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The Efficacy of Scaffolding Strategies in Holistic Language Intervention on Language and Phonologically Delayed Children.

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**THE EFFICACY OF SCAFFOLDING STRATEGIES
IN HOLISTIC LANGUAGE INTERVENTION ON LANGUAGE AND
PHONOLOGICALLY DELAYED CHILDREN**

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
Monica Lynne Bradshaw
B.S., McNeese State University, 1989
May, 1995**

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To Dale and Hunter

for knowing that all things are possible
and being there to help make it happen

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The question of what will happen next rings in head. I only know that life's journey is amazing. If the next part of my life is anything like these past experience, I can only speculate that it will be one wild adventure.

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ABSTRACT

This study investigated the efficacy of scaffolding strategies within holistic language intervention with six language and phonologically delayed preschool children. The scaffolding condition was compared to two experimental controls using either wh-questions or print awareness techniques. It was hypothesized that the use of scaffolding strategies would result in greater semantic displacement, syntactic complexity, and phonological complexity than the use of either the wh-questions or print awareness controls. Efficacy of the conditions was measured by a) semantic levels, b) mean length of utterance, and c) percent of words produced correctly.

An alternating treatment was employed in the single-subject study. The subjects included six preschool children ranging in age from 2;10 to 4;10. Many of the measures yielded significant differences between the scaffolding condition and the two control conditions. Differences all favored the scaffolding condition. Results suggested that during the scaffolding condition semantic levels increased, syntactic complexity increased, and phonological complexity increased. Five out of the six subjects increased semantic levels, three out of five subjects increased syntactic complexity, and four out of five subjects increased phonological complexity. Results are discussed relative to current intervention strategies, theoretical constructs, implications for intervention, and future research.

INTRODUCTION

Speech-language pathologists have provided intervention for preschool children's delayed speech and language development by separating language use into discrete components derived from theoretical models of language, measuring a child's abilities relative to each component, and targeting each language component for which development was considered delayed relative to developmental norms. Shifts in focus to different areas of knowledge such as syntactic (Chomsky, 1957), semantic (Katz and Fodor, 1963), phonological, (Chomsky & Halle, 1968), and pragmatic (Searle, 1969) have been reflected in speech-language pathology interventions. Speech-language pathologists have constructed measurement tools with subtests representing each of these aspects of language at differing levels of language development (Bankson, 1990; Hammill, Brown, Larsen, & Wiederholt, 1987; Newcomer & Hammill, 1988). They have targeted children's use of behaviors representing each of these areas of language using modeling (Leonard, 1975;), elicited imitation (Connell, 1982) and combinations of modeling and elicited imitation with positive results found in most studies (Fey, Cleave, Long, & Hughes, 1993; Hodson & Paden, 1991; Lee, Koenigsknecht, & Mulhern, 1975).

However, the traditional approach sketched above has a number of serious limitations. It is based on language models in which language components are considered to function in a modular fashion, with the computations made at one level not affecting the computations made at another. These models are

contraindicated by research findings demonstrating interactions among language components within children's language functioning. The modularity of the models leads clinicians to expect children with isolated deficits, however research shows that an individual child's language disorder typically affects a wide variety of language components (Paul & Shriberg, 1982). In practice, as an individual child demonstrates more delayed aspects of language, the number of targeted aspects increases with a resultant smaller amount of intervention time available for each problem area. In addition, the more the clinical situation is constructed to focus on a single aspect of language, the less likely it is that the child will generalize the learning that occurs to more natural contexts of language use (Fey, 1988).

In contrast to more traditional intervention approaches, the present study investigated the clinical efficacy of a holistic language intervention (Norris & Hoffman, 1993) based on principles of social mediation (Vygotsky, 1962), whole-to-part learning (Clark, 1993; Goodman, 1986; Nelson, 1985), and a connectionist view of cognitive development (McClelland, 1989; Tierson, 1990). This intervention strategy maintains a whole context, story book reading, in which the development of the language parts of the whole (i.e., pragmatic, semantic, syntactic, and phonological knowledge) is facilitated through conversational scaffolding techniques. This study will compare the use of scaffolding strategies with two alternate conditions using wh-questions or print awareness. The sections that follow will elaborate on the basic principles of connectionism, whole-

to-part learning, and social mediation that underlie the intervention strategies to be evaluated in this treatment study.

