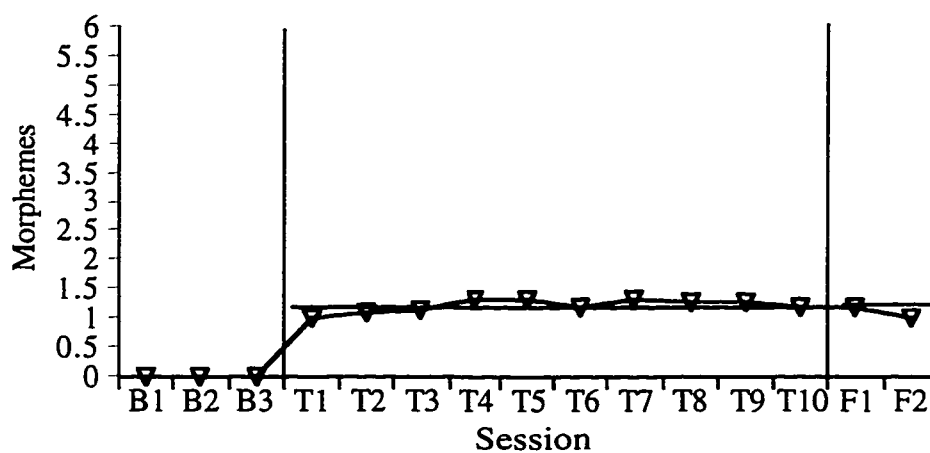
**Figure 11.** Number of story initiations (SIs) for Child 1 across baseline, training, and follow-up.

### CHILD 1 SEMANTIC DIVERSITY



**Figure 12.** Semantic diversity of utterances for Child 1 across baseline, training, and follow-up sessions.

### CHILD 1 MLU



**Figure 13.** Mean length of utterance (MLU) in morphemes for Child 1 across baseline, training, and follow-up sessions.

baseline phase; therefore, had no MLU to report at baseline. Child 1's average MLU during training was 1.22 morphemes (range = 1.00-1.33). Although still significantly delayed, training level MLUs represented an increase of 0.22 morpheme over her pre-study sample of 1.00 morpheme. Follow-up measurements resulted in an obtained MLU of 1.18 morphemes for a gain of +0.18 morpheme over pre-study performance.

### Dyad 2

To determine whether parent training effected change in Parent 2 storybook reading behaviors and Child 2 communicative behaviors, measures for dependent variables were graphed for visual inspection. Means for dependent variables were calculated and plotted using solid straight lines across each phase of the study completed by Dyad 2.

### Parent 2 Measures

Parent 2 exhibited fairly stable and consistent baseline behaviors for number of CRCs and measures of MLU, but presented less stable baselines for percent of parent turns and percent responses to child story initiations. When comparing baseline measures to training and follow-up, training effects in the expected direction occurred for the following dependent variables: number of CRCs, percent of parent turns, and parent responses to child story initiations, and parent-child difference in MLU.

Number of Complete Reading Cycles. Figure 14 illustrates observed changes in the number of scaffolded reading cycles completed. During the baseline phase, no CRCs were completed until the third session, and then only 2 occurrences were identified. Dyad 2 completed 11 CRCs at T1 and continued to show gradual increases in CRCs completed. Notable decreases in performance occurred at T8 and T10, with increases occurring again at follow-up. Average CRCs were 0.67 (range = 0-2) at baseline, 15.10 (range = 7-22) during training, and 24.50 (range = 20-29) at follow-up, indicating positive changes over baseline performance. Overall increases were 14.43 CRCs from baseline to

training, 9.40 CRCs from training to follow-up, and 23.83 CRCs from baseline to follow-up.

**Percent of Parent Turns.** Ratio of parent-to-child turns for Dyad 2 are illustrated in Figure 15. During the baseline phase, Parent 2 took an average of 82.3% (range = 68%-95%) turns during storybook reading, with a downward trend emerging. This reduction in percentage of parent turns continued into the training phase until T6, when a sharp increase occurred at T6. Peaks and valleys continued throughout training, but resulted in a more balanced proportion of parent to child turns when means for the various phases were compared. Parent 2 took an average 58.5% (range = 45%-78%) and 52.5% (range = 52%-53%) of storybook reading turns during training and follow-up phases respectively. Observed changes represented a 23.8% decrease from baseline to training, a 6% decrease from training to follow-up, and a 29.8% decrease in percent of parent turns taken from baseline to follow-up.

**Parent Responses to Child Story Initiations.** Figure 16 shows the percent of parent responses to child story initiations. There was an overall scatter effect in the parent's rate of responding that began with a low of 0% responding at B1 to a high of 100% responding at T2. This parent continued with an erratic responding pattern that dipped to 33% at the last training session; however, this was followed by a 73% response rate at the first follow-up session. The mean percent of parent responses to child initiations was 25% (range = 0-50%) for baseline, 60% (range = 33%-100%) during training, and 80% (range = 73%-87%) at follow-up.

**Parent Changes in MLU.** Parent 2's changes in MLU across the three study phases are illustrated in Figure 17. Parent 2 started to show a reduction in MLU from T1 to T4 but reversed this trend and began an increase in MLU at T5, with peaks and valleys occurring throughout training. This resulted in the mean training MLU being the highest and follow-up showing the lowest MLU. Average parent MLUs were 5.74 (range = 5.49-6.10) morphemes for baseline, 6.06 (range = 5.13-7.16)

morphemes during training, and 4.96 (range = 4.57-5.35) morphemes at follow-up. Comparison of baseline averages to training averages show an increase of 0.32 morphemes. However, training to follow-up comparisons showed a decrease of 1.10 morphemes, and baseline to follow-up changes resulted in a 0.78 morpheme decrease in parent MLU.

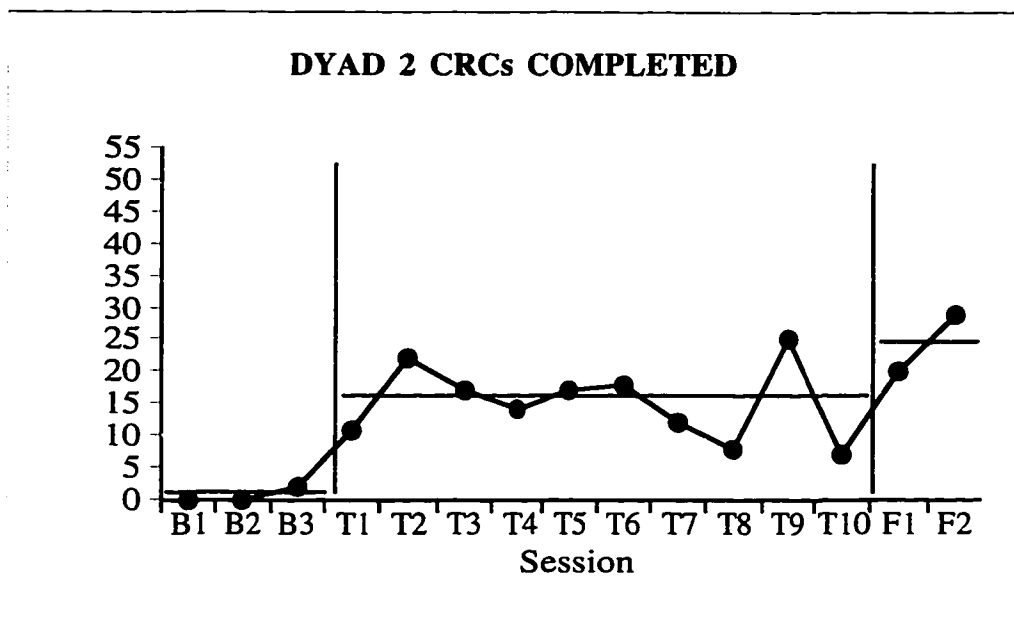
Difference in Parent-Child MLU. To determine whether changes in Parent 2 MLUs resulted in a closer match to Child 2's MLU levels, differences between parent and child MLUs were identified (see Figure 18). Although Parent 2 increased MLU from baseline to training, the difference between parent and child MLUs actually decreased across the three study phases, indicating a reciprocal increase in the parent's MLU as the child's MLU increased. The average baseline difference was 3.41 morphemes (range = 2.99-3.65), while the average training difference was 2.95 (range = 1.36-4.56) morphemes. The average difference at follow-up was calculated to be 2.23 (range = 1.84-2.63) morphemes, suggesting a better parent-child match in grammatical complexity of utterances as a result of parent training.

### Child 2 Measures

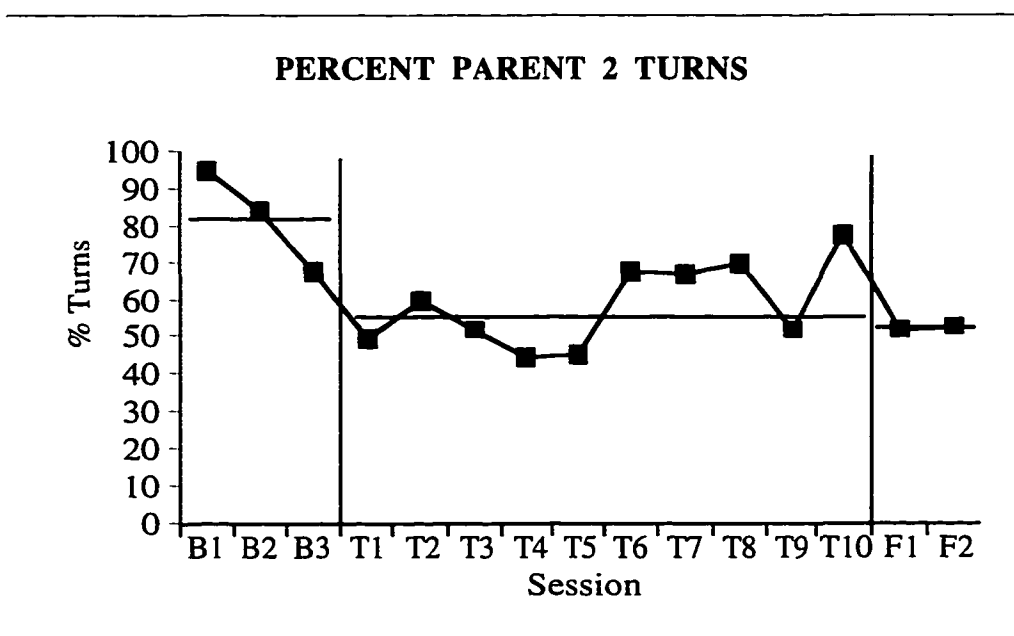
To determine whether the changes in Parent 2's storybook reading behaviors produced changes in Child 2's communicative behaviors, Child 2's dependent variables were examined. Results are illustrated in a number of figures, with mean levels for each dependent variable designated by solid straight lines across each study phase.

Number of Communicative Turns. Child 2 showed a rapid rise from baseline to training in the number of verbal turns used, with a simultaneous decline in nonverbal turns (see Figure 19). The data show a downward trend in verbal turns beginning at T5 and continuing through T8. This is followed by a dramatic peak at T9 and subsequent decline at T10. Mean number of nonverbal turns are designated by thin straight lines, and mean verbal turns are designated with thick straight lines. Means for nonverbal turns were 9.0 (range = 0-25) at baseline, 7.1

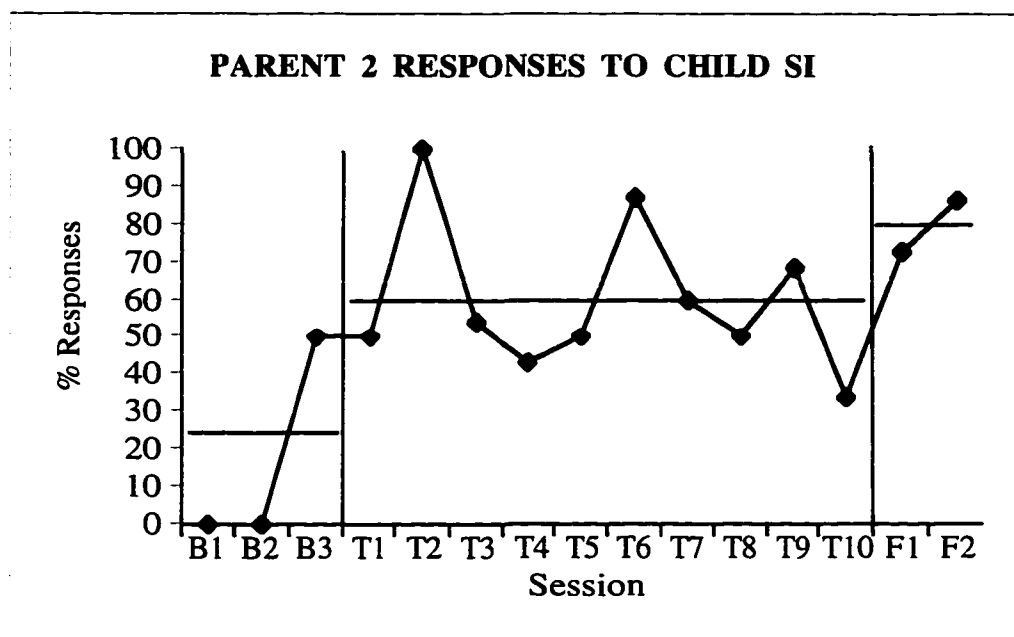




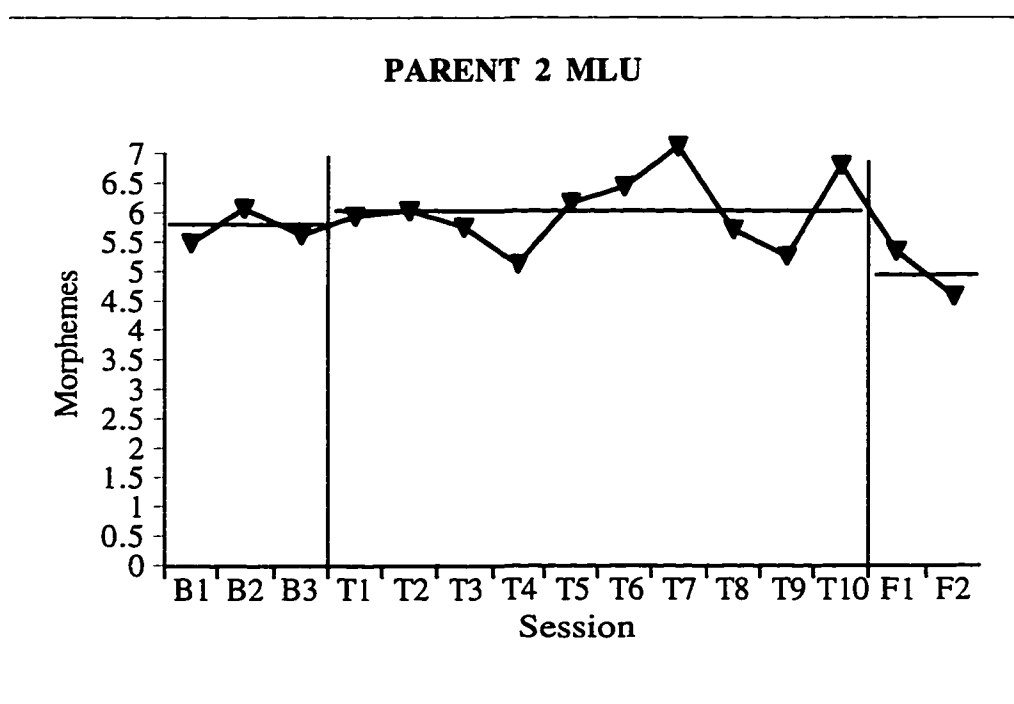
**Figure 14.** Number of complete reading cycles (CRCs) for Dyad 2 across baseline, training, and follow-up sessions.



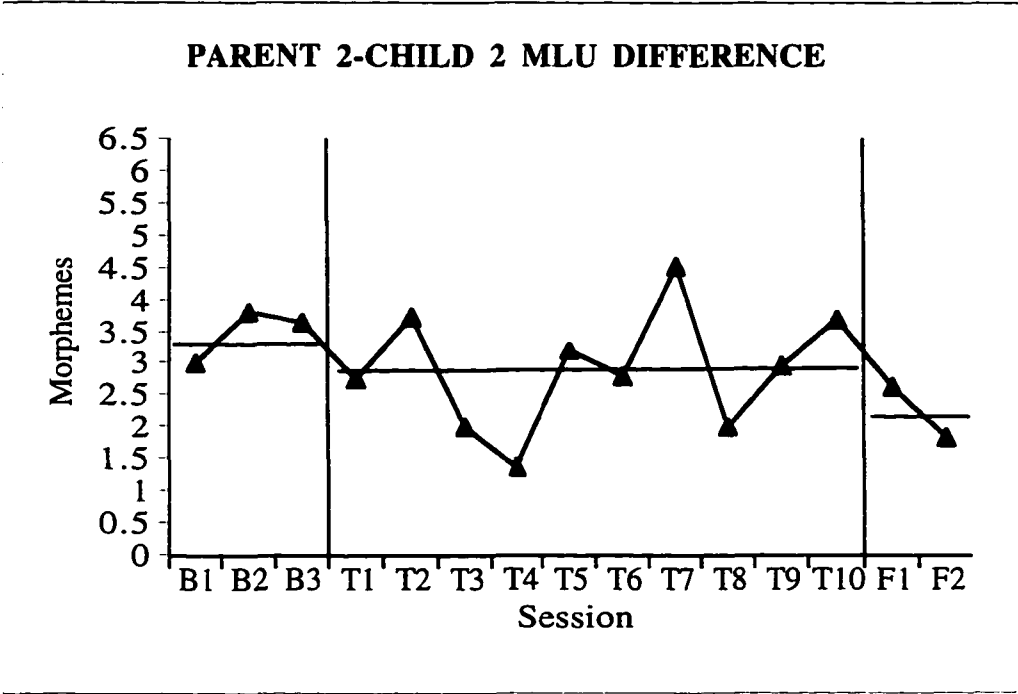
**Figure 15.** Percent of turns taken for Parent 2 across baseline, training, and follow-up sessions.



**Figure 16.** Percent of responses to child story initiations (SIs) for Parent 2 across baseline, training, and follow-up sessions.



**Figure 17.** Mean length of utterance (MLU) in morphemes for Parent 2 across baseline, training, and follow-up sessions.



**Figure 18.** Morpheme difference between Parent 2 and Child 2 mean length of utterance (MLU) across baseline, training, and follow-up sessions.

(range = 0-15) during training, and 3.5 (range = 2-5) at follow-up. Means for verbal turns were 4 (range = 2-6) at baseline, 36.8 (range = 17-57) during training, and 56.5 (range = 48-65) at follow-up. Of all communicative turns collected and analyzed for Child 2, verbal turns accounted for 31% of utterances at baseline, 84% of utterances during training, and 94% of utterances at follow-up, with verbal turns showing a dramatic increase over baseline when training was initiated.

Number of Story Initiations. As can be seen in Figure 20, Child 2 fluctuated in the number of story initiations made from one session to another. There were few initiations at baseline showing a mean of 2.33 (range = 0-6) initiations. However, at T4 Child 2 made 28 story-related initiations, with an average of 11.50 (range = 6-28) initiations during training. This upward trend continued throughout follow-up, with a mean of 13 (range = 11-15) initiations observed during that time. This resulted in mean increases of 9.17 story initiations from baseline to training, 1.5 from training to follow-up, and 10.67 from baseline to follow-up.

Semantic Diversity of Utterances. Child 2 demonstrated increased semantic diversity from baseline to training that continued into follow-up sessions. Figure 21 illustrates Child 2 utterances according to frequency and type of semantic level exhibited during each phase of the study. At baseline, Child 2 used primarily indications (mean = 9.67; range = 1-25)), comprising 74% of all baseline communicative turns. However, indications dropped to 24% use during training, and constituted only 19% of Child 2's utterances at follow-up. Labels accounted for 8% of baseline, 26% of training, and 48% of follow-up utterances, for a mean number of 1 (range = 0-3) label used at baseline, 9.6 (range = 1-22) labels during training, and 27 (range = 27-27) labels at follow-up. Descriptions comprised 17% of baseline, 26% of training, and 15% of follow-up utterances, with a mean number of 0.67 (range = 0-1) descriptions at baseline, 9.6 (range = 3-17) during training, and 8.5 (range = 6-11) at follow-up. Interpretations emerged at T3 and continued

for a mean of 4.2 (range = 2-9) interpretations per session throughout training. Interpretations comprised 11% of all collected training utterances and accounted for 4% of follow-up verbal turns. Child 2 also demonstrated use of inferences at T4 and T8 for a mean of 0.5 (range = 0-4) inferences throughout training. However, use of inferences was limited and comprised only 1% of verbal turns during training, with none observed in baseline or follow-up samples.

Overall, Child 2 showed dramatic increases in the frequency and variety of semantic categories used from baseline to follow-up, with baseline utterances comprised largely of indications while training and follow-up utterances showed consistent use of labels and descriptions. Although not present with the frequency of labels or descriptions, interpretations that had been absent from baseline samples appeared during training and were maintained at follow-up measurements.

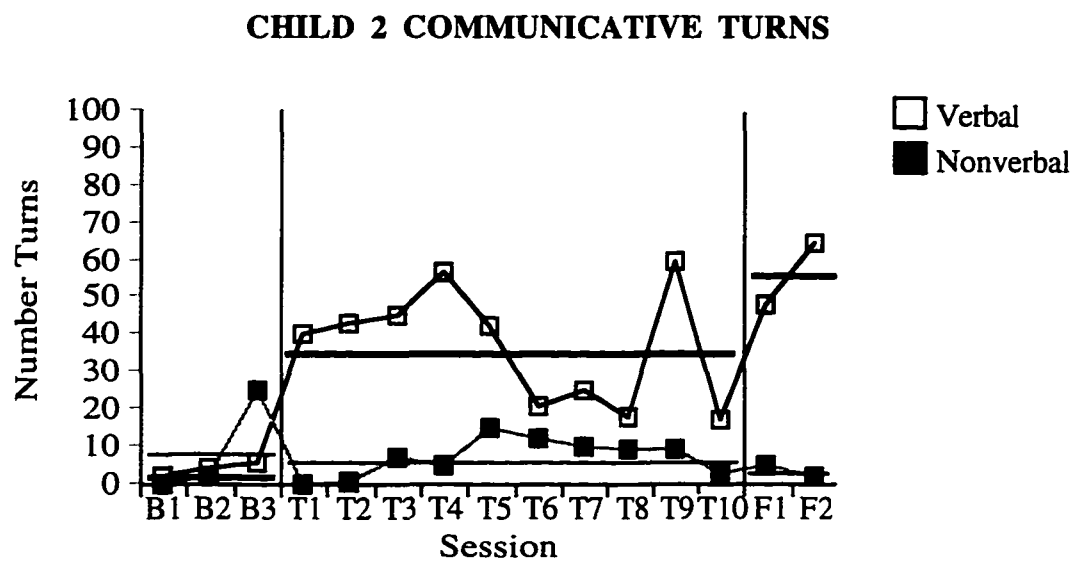
Child Changes in MLU. MLU measurements for Child 2 showed a change in mean from baseline to training and follow-up (see Figure 22). Child 2's MLU for baseline sessions was 2.25 morphemes (range = 2.00-2.50). During training, however, Child 2 exhibited a MLU of 3.11 (range = 2.33 - 3.77), representing an increase of 0.86 morphemes. At follow-up, Child 2's MLU dropped to 2.73 morphemes; however, this remained higher than MLUs obtained from baseline measures.

### Dyad 3

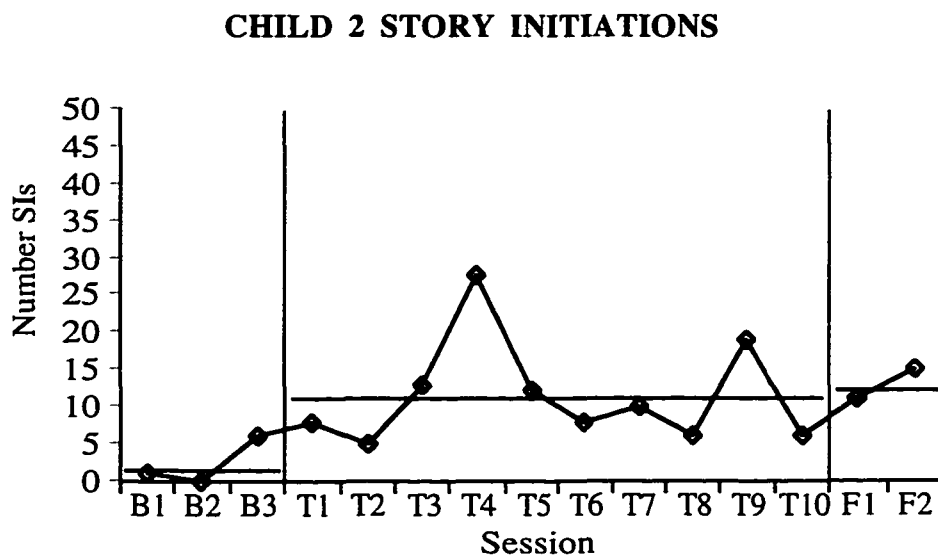
Dyad 3 presented interesting and complicating circumstances. The child subject for Dyad 3 experienced medical problems beginning at T9. This resulted in Child 3 being hospitalized, and subsequently dropping out of the study. Therefore, no follow-up measures were available to report for Dyad 3. The reader should note that data for T9 show a marked change in trend for all measurements obtained.

### Parent 3

Overall, Parent 3 made observable changes from baseline to treatment sessions. Behaviors fluctuated throughout the baseline and

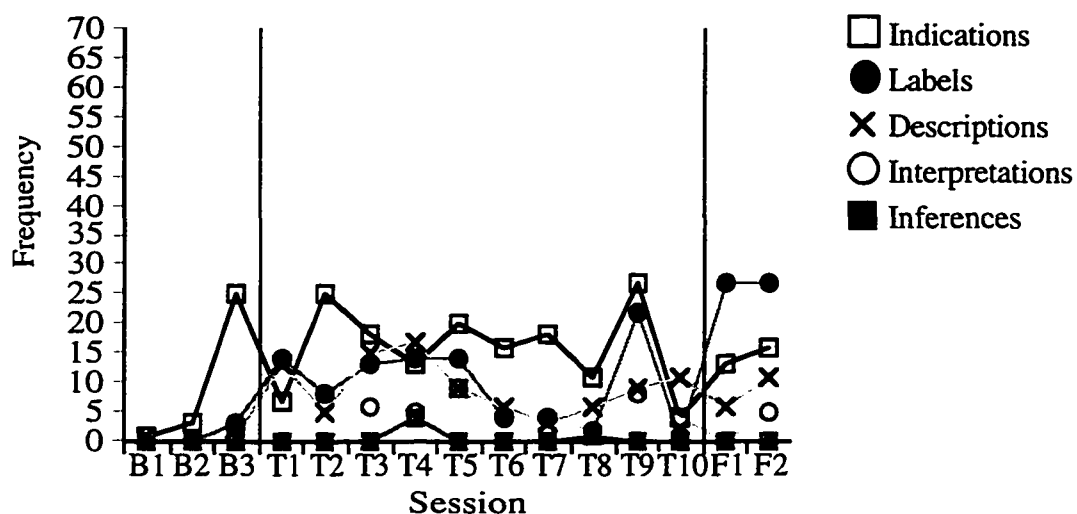


**Figure 19.** Number of verbal and nonverbal turns for Child 2 across baseline, training, and follow-up sessions.



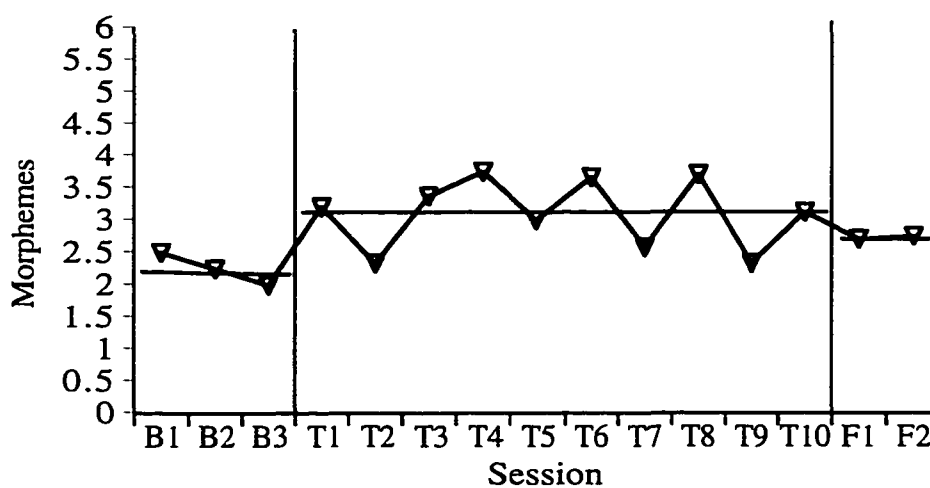
**Figure 20.** Number of story initiations (SIs) for Child 2 across baseline, training, and follow-up sessions.

### CHILD 2 SEMANTIC DIVERSITY



**Figure 21.** Semantic diversity of utterances for Child 2 across baseline, training, and follow-up sessions.

### CHILD 2 MLU



**Figure 22.** Mean length of utterance (MLU) in morphemes for Child 2 across baseline, training, and follow-up sessions.

treatment phases, but resulted in generally positive changes in dependent variables. Mean performance for dependent variables are graphically displayed by solid straight lines through each study phase.