Connectionism

Connectionism is a class of theories of intelligence based on a number of common assumptions or traits (Tierson, 1990). The basic structure of such models includes a network of units or nodes. Each node is a neuron-like processor that has, at any moment in time, an activity level that is affected by the positive and negative influences of the other nodes to which it is attached. In turn, the activity level of each node affects all of the others to which it is attached. The connections among nodes carry variable degrees of resistance to the passage of activity from one to another known as weights. Importantly, the connection weights among nodes vary as a function of experience and thus allow for learning to occur. Learning involves making connection weights among nodes that are frequently activated at the same time stronger so that the activation of a particular node will more readily activate other nodes that are related through experience.

There are three classes of processing units, input, output, and hidden. The input units are sensory in nature and account for information entering the system from the outside world through visual, auditory, olfactory, taste, and tactile-kinesthetic modes (Tierson, 1990). Output units send signals outside the system through muscular action and send feedback that results from the person's actions back into the system. Hidden units are internal

to the system, having no direct sensory connections to the outside world. The hidden units react to input information and each other on a continual basis to produce activity at the output units. Development of connection weights among the hidden units allows for the formation of layers of internal conceptual structures.

The conceptual structures are patterns of activity that have occurred often enough through sensory inputs from the outside world and internal motoric reactions to have established relatively strong connection weights. The formation of conceptual patterns of connection weights results in learning within the system (Rumelhart & McClelland, 1986). For example, repeated exposure to the word "mommy" spoken by the infant's mother, will increase the connection weights among visual aspects of the word being produced, including two lip closures, and auditory aspects, including two relatively loud pulses. Hidden units that connect these patterns will develop to represent the concepts of "word" and "syllable." Connections to a variety of other aspects of the child's sensory experience such as visual characteristics of mommy's face, and the feelings associated with being cuddled, dried, and fed will also become part of the information network associated with the meaning of the spoken word "mommy." Learning occurs as sensory inputs from patterns of connection weights among the many hidden units that result in motoric output patterns. The outputs are compared to expected outputs and a process called backward propagation is used to alter the hidden connections to change the

underlying patterns to more closely approximate the expected outcome.

Learning within this theoretical network involves creation of cognitive patterns using corrective feedback that is supplied from outside of the system. In language development, the cognitive patterns include a variety of levels of knowledge extending from the discourse structure of whole texts through sentential, phrasal, morphemic, and phonemic levels. Feedback comes from the guidance of knowledgeable language users who help the child interact verbally in social situations. Children appear to organize mental representation of whole situations that they progressively parse into important conceptual parts (Nelson, 1985). This process will be described in the following section, entitled "Whole to Part Learning." Children are guided in this process by adults as described by Bruner (1978) and Vygotsky (1962). This process will be described in the final section entitled "Adult Scaffolding."

Whole to Part Learning

Nelson (1985) viewed the child's active participation in routine events as the basis for all learning. Routines such as dressing, eating, and shopping provide frameworks in which the actions of people, including their uses of instruments and language, are organized in temporal sequences that are related to physical cause-effect relationships and the goals of the people involved in the events. Nelson proposed that children rapidly form rough mental representations of events that are gradually

refined through experience. Children use these representations as frameworks to guide their participation in the events. The representations embody the child's understanding of the relationships among the more refined details of the event. Nelson maintains that learning proceeds from the whole (the event representation) to the parts of the whole (the people, actions, and objects in the event representation).

Children participate in routine activities such as dressing and eating on a daily basis. The child's representation for each event contains a series of actions. Learning the time course of the sequence of actions allows the child to take a progressively more active role in the event. This is first observed in the child's anticipation of actions in an event, for example raising arms in anticipation of having a shirt taken off. These actions are the early forms of the syntagmatic relationships such as actor-object that will later be coded through syntactic aspects of English such as noun phrase-verb phrase. The child also forms primitive paradigmatic categories or classes of objects that are functionally similar within the event representation. Cereal and fruit become related to one another because both are eaten out of bowls with spoons. These primitive categories are the earliest paradigmatic classes that will later be refined into the child's understanding of the variety of meanings that a concept has within and across events.