Number of Complete Reading Cycles. During the baseline phase, Dyad 3 completed few (mean = 3.5) CRCs during storybook reading (see Figure 23). This was followed by a marked change once training was initiated. Throughout training, Parent 3 maintained an average CRC rate of 26.56 (range = 15-35) per session, resulting in an average increase of 23.16 CRCs over baseline measures.

Percent of Parent Turns. Examination of Dyad 3's baseline measures for ratio of parent to child turns (see Figure 24) indicated that Parent 3 dominated communicative turns, with an average of 72.75% (range = 67%-84%) of all turns during parent-child storybook reading. At T1 parent turns dropped to 54% but increased again to 70% at T4 and T9. However, this represented only a 3% increase over the lowest (67%) percent of turns observed for Parent 3 during the baseline phase. Average percent of turns taken by Parent 3 during training was 60.67% (range = 54%-70%), a decrease of 12.08% from the baseline average.

Parent Responses to Child Story Initiations. Figure 25 illustrates the changes in Parent 3's responses to Child 3's story initiations. During B1 and B2, Parent 3 responded to 100% of Child 3's story initiations. However, this was followed by a dramatic decline in responding to a low of 36% at B4, yielding an average response rate of 76.8% (range = 36%-100%) during the baseline phase. Parent 3 then began a gradual increase in responding to the child's story initiations during training. Parent 3's mean rate of responding throughout training was 83.3% (range = 67%-100%), resulting in an average increase of 6.5% over baseline measures.

Parent Changes in MLU. Measures of MLU for Parent 3 are graphically displayed in Figure 26. Parent 3 averaged 5.60 (range = 4.78-6.09) morphemes per utterance during baseline and 4.98 (range = 4.26-6.46) morphemes per utterance during training. A marked peak for



parent MLU occurred at T9 resulting in the highest (6.46 morphemes) parent MLU of the study. Despite the marked rise at T9, there was a small overall decrease in MLU of 0.62 morphemes from baseline to training.

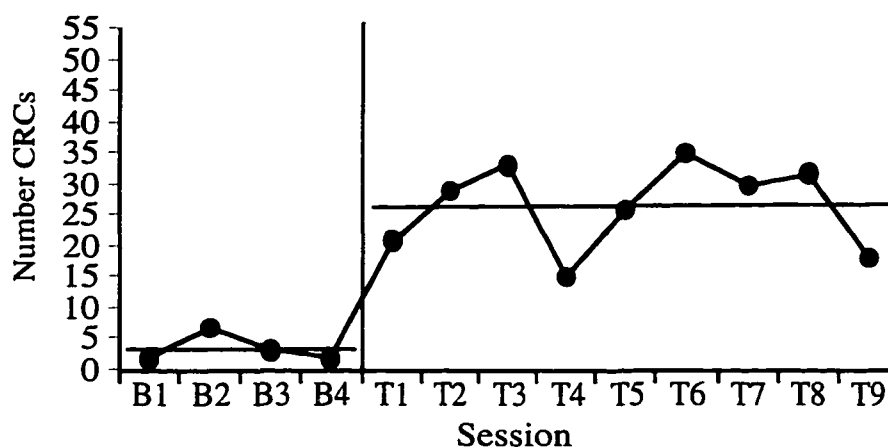
Difference in Parent-Child MLU. To determine whether Parent 3's MLU changes resulted in a closer match to Child 3's MLU, differences in parent-child MLUs were calculated (see Figure 27). During baseline the mean parent-child difference was 4.25 (range = 3.75-5.09) morphemes, with a general trend upward from B1 to B4. However, from B4 to T1 there was a reverse in trend that resulted in an average parent-child MLU difference of 3.46 (range = 2.75-4.64) morphemes during training. Again there was a marked peak in performance at T9 opposite the expected direction of change. Because Dyad 3 dropped out of the study after T9, there was no additional information to determine whether the difference would have continued in an upward trend or would have returned to previous training levels.

### Child 3 Measures

To determine whether changes in Parent 3 storybook reading behaviors resulted in simultaneous changes in Child 3 communicative behaviors, data were graphed for visual inspection. Mean dependent measures were marked with solid straight lines across each study phase completed by Dyad 3. Reader please note observed changes in trend at T9.

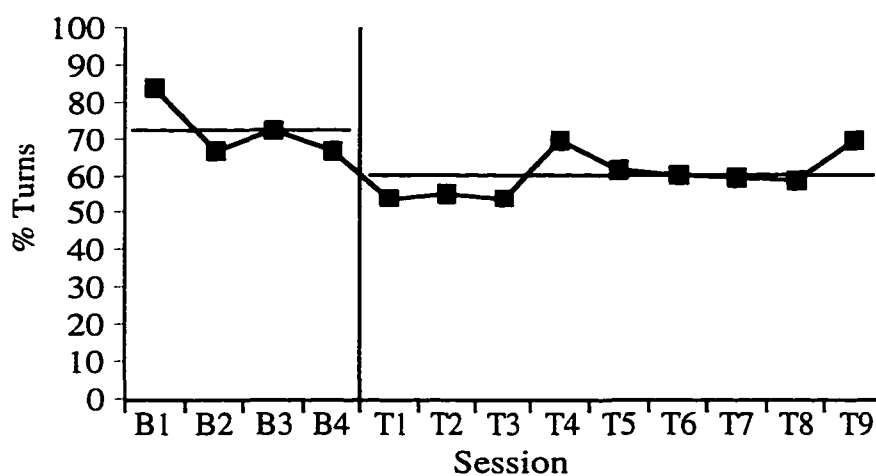
Number of Communicative Turns. As can be seen in Figure 28, during the baseline phase Child 3 had similar means for the number of verbal and nonverbal turns taken during storybook reading. Means for verbal turns are designated by thick straight lines, while means for nonverbal turns are indicated by thin straight lines across each study phase. At baseline nonverbal turns (mean = 8.75) exceeded verbal turns (mean = 6.75) by 2 turns. The graph shows an immediate increase in verbal and nonverbal turns when training was initiated. Both types of

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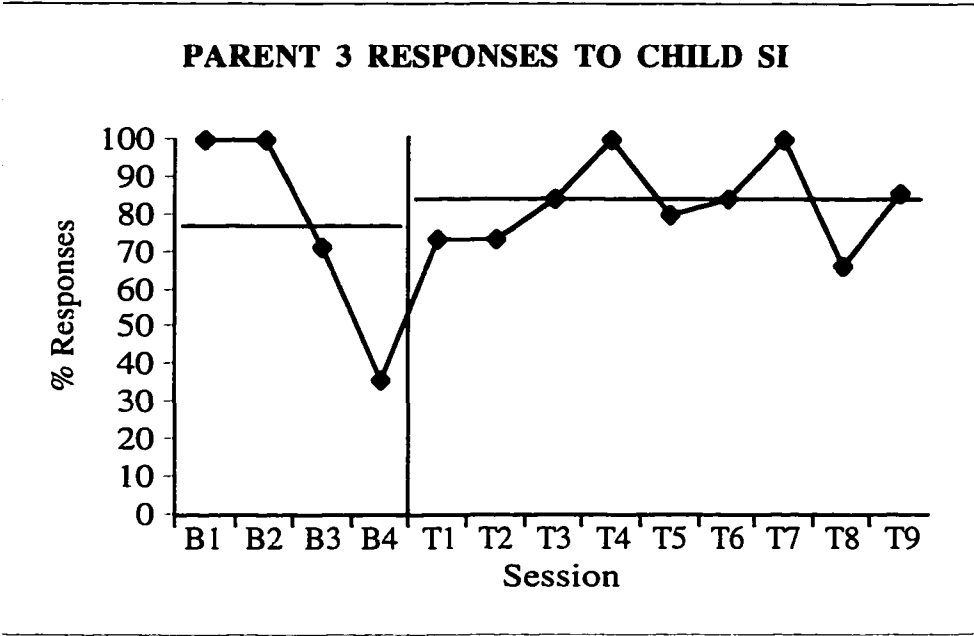
**DYAD 3 CRCS COMPLETED**

**Figure 23.** Number of complete reading cycles (CRCs) for Dyad 3 across baseline and training sessions.

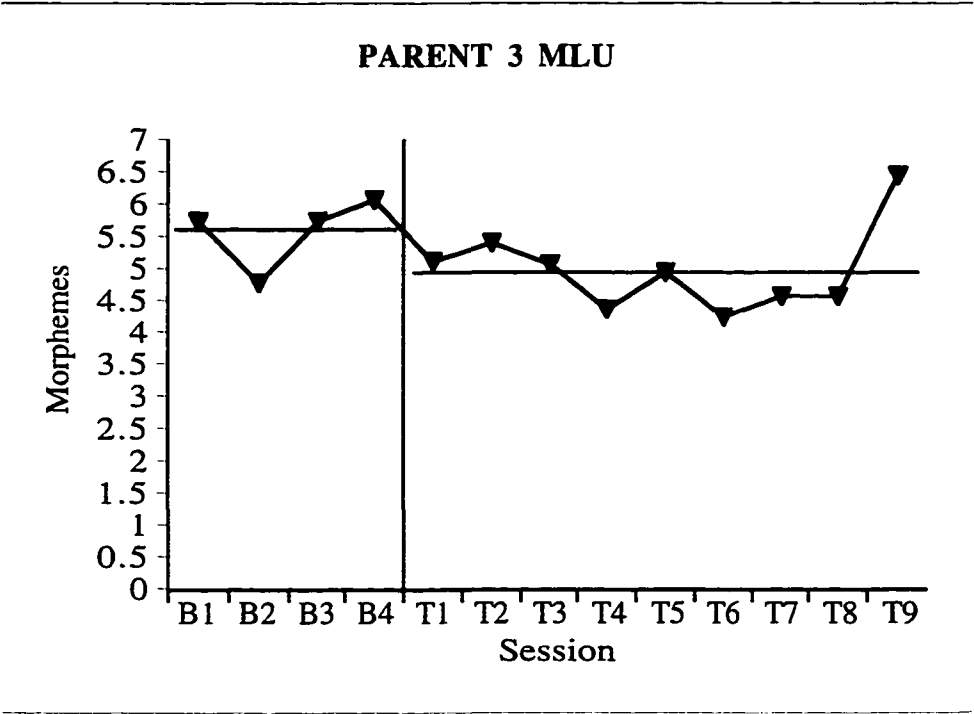
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**PERCENT PARENT 3 TURNS**

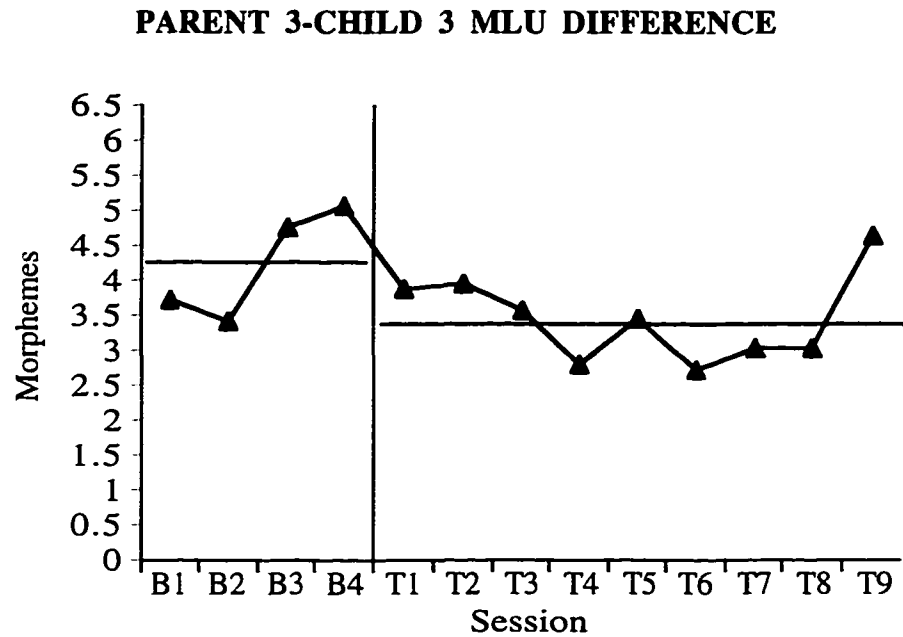
**Figure 24.** Percent of turns taken for Parent 3 across baseline and training sessions.



**Figure 25.** Percent of responses to child story initiations (SIs) for Parent 3 across baseline and training.



**Figure 26.** Mean length of utterance (MLU) in morphemes for Parent 3 across baseline and training.



**Figure 27.** Morpheme difference between Parent 3 and Child 3 mean length of utterance (MLU) across baseline and training sessions.

communicative turns continued to increase until T3, at which point nonverbal turns started to decline while verbal turns continued to increase in frequency. At T4 verbal turns exceeded nonverbal turns and remained at higher levels throughout the remainder of the study. Nonverbal turns comprised 56% of baseline communicative turns but accounted for only 39% of all Child 3's turns during training. The mean for nonverbal turns was 24.3 (range = 3-60) throughout training, while the mean number of verbal turns was 36.67 (range = 14-61) during the same time period. This resulted in a mean increase of 15.8 nonverbal turns and 29.92 verbal turns from baseline to training.

Number of Story Initiations. To identify whether Child 3's increases in communicative turns also resulted in increased initiations during story-book reading, Child 3's story initiations were counted (see Figure 29). Baseline story initiations ranged from 2-17 and training initiations ranged from 5-23. Although there was an increase in story initiations when training began, the mean difference from baseline (mean = 8.5) to training (mean = 10.67) was only slightly greater than 2 initiations. There were fluctuations throughout baseline and training, with an upward trend at B4 and dips in performance at T4, T5, T7 and T9; thus, limiting confidence in statements regarding the effects of training for this variable.

Semantic Diversity of Utterances. Child 3 demonstrated notable increases in semantic diversity from baseline to training (see Figure 30).

During the baseline phase, Child 3 showed a marked preference for the use of indications. Mean use of indications was 9 (range = 1-17) for baseline and 30.89 (range = 11-59) for training, comprising 59% and 17% of verbal and nonverbal turns during baseline and training respectively.

The average use of labels was 1.25 (range = 0-4) at baseline and 24.78 (range = 11-37) during training, comprising 18.5% of Child 3's baseline utterances and 66% of training verbal turns. There was a noticeable increase in the use of labels at T1, with use of labels surpassing the use

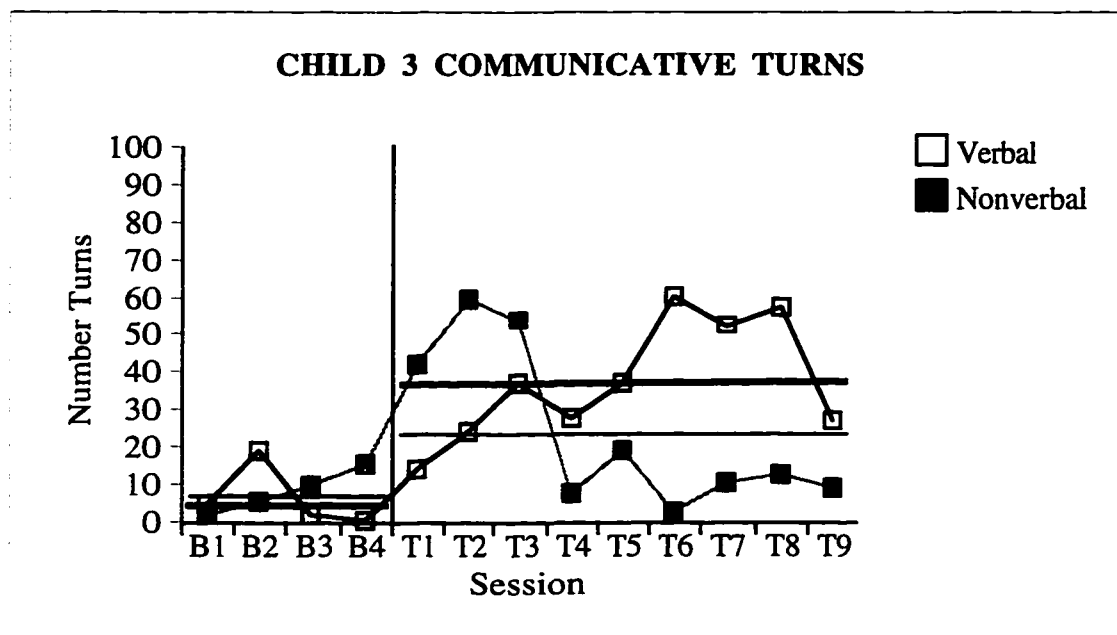
of indications beginning with T4 and continuing to the last training session. The mean use of descriptions was 0.75 (range = 0-2) at baseline and 4.78 (range = 1-8) during training, constituting 12.7% of verbal turns during the training phase. There were no interpretations present in Child 3's baseline measures; however, interpretations occurred in 3.5% of training utterances.

Child Changes in MLU. Child 3 presented an interesting change in MLU pattern. As can be seen in Figure 31, Child 3 had the highest MLU (2.00 morphemes) at B1 and then made a sharp and gradual decline to a low of 1.00 morpheme per utterance at B3 and B4. However, this downward trend showed a reversal when training was initiated. Child 3's MLU throughout training showed a gradual increase with the highest training MLU of 1.82 morphemes occurring at the last session. The baseline MLU for Child 3 was 1.34 morphemes, and the training MLU was 1.52 morphemes. This represents an increase of 0.18 morpheme from baseline to training. Although the differences in means were small, the change in trend was quite obvious from baseline to training, with training MLUs moving in a more positive direction.

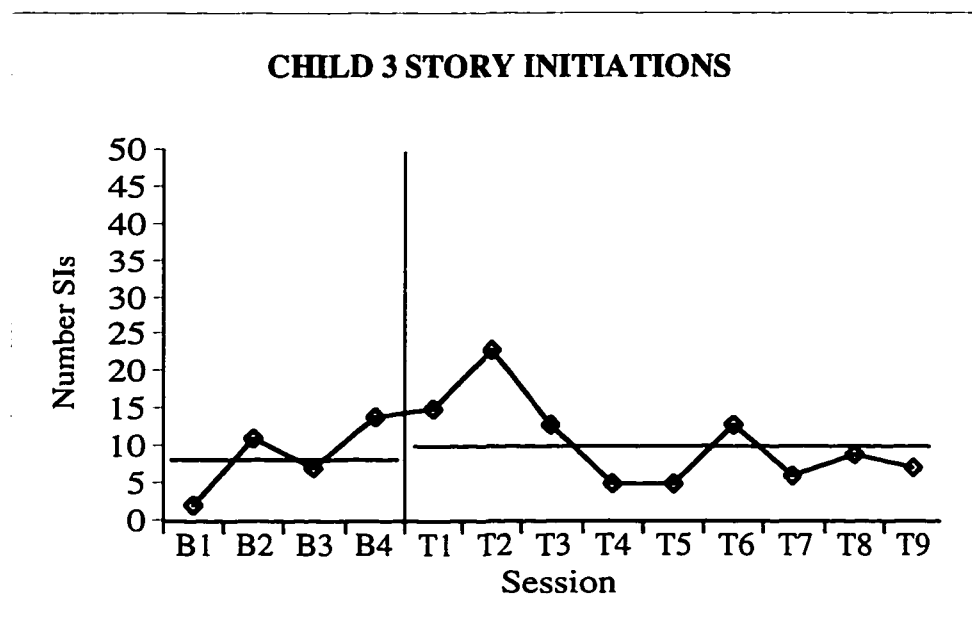
#### Dyad 4

To determine whether Dyad 4 subjects changed their storybook reading behaviors as a result of parent training, data for dependent variables was collected at baseline, training, and follow-up sessions. Measures were plotted and graphed for visual inspection, with mean levels of performance designated by solid straight lines across each phase of the study completed by Dyad 4.

It should be noted that Child 4 was exhibiting early signs of illness at B2. This appeared to have a negligible effect on parent or child behaviors when compared to other baseline measurements, except for the child variables, number of verbal turns taken and number of labels produced during that session.



**Figure 28.** Number of verbal and nonverbal turns for Child 3 across baseline and training sessions.



**Figure 29.** Number of story initiations (SIs) for Child 3 across baseline and training sessions.

CHILD 3 SEMANTIC DIVERSITY

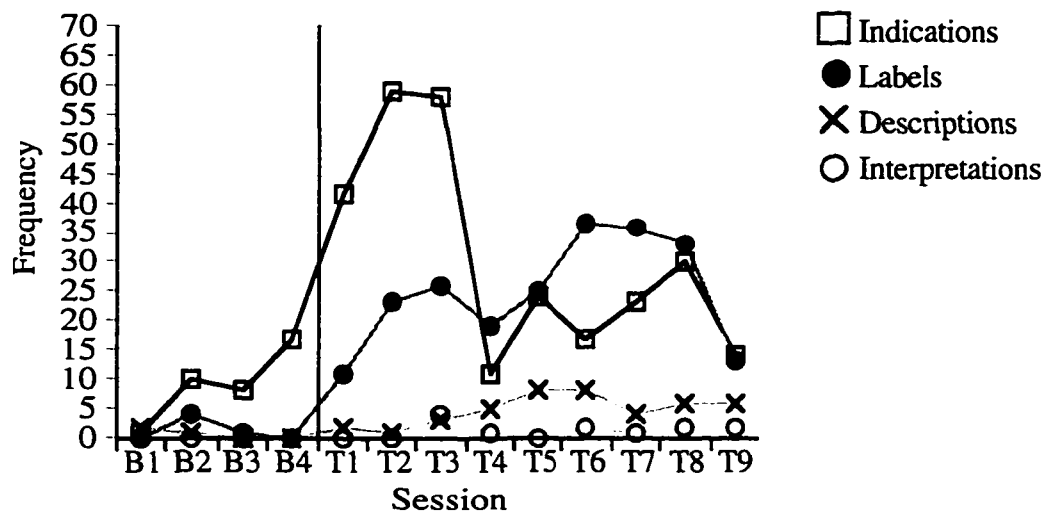


Figure 30. Semantic diversity of utterances for Child 3 across baseline and training sessions.

CHILD 3 MLU

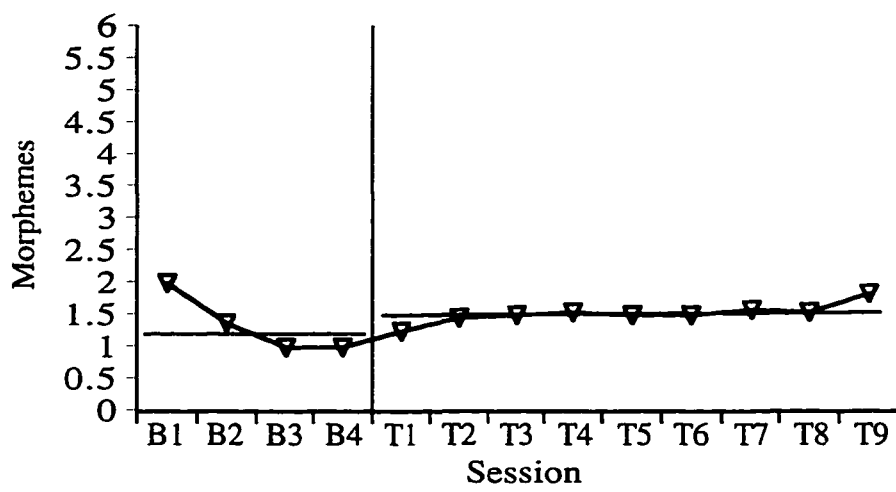


Figure 31. Mean length of utterance (MLU) in morphemes for Child 3 across baseline and training sessions.



### Parent 4 Measures

Parent 4 exhibited inconsistent patterns of behavior across dependent variable measurements. Noticeable changes in the expected direction occurred for number of CRCs, ratio of parent to child turns, and parent measures for MLU. However, Parent 4's responses to child story initiations showed a trend opposite the expected direction toward the end of training and into the follow-up sessions.

Number of Complete Reading Cycles. Parent 4 showed notable changes in the number of CRCs completed from baseline to training and follow-up (see Figure 32). At baseline Dyad 4 completed an average of 11.5 (range = 7-16) CRCs per session. This increased to an average of 39.33 (range = 29-51) during training and was maintained with a mean of 39.5 CRCs completed during follow-up sessions. Although there was a decline in CRCs at T5 and T9, at no time did the number of CRCs completed during training or follow-up fall to baseline levels.

Percent of Parent Turns. The ratio of parent to child turns also showed a positive trend (see Figure 33), with Parent 4 reducing the percent of turns taken from a baseline average of 69.5% (range = 62%-79%) to 55.67% (range = 50%-59%) during training. Parent 4 showed a continued reduction in turn-taking behavior at follow-up, with an average 54.5% (range = 54%-55%) parent to child ratio of turns. This resulted in a 14% decrease from baseline to training, a 1% decrease from training to follow-up, and a 15% decrease from baseline to follow-up, suggesting a more balanced turn-taking ratio as a result of training.

Parent Responses to Child Story Initiations. Parent 4 demonstrated an inconsistent pattern of responding to Child 4's story initiations. As can be seen in Figure 34, Parent 4 responded to 100% of Child 4's initiations at B1 and B2, but began a significant downward trend at B3 and B4, resulting in an average response rate of 80% (range = 58%-100%) during baseline. This was followed by a generally upward trend of increased responding when training was initiated. However, Parent 4

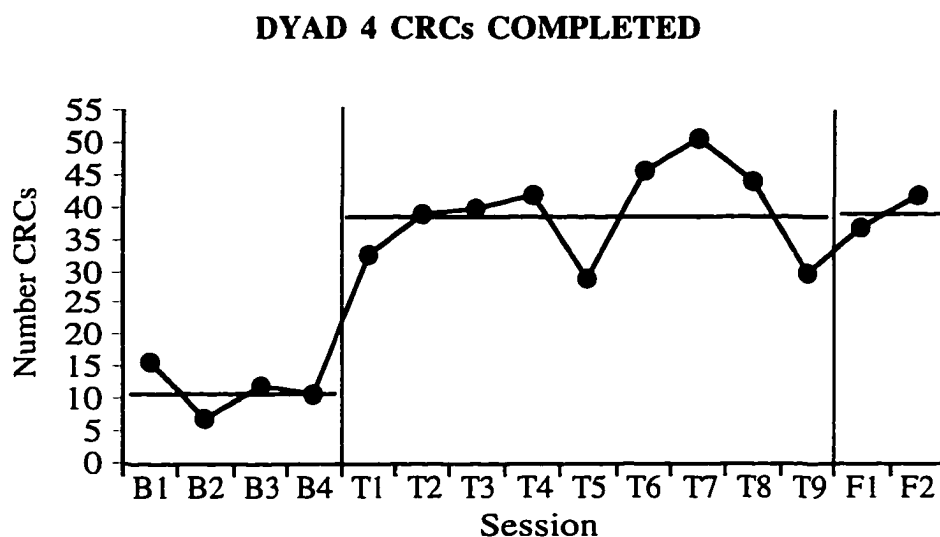
showed a marked decline in responding to Child 4's story initiations at T4, T5, T8, and T9, resulting in a mean response rate of 80.5% (range = 67%-100%) throughout training. The downward trend continued into follow-up, with the parent responding to an average 59% (range = 50%-68%) of the child's story initiations during follow-up sessions.

Parent Changes in MLU. Generally positive and stable results occurred when analyzing MLU levels for Parent 4 from baseline to treatment and follow-up (see Figure 35). Parent 4 maintained an MLU of 4.91 (range = 4.24-4.99) morphemes throughout baseline, but reduced the average MLU to 4.26 (range = 3.64-4.68) morphemes during training. Although the average follow-up MLU (mean = 4.51) was 0.25 morphemes higher than during training, Parent 4's MLU remained 0.40 morphemes lower than baseline levels.

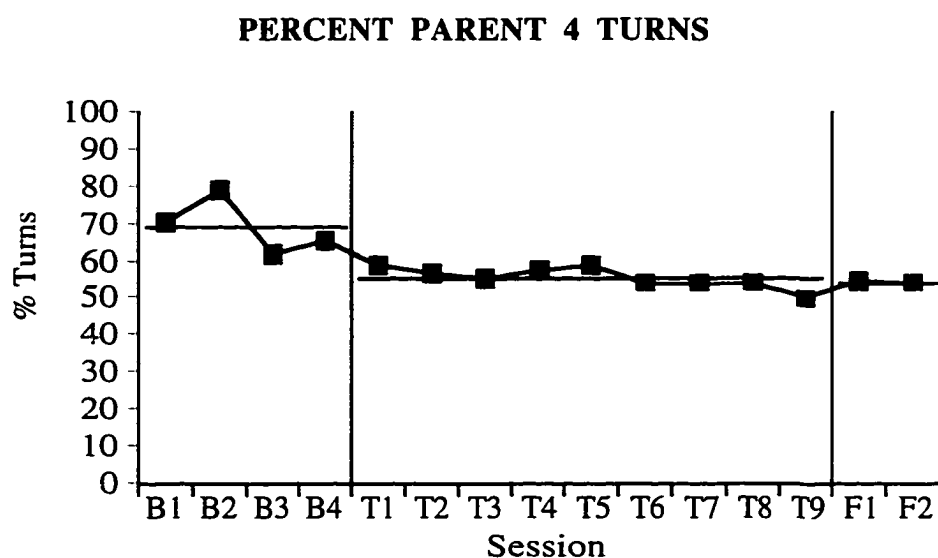
Differences in Parent-Child MLU. To determine whether Parent 4's reduction in MLU resulted in a closer match to Child 4's MLU, the parent-child morpheme differences were calculated for each study phase. Figure 36 shows a succession of peaks and valleys throughout each study phase. There was an upward trend toward a greater parent-child MLU difference at the end of baseline and a generally more positive decrease in gap between parent and child MLUs through the training and follow-up phases. Mean differences in MLU were calculated at 3.85 (range = 3.29-4.33) morphemes at baseline, 2.95 (range = 2.08-3.47) morphemes during training, and 3.25 (range = 3.08-3.42) morphemes at follow-up. This produced an overall change in the parent-child MLU difference of -0.90 morphemes from baseline to training and -0.60 morphemes from baseline to follow-up.