Nelson (1985) characterized the learning that children progress through in three stages. This study is primarily concerned with the first two, known as Prelexical and

Conceptual. In the Prelexical stage, prior to 18 months, a child's words essentially refer to the event as a whole, for example, production of the word "ball" representing the whole event of playing with a ball by bouncing and rolling the ball. In connectionist terms, the child's earliest representations of such events would be relatively undifferentiated activations of all hidden units with positive connection weights to the input units that are activated by the situation. Phonological aspects of words produced during this phase appear to be relatively undifferentiated as well, as indicated by the observation that children's first fifty words are produced with variable phonological forms that make identification of phonemic contrasts impossible (Ferguson & Farwell, 1975).

In the Conceptual stage, approximately the age range of 18 months to four years, the child discovers that events can be subdivided into parts, motivating the formation of conceptual categories related to the objects, people, and actions that occur across events. In Nelson's terms, the child has parsed the event representations to build conceptual categories. With adult assistance, the child learns words and phrases that refer to these developing conceptual categories. The parsing of events into concepts and the learning of language parts result in the child's explosive vocabulary growth, the production of early novel word combinations, and then the more conventional syntactic representations of actions. Within connectionist models, parsing of concepts results from the strengthening of connections among hidden units that represent objects,

attributes of objects, actions, and the language forms that refer to these concepts across a variety of events. While participating in an event the child will be receiving many inputs and producing many outputs. Those inputs that repeat most often in an event and those inputs that are encountered across many events will become more strongly interconnected and form into more coherent concepts. Thus, as the child plays with balls of differing sizes and shapes in many contexts, the concept of ball is parsed via the strengthening of connection weights among the hidden units that are common to the balls the child uses. These would include physical attributes such as roundness and functional attributes such as the ability to roll.

Phonological information related to words associated with the concepts will also be parsed. The results of parsing of phonological information is seen in the common error patterns referred to as phonological processes (Hoffman, 1992). The preponderance of CV syllables in children's early vocabulary items result in stronger connection weights for CV combinations than for CVC or CCV combinations. Initially, children's attempts at adult word forms containing clusters and final consonants often result in the better connected CV productions. The relatively high number of stop and glide productions in babbling and in early word productions results in the use of these consonants when words containing more complex fricative, affricative, and liquid consonants are attempted.

The intervention studied in this investigation is based on whole to part learning. Children will be engaged in the whole

activity of storytelling. They will be assisted in learning the parts within the whole such as the characters and actions that occur in the story, as well as the language used to refer to these parts. The child's attempts to make sense of events through parsing are aided by the language and actions of adults interacting with the child within events. The facilitation provided by adults has been referred to as scaffolding by Bruner (1978). Scaffolding will form the basis of the adult interaction in the intervention to be assessed in this study.

Adult Scaffolding

The functional relationships among objects such as spoons, bowls, and bananas within events such as eating breakfast are largely dictated by the cultural values of the child's social group as transmitted by the adults in the child's life. Adults transmit this knowledge through a process Bruner (1978) referred to as scaffolding. Like the temporary supports built for a wall of a building during construction, an adult's scaffold temporally assumes responsibility for part of the actions expected of the child. As the child independently takes on more of the responsibility for the actions, the adult relinquishes control to the child. Caretakers may facilitate the child's use of spoons to eat bananas by first taking on the whole responsibility of the action. The adult cuts the banana with the spoon while it is in the bowl, scoops a piece of banana, holds the spoon in front of the child's mouth while instructing the child to "open wide" and modeling an open mouth. At a later time, the adult may cut the

banana, scoop a piece, and help the child pick it up with the spoon and guide it to the child's mouth. Still later, the adult may need only to cut the banana in the bowl and allow the child to eat with the spoon.

The repetitive use of certain language forms in predictable, repetitive contexts, enables the child to identify these forms and their referents within this situational context (Nelson, 1985). In connectionist terms, repeated exposure and active participation in routines strengthens connections to the language forms used in those routines. Piaget (1975) suggested that the initial stage in child development is the sensori-motor stage. External action beginning with reflexive behavior develops into creative instrumental behavior. It is in this stage that children experience the world on a sensory level. From the connectionist viewpoint, these sensory inputs are built into hidden units that the child will use to represent or symbolize through imitation, signs, and symbols.