#### Child 4 Measures

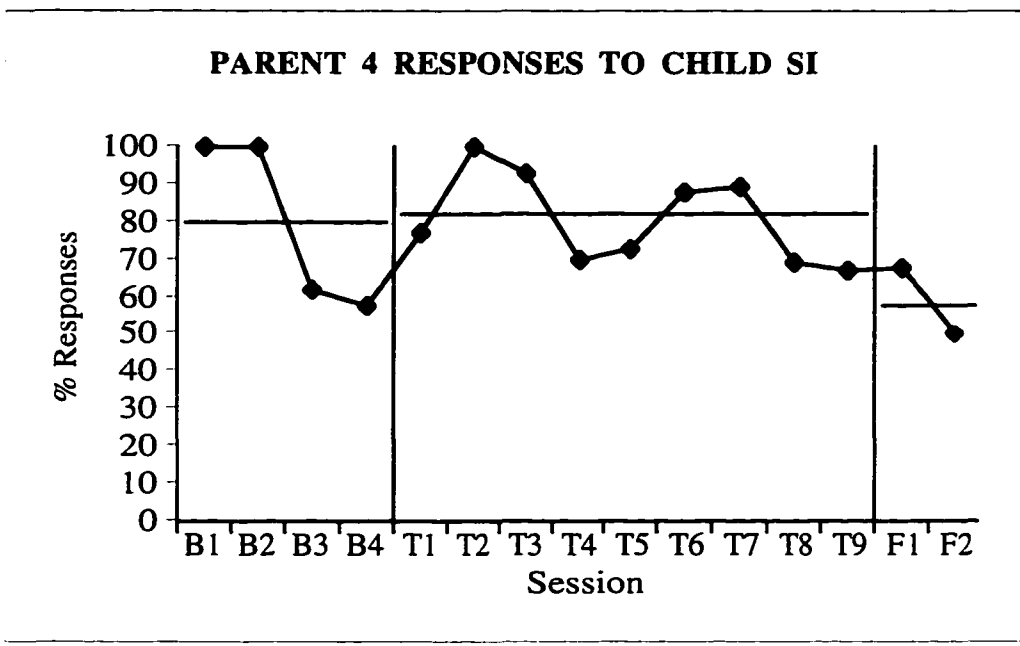
To determine whether observed changes in Parent 4 behaviors resulted in reciprocal changes in Child 4 behaviors, measures of child dependent variables were graphically displayed for visual inspection.



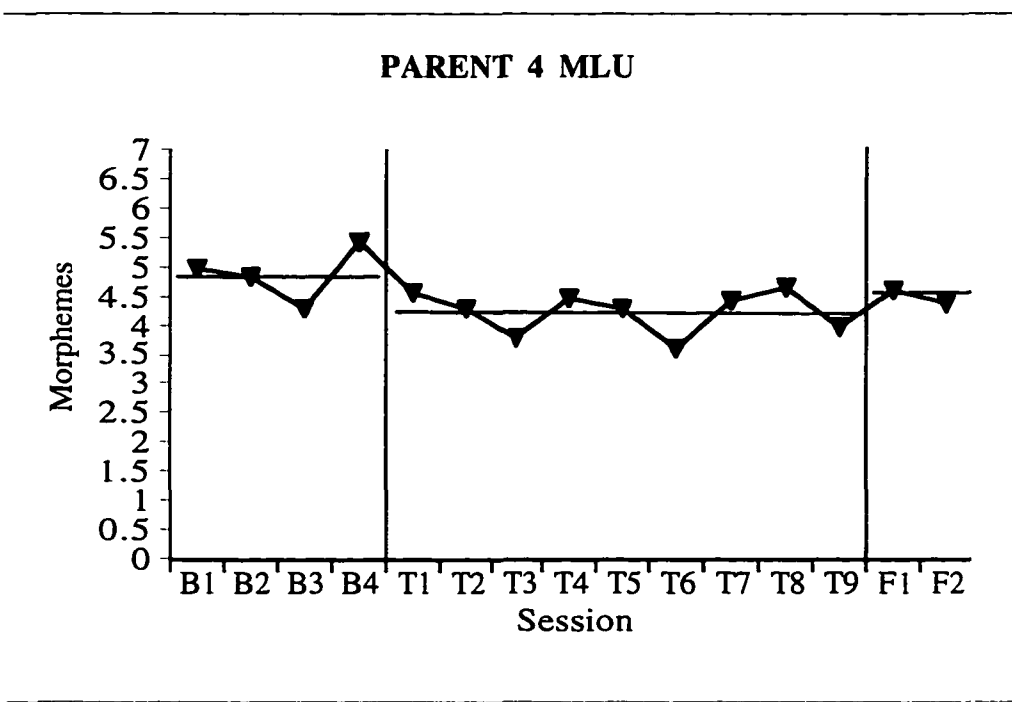
**Figure 32.** Number of complete reading cycles (CRCs) for Dyad 4 across baseline, training, and follow-up sessions.



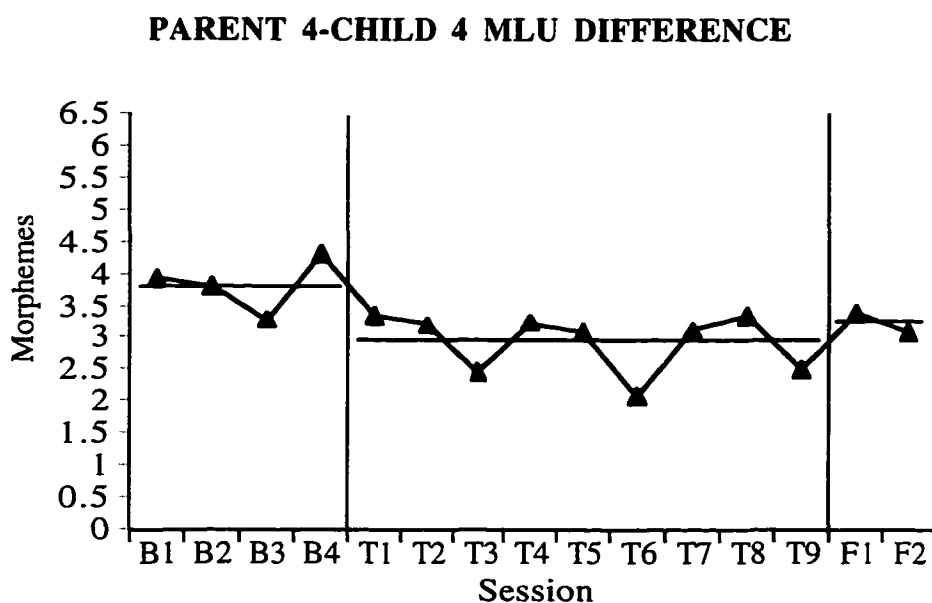
**Figure 33.** Percent of turns taken for Parent 4 across baseline, training, and follow-up sessions.



**Figure 34.** Percent of responses to child story initiations (SIs) for Parent 4 across baseline, training, and follow-up sessions.



**Figure 35.** Mean length of utterance (MLU) in morphemes for Parent 4 across baseline, training, and follow-up sessions.



**Figure 36.** Morpheme difference between Parent 4 and Child 4 mean length of utterance (MLU) across baseline, training, and follow-up sessions.

For each phase of the study (i.e., baseline, training, and follow-up) mean measurements were calculated and plotted using solid straight lines.

**Number of Communicative Turns.** Child 4 exhibited a fairly stable baseline for number of verbal and nonverbal turns taken (see Figure 37), except for B2 as noted previously. Means for nonverbal turns were 3.25 (range = 1-5) at baseline, 4 (range = 0-11) during training, and 8 (range = 7-9) at follow-up. Despite the significant decline in verbal turns at B2, Child 4 maintained an overall average of 34.25 (range = 8-44) verbal turns per baseline session. Child 4 increased verbal turns to a mean of 88.56 (range = 66-99) during training and continued to increase at follow-up with an average of 95 (range = 91-99) verbal turns per session. Further analysis of the data indicated this subject exhibited a definite preference for verbal over nonverbal communication during storybook reading throughout all study phases. The proportion of verbal to nonverbal turns was approximately 11/1 for baseline, 22/1 during training, and 12/1 at follow-up, with verbal turns accounting for 91%, 95%, and 92% of Child 4's communicative turns during baseline, training, and follow-up respectively.

**Number of Child Story Initiations.** Figure 38 illustrates Child 4's changes in story-related initiations. There was a definite upward trend in total number of initiations from B1 to B4. However, when comparing the average number of story initiations across the three study phases there appears to be a training effect that accelerated the rate of increase. Mean number of initiations were 8 (range = 3-13) at baseline, 22.2 (range = 9-34) during training, and 22.5 (range = 20-25) at follow-up.

**Semantic Diversity of Utterances.** Child 4 demonstrated increased semantic diversity from baseline to training, that was maintained at follow-up sessions (see Figure 39). During baseline sessions, Child 4 used primarily indications (mean = 14.75; range = 7-21) and labels (mean = 20.57; range = 4-31) for communicative turns, with 1.0 description used in each of the sessions B1, B3, and B4. By semantic category

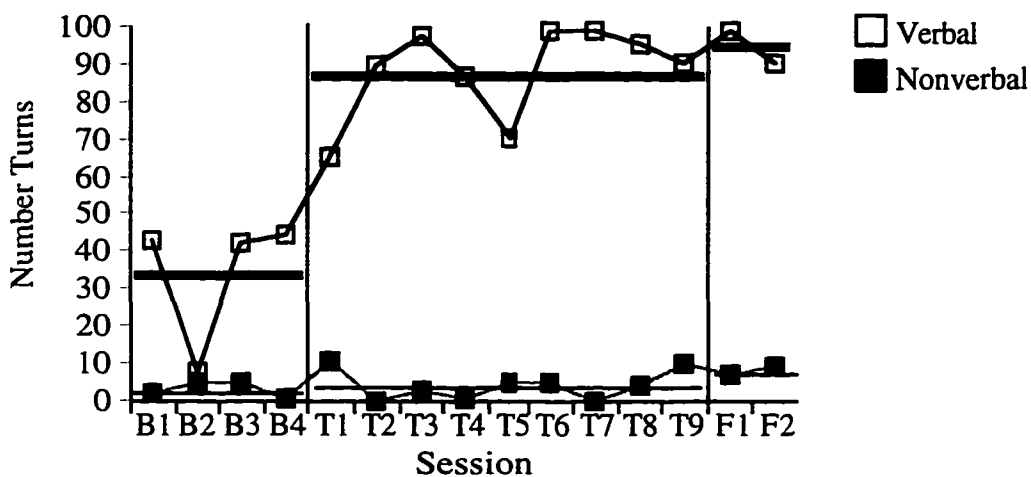
indications accounted for 33%, labels comprised 61%, and descriptions constituted 2% of verbal turns during baseline. Throughout training Child 4 continued to add semantic categories to her storybook reading behaviors. Measurements at T4 indicated 21% of Child 4's utterances were descriptions, and 7% were interpretations. Mean semantic context levels were calculated for training with the following results: 32.33 indications (range = 27-36), 38.46 (range = 30-50) labels, 14.11 (range = 3-32) descriptions, and 5.22 (range = 0-11) interpretations. When converted to percentage of verbal turns, indications accounted for 32%, labels constituted 43%, descriptions represented 16%, and interpretations comprised 6% of Child 4's storybook utterances during training. Use of indications dropped to 20% at follow-up, with labels rising to 68%. Although not maintained at training levels, descriptions and interpretations were present in an average of 7% and 2% of Child 4's follow-up utterances respectively. The highest follow-up semantic category of interpretations replaced the highest baseline category of descriptions at the same percentage of occurrence (i.e., 2%).

Child Changes in MLU. MLU measurements for Child 4 showed generally positive changes from baseline to training, with follow-up measures showing gains over baseline levels (see Figure 40). As can be seen, the baseline MLU for Child 4 was 1.05 (range = 1.00-1.11) morphemes. The average training MLU of 1.31 (range = 1.13-1.56) morphemes resulted in a 0.26 morpheme increase over baseline MLU levels. Child 4's MLU at follow-up was calculated at 1.26 (range = 1.21-1.31) morphemes, a decrease of 0.05 morpheme from training levels, but a 0.21 morpheme increase over baseline MLU measures.

#### Dyad 5

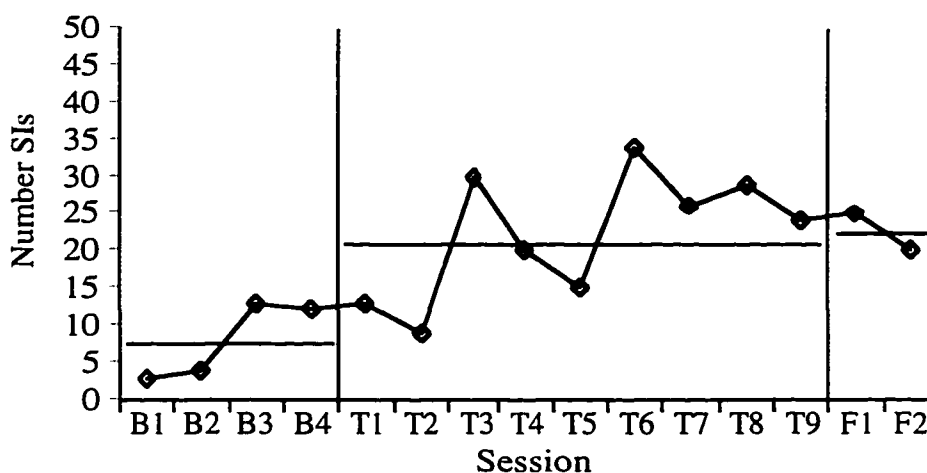
To determine whether parent training effected change in the storybook reading behaviors of Dyad 5, measurements of the dependent variables for Parent 5 and Child 5 were graphically displayed for visual

### CHILD 4 COMMUNICATIVE TURNS



**Figure 37.** Number of verbal and nonverbal turns for Child 4 across baseline, training, and follow-up sessions.

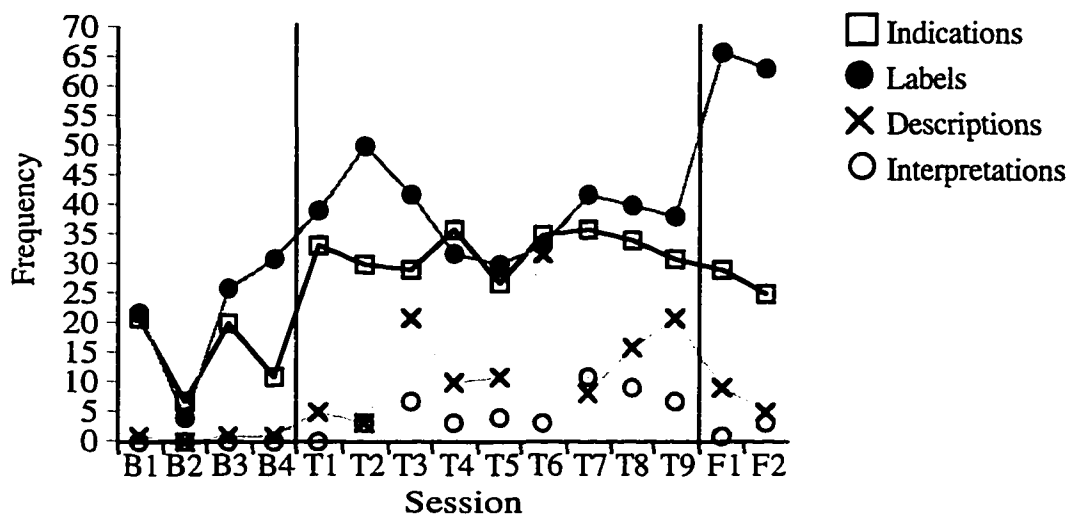
### CHILD 4 STORY INITIATIONS



**Figure 38.** Number of story initiations (SIs) for Child 4 across baseline, training, and follow-up sessions.

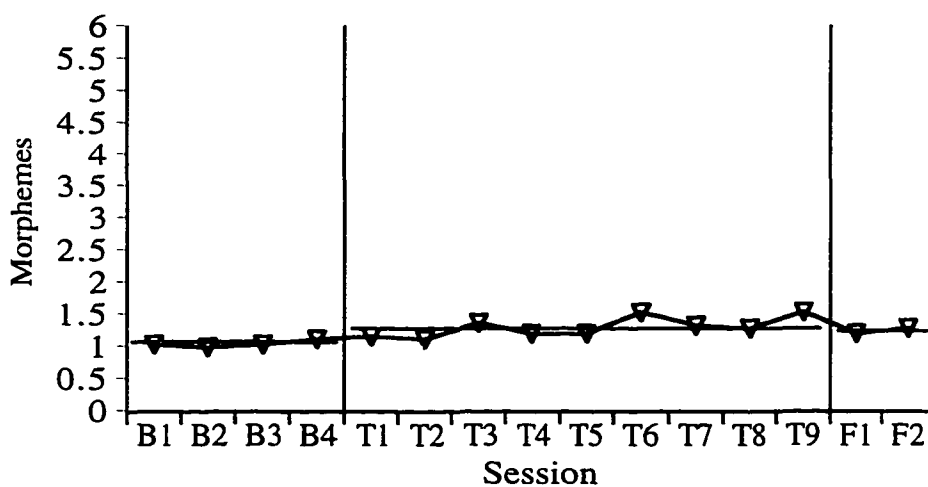


### CHILD 4 SEMANTIC DIVERSITY



**Figure 39.** Semantic diversity of utterances for Child 4 across baseline, training, and follow-up sessions.

### CHILD 4 MLU



**Figure 40.** Mean length of utterance (MLU) in morphemes for Child 4 across baseline, training, and follow-up sessions.

inspection. Mean performance levels are indicated on each graph with solid straight lines to facilitate comparison of changes observed.

#### Parent 5 Measures

Parent 5 demonstrated change in storybook reading across all dependent variables. Changes in the expected direction were noted for number of CRCs, percent of parent turns taken, and parent changes in MLU measures. However, for parent responses to child story initiations, changes were opposite the expected direction.

Number of Complete Reading Cycles. Figure 41 illustrates changes observed in the number of CRCs completed by Dyad 5. During the baseline phase, an average of 18.2 (range = 13-24) CRCs were completed. This is contrasted by twice as many CRCs completed during training for a mean of 36.38 (range = 10-46) CRCs. There was a dramatic increase at T1 (45 CRCs) and a sharp decrease at T7 (10 CRCs). However, the decrease was followed by a return to mean training levels. Follow-up measures showed a slight decrease from training with 32 CRCs completed in each of the two follow-up sessions. Overall gains in CRCs for Parent 5 were 18 from baseline to training and 14 from baseline to follow-up.

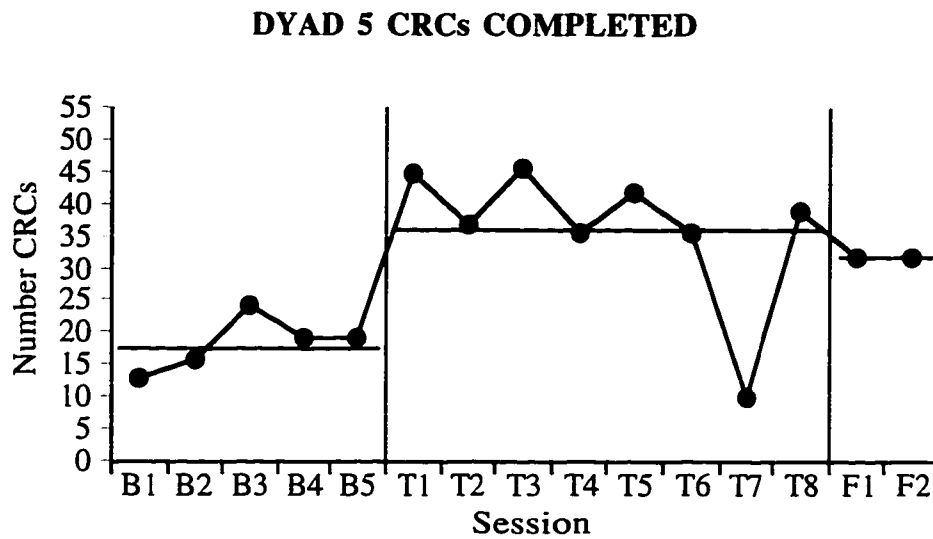
Percent of Parent Turns. Parent 5 established fairly stable turn-taking patterns with Child 5 during each phase of the study (see Figure 42). Baseline measures produced the highest percent of parent to child turns, with Parent 5 averaging 68.2% (range = 64%-72%) of all turns taken. This dropped to 54.6% (range = 48%-61%) during training, and continued to decrease to a mean of 53.5% (range = 53%-54%) parent turns at follow-up. Overall changes were -13.6% from baseline to training, -1.1% from training to follow-up, and -14.7% from baseline to follow-up.

Parent Responses to Child Story Initiations. Analysis of Parent 5's responses to Child 5's story initiations, indicated a change opposite the expected direction (see Figure 43). Overall, Parent 5 decreased responses to child initiations by 6.4% from a baseline average response rate of

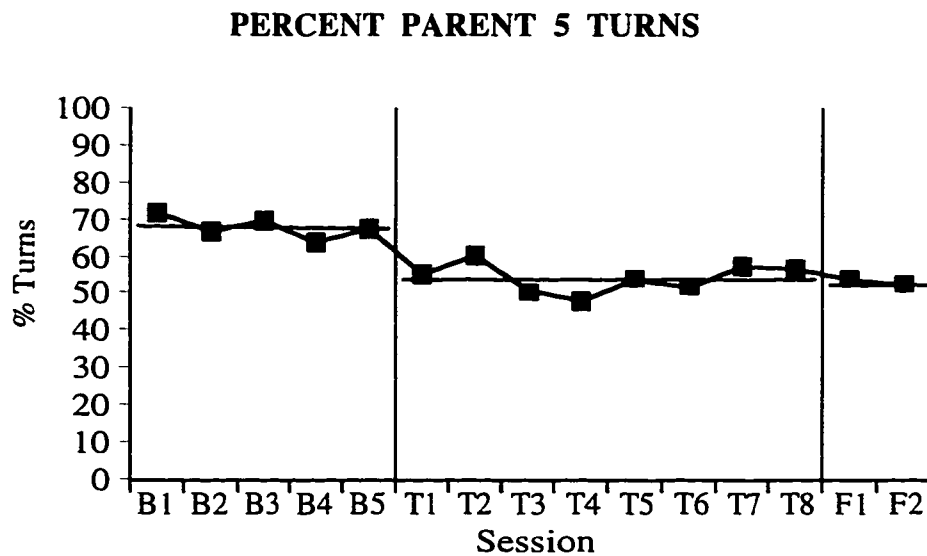
83.4% (range = 67%-94%) to a training average of 77% (range = 72%-85%), and decreasing 7.4% from baseline to follow-up (mean = 76%; range = 72%-80%). Of particular note for Parent 5 is that this parent never achieved 100% responding to the child's story initiations at any phase in the study. However, this could be attributed, in part, to Child 5's frequent topic shifts that occurred in succession without pausing for discussion or elaboration.

Parent Changes in MLU. Parent 5's changes in MLU across the three study phases are illustrated in Figure 44. During the baseline phase Parent 5 produced an average MLU of 5.9 (range = 5.55-6.26) morphemes, the highest recorded for this subject. This is contrasted by a significant drop from B5 to T1 in which the parent decreased MLU from 6.20 morphemes to 3.32 morphemes, a difference of 2.88 morphemes. Mean utterance lengths for Parent 5 were calculated at 4.16 (range = 3.32-4.76) morphemes during training and 4.10 (range = 3.87-4.32) morphemes at follow-up. Differences in baseline and training MLUs were 1.74 morphemes, and from baseline to follow-up were 1.80 morphemes.

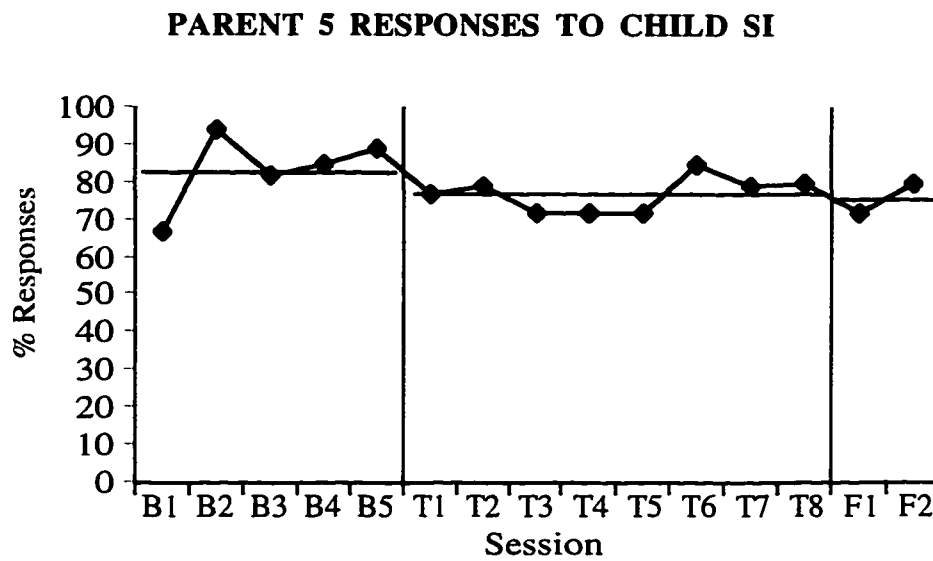
Difference in Parent-Child MLU. To determine whether changes in Parent 5 MLUs resulted in a better match to Child 5's MLU levels, differences between parent and child MLUs were calculated for each phase of the study (see Figure 45). Baseline averages indicated that the parent-child MLU difference was 4.47 (range = 4.16-5.09) morphemes. A noticeable change occurred during training, as the parent-child MLU difference decreased to 2.54 (range = 1.97-3.23) morphemes. This was maintained and continued to decrease at follow-up with the MLU difference calculated at 2.29 (range = 2.04-2.54) morphemes. Overall differences were -1.93 morphemes from baseline to training, -0.25 morphemes from training to follow-up, and -2.16 from baseline to follow-up. These results would suggest that a better parent-child match in grammatical complexity of utterances occurred as a result of parent training.



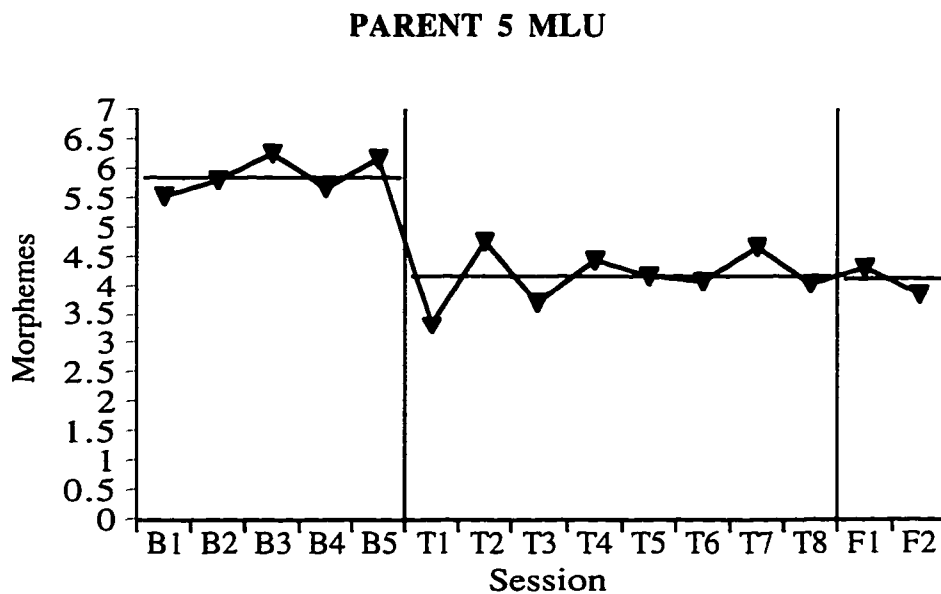
**Figure 41.** Number of complete reading cycles (CRCs) for Dyad 5 across baseline, training, and follow-up sessions.



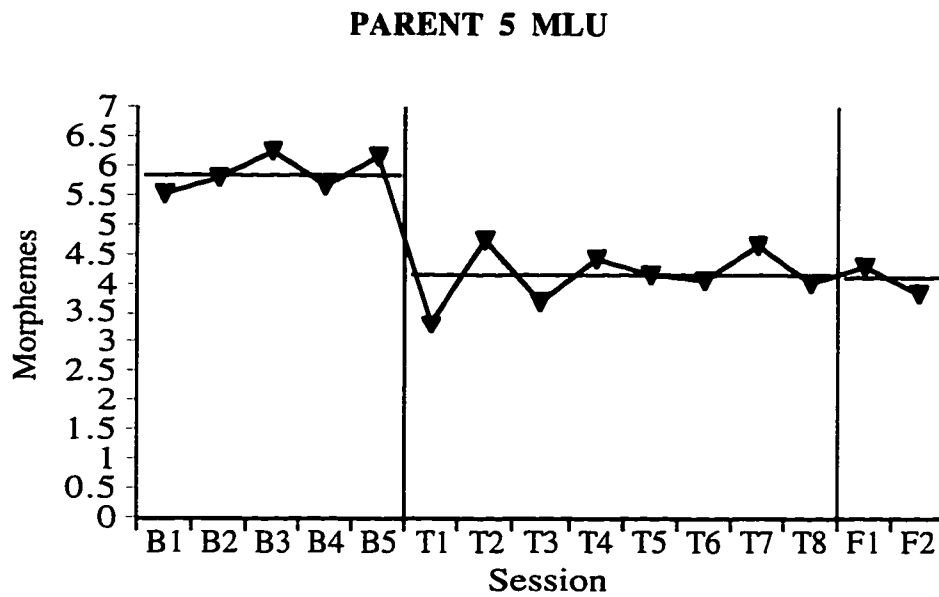
**Figure 42.** Percent of turns taken for Parent 5 across baseline, training, and follow-up sessions.



**Figure 43.** Percent of responses to child story initiations (SIs) for Parent 5 across baseline, training, and follow-up sessions.



**Figure 44.** Mean length of utterance (MLU) in morphemes for Parent 5 across baseline, training, and follow-up sessions.



**Figure 45.** Morpheme difference between Parent 5 and Child 5 mean length of utterance (MLU) across baseline, training, and follow-up sessions.

### Child 5 Measures

To determine whether observed changes in Parent 5 storybook reading behaviors resulted in reciprocal changes in Child 5 communicative behaviors, data for child dependent variables were graphed for visual inspection. Mean levels of performance were marked with solid straight lines across each study phase completed by Dyad 5.

Number of Communicative Turns. Figure 46 shows the number and types of communicative turns exhibited by Child 5 during storybook reading. During the baseline phase Child 5 displayed a fairly stable pattern in number of verbal turns taken, but exhibited an increase and subsequent decrease in use of nonverbal communications. The mean for verbal turns are designated by thick solid lines, and nonverbal turns are marked with thin solid lines across the three study phases. At baseline, the average number of nonverbal communicative turns was 30 (range = 22-42), and the average number of verbal turns was 18.4 (range = 1-33). Beginning with T1 and continuing throughout training and follow-up, Child 5 increased the number of verbalizations while simultaneously decreasing the use of nonverbal communications. This resulted in an average of 12.9 (range = 9-19) nonverbal turns and 68.1 (range = 30-93) verbal turns throughout training. Thus, verbal turns accounted for 84% and nonverbal turns constituted 16% of all story-related communications during the training phase. Follow-up measures indicated that Child 5 continued to use an average of 8.5 (range = 6-11) nonverbal communications and 74.5 (range = 73-76) verbal communications during parent-child storybook reading after parent training ended. Verbal turns showed overall increases of 49.7 from baseline to training, 6.4 from training to follow-up, and 56.1 from baseline to follow-up.

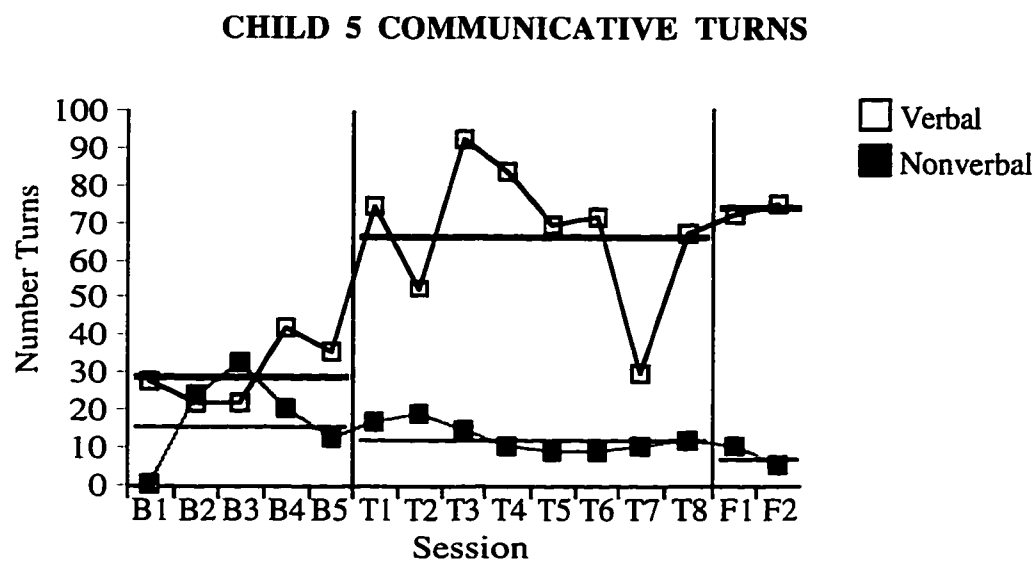
Number of Story Initiations. To determine whether changes in Child 5's communicative turns resulted in simultaneous changes in story-related initiations, Child 5's initiations were recorded and counted (see Figure 47). Visual inspection of the data indicate Child 5 produced a high

number of story initiations throughout baseline, training, and follow-up. Mean levels for initiations were calculated at 30.8 (range = 15-40) for baseline, 30.38 (range = 19-43) for training, and 24.5 (range = 20-29) at follow-up, with follow-up showing an approximate decrease of 6 initiations from baseline and training levels. The data suggest Child 5 decreased the frequency with which he shifted topics as a result of training.

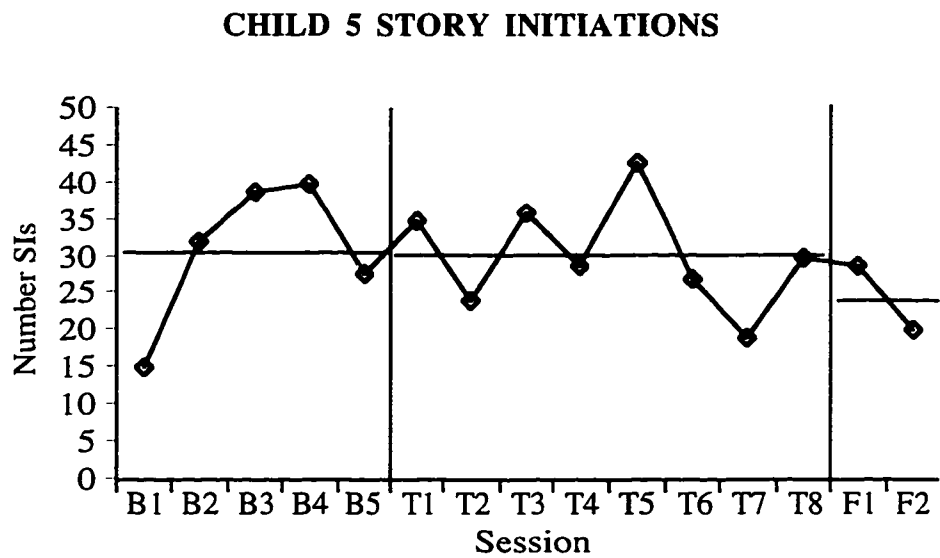
Semantic Diversity of Utterances. Child 5 exhibited an overall increase in semantic diversity when comparing baseline behaviors to training and follow-up (see Figure 48). At baseline Child 5 used only 3 semantic categories, those of indications, labels, and descriptions. This is contrasted by the addition of interpretations to Child 5's communicative behaviors during training. Also of note are the increases in frequency for the use of various semantic identifiers. Child 5 used a high number of indications at baseline (mean = 38; range = 21-53), comprising 79% of verbal and nonverbal communications. Throughout training Child 5 continued to use indications for approximately 46% of all communicative turns, with an average use of 37.25 (range = 19-54) per session. Labels (mean = 8; range = 5-10) accounted for 27% of verbal turns at baseline, but increased throughout training and follow-up for an average of 25.88 (range = 11-37) and 34 (range = 32-36) per session, respectively. Labels comprised 38% of Child 5's utterances during training and 46% of follow-up verbal turns. The average use of descriptions was 2.4 (range = 1-5) per session during baseline. Descriptions occurred in 23% of training utterances and 25% of follow-up utterances, with a mean use of 15.5 (range = 6-22) for training and 18.5 (range = 15-22) at follow-up. Interpretations emerged during training for an average of 0.88 (range = 1-3) per session and occurred 3 times in each of the follow-up sessions.

Child Changes in MLU. Child 5 demonstrated notable changes in MLU from baseline to treatment and follow-up (see Figure 49). Child 5 produced a baseline MLU of 1.43 morphemes. This is contrasted by a



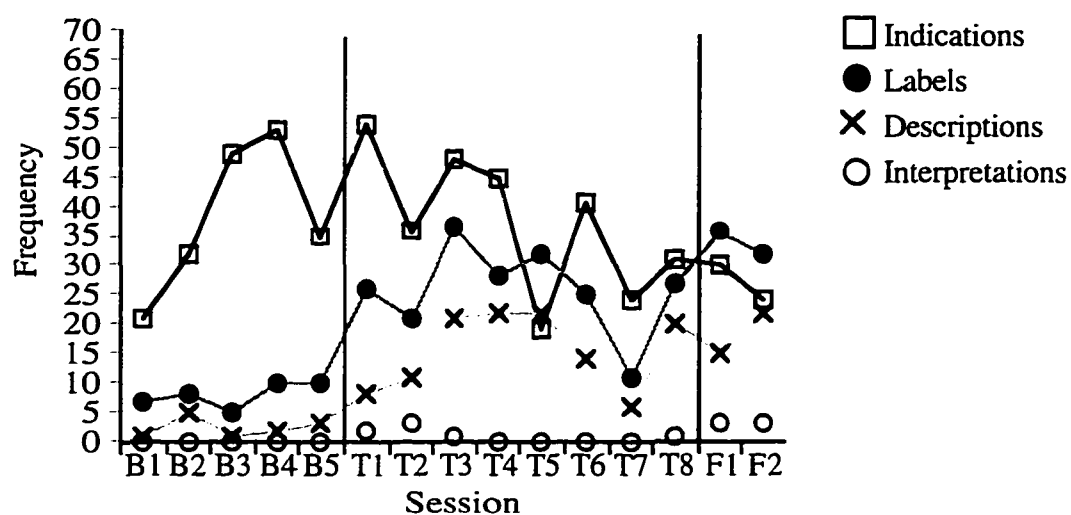


**Figure 46.** Number of verbal and nonverbal turns for Child 5 across baseline, training, and follow-up sessions.



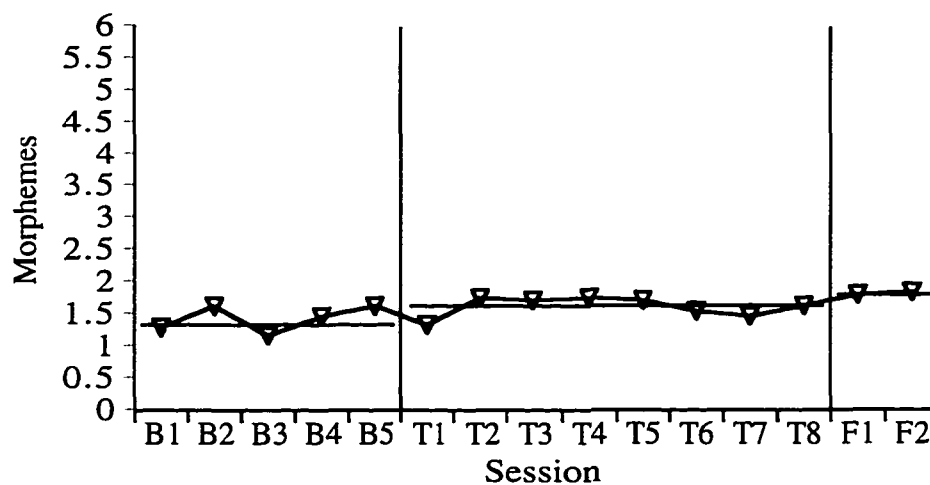
**Figure 47.** Number of story initiations (SIs) for Child 5 across baseline, training, and follow-up sessions.

### CHILD 5 SEMANTIC DIVERSITY



**Figure 48.** Semantic diversity of utterances for Child 5 across baseline, training, and follow-up sessions.

### CHILD 5 MLU



**Figure 49.** Mean length of utterance (MLU) in morphemes for Child 5 across baseline, training, and follow-up sessions.

noticeable increase in the average training MLU of 1.62 morphemes. Child 5 continued to show an increased MLU at follow-up, with an average of 1.81 morphemes computed. Overall changes in MLU were +0.19 morphemes from baseline to training, +0.19 morphemes from training to follow-up, and +0.38 morphemes from baseline to follow-up.

### Dyad 6

To determine whether parent training produced changes in the storybook reading behaviors of Dyad 6 subjects, data for dependent variables was collected throughout baseline, training, and follow-up sessions. Measures were plotted and graphed for visual inspection, with mean levels of performance designated by solid straight lines across each phase of the study completed by Dyad 6.

### Parent 6 Measures

Parent 6 demonstrated only minimal changes across the study phases. Baseline measures were relatively high and generally stable. There were small changes in the expected direction for CRCs completed and percent of parent turns taken. However, variable results occurred for parent responses to child story initiations and parent-child MLU differences, while parent reduction in MLU was opposite the expected direction of change.

Number of Complete Reading Cycles. Figure 50 illustrates the measured changes observed in CRCs. At baseline an average of 20 (range = 12-25) CRCs was completed. This increased minimally during training to a level of 20.38 (range = 12-26) CRCs per session. At follow-up there was a slight upward trend in CRCs with an average 22.5 (range - 21-24) per session. Because changes from baseline to training and follow-up were so small, parent training had little effect in increasing the number of CRCs for this dyad.

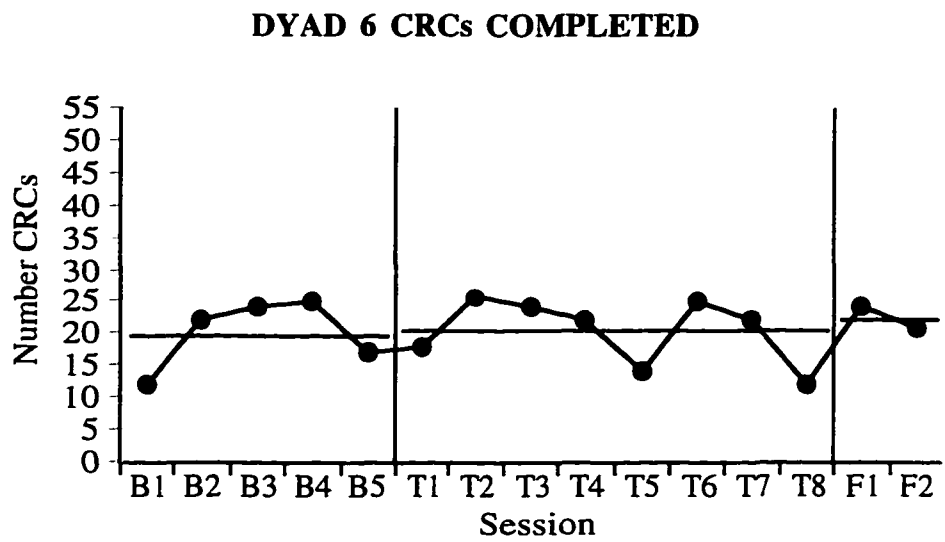
Percent of Parent Turns. The magnitude of change for the ratio of parent to child turns was small, with Parent 6 decreasing percent of turns taken only slightly from baseline to training and follow-up (see

Figure 51). Data for average parent turns taken resulted in 67.6% (range = 60%-78%) at baseline, 64.88% (range = 63%-67%) during training, and 62.5% (range = 61%-64%) for follow-up sessions. This represented a 2.7% decrease in parent turns from baseline to training and a 5.1% decrease from baseline to follow-up.

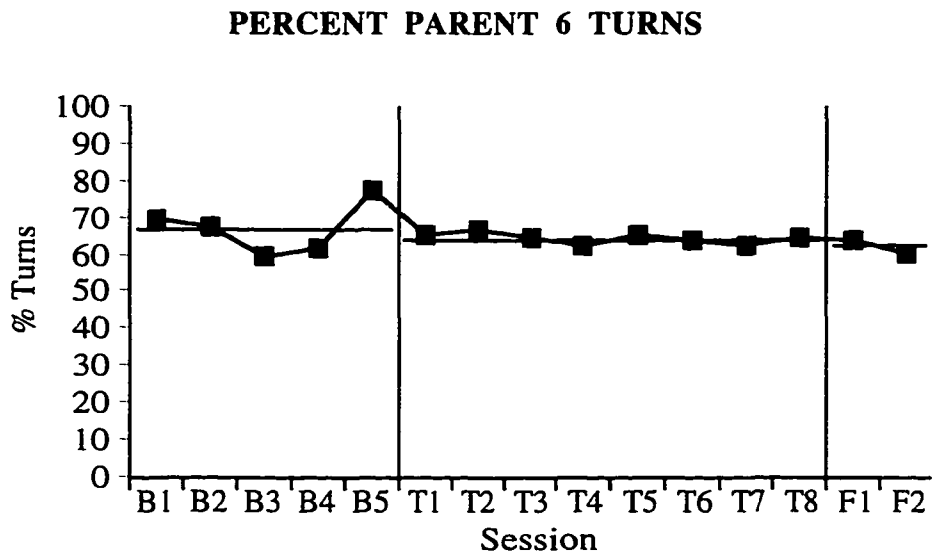
Parent Responses to Child Story Initiations. Parent 6 demonstrated a decrease in responding to Child 6's story initiations from baseline to training, but showed an increase at follow-up that exceeded baseline and training measures (see Figure 52). Parent 6 exhibited a high response rate to Child 6's topic initiations. Examination of the data indicated that Parent 6, on the average, responded to 89.6% (range = 75%-100%) of Child 6's story-related initiations during the baseline sessions. This was followed by a slight decrease in responding during treatment to an average of 86.8% (range = 75%-100%) parent responses to child story initiations. At follow-up Parent 6 increased responding to an average of 94% (range = 88%-100%), yielding an overall increase of 4.4% from baseline to follow-up. However, the 2.8% decrease from baseline to training limit statements regarding the effects of parent training in increasing Parent 6's responsiveness.

Parent Changes in MLU. Parent 6 showed a steady increase in MLU from baseline to training, and a continued increase into follow-up (see Figure 53). Parent 6's average baseline MLU was 5.80 (range = 5.25-6.20) morphemes. The average during training was calculated at 6.00 (range = 5.29-6.40) morphemes, with a follow-up MLU determined to be 6.07 (range = 5.84-6.30) morphemes, suggesting overall increases of 0.20 morphemes from baseline to training and 0.27 morphemes from baseline to follow-up.

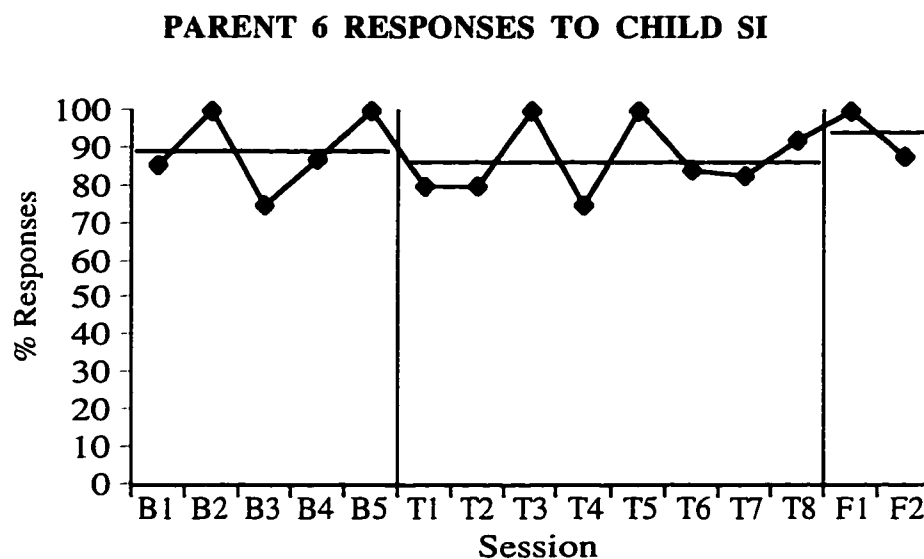
Difference in Parent-Child MLU. To determine whether observed increases in Parent 6's MLU resulted in a wider gap between parent and child MLU levels, differences between parent-child MLUs were calculated and compared. Figure 54 shows an upward then downward trend during



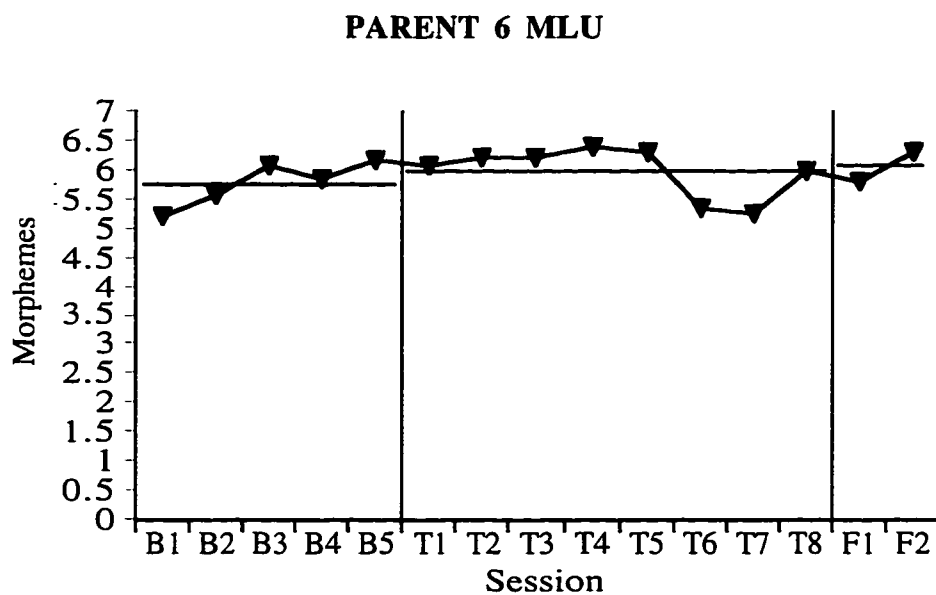
**Figure 50.** Number of complete reading cycles (CRCs) for Dyad 6 across baseline, training, and follow-up sessions.



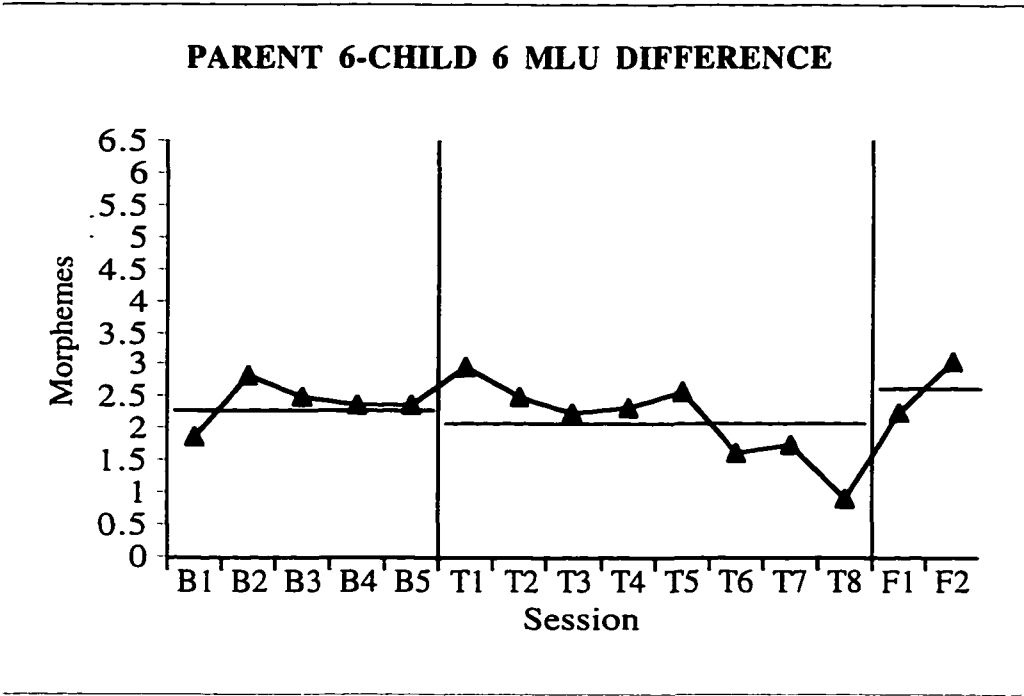
**Figure 51.** Percent of turns taken for Parent 6 across baseline, training, and follow-up sessions.



**Figure 52.** Percent of responses to child story initiations (SIs) for Parent 6 across baseline, training, and follow-up sessions.



**Figure 53.** Mean length of utterance (MLU) in morphemes for Parent 6 across baseline, training, and follow-up sessions.



**Figure 54.** Morpheme difference between Parent 6 and Child 6 mean length of utterance (MLU) across baseline, training, and follow-up sessions.

baseline, followed by a peak at T1 and a gradual decrease to a low at T8. The baseline average for the parent-child MLU difference was 2.40 (range = 1.89-2.85) morphemes. The data from training suggest a possible training effect as Parent 6 reduced the parent-child MLU difference (mean = 2.14) from a high of 2.97 at T1 to a small difference of 0.97 morphemes at T8. However, this was followed by a slight increase at follow-up for a mean difference of 2.64 (range = 2.23-3.04) morphemes.

#### Child 6 Measures

To determine whether parent training effected change in Child 6's communicative behaviors, measures for dependent variables were collected and graphically displayed for visual inspection. For each phase of the study, mean measurements were calculated and plotted using solid straight lines. Child 6 exhibited similar patterns of behaviors as noted with Parent 6. There was a general trend in the expected direction of change for communicative turns, semantic diversity, and MLU, with mixed results occurring for changes in story initiations.

Number of Communicative Turns. Child 6 exhibited a high number of verbal turns but a proportionally low number of nonverbal turns throughout all phases of the study (see Figure 55). The average nonverbal turns taken was 4 (range = 2-8) during baseline, 7.5 (range = 2-16) during training, and 11 (range = 6-16) at follow-up. Verbal turns averaged 36.6 (range = 17-50) at baseline, 43.9 (range = 37-47) during training, and 42 (range = 38-46) at follow-up. When calculated as percentage of turns, verbal turns constituted 90% of baseline, 86% of training, and 79% of follow-up communications during storybook reading. Although showing a decline in percentage of use across the three study phases, there was a general trend toward an increase in Child 6's total verbal turns. The mean increase was 7.28 verbal turns from baseline to training and 5.4 from baseline to follow-up, with total number of turns (nonverbal + verbal) increasing by more than 12 turns from baseline to follow-up.



Number of Child Story Initiations. Figure 56 illustrates the changes in Child 6's story-related initiations. Although Child 6 showed a slight change in story initiations from baseline to training (increase of 1 initiation), the number of initiations fell to baseline levels at follow-up. The mean story initiations were 16 (range = 8-24) for baseline, 17.13 (range = 10-28) for training, and 16 (range = 15-17) for follow-up.

Semantic Diversity of Utterances. The most notable changes for Child 6 occurred in the frequency and variety of semantic categories used from baseline to training and follow-up (see Figure 57). Child 6 consistently used indications (mean = 11.2; range = 9-15), labels (mean = 8.6; range = 2-15), and descriptions (mean = 16.4; range = 10-23) during baseline sessions, with interpretations (mean = 3.2; range = 1-7) used less frequently. Throughout training Child 6 added inferences (mean = 3.75; range = 0-10) and evaluations (mean = 0.88; range = 0-3), while increasing the use of baseline semantic categories. Indications represented 30% of verbal and nonverbal communications throughout training. During training, labels dropped to a mean of 5 (range = 1-9), as they were replaced by descriptions (mean = 12.25; range = 4-19) that accounted for 30% of training utterances. Interpretations increased to a mean use of 10.38 (range = 3-15) per session throughout training and constituted 24% of verbal communications during that phase. At follow-up semantic categories were represented at the following mean levels: indications, 11.5 (range = 10-13); labels, 7.5 (range = 7-8); descriptions, 17 (range = 12-22); interpretations, 3 (range = 2-4); inferences, 0.5 (range = 0-1); and evaluations, 0.5 (range = 0-1). Descriptions (40%) accounted for the most frequently occurring semantic category at follow-up, followed by indications (27%), labels (18%), and interpretations (7%). Inferences and evaluations each comprised 1% of follow-up utterances. Because Child 6 showed an immediate increase in semantic diversity and frequency of use for semantic categories at T1, it appeared that training effected notable change for this variable.