A crucial component of the development of more complex concepts and language is scaffolding within social interaction. Social interaction is not merely a transfer of information, rather information is mediated through social activities (Vygotsky, 1962). According to Vygotsky, an important feature of the process of learning is the zone of proximal development. The ability to learn when provided assistance by an adult is the child's potential developmental level. The actual developmental level is that learning which has already been completed. The distance from the actual level to the potential level is the zone

of proximal development. The zone defines those functions which have not yet completely matured, but are in the process of development. It is within this zone that social mediation and scaffolding can facilitate the child's development of various levels of learning.

Adults immerse children in many language experiences. Through social mediation, children participate in experiences with complexity that is higher than their completed developmental levels (Day, French, & Hall, 1983; Vygotsky, 1978). While children are experiencing events at higher levels, their cognitive systems develop more complex hidden units. For example, repeated scaffolding in the parts of using a spoon as part of eating created the hidden unit connections necessary to guide the whole process of eating with a spoon. Adults and peers mediate the child's experiences by organizing the environment, interpreting and giving meaning to events, directing attention to important aspects within experiences, and regulating problem-solving.

Language arises initially as a means of communication between children and the people in their environment. As language becomes internalized, it can serve as a tool to organize and guide the child's thought (Vygotsky, 1978). The adult mediates and parses relevant information within a supportive interaction to create strong patterns of connections among concepts within the child. A child at one level of learning can be constructing the basis for higher levels of learning. The adult can help the child in this process (Bornstein & Bruner, 1989).

Bruner (1978) found that adult scaffolded interactions begin before the child communicates through speech. The adult interprets the child's vocalizations and gestures as meaningful before the child has developed intentionality (Bruner, 1978; Ninio & Bruner, 1976; Snow, 1983). As a result, the child begins to attach meaning to gestures. In terms of connectionist theory, the scaffold served to build onto existing patterns. The adult attached meaning to the child's gestures facilitating the emerging linguistic structure. At a later stage when the child points to an object, the adult may label and give the object to the child. If that child expresses the word 'ball' the mother may expand the utterance by asking "The red or the blue ball?" thus building the child's network.

Adult scaffolding is used to assist the child in expanding, building, and strengthening already existing patterns in the child (Norris & Hoffman, 1990). Scaffolding provides feedback regarding the appropriateness of the child's language in terms of syntax, semantics, and phonology within the context of the overall communication. Scaffolding provides assistance for improving linguistic and phonological structure and semantic content.

To be within the child's zone of proximal development, the interactions must be developmentally appropriate for each child (Vygotsky, 1962). According to Bruner (1978), utilization of a scaffold allows children to vary their responses as they become competent within the communicative interaction. Changes made are within the child's control, with the adult providing a scaffold

to support the child's development. The scaffolding provided must vary accordingly.

Adult scaffolding within naturalistic contexts can be used to facilitate language development in language disordered children (Kirchner, 1991; Norris & Hoffman, 1990). Scaffolded interactions will create opportunities for the child to experience and participate in activities in which the adult assists by organizing events and supporting child participation. Scaffolding within these whole contexts will enable children to strengthen and build existing patterns of connections to refine their knowledge of the parts of the whole.

The three sections above have presented principles from connectionism, whole-to-part learning, and social mediation that provide the theoretical background for holistic language intervention. In the next chapter, empirical literature supporting three premises will be presented. Components of language interact with each other. Traditional intervention has focused on modeling or elicitation of particular aspects of the child's problem. Holistic language intervention using adult scaffolding can successfully focus on facilitating all aspects of the child's problem.

REVIEW OF RELATED LITERATURE

Interventions for children identified as either language delayed or speech delayed have typically been provided by separately targeting each level of language organization. An aspect of language organization, such as a particular syntactic structure, bound morpheme, or phoneme, is targeted in a three part sequence. First, the interventionist constructs a situation in which the use of the targeted language part is required. Second, models of the language part being used in that situation are provided to the child. Finally, feedback is provided regarding how well the child uses that language part (Fey, 1986). However, interactions among levels of language organization demonstrated in language delayed children's use of language parts suggest the need to develop interventions addressing multiple levels of language simultaneously. The following sections will review literature supporting the existence of interactions among phonological, morphological, and syntactic language parts. This is followed by a discussion of currently suggested language intervention strategies. The final section discusses the use of scaffolding procedures within language intervention to target language parts within whole contexts.