Child Changes in MLU. Child 6 also demonstrated increased MLU from baseline to training and follow-up. Figure 58 illustrates those changes. As can be seen, at baseline Child 6 exhibited a MLU of 3.40 (range = 2.74-3.82) morphemes. During training, however, Child 6's MLU increased to 3.86 (range = 3.13-5.08) morphemes for a gain of 0.46 morphemes over baseline levels. There was a slight decline at follow-up to 3.44 (range = 3.26-3.61) morphemes showing only a negligible gain over baseline levels.

### Summary

Across subject comparisons indicated that a number of parent and child behaviors changed as a result of parent training. Statistical analyses identified the following changes in parent dependent variables that reached levels of significance: number of scaffolded reading cycles completed, reduction in percent of parent turns, decreases in parent MLUs, and decreases in parent-child MLU differences. Statistical procedures identified the following changes in child variables that reached levels of significance: number of verbal turns, number of total communicative turns, increases in story initiations, and number of semantic categories used.

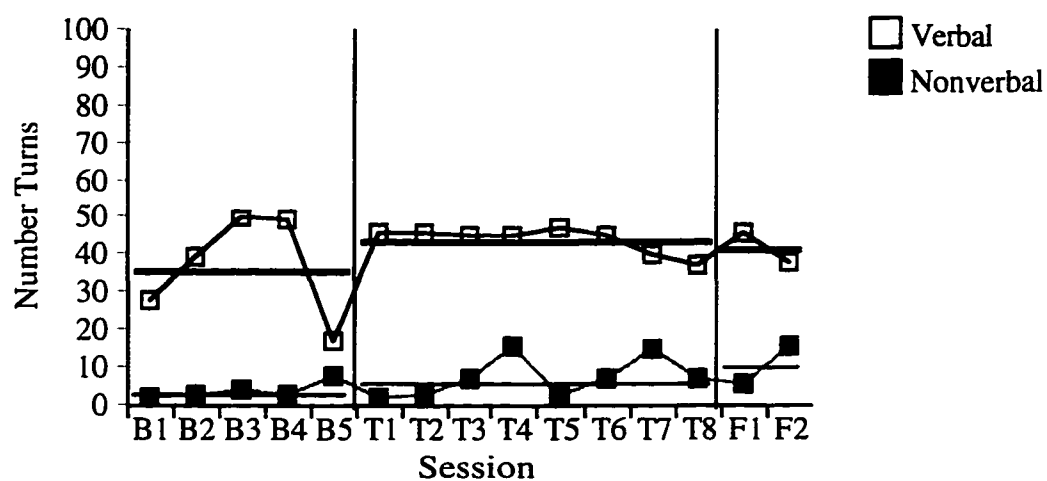
### Parent Measures

#### Number of Complete Reading Cycles

For each of the six parent subjects, the number of CRCs increased from baseline to training. These data are represented in Figure 59. The average increase for the six subjects was 18.9 (range = 0.38 to 29.5) CRCs from baseline to training. However, Parent 6, whose mean change in CRCs was +0.38 from baseline to training, changed less for this dependent variable than the other five subjects.

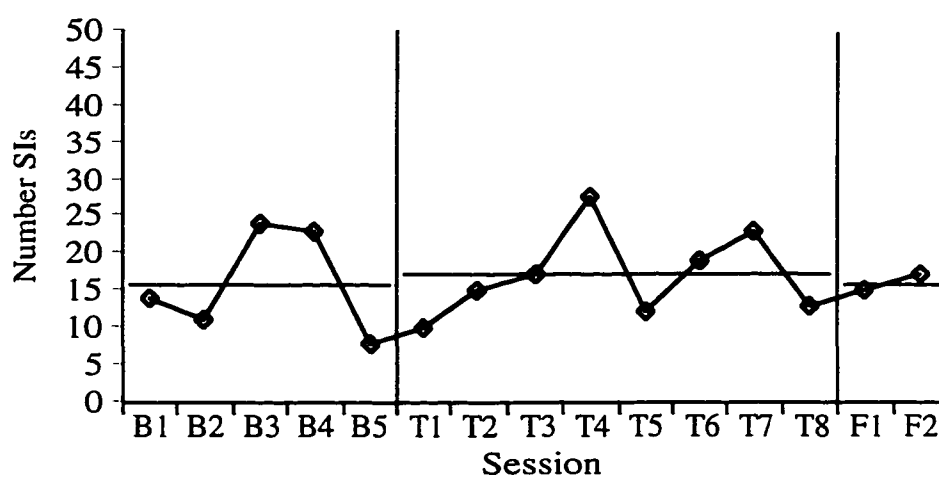
To determine whether parent training produced lasting effects on parent-child storybook reading once training terminated, two follow-up measures were completed. Dyad 3 dropped out of the study prior to follow-up. Dyad 1 and Dyad 5 showed decreases in CRCs from treatment

### CHILD 6 COMMUNICATIVE TURNS



**Figure 55.** Number of verbal and nonverbal turns for Child 6 across baseline, training, and follow-up sessions.

### CHILD 6 STORY INITIATIONS



**Figure 56.** Number of story initiations (SIs) for Child 6 across baseline, training, and follow-up sessions.

### CHILD 6 SEMANTIC DIVERSITY

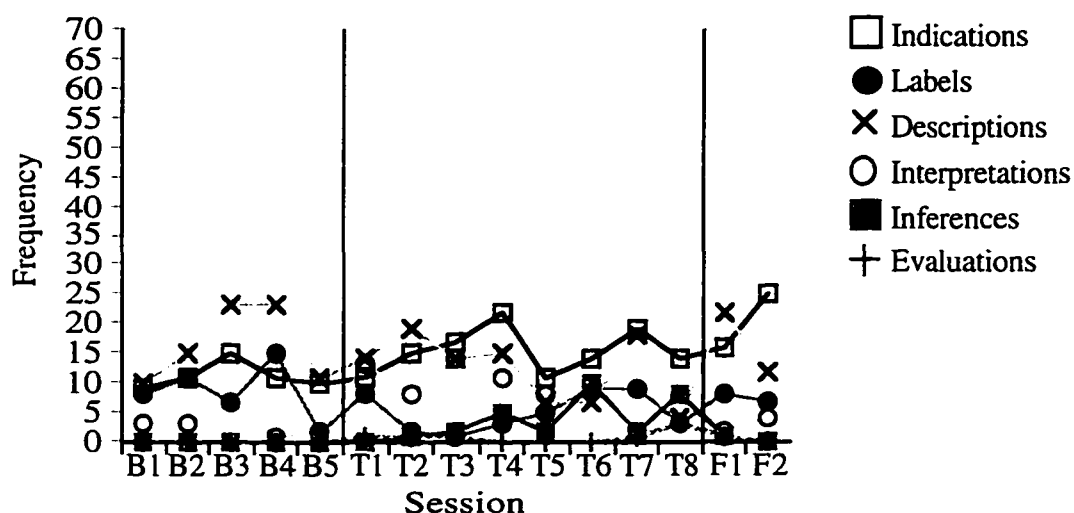


Figure 57. Semantic diversity of utterances for Child 6 across baseline, training, and follow-up sessions.

### CHILD 6 MLU

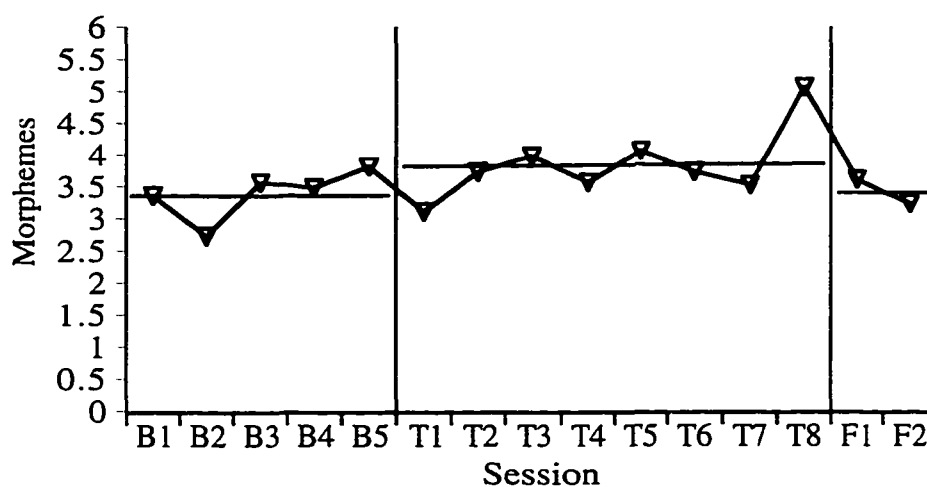


Figure 58. Mean length of utterance (MLU) in morphemes for Child 6 across baseline, training, and follow-up sessions.

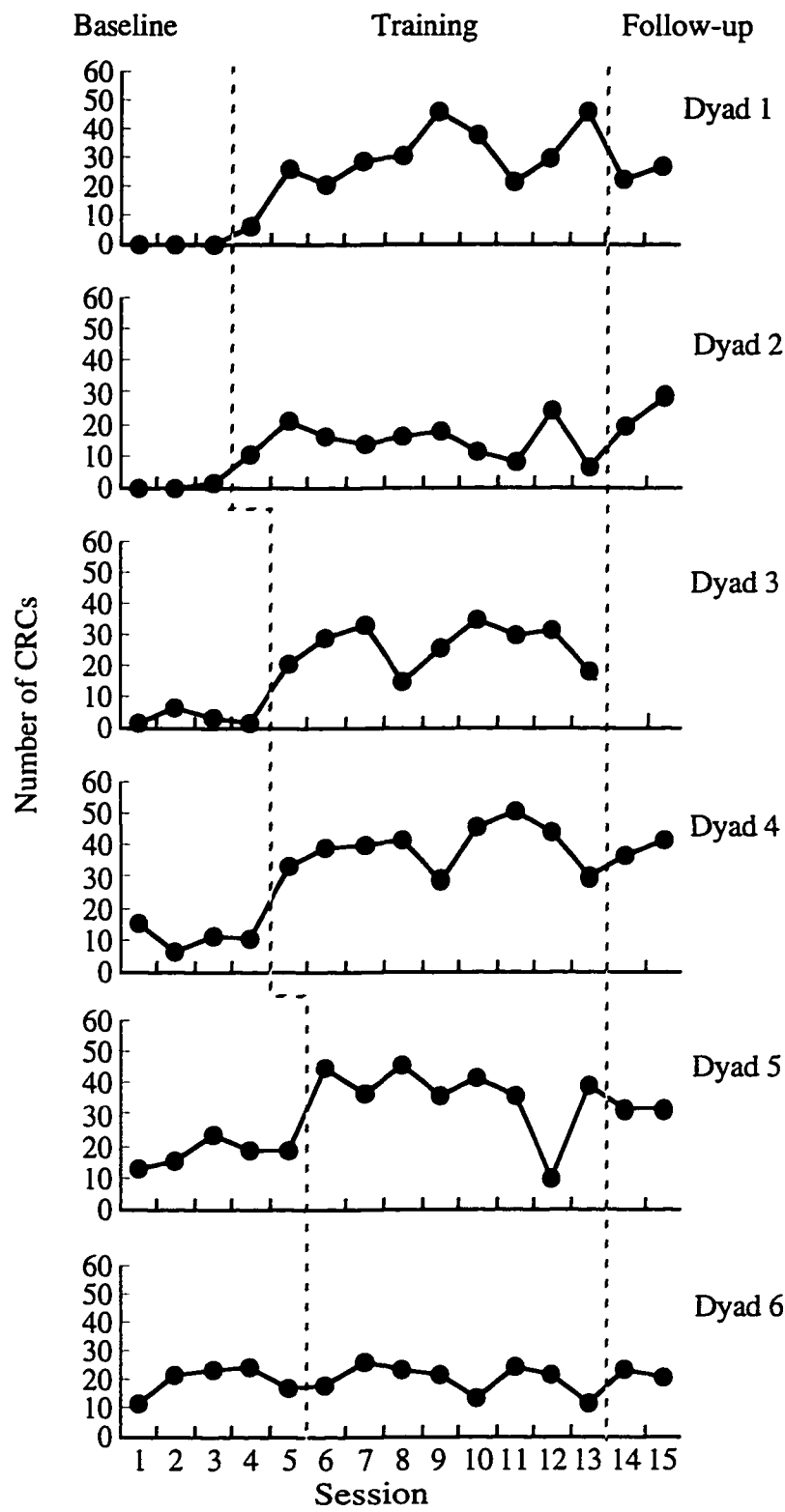
to follow-up, resulting in an overall mean increase of only 0.56 (range = -4.5-9.4) CRCs for the five dyads. However, comparison of baseline to follow-up measures show a mean increase of 18.6 (range = 2.5-28) CRCs across the five dyads. Thus it could be concluded that parent training resulted in an increased number of CRCs for these subjects, with training effects continuing when withdrawn.

#### Percent of Parent Turns

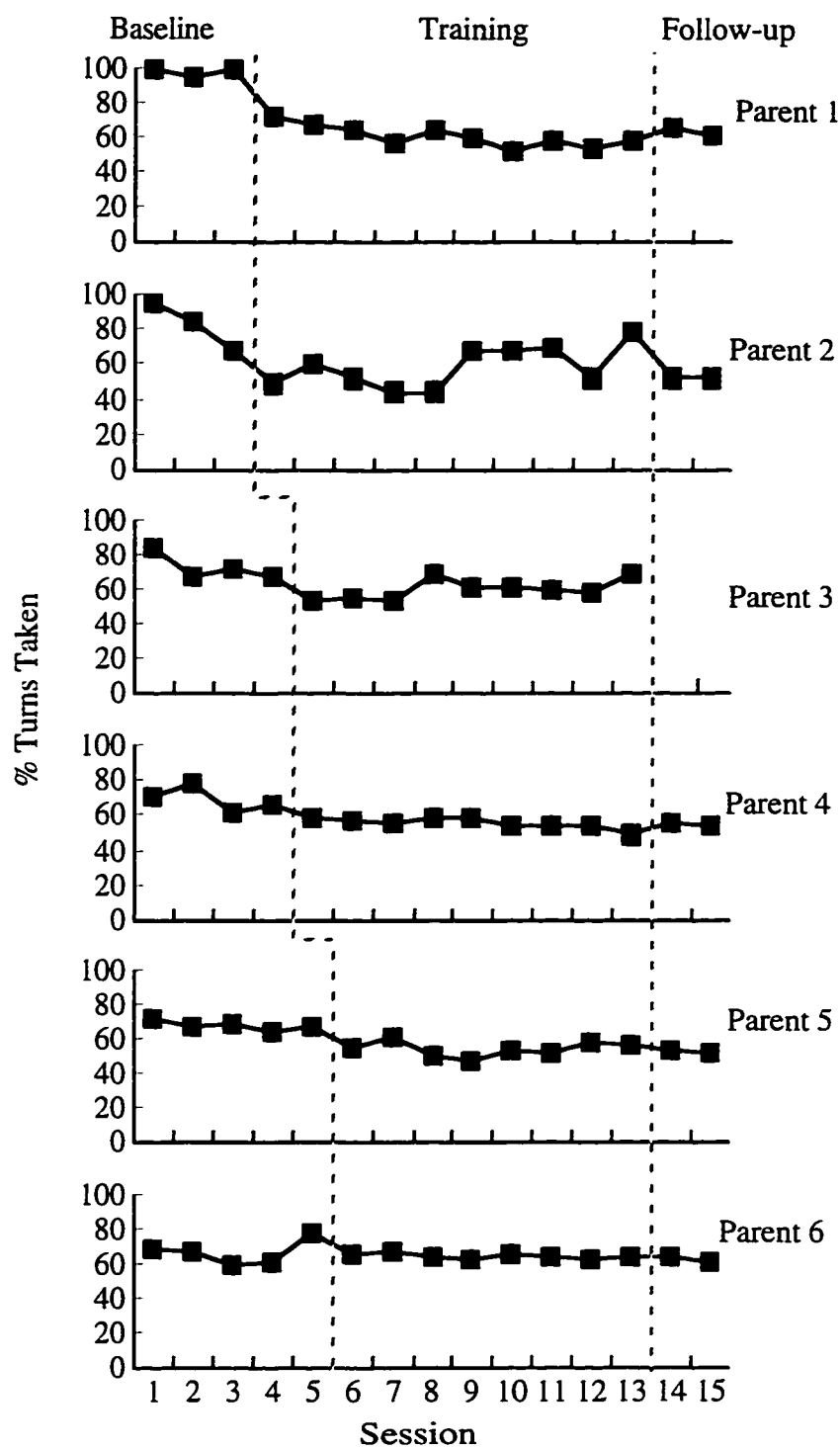
Data for percent of parent turns taken show all six parent subjects decreased their percent of turns taken from baseline to training (see Figure 60). The average decrease for parent to child turns was 17.3% (range = 2.72%-37.8%) for the six parent subjects during training. Comparison of training to follow-up for the five subjects who completed follow-up sessions, showed that Parent 1 increased the percent of turns taken by 2.6%, but all others showed a continued reduction in turn dominance for an average of 1.6% decrease in proportion of turns from training to follow-up. Average baseline to average follow-up comparisons for Parents 1, 2, 4, 5, and 6 showed a dramatic 19.9% (range = 5.1%-35.2%) decrease in percent of parent turns. These data suggest that parents were able to establish a more balanced turn-taking pattern with their child as a result of parent training, and that effects of training continued after parent training ended.

#### Parent Responses to Child Story Initiations

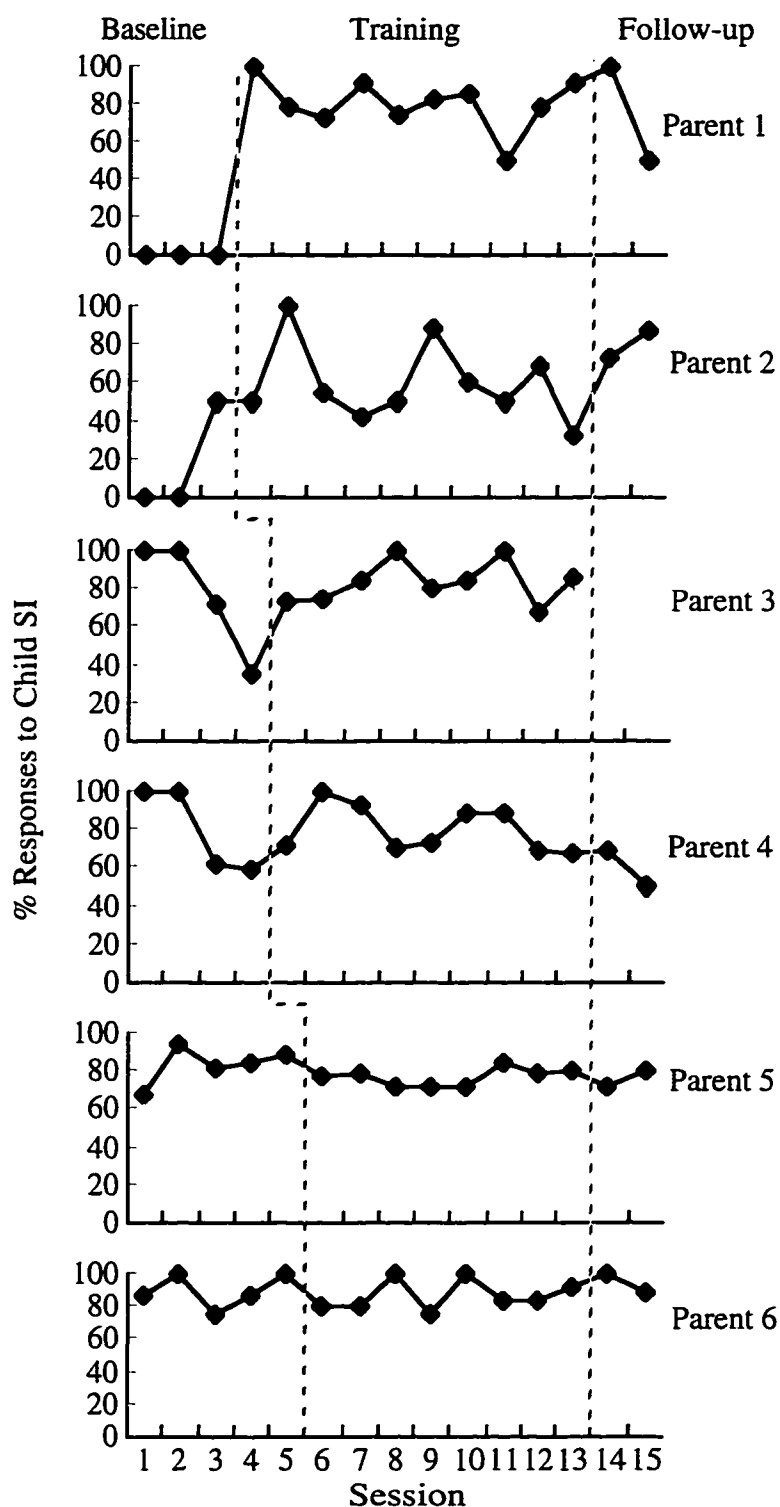
Data for parent responses to child story initiations showed variable results (see Figure 61). For Parent subjects 1, 2, 3, and 4, there appeared to be a rapid training effect, as the first 2 training sessions showed a significant increase in their responses to child initiations over final baseline measures. Mean increases were 30.75% (range = 0.05%-81%) for Subjects 1 through 4 and 18.97% (range = -6.4%-81%) for all six subjects from baseline to training. Results showed an average gain of 21.2% (range = -21%-75%) when comparing baseline to follow-up measures for the five subjects completing all 15 study sessions.



**Figure 59.** Number of complete reading cycles (CRCs) for subject dyads across baseline, training, and follow-up sessions.



**Figure 60.** Percent of turns taken for parent subjects across baseline, training, and follow-up sessions.



**Figure 61.** Percent of responses to child story initiations (SIs) for parent subjects across baseline, training, and follow-up sessions.



Examination of individual subject changes indicate Subject 4 started to decrease in responding to child initiations near the end of training and continued to decrease responding behaviors into follow-up. Subjects 5 and 6 showed either declines or no change from baseline to training and from training to follow-up. Data would suggest that for at least 3 subjects (i.e., Subjects 1, 2, and 3) parent training produced positive changes in parent-child storybook reading behaviors with regard to percent of parent responses to child story initiations. The data also suggest that for half the parent subjects, their responses to the children were high and remained high or they decreased their responding to the children's shifts in topic.

#### Parent Changes in MLU

Two measures of parent changes in MLU were examined to determine the effects of training on parent behaviors during storybook reading. These included overall changes in parent MLU in morphemes and differences in parent-child MLUs.

Baseline averages across all six subjects resulted in parent MLUs of 5.62 (range = 4.91-5.80) morphemes during storybook reading (see Figure 62). This is contrasted with their average training MLUs of 4.97 (range = 4.16-6.06) morphemes, a reduction of 0.65 morphemes. The five subjects who completed follow-up showed a continued decrease in overall MLU for an obtained average of 4.76 (range = 4.10-6.07) morphemes. This represented a decrease of 0.21 morphemes from training to follow-up, and an overall decrease of 0.86 morphemes from baseline to follow-up. However, Subject 2 showed MLU increases from baseline to training, as did Subject 6 who also increased MLU from training to follow-up. Closer inspection of the data show that Subject 2 started to decrease MLU in sessions 6 and 7, and then varied from session-to-session in overall length of utterances. Parent 6 reduced MLU at session 12, but then showed an increase again at session 13 and into follow-up. Therefore, it was important to look at the parent-child MLU difference to examine whether the increases in MLU for Subjects 2 and 6

resulted in wider gaps between parent and child grammatical complexity of utterances.

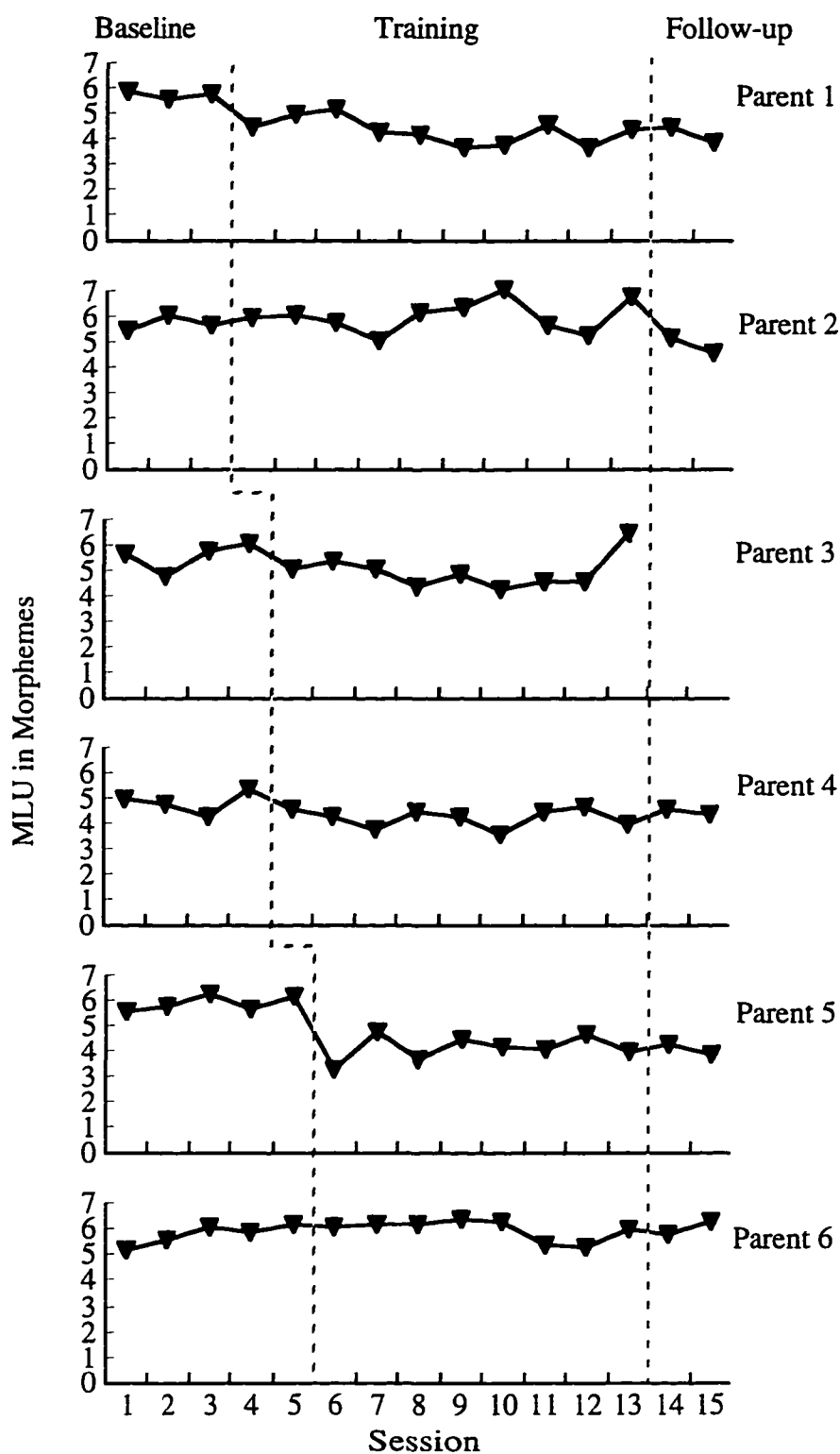
To determine whether parent changes in MLU resulted in a closer match to their respective child's MLU level, differences between parent and child MLUs were examined (see Figure 63). During baseline sessions average child MLUs were 1.75 (range = 1.00-3.40), with overall parent-child MLU differences calculated at 3.87 (range = 2.40-4.79) morphemes. However, average measures of MLU for training showed a narrowing of the parent-child MLU gap to a 2.86 (range = 2.14-3.46) morpheme difference. For this variable all six dyads showed a reduction in parent-child MLU difference when comparing baseline to training measurements.

Average parent-child differences computed for the five dyads completing all 15 training sessions were as follows: baseline = 3.78 morphemes, training = 2.73 morphemes, and follow-up = 2.68 morphemes. Parent subjects 4 and 6 showed slight increases in parent-child MLU difference from training to follow-up, but overall changes for the five dyads who completed follow-up indicated a more closely matched parent-child MLU. Baseline to follow-up comparisons showed a decrease in parent-child MLU difference by 1.10 morphemes, suggesting that as a result of parent training, all parents in the study were better at adjusting their linguistic complexity to be only slightly in advance of their child's language level.