Interactions in Development of Phonological, Morphological, and Syntactic Language Parts

A variety of research studies have pointed to the interactive nature of language parts in development. Studies

have demonstrated that phonological and syntactic delays co-occur, that increases in syntactic complexity of utterances results in decreased phonological complexity, and that children with oral language delays are likely to have difficulty acquiring written language abilities.

Co-Occurrence of Language and Phonological Problems

Children who are primarily identified as speech-delayed have subsequently been shown to perform less well than their normally developing peers on a wide variety of higher order language measures. The spontaneous language of school-age children with delayed articulation development has been characterized as having a lower mean length of utterance (Shriner, Holloway, & Daniloff, 1969) and less grammatical complexity (Van DeMark & Mann, 1965) than that of children with normally developing phonology. Children identified as speech-delayed perform less well than their normally articulating peers on standardized measures of receptive and expressive syntax (Hiimmelwright-Gross, St.Louis, Ruscello, & Hull, 1985; Marquardt & Saxman, 1972; Smit & Bernthal, 1983). An estimated 88% of the children identified as phonologically delayed demonstrate delayed development of morphology (Paul & Shriberg, 1982). Three-fourths of another group of children with speech-delayed were reported to have delayed syntax, delayed onset of speech, and word finding problems (Shriberg, Kwiatkowski, Best, & Hengst, 1986).

Similarly, children who are originally identified as language delayed have been shown to present phonological

development problems as well. Bishop and Edmundson (1987) found that 79% of a group of children identified as syntactically delayed also demonstrated delayed phonological development while Fey and colleagues (1994) found that 90% of the children with language delays also had phonologically delays. Paul and Jennings (1992) found that children identified as "late talkers" produced significantly fewer consonants and less complex syllable structures than their peers at age two years. At age four, these same children were producing less complex sentence structure and less complex oral narratives.

This line of research indicates that children identified with either delayed speech development or delayed language development are at risk for the other classification. A number of logical possibilities exist for these relationships. Delayed speech development may cause delayed language development. Delayed language development may cause delayed speech development. Both delayed speech and language may be symptoms of an inability to create whole-part relationships among language units. These possibilities are further supported by experimental data showing that children's production of phonological parts of language are affected by the larger language units in which they are contained and the larger units are affected by the complexity of the smaller phonological units.

Interactions of Morphological, Syntactic, and Phonological Complexity Within Utterances

A number of experimental studies have observed interactive relationships among morphological, syntactic, and

phonological complexity of children's utterances. Leonard and colleagues (1982) taught vocabulary items to children with language delays. The words were constructed to either be similar to the phonological patterns found in the children's production of words or more complex. They found that children's acquisition of vocabulary items favored words that fit their currently available phonological patterns. Panagos, Quine, and Klich (1979) manipulated the syntactic complexity of children's utterances in elicited imitations of noun phrases, active voice sentences, and passive voice sentences. The number of speech errors systematically increased across these utterance types as syntactic complexity was increased. Furthermore, the interaction between syntactic complexity and phonological complexity appears to be bidirectional in nature. Panagos and Prelock (1982) found that children with language disorders produced more syntactic errors within elicited imitation tasks when the phonological complexity of words was increased by including more consonant clusters and multisyllabic words within elicited imitation tasks.

Effects of Delayed Oral Language Development on Written

Language Development

Inasmuch as a significant amount of language learning occurs during the early school years, a number of investigations have looked at relationships between early oral language development, and written language development. Both retrospective (Aram & Nation, 1980; Hall & Tomblin, 1978) and longitudinal (Aram, Ekelman, & Nation, 1984; Bishop & Adams,

1990; Menyuk, Chesnick, Liebergott, Korngold, & D'Agostino, 1991) studies have shown that preschool children with speech and language impairments are at risk for failure in the development of reading. Measures of receptive language ability and expressive language ability in preschool have been shown to be correlated with reading ability at age eight (Bishop & Adams, 1990).

Recent follow-up studies of adults with a history of preschool speech and language impairment suggest that preschool oral language problems become more subtle and related to written language with age. Felsenfeld, Broen, and McGue (1992) compared the language development of the children with the lowest preschool phonological scores to a comparable group of average performing children derived from the Templin (1957) study and tested the two groups as adults. In kindergarten, the children with phonological delays also showed lower oral vocabulary scores. During the elementary school years, the difference in speech sound production scores between the delayed and not delayed groups lessened as the single word productions of the delayed group approximates those of the not delayed group. During middle school the children with phonological delays continued to be delayed in vocabulary development. In high school, they demonstrated lower oral reading and reading comprehension scores. As adults, their reading vocabulary and comprehension continued to be low with a subgroup whose articulation remained faulty.