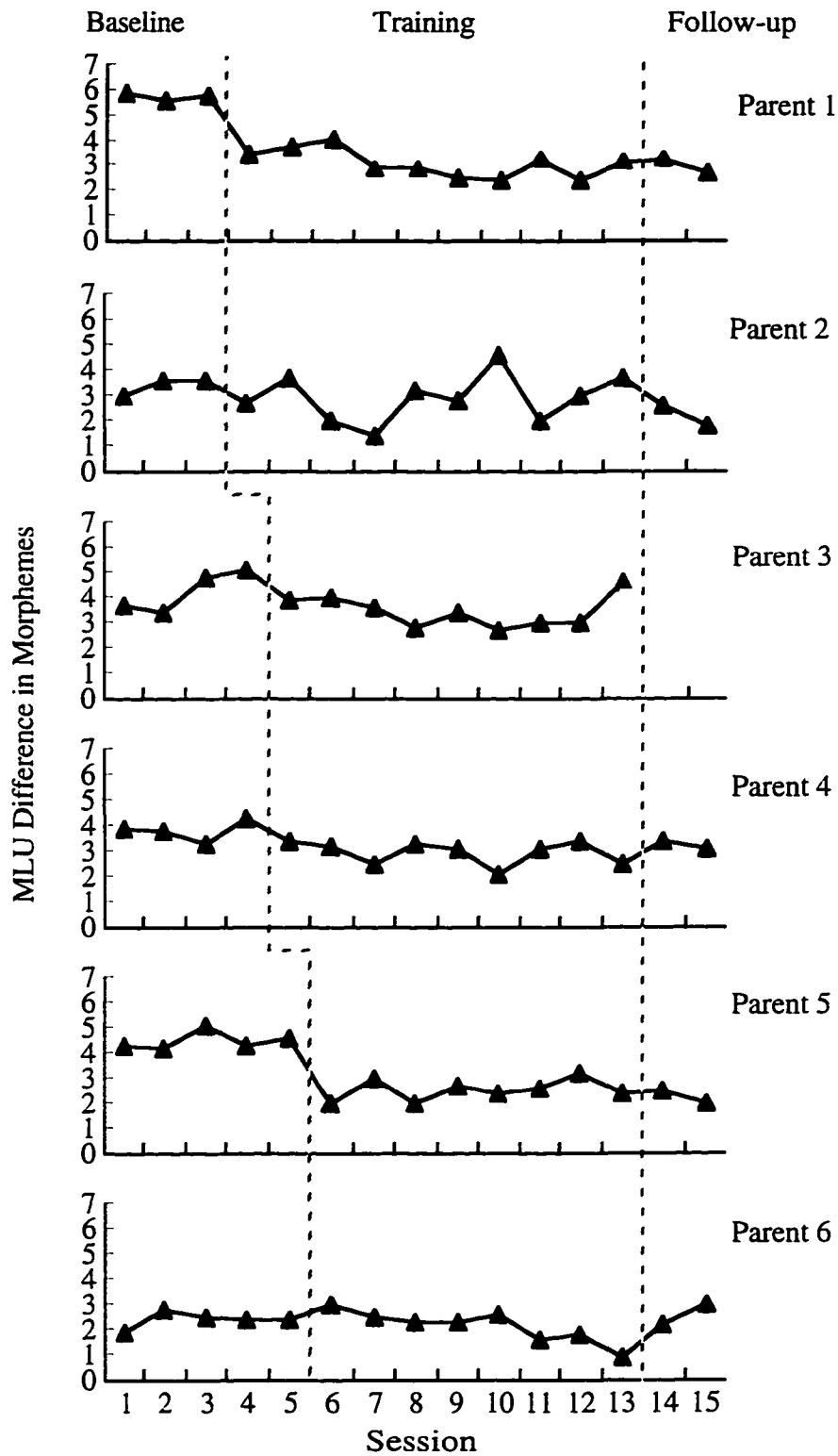
### Child Measures

#### Number of Communicative Turns

Data for the six child subjects show a marked increase in total number of communicative turns (see Figure 64). The average for child turns taken at baseline was 25.9 (range = 0.33-48.4). Child 1 showed the lowest number of turns (range = 0-1 nonverbal turns), while Child 5 took the highest number of turns (range = 29-63 total turns) during baseline sessions. When compared to number of turns during treatment (mean = 66.05; range = 43.9-92.9), all six child subjects increased communicative



**Figure 62.** Mean length of utterance (MLU) for parent subjects across baseline, training, and follow-up sessions.



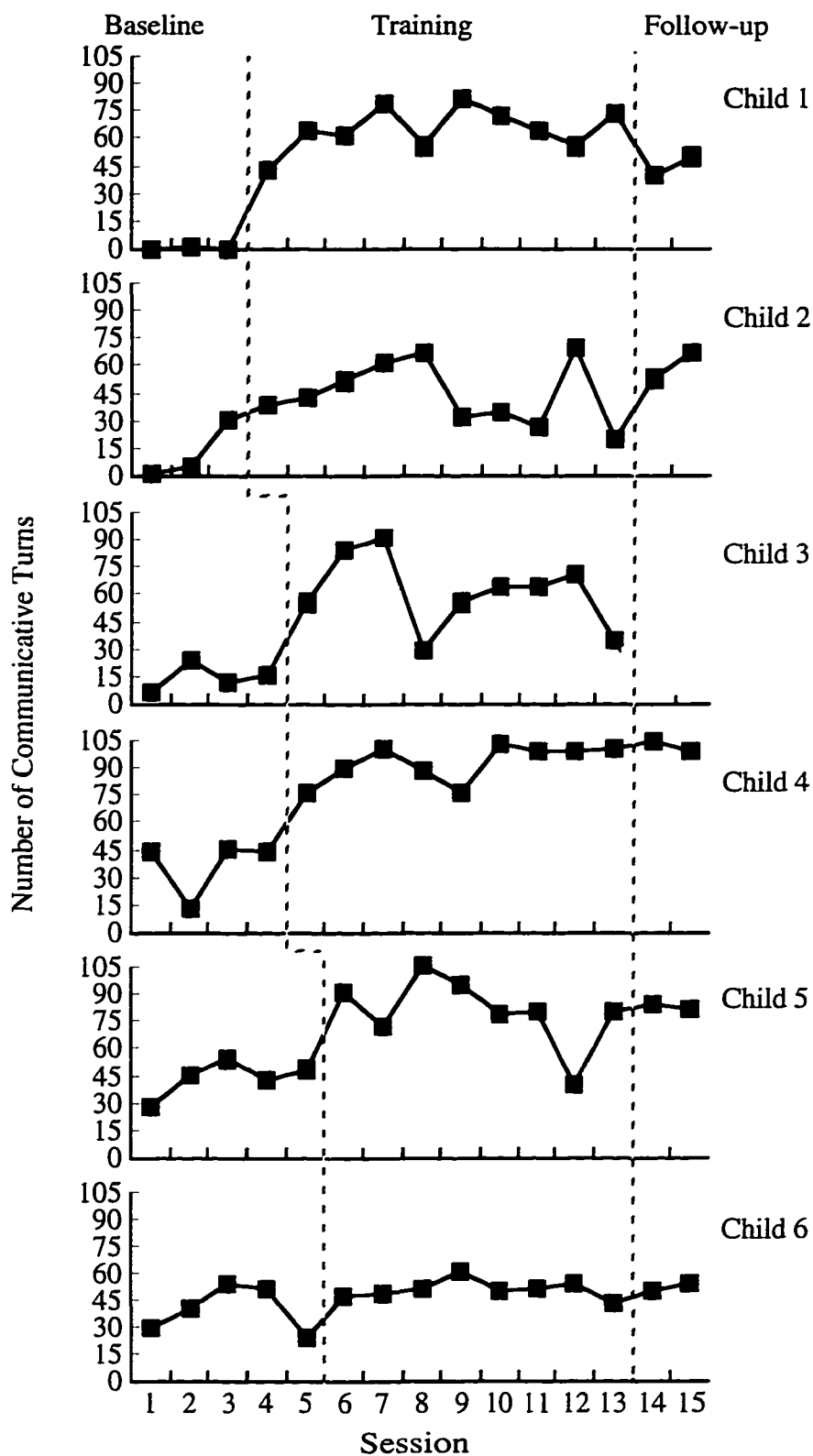
**Figure 63.** Morpheme difference between parent and child mean length of utterance (MLU) for all subjects across baseline, training, and follow-up sessions.

turns during storybook reading by an average of 41.5 turns. For the five subjects who completed follow-up sessions, the number of child communicative turns increased to 68.9 (range = 45.5-103) turns per session. This resulted in increases of 40.9 turns over baseline levels and 2.0 over training levels. These results for increases in child communicative turns would be expected considering the noted decreases in parent turns following parent training.

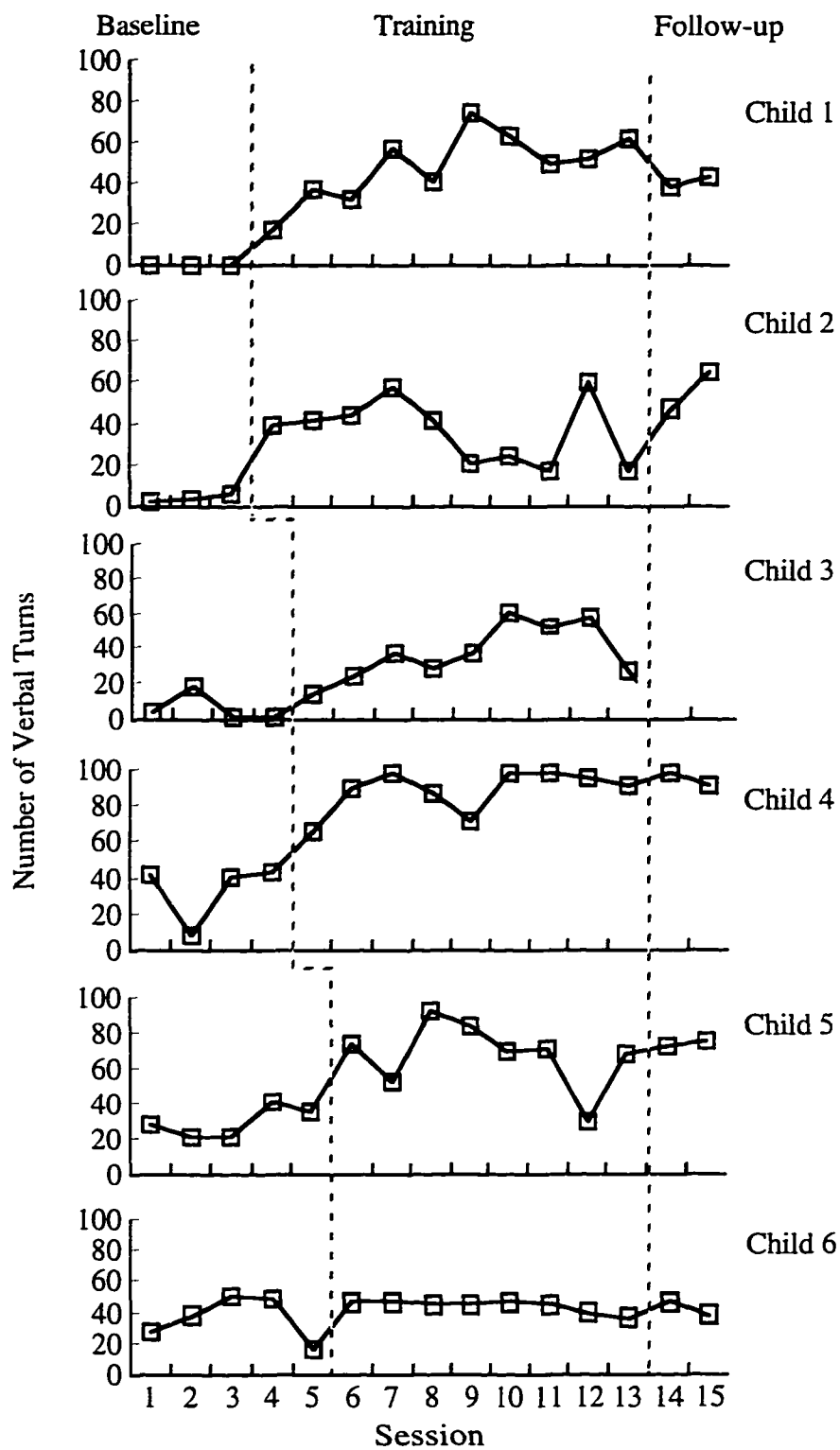
Also of interest for this investigation was the number of verbal turns for each child during parent-child storybook reading. As can be seen in Figure 65, all subjects showed an increase in verbal turns from baseline to training, and the five subjects who completed follow-up showed continuing increases at F1 and F2. The average number of verbal turns for child subjects was 18.6 (range = 0-36.6) at baseline, 54 (range = 36.8-88.6) during training, and 61.9 (range = 41.5-95) at follow-up. Comparison across study phases shows an increase in child verbal turns of 4.6 from training to follow-up and 40.9 from baseline to follow-up. The data suggest child subjects increased verbal turns during parent-child storybook reading as a result of changes in parent communicative behaviors, with continued positive effects in number of turns taken when training ended.

#### Number of Story Initiations

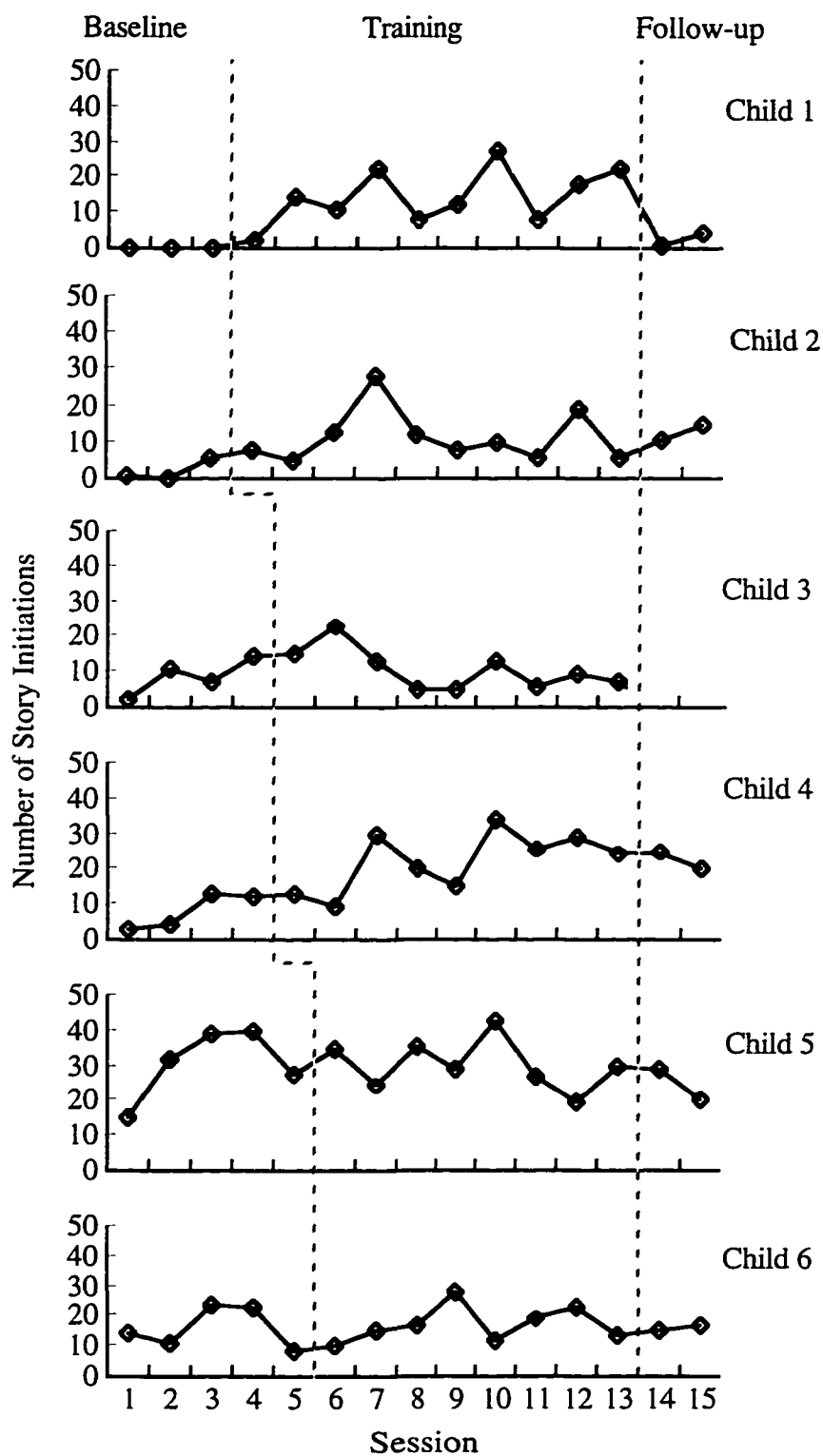
Data for the six child subjects show variable results in number of story initiations produced during parent-child storybook reading. Subjects 1, 2, 3, and 4 showed marked average changes when comparing baseline (mean = 6.3; range = 0-8.5) to training (mean = 18.13; range = 11.5 - 24.3) measures for those subjects. However, consistent initiations were not achieved across subjects as Figure 66 illustrates. Also of note was the consistently high number of story initiations produced by Subjects 5 and 6 throughout baseline, suggesting they entered the study with a greater facility for active participation in storybook reading.



**Figure 64.** Total number of communicative turns for child subjects across baseline, training, and follow-up sessions.



**Figure 65.** Number of verbal turns for child subjects across baseline, training, and follow-up sessions.



**Figure 66.** Number of story initiations for child subjects across baseline, training, and follow-up sessions.



### Semantic Diversity of Utterances

There was great variability in the frequency and variety of semantic context levels used by the child subjects. As can be seen in Table 8, Child 1 had no opportunities to verbalize during baseline sessions. In contrast Child 6 used four semantic categories consistently at baseline. Child 2 and Child 3 used primarily one semantic category, indications, at baseline, while Child 4 and Child 5 were using two semantic categories, indications and labels, for the majority of their storybook communications.

Beginning at T1 all subjects either added a semantic category or increased the frequency of use of their highest baseline category. This trend continued throughout training and into follow-up sessions. Child 1 added consistent use of three semantic categories from baseline to treatment and follow-up. Child 2 added two semantic categories, descriptions and interpretations, from baseline to training and follow-up and demonstrated emerging use of inferences during training. Child 3 added consistent use of labels and descriptions during training, and exhibited beginning use of interpretations from T3 to T9. Child 4 added consistent use of descriptions and beginning use of interpretations during training that was maintained above baseline levels into follow-up sessions. Child 5 showed increased use of descriptions during training and demonstrated emerging use of interpretations that had not been present in baseline utterances. Child 6 increased semantic complexity of utterances to include consistent use of interpretations and emerging use of inferences and evaluations during training and throughout follow-up sessions. Overall, these children showed marked changes in the frequency and variety in the semantic levels of storybook reading behaviors as a result of parent changes in communicative behavior following parent training.

Table 8

**Mean Frequency of Semantic Levels for Child Subjects at Baseline, Training, and Follow-up**

Semantic Level	Subject					
	1	2	3 <sup>a</sup>	4	5	6
<b>Indications<sup>b</sup></b>						
Baseline	0.33	9.67	9.00	14.75	38.00	11.20
Training	26.10	15.90	30.89	32.33	37.25	15.38
Follow-up	10.50	14.50	- -	27.00	27.00	20.50
<b>Labels</b>						
Baseline	0.00	1.00	1.25	20.75	8.00	8.60
Training	33.40	9.60	24.78	38.46	25.88	5.00
Follow-up	31.00	27.00	- -	64.50	34.00	7.50
<b>Descriptions</b>						
Baseline	0.00	0.67	0.75	0.75	2.40	16.40
Training	7.38	9.60	4.78	14.11	15.50	12.25
Follow-up	2.00	8.50	- -	7.00	18.50	17.00
<b>Interpretations</b>						
Baseline	0.00	0.00	0.00	0.00	0.00	3.20
Training	0.00	4.20	1.33	5.22	0.88	10.38
Follow-up	0.00	2.50	- -	2.00	3.00	3.00
<b>Inferences</b>						
Baseline	0.00	0.00	0.00	0.00	0.00	0.00
Training	0.00	0.50	0.00	0.00	0.00	3.75
Follow-up	0.00	0.00	- -	0.00	0.00	0.50
<b>Evaluations</b>						
Baseline	0.00	0.00	0.00	0.00	0.00	0.00
Training	0.00	0.00	0.00	0.00	0.00	0.88
Follow-up	0.00	0.00	- -	0.00	0.00	0.50

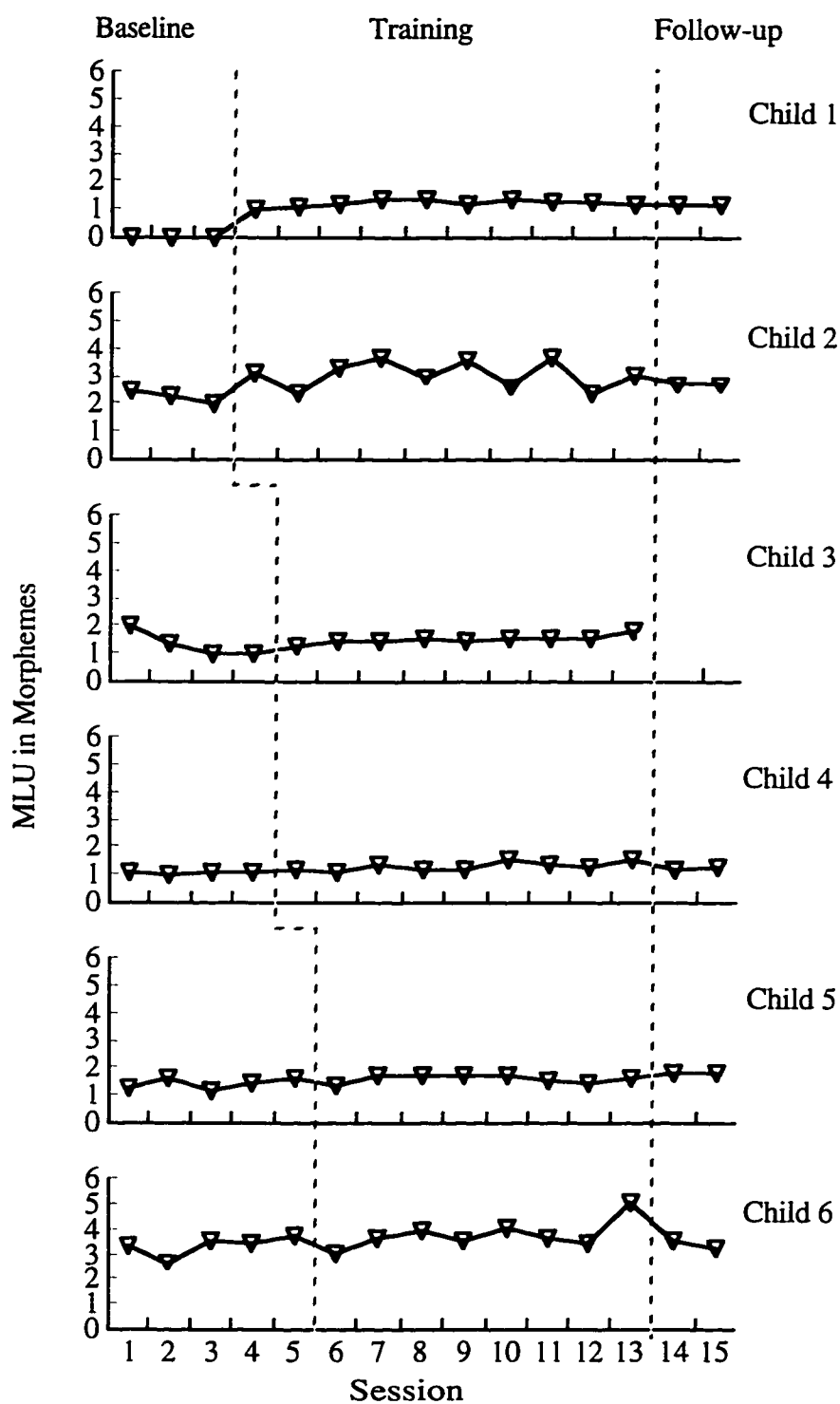
**Note.** <sup>a</sup>Subject 3 did not complete follow-up sessions. <sup>b</sup>Indications include combined verbal and nonverbal communications.

### Child Changes in MLU

Data for child changes in MLU are graphically displayed in Figure 67. As can be seen there were only small, positive changes in MLU for all six subjects. The average baseline MLU for the six child subjects was 1.58 (range = 0.00-3.40) morphemes. This is contrasted with an average training MLU of 2.11 (range= 1.22-3.86) morphemes, for a 0.53 morpheme increase from baseline to follow-up. Comparison of training measures to follow-up measures for the five subjects completing all 15 study sessions show an average decrease in MLU of 0.14 morphemes. However, baseline to follow-up comparisons of the same five subjects indicate an overall gain of 0.45 morphemes from baseline levels.

### Parent-Child Comparisons

Comparison of parent changes to observed child changes in dependent variables during parent-child storybook reading, revealed that as parents relinquished the number of turns taken there were subsequent increases in child verbal turns, and for at least four child subjects (i.e., Subjects 1, 2, 3, and 4) there were also increases in story-related initiations. Parent responses to child story initiations, however, were not consistent across subjects and appear to have been affected by total number of story initiations by the child and whether the initiations served to focus on a topic. The more random the child's initiation the less consistent was their parents responding behavior. It might also be surmised that the increase in the number of CRCs resulted from providing a better situational context and was facilitated by establishing a more balanced turn-taking pattern between the parent and child. Parents afforded more opportunities for the children to engage in the storybook reading while following a four-step sequence of focusing attention, providing a query, eliciting a response, and providing feedback. Child changes in semantic diversity suggest an increased attention to detail that most likely was facilitated by the parent's focus on new information and finding ways to actively engage the child in reading the same storybook



**Figure 67.** Mean length of utterance (MLU) in morphemes for child subjects across baseline, training, and follow-up sessions.

multiple times. It would also appear there was a reciprocal and step-wise effect of parent-child MLU changes. When parents reduced the length of their utterances initially, children began to increase their utterance length. In response, parents again increased their own MLU while maintaining an overall better match of parent to child utterance length when compared to baseline MLU differences.

Overall, subjects demonstrated considerable variability and unique reading styles across all dyads. Results suggest that all parents and children in the study changed their storybook reading behavior following parent training. Interpretation of those changes will be discussed in greater detail in the following chapter.

## DISCUSSION

The purpose of this study was to assess the efficacy of a parent training program based on the routine event of parent-child storybook reading. The controlled repetitive context that storybook reading provides was considered ideal for children's language learning and for training parents to use patterns of interaction that facilitate this learning (Snow & Goldfield, 1983). Parents were taught to use patterns that followed a format termed complete reading cycles (CRCs) (Ninio & Bruner, 1978). Complete reading cycles were composed of evoking attention to a picture or other storybook related text, requesting information, responding to the query, and acknowledging through feedback. This paradigm was placed within the framework of a model that reflected the integration of development across the cognitive, social, linguistic, and sensory motor domains that work in coordination to result in language learning and use. This model, comprised of Situational, Discourse, and Semantic (SDS) contexts, was used to analyze the interactions occurring between parents and their children with specific language impairments for changes in the patterns of interaction and language use occurring during storybook reading as a result of parent training.

Changes in the patterns of interaction and language use were measured by comparing the number of complete reading cycles produced, the information talked about, ratio of turns taken by each participant, the communicative initiations produced by the child and responded to by the parent, and the mean length of utterance produced by each participant at three phases of the study. These phases included a baseline period, an eight-to-ten session intervention phase, and a postintervention phase where training was withdrawn. It was hypothesized that parent training using the scaffolded complete reading cycle procedure would (a) increase parent use of language facilitating strategies, (b) improve child language abilities, and (c) produce continued positive effects once training stopped.

The results of this study will be discussed according to the three hypotheses of the investigation. This will be followed by an interpretation of the results using the SDS model.

#### Parents' Use of Language Facilitating Strategies

The measures related to parents' use of language facilitating strategies included responding to more of the initiations produced by their children, reducing the mean length of utterance (MLU), matching the mean length of utterance to be only slightly above the level produced by the child, reducing the dominance of the storybook reading by engaging in a balanced ratio of storybook reading, and supporting the child's active participation in storybook reading by producing a greater number of complete reading cycles during each session. Patterns of change for each variable will be presented first. This will be followed by an interpretation of the patterns when the interactive dynamics are interpreted using the Situational-Discourse-Semantic model.

It was hypothesized that parent training using a scaffolded complete reading cycle procedure would be effective in increasing parent use of language facilitating strategies. In across subject comparisons, four of the five parent dependent variables reached levels of significance. Parents demonstrated significant differences as a result of parent training for number of CRCs completed, percent of parent communicative turns, changes in MLU, and parent-child MLU difference. Parent changes in percent of responses to child story initiations did not reach levels of significance.

Analysis of within subject changes for number of CRCs completed indicated all six parents increased the number of CRCs. However one parent showed only a slight change.

Measures for percent of parent turns taken resulted in five of six subjects demonstrating notable decreases in their proportion of communicative turns. One parent showed only slight decreases in percent of turns taken from baseline to training.

Three of six parents increased their proportion of responses to the child's story initiations. Two of six parents made no changes, and one parent showed a decrease in the percent of responses to child initiations.

Parent MLUs were analyzed in two ways to identify changes as a result of parent training. Four of the six parents decreased their average utterance length, while two parents showed increases in overall MLU. However, examination of the parent-child MLU difference showed that all six parents were more closely matched to their child's language level with regard to utterance length.

In summary, two of the five measures of parent's use of language facilitating strategies showed a measurable increase for all six parents during the intervention. These two measures were maintained above baseline levels when treatment was discontinued for the five subjects who completed follow-up sessions. One measure, percent of turns taken, decreased for five of the parents, with continuing decreases observed at follow-up for four of those five who were still in the study. Decreases in MLU were exhibited by four parents, with three showing continued decreases at follow-up. The fifth measure, parent responses to child story initiations increased for half the subjects, while two parents showed no change, and one decreased in percent of responding.

#### Situational Context

Analysis of parent behaviors revealed that parent training was effective in changing the way parents use storybooks to establish a Situational Context for language development. At baseline, all six parents engaged in reading the text, with five of the six parents using a combination of reading the text and pointing to or labeling the pictures. For at least one dyad, this level of displacement appeared appropriate, as evidenced by the high number of CRCs completed and the number of story initiations produced by the child during baseline and throughout the study. For three dyads, however, the children made few or no initiations at baseline, and the parent-child dyad completed a low number of CRCs.



This would suggest the level of contextual support provided was too displaced for the child to understand and talk about. The two remaining dyads in the study showed mixed results in that both dyads completed some CRCs, with one child making frequent story initiations and the other child producing a low number of initiations. For these two dyads, each parent was providing some contextual support, but not consistently.

Parents were not able to make modifications in the situational context prior to parent training. During the baseline phase, repeated reading of storybooks alone did not result in the creation of a situational context that was conducive to learning for five of the six children.

As a consequence of training, five of the parents reduced the level of the Situational Context to enable their children to actively participate in the storybook reading. They made the book an object to act on the child, modeled actions on the book for the child to imitate, encouraged the child to perform actions on the book, and increased the frequency with which they pointed to the pictures. In doing so, all five parents were able to identify a more appropriate ZPD, working flexibly between the child's lower and upper end of the zone. This resulted in increased child story initiations and number of CRCs completed throughout training, with stable levels maintained at follow-up.

These findings support previous investigations examining parents' use of techniques to establish context and a focal point for interaction. Past research reports that parent's use evocative techniques such as verbal and gestural cues to establish a focus or context for storybook reading (Arnold, Lonigan, Whitehurst, & Epstein, 1994; Panofsky, 1986). Parents point out salient information provided by the pictures. Other researchers have found that parents of children with speech and language impairments use reading the text and pointing to pictures as the primary strategy for establishing a context for storybook reading (Marvin, 1994). However, this investigation demonstrated that for some children merely pointing to the pictures did not provide a sufficiently supportive

situational context to afford the child active engagement in storybook reading. Instead, this study illustrated the equal contributions the parent and child in establishing a language supporting situational context. The adult must be able to adapt and adjust the manner in which the book is used and shared with the child to achieve a level of displacement at which the child can learn.

### Discourse Context

Examination of parent behaviors revealed that parent training was effective in changing parent storybook interactions to result in shared maintenance and development of a topic within the Discourse Context. At baseline, storybook reading was comprised of a high level of parent monologue, and all six parents took more storybook reading turns than their respective children. One parent read the book from cover-to-cover without stopping or attempting to engage the child in the storybook reading. This was evidenced by a high parent turn-taking ratio and no parent responses to child initiations. Three of the parents used directing behaviors and closed-ended questioning techniques as engagement strategies, thus placing the child in a more passive listener and single-word responder role. For these dyads, parent turns were high and responses to child initiations were low. The two remaining dyads used a greater variety of communicative roles. These included some directing mixed with reading the text, asking closed-ended questions, and responding to their children's story initiations. This would suggest that there was a continuum of turn-taking patterns exhibited by the parents, with those at one end controlling the interactions while engaged in monologues. Others presented varying levels of communicative engagement techniques and limited dialogue.

Baseline measures indicated each dyad had well established interaction patterns for storybook reading prior to parent training. All parents dominated the interactions by taking the majority of the communicative turns. Communicative roles, although different across

dyads, were clearly defined with all parents making more initiations and asking more questions than their respective children. By maintaining control of the storybook and asking questions, the parents did not provide a supportive discourse context to allow their children active participation in the storybook reading. The stability of the measures indicate the parents were unable to modify the patterns of interaction within the Discourse context prior to parent training. This was due, in part, to the situational context being too advanced for the children; therefore, the children could not respond to parents' bids for more active participation.

Parent training effected change in all six parents' turn-taking behaviors and communicative roles. As a consequence of parent training, the percent of parent turns decreased, with simultaneous changes in parent and child communicative roles. These more facilitative interaction styles allowed the children to actively participate in the storybook reading. Parents spent less time reading the text and engaged in frequent episodes of conversation using elaborating and questioning techniques to talk about the people, objects, and events depicted in the pictures. This resulted in longer topic maintenance with more time and a greater number of opportunities for children to comment or ask questions. The use of questions continued throughout training with types of questions transitioning from questions to elicit information about discrete elements of the story to a level of questioning that elicited retelling parts of the story.

For four of the six parents there was an increase in responding to the child's story initiations. Two parents, however, reduced responses to child initiations as a result of parent training. For these dyads, the changes were considered appropriate, as the children made frequent and random changes in their objects of focus without pausing to elaborate or develop the topic. By ignoring some of the children's topic shifts, these two parents were able to increase the time spent in discussing information depicted on each page. For all six parents, assuming and modeling a

variety of communicative roles (e.g., initiator, responder, informer, elaborator, and so on) and reducing the number of communicative turns taken provided increased opportunities for their children to contribute equally to the storybook reading. This resulted in increased child verbal turns and total turns taken across all six child subjects.

Roser and Martinez (1985) reported that children's response to literature is influenced by the role the adult assumes during parent-child storybook reading. If the adult is a co-responder, then the child contributes equally. Adults who act as informers explain aspects of the story, while the child is assigned a more passive participant role. When the adult manages or directs the reading, the child becomes a responder or passive listener. These authors maintained that for children to expand their conversational functions in the context of storybook reading, parents need to use a variety of communicative roles. The current investigation would support this literature in that a rigid communicative role assumed by parent or child can be a barrier to language facilitation and development. However, this study also demonstrated that parents can be trained to alter their discourse patterns by balancing the interactions and changing their engagement strategies, with resultant increases in child language productivity.

#### Semantic Context

Analysis of parent behaviors demonstrated that parent training resulted in positive changes in the way parents use storybooks to create a Semantic Context for language development. At baseline, all six parents exhibited similar MLUs across subjects. Their utterances closely matched the number of words for the baseline storybook, suggesting all parents primarily used reading the text to convey the meaning. In doing so, a gap was produced between parent and child language levels. This would suggest the level of semantic complexity exhibited by the parent was not well matched to the semantic complexity expressed by the child.

The consistency with which parents maintained high MLUs at levels considerably different from their respective children indicate the parents were unable to modify the semantic context prior to parent training. As a result of this mismatch between parent and child MLU, child MLUs did not change across baseline, nor did the semantic level of their utterances show any notable degree of change.

As a consequence of training, four of the six parents reduced their MLU, while two of the six showed increases. However, closer examination of changes in parent MLU indicate there was a reciprocal and step-wise effect of parent and child MLU changes. When parents initially reduced the length of their utterances during training, children began to show increases in MLU. In response, parents again increased their own MLU while maintaining an overall better match of parent and child utterance length. Five of the six parents modified their utterance length by spending less time in reading the text and engaging in more frequent episodes of labeling and commenting behavior to limit the information presented to the child. Parents also increased the use of short, simple questions (e.g., “Where’s Critter?” and “What’s Critter doing?”) that further reduced the semantic level of information supplied for and requested of the child.

Further evidence to support the facilitating effects of the closer language match occurred as each child began to increase the semantic level of their responses to storybook reading. All six children increased the level of meaning expressed during storybook reading by at least one semantic level as a result of parent training, and three children increased the level of meaning for story-related utterances by two semantic categories from baseline to training. The reciprocal effects of parent and child change were clearly evident for these parent measures. By engaging in more frequent discussions about the storybook the parents reduced their utterances to more closely match the child’s level. As the child showed language change, the parent simultaneously made linguistic adjustments to

introduce more complex or abstract information within the semantic context.

A number of researchers have described storybook reading as a process for constructing meaning (Altwerger, Diel-Faxon, & Dockstader-Anderson; Norris, 1992; Sulzby, 1985). For typically developing children and their parents, frequent repeated encounters with the same book results in greater understanding and depth of meaning conveyed by the pictures and text. First readings include labeling and describing with subsequent readings affording opportunities for adding and expanding the information. However, reading experiences for parents and their children with SLI are reportedly less language facilitating than are those reported for typically developing children (Marvin, 1994; Norris & Hoffman, 1991). Parents of children with SLI engage in greater periods of reading the text and asking the child to point to or label pictures. This investigation supported both lines of research. During baseline sessions parents made few adjustments to the level of language used by their children. Parents engaged in episodes of reading, with some parents pointing to the pictures or asking the child to label or point. With training, the parents developed strategies for matching the child's level of language comprehension and use (i.e., reducing semantic and grammatical complexity of utterances), with resultant notable changes in child semantic development.

#### Child's Changes in Language Abilities

Measures obtained to indicate the child's changes in language abilities included the number of verbal and total communicative turns produced while engaged in storybook reading, the number of story-related initiations to participate in the storybook reading, the semantic diversity of utterances used to talk about the storybook, and the mean length of utterances produced. Observed changes in each variable will be presented. This will be followed by an interpretation of the observed changes that occurred as a result of parent behavioral changes. These

reciprocal changes will be interpreted using the Situational-Discourse-Semantic context model.

It was hypothesized that increases in parent use of language facilitating strategies as a result of parent training would result in increased child language productivity. In across subject comparisons, four of the five dependent variables reached levels of significance. Children showed significant differences as a result of parent changes in interaction style for the total number of communicative turns, number of verbal turns, number of story initiations, and semantic diversity of utterances. Although there was a trend for positive change, increases in child MLUs did not reach levels of significance in across subject comparisons.

Analysis of individual measures showed that six of six children made measurable changes in total turns as a result of parent changes in storybook interactions. Of those six, the five who completed follow-up sessions continued to increase turns when training ended.

All six children demonstrated an increase in the number of verbal turns taken as a result of parent changes in storybook reading behavior. The five who completed follow-up sessions continued to increase verbal turn-taking as a result of parent training.

Increases in story-related initiations occurred for four of the six children as a result of parent changes. One child showed a decrease from baseline to training, and one made no change. Three children maintained the initiating behavior above baseline levels at follow-up.

Increases in the semantic diversity of storybook utterances occurred for all six children. Three children added one semantic category, while three children added two categories throughout the course of training. These changes were maintained during follow-up sessions.

Six of six children showed changes in MLU as a result of parent changes in interaction. All five children who completed follow-up maintained the increased MLU above baseline levels.

To summarize, four of the five measures of child language productivity showed a measurable increase for all six children during the intervention phase of the study. Changes in these four measures were maintained above baseline levels at follow-up for the five children who remained in the investigation. Children's total turns and verbal turns taken continued to increase once training ended. One measure, story initiations, increased for four of the six children, with one child showing a decrease and one child showing no change. Three children maintained an increased use of initiations at follow-up.

### Situational Context

Examination of child measures of language productivity demonstrated that altering parents' interaction styles during storybook reading to be more language supporting was effective in establishing a more language facilitating Situational context. Child changes were observed across a range of language behaviors. Prior to parent training, the children displayed varying levels of displacement with regard to storybook reading. However, for all children the language produced at baseline ranged at the lower ends of the contextualized continuum.

Initially, two children sat passively and listened as the parent read the text. These children were unable to create their own situational context or to gain access to active participation in the storybook reading; therefore, they participated minimally at the Egocentered-Contextualized level. The other four children exhibited varying levels of displacement for interacting with the storybook. This included looking at the pictures, talking about the pictures, and answering wh questions with regard to the here and now (i.e., Situational Level II; Contextualized-Decentered). One child exhibited a greater facility for accessing the situational context presented by the storybook. This child was able to refer to people and things engaged in or included in ongoing activities, such as talking about Mommy washing the dishes or the children watching t.v. (i.e., Situational Level III; Contextualized-Relational).



Changes in parents' use of language facilitating strategies resulted in observed child changes along the Situational Context scale. For the two children who were passive listeners at baseline, changes included rapid movement along the contextualized-decontextualized continuum of the Situational context. Initial displays of acting on the book and pointing to pictures (i.e., Contextualized-Decentered) eventually were replaced by talking about the pictured objects and adding some personal experiences and talking about personal possessions with regard to the pictured information. Although showing greater cognitive distancing, much of the interaction remained tied to the here and now.

Advancements along the displacement continuum for each child illustrated the facilitating effects that result from manipulating the Situational context to accommodate varying levels of the child's ZPD. Subsequent encounters with the storybook, facilitated by a more contextualized learning environment, enabled three of the five children to go beyond the here and now to create future events, such as "I'll play in my sandbox, too" (Contextualized-Symbolic). One child advanced to even greater levels of displacement by creating imaginary episodes to accompany the story. For example, this child continually added information to talk about pictures inside the book cover. With each encounter he developed greater displacement in the language used to create the situation. This evolved into the following: (The picture was Critter and Sister standing beside each other with no ongoing activity depicted. Also, there was no frog in the picture) "He's got a frog. He eats it. And he takes it out of his mouth and put in his pocket. He won't put it down in his tummy. I like to put a baby frog in my mouth." (Decontextualized-Egocentered).

All six children demonstrated rapid and continued change in their ability to engage in storybook reading at increasing levels of decontextualization as a result of parent changes in storybook reading behavior. As the parents and children co-constructed the story through

the scaffolded CRC procedure, the dyads also created Situational contexts that supported each child's level of cognitive distancing (e.g., within the child's ZPD). This has been described elsewhere in the literature as a negotiation process, whereby one member of the dyad directs attention and establishes a topic that is followed by exchanges between the two in which information is discussed at increasing levels of decontextualization (Altwerger, Diel-Faxon, & Dockstader-Anderson, 1985; Norris & Hoffman, 1993). The increased levels of displacement achieved by all six children across the intervention phase demonstrated the facilitating effects of parent training within the Situational context created during interactive storybook reading.

### Discourse Context

Analysis of child behaviors revealed that altering parents' storybook reading behavior to be more language supporting was effective in facilitating change in parent and child patterns of interaction. Baseline measures indicate the children presented varying degrees of ability to engage in shared development of a topic. One child produced no verbal turns, while making only one nonverbal response over the course of three baseline storybook reading sessions. Two children used more nonverbal communicative attempts than verbal, while the remaining two children used more verbal than nonverbal communications. Closer inspection of the children's language behaviors show that four children had few or no story initiations. This would suggest that their communicative turns were responses to adult questions rather than attempts to establish a topic for discussion. The dominating conversational roles of the parents were emphasized by the low percent of turns afforded to the children, with the highest number of child turns only 32% at baseline.

Because children varied little throughout baseline in their conversational turns and story initiations, it appeared the dyads had firmly established patterns of parent-child storybook reading behaviors. However, there was considerable variability across dyads in their

interactions. Three children were passive listeners and minimal responders. The effects of SLI for these three children were significant, as they were unable to assert their roles as communicative partners and engage in active discourse. Although three children exhibited several story initiations, two of the three children appeared to make random points to pictures or single-word initiations to target Discrete elements of the story rather than attempting to establish and elaborate upon a topic. As the respective parents followed the children's random initiations, the number of child story initiations increased in frequency. In doing so, the children gained no new information about the ongoing events and were not able to move beyond a level of Collections along the Discourse context scale. None of the six children produced discourse structures above the level of Descriptive Lists (i.e., people, objects, and actions organized around a central theme) at baseline.

With parent increases in language facilitating strategies as a result of parent training, there were subsequent and reciprocal child changes in turn-taking, communicative roles, and discourse structures. The more facilitative Discourse context created by the parent and child resulted in measurable increases for all children in the number of verbal and nonverbal turns taken. Story initiations also increased across all the child subjects. However, for the two children who made rapid topic shifts during baseline, the parents began to consequent the initiations less frequently in attempts to focus the child on one aspect of the story. For one of the two children the story initiations began to decrease as training continued. Although the other child did not decrease initiations, she did increase periods of time spent in elaborating on a topic.

By engaging in more frequent turn-taking exchanges, children began to elaborate on topics at increasing levels of discourse complexity. Children previously at the level of Discrete Events and Collections began using Descriptive Lists. For three of the children who initially produced Descriptive Lists, two demonstrated emerging use of Ordered Sequences

(e.g., “Critter brushes his teeth. He reads a story. And goes night night.”). For the third child at the Descriptive List level, there were increasing episodes of story elaborations and creations of mini episodes not provided by the text or represented in the pictures. He also engaged in some pretend reading behaviors (i.e., points to the sign on Critter’s door and says, “This says, ‘Keep Out.’”).

This study illustrated the facilitative effects that occur as children are immersed in a supportive Discourse context. As parents afforded the children a greater number of communicative turns embedded in an interpretable Situational context, the children became co-constructors, story retellers, and pretend “readers” in the context of parent-child storybook reading.

### Semantic Context

Analysis of child behaviors revealed that changes in parent use of language facilitating strategies resulted in positive changes in the way the children expanded the meaning of their storybook reading behavior to express more abstract levels of language along the Semantic Context scale. Across all six dyads changes in semantic diversity occurred at the first training session. At baseline, one child had no verbalizations and produced only one nonverbal Indication, while four children varied in their use of Indications, Labeling, and emerging Descriptions. The sixth child used equal numbers of Indications, Labeling, and Descriptions, with Interpretations emerging into occasional use. Although there were obvious differences across children in MLU and semantic diversity, none of the children showed measurable change for these variables from the first to the last baseline session. This would suggest that repeated readings and subsequent encounters with the storybook did not result in the children gaining new information from or adding new information to the story.

Changes in child language productivity increased as a function of changes in parent interaction style and parents’ use of language

facilitating strategies. Throughout the parent training phase, children increased their MLU and expanded their lexicons to include words to express greater depth of meaning. As children gained more information from the book through a scaffolded reading approach, they needed the words and a word order strategy to accommodate their expanding concepts and knowledge base. For some children the changes included increases in the use of Labeling and Descriptions, while children at more advanced levels on the semantic continuum progressed to using Inferences (e.g., “Critter’s gonna eat that frog.”) and Evaluations (e.g., “I like to put baby frogs in my mouth.”).

As the parents and children continued to construct meaning together, the children began to internalize the information about the book and the objects, people, actions, feelings, and reactions represented. This was evidenced by the children providing information other than what was depicted in the illustrations or what was stated in the text. This included discussions of personal experiences and comments associating objects in the book with possessions and other objects in the child’s world.

For the six children in this study, as the semantic diversity of their utterances increased, so did the individual child MLUs. Throughout the course of the training, the children increased both the morphemes and the number of words per utterance to produce progressively longer phrases and sentences.

The increased semantic diversity and grammatical complexity of child utterances provides evidence to support the literature describing the reciprocal influences of parent and child communicative behaviors (Hubbell, 1981). The changes would suggest that as parents achieved a better linguistic match with their child, the children responded by increasing the length of utterances and the complexity of ideas expressed.

#### Summary

Previous investigators (Kaiser, Yoder, & Keetz, 1992) suggest that child-focused intervention techniques within naturally occurring contexts

may not be appropriate for some children with language delays or impairments. However, this study indicated that notable changes in child language productivity could be achieved in the absence of direct teaching of selected targets. Despite varying levels of language ability across the child subjects, all benefited from a semantically-based intervention approach within a naturally occurring communicative context of parent-child storybook reading.

Findings from this study support the hypothesis that changes in parent interaction style during storybook reading results in simultaneous changes in child language productivity. All children demonstrated observable changes along all three dimensions of the Situational-Discourse-Semantic Context scale. The changes can be supported by the integrated model of language acquisition, SDS, in which social, cognitive, communicative, and sensory motor processes function synergistically. A change in one domain results in simultaneous changes in the other domains when the social, linguistic, and physical properties of the situation are within the child's Zone of Proximal Development (Vygotsky, 1968).

#### Continued Effects Following Training

To evaluate the continuing effects of parent training on parent's use of language facilitating strategies and subsequent changes in child language productivity, two follow-up sessions were completed. During follow-up measures, the baseline book was reintroduced to determine if observed changes in parent and child behaviors would be generalized from the training book to another storybook context. The baseline book was used to allow pretraining and posttraining comparisons and to determine if parents would use the book differently than had been observed throughout the baseline phase of the study. All parent and child measures were the same as those obtained during baseline and training. However, only five of the six parent-child pairs completed the follow-up sessions, with resultant posttraining measures obtained for those five dyads. Parent

behaviors included number of CRCs completed, percent of turns taken, responses to child story initiations, and measures for MLU. Child measures included verbal and nonverbal turns, story initiations, semantic diversity of utterances and MLU. The follow-up measures are presented in Table 9 to facilitate discussion.

It was hypothesized that training parents to use a scaffolded complete reading cycle during parent-child storybook reading would result in continued positive effects when training was withdrawn. In examining parent changes, two of the five dependent variables, CRCs and parent turns, were maintained at training levels or continued to show improvement for all five parents during follow-up measures. The two measures of MLU, decrease in morphemes and parent-child MLU difference, also continued to show positive changes or maintenance at training levels for four parents. Parent responses to child SIs were maintained above baseline levels or continued to increase after training for three of the five parents.

Four of the five child dependent variables showed continued improvement or maintenance above baseline levels for all five children. Only one measure, story initiations, showed a return to baseline levels for two subjects.

Comparison of parent changes to child changes indicate the facilitating effects achieved by engaging the child in a scaffolded reading cycle, providing communicative opportunities for the child, and matching the child's language level. The findings also suggest that parents need not be proficient or highly skilled in language facilitation techniques to effect continued positive changes in the child's language productivity.

Follow-up measures from this study provide continued evidence to support previous research comparing the reciprocal effects of parent and child behaviors. MacDonald (1989) described parent language behaviors and interaction patterns that are important to language development for children with disabilities. These include balancing the turns taken,

Table 9

**Number of Parents and Children Who Continued to Improve, Maintained Changes, or Returned to Baseline for Dependent Measures at Follow-up**

Variable	Continued to Improve	Maintained above Baseline	Returned to Baseline
Parents ( $n = 5$ )			
Complete Reading Cycles	2	3	0
Percent Parent Turns	4	1	0
Respond to Child story initiations	2	1	2
Mean Length of Utterance	3	1	1
Parent-Child MLU Difference	3	1	1
Children ( $n = 5$ )			
Total Turns	5	0	0
Verbal Turns	5	0	0
Story Initiations	2	1	2
Semantic Diversity	0	5	0
Mean Length of Utterance	1	4	0

**Note.** SI = story initiations; MLU = mean length of utterance in morphemes.

matching the child's language level, being responsive to the child, and following the child's lead. Findings from this study emphasize the importance of balancing, matching, and responding contingently to the child, as evidenced by the parent changes in turn-taking, MLU, and CRCs completed. However, this study also demonstrated that in some cases it is not always appropriate to follow the child's lead, if the child moves randomly and frequently from one topic to another.

#### Implications of the Findings

Results of this investigation provide evidence to support the use of storybook reading as a context for parent training. The findings suggest



this approach for teaching parents of children with SLI to use a scaffolded complete reading cycle has both practical and clinical utility. The gradual changes in parent interaction patterns enabled the parent to create a more supportive language-learning environment for the child. This resulted in rapid, notable changes in child language productivity that was maintained after training was withdrawn.

The amount and types of intervention provided to the parents in this study varied as a function of the transactional relationship established with the parent, child, and their environment (i.e., the storybook). Initially, the parents managed and controlled the situation, with all parents using the storybook in a same or similar manner. Because the children could not signal that the context was too displaced or out of their ZPD, this resulted in a mismatch between the environment (i.e., social and linguistic) created by the parent and the cognitive distance achieved by the children.

With parent training, parents were able to establish a more language supportive learning environment for their children. This included changing the way in which the storybook was used, altering the discourse structure and communicative roles to allow active participation by the child, and providing information at a level of meaning that more closely matched the child's perceptual abilities. Although all parents differed in their interaction styles both before and after training, each developed strategies for using the same storybook in ways that were facilitative to the transactional relationship of their respective dyads.

Changing the parents' communicative behaviors with their children, resulted in the children's rapid changes in both qualitative and quantitative measures of language. This included increased number of verbal and nonverbal turns, increased length of utterances, and advanced levels of semantic and grammatical complexity of storybook reading behavior. Because child language productivity showed continued improvement at follow-up measurements, there was evidence to support that the children

had established higher level language use, not confined to the training setting. Changes occurred for all children regardless of pre-study language performance and general ability levels presented by each child.

Use of the scaffolded reading procedure as a parent training approach sought to overcome some of the barriers described in past parent training research, such as time commitment, unnatural patterns of interaction, difficult strategies to learn, unstructured context, and so on. By teaching parents to complete a scaffolded reading cycle, rapid changes in child language productivity were achieved in a relatively brief period of time (i.e., 10-15 minutes, three times each week for 5 weeks). The techniques were more natural in that they were based on typical parent-child storybook interactions reported throughout the literature (Ninio & Bruner, 1978; Snow & Goldfield, 1983). The context and structure provided by the book gave parents a frame in which to practice techniques with the same or similar events recurring. However, the context was not limiting, as the parents added personal experiences and accessed shared background knowledge with the child in order to keep the book interesting with subsequent readings. Therefore, it provided stability, yet allowed for variety and flexibility, making it a more ideal parent training context.

In summary, these preliminary findings lend strong support to previous investigations reporting the effectiveness of parent training. This facilitating context of parent-child storybook reading provided a frame for establishing a more balanced and reciprocal language supporting environment. Parents were able to more closely match their child's language level while staying slightly advanced of the child. In doing so, the parents enabled the child to use the environment to "bootstrap" into higher levels of language use. This was evidenced by rapid shifts in each child's communicative behaviors with the first training session and in the overall changes in child language productivity. Parents also balanced interactions allowing more child turns and active participation, thus, disrupting the less supportive cycle of interactions that were occurring

prior to training. Providing the parents with scaffolding strategies for improving the conversational exchanges with their children, allowed the parent and child to create a language environment that more closely resembled parent-child interactions reported in normal language development (Bruner, 1978) and storybook reading literature (Ninio & Bruner, 1978; Sulzby, 1985).

### Limitations of the Study

Results of the current investigation indicate that training parents to use a scaffolded reading cycle during parent-child storybook reading effects positive changes in parent interaction style and certain aspects of child communicative and language behaviors. The results also show that positive changes were maintained above baseline levels once training ended. Although changes in the expected direction for parent and child behaviors occurred, there are limitations to the investigation that restrict generalization of the results.

First, a limitation of the study is the sample size. Because the sample contained only six dyads, a nonparametric statistical test was used. Nonparametric statistical tests are less systematic and less generalizable to a population than are parametric tests. Small samples also make it difficult to identify significant differences in the data. Therefore, it is unclear whether failure to achieve significance for some measures is due to no parent training effects or to the small sample size. All nonsignificant findings and trends opposite the expected direction of change must be interpreted with caution.

Second, despite efforts to obtain a homogeneous sample, there was great variability among the parent and child subjects. Subject selection criteria were limited to specific child characteristics for SLI. Although all child subjects met defining criteria for SLI, there were differences in child ability levels and variability in the general language performance across child subjects. Parents also differed in their pre-study levels of storybook reading behaviors. Therefore, study measures did not

accurately reflect the qualitative changes in interaction patterns that occurred for some parents and their children. Subgrouping or controlling for differing parent-child interaction styles would facilitate examination of changes in performance using criteria more appropriate to various subgroups.

Third, the parent training procedures used in the study can be affected by the manner in which the coaching and teaching strategies are implemented. The approach is based on principles involving the simultaneous integration and coordination of language contexts (i.e., situational level, discourse level, and semantic level), as they occur in ongoing interactions. The interventionist must attend to parent and child behaviors, determine the reciprocal effects of one's actions upon the other, and discriminately identify the appropriate level of intervention. Because a number of variables must be coordinated at any given moment in time, the parent training approach requires considerable instruction under closely monitored conditions. Therefore, incorporation of the parent training procedures warrants considerable time and effort to become proficient in its implementation.

Fourth, the study included only preschoolers 3 to 3 1/2 years old; therefore, generalization of findings is limited to this population. Replication with children of different age levels would be useful for evaluating the utility of this treatment approach.

#### Suggestions for Future Research

Results of this investigation yield several potential avenues for future research. There are a limited number of studies utilizing storybook reading as a parent training context. Norris and Hoffman (1991) completed a case study in which a mother used repeated reading of a storybook to facilitate language and phonological development with her preschool child exhibiting SLI. In a different study, Norris, Hoffman, and Crowe (1993) used a storybook reading context to train 13 parents in the use of language facilitation strategies with their preschool children

exhibiting varying levels of speech and language impairments. While results of those studies showed positive effects in parent and child behaviors, the procedures were less well-defined than the scaffolded reading cycle and coaching strategies employed by the current investigation. Replications are needed to support the efficacy of these intervention techniques with other parents and their children with language impairments.

Because this is the first study examining the efficacy of using an adaptation of Ninio and Bruner's (1978) scaffolded reading cycle with parents of children with SLI, future research should expand the application of the procedures to other populations. Examining the effects of scaffolded reading and collaborative coaching with younger and older children could prove valuable to speech-language pathologists who work with children and their families. A broader scope of application is needed to further support these initial findings.

Additionally, the varying levels of change exhibited by the individual parent-child dyads within this investigation suggest that a number of interaction and language skills are refined as a result of scaffolded reading. Studies to examine the changes in the parent's level of questioning, the frequency and types of language facilitation strategies used (i.e., expansions, extensions, and expatiations), and semantic contingency of utterances would provide additional insights into the qualitative changes not measured in this study. Changes in child topic shifts and predications on a topic also need to be conducted to elaborate on these initial findings.

This study did not compare the effects of training parents to use scaffolded reading to the effects of other intervention procedures. Future investigations could compare the effects of modeling, mand-model, or incidental teaching procedures to the effects of scaffolded reading and collaborative coaching in the context of parent-child storybook reading.

There is also a need to examine the long-term effects of training parents to use a scaffolded reading cycle as a language facilitation context. The current investigation included two follow-up sessions to determine generalization and maintenance of training effects. However, these sessions occurred within 2 to 3 days after the last training session. Follow-up sessions conducted 1-month or 6-months posttraining would provide greater insight into the continued effects of training.

Although the training period of the study was relatively short, 15 sessions in approximately 5 weeks, future investigations conducted over different periods of time might prove as successful. Studies could last fewer sessions or meet fewer times each week (study sessions occurred 3 times per week) to determine whether similar or comparable training effects could be achieved.

Results of the current investigation lend support to previous investigations that report reading to children facilitates oral language development (Flood, 1977; Snow & Goldfield, 1983). The theoretical model that forms the basis for the present study involves the integration and coordination of cognitive, social, and semiotic processes that develop as a result of reciprocal and facilitative interactions between and among the parent, child, and the environment. This study suggests that contexts (i.e., storybook reading) and responsive, balanced interaction styles used by typically developing children and their primary caregiver can serve as a facilitative model for parents and their children with SLI. Changes across a number of communicative and language behaviors can be facilitated within one activity. Future research is needed to further support these findings and to add to our knowledge base regarding the quantitative and qualitative changes that can occur as a result of scaffolded parent-child storybook reading.

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**APPENDIX A**  
**RECRUITER CHECKLIST**

**Subject Selection Criteria for Recruiters**

Dear (Preschool Teacher),

I would like your assistance in selecting subjects for a research project. I am looking for preschool children with specific language impairments. If you work with any children or know of any children who meet the following characteristics and whose parents would be willing to participate in a research study in their home, please contact me at (402) 472-5199.

---

Potential Subject's Name: \_\_\_\_\_

Parent/Guardian Name: \_\_\_\_\_

Address: \_\_\_\_\_ Phone: \_\_\_\_\_

If the child meets the specified criteria, indicate by checking the line beside each item below.

---

The child must:

1. Be between the ages of 3;0 and 3;6 years of age. \_\_\_\_\_  
Child's present age: \_\_\_\_\_
2. Speak English as the primary language and language spoken in the home. \_\_\_\_\_
3. Have no reported history of hearing problems. \_\_\_\_\_
4. Have no identified intellectual, behavioral, or neurological deficits or disability. \_\_\_\_\_
5. Demonstrate appropriate social skills for age, not attributable to language deficits. \_\_\_\_\_
6. Be identified with a speech-language impairment in the area of language. \_\_\_\_\_
7. Use primarily one-word and some two-word utterances. \_\_\_\_\_

**APPENDIX B**  
**CONSENT FORM**  
**PARENTAL INFORMED CONSENT FORM**  
**IRB # 94-08-336 EP**  
**TRAINING PARENTS TO FACILITATE LANGUAGE**  
**THROUGH STORYBOOK READING**

**INVITATION TO PARTICIPATE:**

You and your child are invited to participate in a research project to help us learn more about how language and literacy develops in young children. Your child has been selected on the basis of your child's participation in the public school preschool program, and on the recommendation of your child's teacher.

**PURPOSE OF THE STUDY:**

We have learned much about how children learn to speak and to read storybooks, but there are many questions that are still unanswered. At the University we are examining the language and literacy development of children. We are particularly interested in this development when children are interacting with their mothers. We also are hoping to discover if some methods of interacting with children are more effective in stimulating development than other methods. We are hoping to discover whether working with parents can help them to increase their children's oral language and storybook reading abilities faster

**EXPLANATION OF PROCEDURES:**

We are seeking permission for you and your child to participate together in a study. We are asking permission to test your child's oral language and storybook reading skills at the beginning of the project to determine if your child qualifies for the program. This screening will take place at your child's preschool and will last approximately one and a half hours. Tests used in the screening process will include the Slosson Intelligence Test (a formal test of general cognitive development), the Preschool Language Scale-3 (a formal test of auditory comprehension and verbal ability), the Integrated Developmental Experiences Assessment Scale (an informal measure of cognitive, social, and communicative development), and the Semantic Context scale of the Situational-Discourse-Semantic Context Model (an informal measure of discourse abilities) to determine a general level of storybook reading behavior.

If you and your child are selected for the project, we are asking permission to come to your home three times per week for approximately 30-50 minutes for six weeks. We will make audio and/or video recordings of you and your child's storybook reading during this time so that we can study how mother-child interactions occur, and what children learn from these interactions. During some of these sessions, we will ask you to watch the interactions with your child and to make decisions about other things you could teach or talk about.

**POTENTIAL RISKS AND BENEFITS:**

This study does not involve any risk to you or your child. You and your child will receive an evaluation of your child's oral language and storybook reading skills at no charge to you. At some time during the project, you will receive instruction in parent-child storybook reading at no charge to you.

**ASSURANCE OF CONFIDENTIALITY:**

The information that we collect from this study will be treated confidentially. Only information about you and your child's test scores will be used. Identification numbers rather than names will be used on records, and you and your child's name will not appear anywhere in the research reports. Video and audio tapes made during the course of the study will be stored in a locked file cabinet at the University.

**WITHDRAWAL FROM THE STUDY:**

Participation is voluntary on your part and on the part of your child. Your decision whether or not to participate will not affect any preschool or educational services that you are now receiving. If you decide to participate, you are free to withdraw your consent and discontinue the study at any time.

**OFFER TO ANSWER QUESTIONS:**

You and your child's rights as research subjects have been explained to you. If you have any additional questions concerning you or your child's rights, you may contact the University of Nebraska-Lincoln Institutional Review Board (UNL IRB), telephone (402) 472-6965.

**DOCUMENTATION OF INFORMED CONSENT**

**BY SIGNING AND RETURNING THIS FORM, YOU ARE VOLUNTEERING TO ALLOW YOU AND YOUR CHILD TO PARTICIPATE IN THIS RESEARCH STUDY. YOU ALSO ARE INDICATING THAT YOU HAVE READ THE INFORMATION PROVIDED AND ARE GIVING PERMISSION FOR YOU AND YOUR CHILD TO PARTICIPATE. YOU WILL RECEIVE A COPY OF THIS FORM TO KEEP.**

\_\_\_\_\_  
Signature of Parent/Guardian

\_\_\_\_\_  
Date

\_\_\_\_\_  
Name of Participating Child

\_\_\_\_\_  
Relationship to Child

**IN MY JUDGMENT THE PARENT/LEGAL GUARDIAN IS VOLUNTARILY AND KNOWINGLY GIVING INFORMED CONSENT AND POSSESSES THE LEGAL CAPACITY TO GIVE INFORMED CONSENT TO PARTICIPATE IN THIS RESEARCH STUDY.**

\_\_\_\_\_  
Signature of Investigator

Janet Norris, Ph.D.  
LSU (504)388-3936

Relationship to Subject

\_\_\_\_\_  
Signature of Investigator

Paul Hoffman, Ph.D.  
LSU (504)388-2545

Linda Crowe  
Student Investigator

\_\_\_\_\_

\_\_\_\_\_



## APPENDIX C

### PARENT TRAINING PROCEDURES

Complete Reading Cycle: Procedures for teaching parents scaffolded storybook reading that facilitates language development.

#### Step 1

Provide the parent with a description of the 4-step Complete Reading Cycle.

"There is a 4-step procedure I want you to use when reading with your child."

"**First**, get you and your child to focus on the same thing. You direct the child's attention or let the child direct your attention. This is called an Attentional Vocative."

"**Second**, you or your child request information through a Query. This includes statements or comments that are used to find out something about the picture or object of focus."

"**Third**, you or your child responds to the query. This is called a Response. This may include providing information, adding new information, or paraphrasing the text."

"**Fourth**, some sort of Feedback should follow the response. This should provide an indication whether the response was correct or incorrect or whether you agree or disagree with what the child said."

#### Step 2

Provide the parent specific examples of an Attentional Vocative. This can be an utterance or utterance plus gesture that is used to gain and direct the attention of the child. The child also can initiate an Attentional Vocative..

"Begin each page with an Attentional Vocative."

Attentional Vocative: Look!

OR

"Use the Attentional Vocative to initiate a new idea on the page."

Attentional Vocative: Now look over here!

AND

"Accompany the utterance with a point to focus the child's attention".

Attentional Vocative: Oh! Look at Critter's face. (Point to the face)

OR

"Direct attention to the text when reading. Point to the words and say,"

Attentional Vocative: Let's see what the words say.

OR

"Let the child initiate a topic of interest."

Attentional Vocative: (Child points to a picture)

### Step 3

Provide the parent with examples of the Query and how it is used to find out what the child already knows and how it can assist the child in obtaining new information.

"Follow the Attentional Vocative with a Query, such as a question."

Query: What do you see?

OR

"Use the query as a request for information."

Query: Tell me about this page.

OR

"Interpret the child's point and your cue to read as Attentional Vocative and Query combinations."

IF

Attentional Vocative + Query: (Child points to picture).

OR

Attentional Vocative + Query: Let's see what the words say.

THEN

**Step 4**

Discuss the next step in the cycle, the Response. This provides a response to the Query. Elaborations, prompts, and reading the text can be used during a response turn, as well.

"You follow the child's lead with a Response and talk about what the child is pointing to".

"Child pointed to Little Critter pouring juice on the floor so you say,"

Response: Oh! No! Critter spilled the juice.

OR

Response + Prompt: What a mess! Critter spilled \_\_\_\_.

AND

"You wait for the child to fill in the information. This gives your child a place to get involved in the story reading."

OR

Response + Prompt: Little Critter's pouring something. Do you think it's juice or milk?

IF

"The child does not provide the Response."

THEN

"You go ahead and provide the information."

Response: The juice.

IF

"You indicated that you were going to read the words."

THEN

"Reading provides the Response in the sequence."

Response: (Adult reads the text)

**Step 5**

Tell the parent that the Label should be followed with some sort of Feedback. This completes a discourse cycle while providing clarification and an opportunity to discuss information accuracy before continuing on with the story.

"After your child answers the Query with a word or a point, give some indication to your understanding of the message with Feedback."

Feedback: That's right. Little Critter did spill the juice.

OR

Feedback: I don't think Critter spilled milk. It looks like juice. See it's orange, like juice. It's not white like milk.

OR

"Comment on what you read in the text. For example, on this page where it says, 'I can pour some juice for my little sister...'"

Feedback: It doesn't look like Critter pours very well to me.

THEN

"This leads back into the cycle where you can start all over."

Attentional Vocative: Just look at that juice on the floor.

Query: What can you say to Little Critter?

PAUSE

Response: Say, "Watch what you're doing, Critter!"

WAIT

Feedback: That's right. Critter does need to watch out.

## APPENDIX D

### TRANSCRIPT CODING PROCEDURES

#### Procedures for Coding Transcripts

1. Transcribe all parent and child verbal and nonverbal behaviors using SALT procedures.
2. Code each line of the transcript using the following marks (see attached for definitional guidelines):

Attentional Vocative	[AV]
Query	[Q]
Response	[R]
Feedback	[F]
Other	[O]
Parent Nonverbal Turn	[PNT]
Parent Verbal Turn	[PVT]
Parent Response to Child Story Initiation	[PR]
Child Nonverbal Turn	[CNT]
Child Verbal Turn	[CVT]
Child Story-Related Initiation	[SI]
Child Semantic Level of Bookreading Behavior:	
Indication	[I]
Label	[L]
Description	[D]
Interpretation	[IT]
Inference	[IF]
Evaluation	[E]
Metalinguistic Response	[M]
Complete Reading Cycle	[CRC]

3. Run the SALT program then record the following:

Total number of CRCs	_____
Total number of parent turns (PNT + PVT)	_____
Total number of PRs	_____
Parent MLU in morphemes	_____
Total number of child turns (CNT + CVT)	_____
Total number of CVTs	_____
Total number of SIs	_____
Child MLU in morphemes	_____
Percent of parent responses to SIs (PR/SI)	_____
Total number of Is	_____
Total number of Ls	_____
Total number of Ds	_____
Total number of ITs	_____
Total number of IFs	_____
Total number of Es	_____
Total number of Ms	_____

### Definitions for Coding

**Attentional Votive:** any verbal or nonverbal attempt to establish joint focus or attention to pictured objects, actions, events, attributes, or states, or to the written text to be read.

Examples: Look!  
 Look Here!  
 Oh! Look at (picture)!  
 Let's read the words. (Count as AV + Q)  
 (Point to picture; Count as AV + Q)

**Query:** any communicative act that volunteers or requests information to be shared, including comments, questions, requests for information, and protests.

Examples:	What's that?	What do you see?
	What did he/she do?	What's happening here?
	I wonder if he/she will X.	What will X say?
	You better tell him/her to X.	Tell me about this page.
	What are they going to do now?	

**Response:** any semantically contingent response to the query including an expansion, extension, expatiation, verbatim reading, partial reading, or paraphrase.

**Expansion:** acknowledges discourse partner's previous communicative act by exact repetition of an utterance, repetition of the idea expressed in the previous utterance, verbalizing a nonverbal communication attempt.

**Extension:** develops the current topic by adding a new idea, increasing the semantic level of the topic (e.g., from label to description), adding personal experience of background knowledge to the topic.

**Expatiation:** adds detail or clarification to the topic by prompting the child to respond when he/she could not do so spontaneously, or to add detail to an incomplete or inaccurate statement by the child.

**Paraphrase:** provides a verbal summary or interpretation of the written text.

Examples:	It's an X.	Those are Xes.
	I see an X.	They're X-ing.
	There's a _____ and a _____.	Will he/she X or Y?
	Is it an X or a Y?	(Reading the text)
	That's just like your X at home.	(Child point to picture)

**Feedback:** any comment that serves as a reply to the response, including an acknowledgment, request for clarification, request for repair, or restatement.

Examples:	Yes, it is a Y.	No, I think it's an X.
	You're right, he/she is X-ing.	That is a Y.
	No, I don't think it's a Y, because...	Do you mean ...?

**Other:** a miscellaneous category for utterances and nonverbal behaviors that do not meet the defining criteria for other codings.

**Verbal Turn:** any verbalization by parent or child that is intended to communicate through words. Child attempts such as "Uh," "Muh," and "Da" and utterances that are syllabic in nature and have intonational patterns characteristic of conversation should be counted as a verbal turn. Context and accompanying gestures should be considered in determining whether a child's utterance is verbal or nonverbal.

**Nonverbal Turn:** any point, gesture, or noise that is intended to communicate.

Examples: Animal sounds, motor noises, bell sounds, point to pictures, clapping, crying sound, etc.

**Child Story Initiation:** any verbal or nonverbal attempt to introduce a story topic that is not cued or prompted by the parent. This includes points to pictures, environmental sounds related to the storybook pictures, points to pictures accompanied by vocalizations, gazes from book to environmental information accompanied by questioning look or vocalization (e.g., Looking at the book, pointing to self, and saying, "Me?" or Looking from the book to a toy on the floor and pointing to the toy, etc.). Do not count initiations unrelated to the story as book reading.

**Parent Response to Child Story Initiation:** any verbal or nonverbal response by the parent that is semantically connected to the child's story-related initiation. This includes affirmation of the child's verbal or nonverbal attempts through repetition of the child's information, acknowledgment of the child's attempt, affirming or confirming the child's storybook topic of interest.

**Semantic Level of Bookreading Behavior:** the level of meaning expressed by the child's verbal or nonverbal response to the story.

**Indication:** nonverbal communicative attempt including gestures, points, motor noises, and environmental sounds or verbalizations for "yes" and "no."

**Label:** a name or request for a name of an agent (i.e., boy, girl, Critter, Mom), action (i.e., running, jumping, kicking), or object (i.e., ball, house, car). Requests include: "What's that?" and "Where is he?"

**Description:** a reference to some property of a concept or to the relationship between concepts. This includes reference to number, size, shape, color, or quality and the relationship between number (i.e., more, less, same), size (i.e., bigger, littler, taller), shape (i.e., rounder, more pointed), color (i.e., whiter, redder, bluer), or quality (i.e., faster, louder, messier).

**Interpretation:** a statement or comment that adds meaning that is not explicitly given in the text but can be identified from the pictures. For example, the text may read, "I help with the dishes," but the character actually drops the dishes on the

floor and the mother is watching with a scowl on her face. The interpretation may be, "I don't think mom likes the way he/she helps. Look at that mess, and look at mom's face. I think she's mad."

**Inference:** a combining of existing information, events, or concepts with new information to create a new state or event, such as predicting future events or speculating about past events or states (i.e. What happened before and what will happen after the present event).

**Evaluation:** a personal judgment regarding the quality or value of a situation that includes like/dislike, good/bad, should/shouldn't, or fair/unfair.

**Metalinguistic Response:** a statement or comment that focuses on specific aspects of language, such as naming or requesting information about letters, attempting to read the text, or matching oral and written words.

**Complete Reading Cycle:** a cycle involving 4 key elements:

(1) attentional vocative, (2) query, (3) response, and (4) feedback. These elements should generally occur in the sequence presented and may be produced by either participant engaging in the discourse/reading. Elements may be verbal or nonverbal depending on the context and elements may be combined into one utterance. Variability in the sequence is permissible, but a cycle is not complete until all 4 elements have occurred.

**Onset:** a cycle begins when the book is opened and the adult or child focuses attention on the page by pointing or vocalizing about the contents of the book. Episodes of passive gazing at the book or flipping through the pages are not considered onsets. An attentional vocative directed toward the book page will always begin a new cycle.

**Offset:** a cycle ends, whether complete or incomplete, when

- (a) an attentional vocative follows an utterance coded as feedback (begin new cycle),
- (b) a new page or new picture is introduced (begin new cycle),
- (c) the story or story-related information ceases to be the topic,
- (d) the child engages in an activity unrelated to the story (e.g., fussing, leaving the scene, flipping book pages, lying down, looking at other objects in the room without connecting them to the story in some way),
- (e) the parent attends to environmental information unrelated to book-reading (e.g., managing the child's behavior, attending to the child's off topic responses without relating them to the story, attending to someone or something else in the environment).



## Examples:

(1) Parent:	Look! (Points to picture)	= Attentional Vocative
Child:	(No Response)	
Parent:	What is that?	= Query
Child:	(Point to picture)	= Response
Parent:	It is a ball, and look.	= Feedback + Attentional Vocative

Complete  
Cycle\_\_\_\_\_

(2) Child:	(Point to picture)	= Attentional Vocative + Query
Parent:	He's eating a big _____	= Response
Child:	"Uh" (Point to picture)	= Response
Parent:	That's right, a big apple	= Feedback

Complete  
Cycle\_\_\_\_\_

(3) Parent:	Let's see what the words say.	= Attentional Vocative + Query
Child:	No.	= Response
Parent:	Okay, what do you want to talk about?	= Feedback + Query

Complete  
Cycle\_\_\_\_\_

(4) Parent:	What's that? (Point to picture)	= Query + Attentional Vocative
Child:	Bah.	= Response (Offset)
Parent:	What's that? (Point to picture)	= Query + Attentional Vocative
Child:	Da.	= Response (Offset)
Child:	Uh? (Points to picture)	= Attentional Vocative + Query
Parent:	That's a rattle. Say Rattle.	= Response + Query
Child:	Ah.	= Response
Parent:	Yes, rattle.	= Feedback

Complete  
Cycle\_\_\_\_\_

## Sample Coded Transcript

\$ child, parent.  
 + subject code: Dyad 3.  
 + session 2.  
 + time: 2 min 40 sec.  
 p you ready [pvt] [o]?  
 c {nods yes} [cnt] [o].  
 p allbymyself [pvt] [r] [rdg].  
 p i can get outta bed all by myself [pvt] [r] [rdg].  
 p i can button my overalls [pvt] [r] [rdg].  
 p i can brush my fur [pvt] [r] [rdg].  
 c {points to picture} [av] [q] PCF {sounds like uh} [cvt] [r] [i] [si].  
 p <yeah> [pvt] [f] [pr] [crc].  
 c <me> [cvt] [r] [l] [si].  
 p mouse in the door huh [pvt] [f] [pr]?  
 p i can put on my socks [pvt] [r] [rdg].  
 p and tie my shoes [pvt] [r] [rdg].  
 p i can pour some juice for my little sister [pvt] [r] [rdg].  
 p and help her eat breakfast [pvt] [r] [rdg].  
 c {points to picture} [av] [q] PCF {sounds like ow} [cvt] [r] [si] [i].  
 p what [pvt] [f] [crc] [pr]?  
 c {points to picture} PCF {sounds like look} [cvt] [r] [i].  
 p yeah messy huh [pvt] [f]?  
 c yeah [cvt] [r] [i].  
 p i can pull a duck for her [pvt] [r] [rdg].  
 p i can drive my truck [pvt] [r] [rdg].  
 p i can give a drink to my bear [pvt] [r] [rdg].  
 p i can kick my ball [pvt] [r] [rdg].  
 p and roll on the ground [pvt] [r] [rdg].  
 p i can pound with my hammer [pvt] [r] [rdg].  
 p i can sail my boat [pvt] [r] [rdg].  
 p i can look after my little sister [pvt] [r] [rdg].  
 p i can help dad trim a bush [pvt] [r] [rdg].  
 p or ice a cake for mom [pvt] [r] [rdg].  
 p i can look at a book [pvt] [r] [rdg].  
 p and find a mouse [pvt] [r] [rdg].  
 c {points to picture} [av] [q] he do/\*3s [cvt] [r] [si] [d].  
 p yeah [pvt] [f] [pr] [crc].  
 c <he do/\*3s> [cvt] [f] [d].  
 p <right there> [pvt] [f].  
 p and a live one too [pvt] [r].  
 p i can color a picture [pvt] [r] [rdg].  
 c ooh PCF {sounds like da} [cvt] [o] {points to cat in the room}.  
 p yeah urchin/z back [pvt] [o].  
 c ooh PCF {sounds like da} [cvt] [o].  
 c ooh PCF {sounds like da} [cvt] [o].  
 p do/n't worry about that cat [pvt].  
 c ooh PCF {sounds like da} [cvt] [o].  
 p i know [pvt] [o].  
 p urchin/z back [pvt] [o].  
 p i can put my toys away [pvt] [r] [rdg].

p and get into my pajamas [pvt] [r] [rdg].  
 p i can brush my teeth [pvt] [r] [rdg].  
 p i can put myself to bed [pvt] [r] [rdg].  
 c ooh PCF {sounds like na} [cvt] [o] {looks away}.  
 p but i cant go to sleep without a story [pvt] [r] [rdg].  
 p good night [pvt] [r] [rdg].  
 c {points to picture} [av] [q] PCF {sounds like be uh} [cvt] [si] [r] [i].  
 p yeah mama's kiss/ing him night huh [pvt] [f] [pr] [crc].  
 c {points to picture} [av] [q] ah [cvt] [r] [si] [i].  
 p what's he do/in [pvt] [pr] [q]?  
 c air [cvt] [r] [l].  
 p brush/in his hair [pvt] [f] [crc].  
 c yeah [cvt] [f] [i].  
 p {points to picture} [av] what's he do/in here [pvt] [q]?  
 c {points to picture} [av] [q] [cnt] [si] [i].  
 p what where [pvt] [pr] [q]?  
 c {points to picture} bike [cvt] [r] [l].  
 c {points to picture} [av] [q] him [cvt] [r] [si] [l].  
 p yeah riding the bike [pvt] [f] [crc] [pr] [crc].  
 p there's the mouse again huh [pvt] [r]?  
 c yeah [cvt] [r] [i].  
 c {takes book and flips through the pages} [cnt] [si] [i] [r].  
 p now what [pvt] [q] [pr]?  
 c {shows book to adult} [av] [q] [cnt] [si] [i].  
 p okay which one [pvt] [r] [q] [pr]?  
 c {points to picture} [cnt] [r] [i].  
 p i can ride my bike [pvt] [r] [rdg].  
 c {points to picture} [av] [q] [si] [cnt] [i].  
 p i can pull a duck for her [pvt] [pr] [rdg].

## APPENDIX E

### PROCEDURAL RELIABILITY CHECKLIST

#### Reliability Check for Training Procedures

**Directions:** Read the following questions and then view the 3 videotapes provided.

The tapes should include three segments: (1) a discussion of training procedures between the trainer and the parent; (2) a videotape review with parent and trainer present; and (3) a parent-child storybook reading with the trainer coaching the parent. Based on what you observe, rate the trainer's ability to complete the specified procedures as outlined below by circling "Yes," "No," or "N/O" for each question. Use the following as a guide:

**Yes** = the trainer used the procedure,

**No** = the trainer failed to use the procedure,

**N/O** = there was no opportunity to observe this procedure.

#### **Segment 1** (Discussion of training procedures with trainer and parent)

- |   |                |
|---|----------------|
| 1. Was the scaffolded reading cycle introduced to the parent or reviewed with the parent in which the following 4 elements were discussed: (a) attentional vocative = parent or child focusing attention to some aspect of the book, (b) query = parent or child question or prompt to elicit a response, (c) response = parent or child response to question or prompt, and (d) feedback = parent or child request for clarification or comment on the accuracy of the response? | Yes   No   N/O |
| 2. Did the trainer provide examples or demonstrate each segment of the scaffolded reading cycle?  | Yes   No   N/O |
| 3. Did the trainer tell the parent to use pauses or "wait" to allow the child to participate in the reading cycle or to take a turn in the storybook reading?   | Yes   No   N/O |
| 4. Did the trainer tell the parent to follow the child's lead by responding to the child's focus regarding the story?   | Yes   No   N/O |

#### **Segment 2** (Review of videotape with trainer and parent)

- |  |                |
|--|----------------|
| 5. Did the parent and/or trainer identify elements of the scaffolded reading cycle?  | Yes   No   N/O |
| 6. Did the parent or trainer identify instances in which the child initiated or attempted to initiate a topic?   | Yes   No   N/O |
| 7. Given the opportunity, did the parent or instructor identify instances of communication breakdowns, such as the child not attending to the story or the parent ignoring the child's communicative bids? | Yes   No   N/O |

- |   |                |
|---|----------------|
| 8. If communication breakdowns occurred, were possible causes discussed (i.e., no joint focus, complex language used, focus on isolated bits of information, fail to follow child's lead, or series of adult initiated topics)?   | Yes   No   N/O |
| 9. Did the trainer discuss remediation techniques to be used with future communication breakdowns (i.e., establish joint focus, use shorter or simpler sentences, talk about ongoing story events, focus on child's object of interest, encourage child to take turns by using more pauses and prompts, or wait for child to talk about something)? | Yes   No   N/O |
| 10. Did the trainer or parent identify instances of successful and/or facilitative interactions between parent and child?   | Yes   No   N/O |

**Segment 3** (Coaching session with trainer, parent, and child)

- |   |                |
|---|----------------|
| 11. Did the trainer tell the parent to read the story using procedures that had been practiced, learned, discussed, or talked about?  | Yes   No   N/O |
| 12. Did the trainer assist the parent with any or all of the following: provide possible utterances, cue the parent to respond to the child (using words, points, gestures, or body language), redirect the parent to focus on relevant information, help the parent balance turn-taking, and/or model communication strategies with the child or parent? | Yes   No   N/O |
| 13. Did the trainer appear to coach the parent and respect the parent's efforts rather than taking over the storybook reading session?  | Yes   No   N/O |

**Summary Question:**

- |   |                |
|---|----------------|
| 14. Were the three videotape segments distinguishable with regard to (a) types of information discussed or presented and (b) perceived goals of each segment? | Yes   No   N/O |
|---|----------------|

## VITA

Linda Crowe is a speech-language pathologist with 15 years experience working in the public schools of Nebraska as an elementary classroom teacher and itinerant speech-language pathologist. During the past three years she taught undergraduate clinical courses and supervised graduate students in Speech-Language Pathology and Audiology at the University of Nebraska at Lincoln. Ms. Crowe also presented papers and conducted mini seminars at national, regional, state, and local conferences and meetings, including the Annual Convention of the American Speech-Language-Hearing Association (ASHA) and the National Head Start Conference.

Ms. Crowe holds the Certificate of Clinical Competence in speech-language pathology from ASHA and is licensed to practice speech pathology by the Nebraska State Board of Health. Her areas of professional focus include diagnosis and intervention for preschoolers with speech-language impairment, evaluation and treatment of school-age children and adults with language-learning disabilities, and collaboration-consultation with families and school personnel.

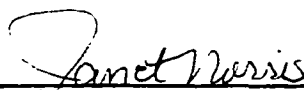
# DOCTORAL EXAMINATION AND DISSERTATION REPORT

**Candidate:** Linda K. Crowe

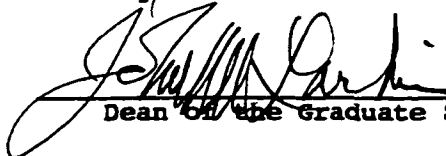
**Major Field:** Communication Disorders

**Title of Dissertation:** Training Parents to Facilitate Language through  
Storybook Reading

**Approved:**



Major Professor and Chairman

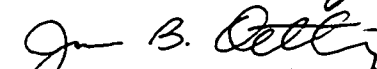


Dean of the Graduate School

## EXAMINING COMMITTEE:









**Date of Examination:**

July 2, 1996