Catts (1989) approached the relationship between speech and language development and written language ability from a different perspective. He studied the phonological abilities of college students who had a history of dyslexia. He found that adult dyslexics made more articulation errors than a control group of students when asked to produce tongue twisters and rapid repetitions of phrases. Data such as these have been used to support the continued provision of speech-language intervention for children throughout the elementary grades. In addition, Catts (1989) has suggested that preschool children with language delays should receive intervention for phonological awareness to increase their abilities to decode print during the early school years.

Results of these three groups of studies suggest that delayed speech and language development are symptoms of a common problem that extends into development of written language. The problems exhibited by the children become more subtle as the obvious misarticulations, morphological errors, and syntactic errors of the preschool child give way to the written language problems of the elementary school student. Currently utilized interventions for preschoolers tend to provide separate interventions for each component of oral language difficulty while ignoring the child's needs with respect to written language development. The following section will elaborate on the intervention strategies that are currently being employed with preschool children with speech-language delays.

Current Intervention Strategies

Language interventions for preschool children identified as language and phonologically delayed have evolved from one-to-one clinical settings to include more naturalistic settings. Phonological interventions have evolved to include manipulation of linguistic context as well as articulatory placement. Research regarding the interaction among language and phonological levels has motivated the development of interventions designed to simultaneously address both deficits. Concern for future academic problems of children with language and phonological delays has motivated the development of interventions designed to promote metalinguistic awareness in these children. The following sections will review interventions that are currently being employed by speech-language pathologists.

Language Interventions

Current language interventions systematically apply adult behaviors found to facilitate language acquisition in studies of parent-child interactions. These behaviors can be used in more naturalistic interactions than more traditional clinical training sessions using artificial stimuli and reinforcement progressions. The interactions are used to increase the use of specific pragmatic interactions, semantic-syntactic relationships, or morphological forms (Fey, 1986). Typically, the clinician chooses a form based on a normal developmental continuum (Schiefelbusch & Lloyd, 1974). The clinician then applies goal attack strategies that model targeted forms,

specifically elicit targeted forms, and provide adult feedback regarding the use of the forms. These strategies may be applied in play or other naturalistic settings. This section will review studies of language interventions called focused stimulation, incidental teaching, mand-model procedure, milieu training, and holistic intervention.

Fey, Cleave, Long, and Hughes (1993) demonstrated the utility of a naturalistic language intervention called focused stimulation. Goals were set to develop the use of specific syntactic forms, including main verbs and personal pronouns. Intervention sessions provided a ten minute period in which the child imitated target forms followed by a preschool activity designed for the child to hear and produce the target. The target form was modeled by the adult, attempts were made by the child, and child utterances were recast by the adult through expansion or by changing the sentence to highlight the target word. Compared to the control group, the intervention group made greater gains in syntactic development.

A second variety of naturalistic intervention is called incidental teaching. Incidental teaching involves interactions between an adult and child that arise naturally and are used systematically by the adult to transmit new information or give the child practice in developing a skill (Hart & Risley, 1974; Warren & Kaiser, 1986). This approach involves selecting specific language targets, using prompts to ensure use of the targets, responding to the child's initiations which resemble the targets, and reinforcing attempts to produce the target. For

example, if the selected target form is nouns, when the child points to a box of crayons, the adult provides a prompt, "What do you want?" If the child does not respond, the adult provides a model "Say I want crayons." The adult provides a functional reinforcement, "Good, here are the crayons." Hart and Risley (1974,1975) studied increased use of targeted nouns, adjectives, and compound sentences. Use of each target increased relative to the others only when intervention was applied.

Warren, McQuarter, and Warren (1984) developed an intervention called the mand-model procedure. It was designed to be used with unresponsive language delayed preschool children within a naturalistic setting. While similar to incidental teaching, this approach involves direct instruction to talk about a topic chosen by the clinician. The clinician initiates the interaction with a mand, which is an open ended question requiring more than a "yes" or "no" answer or an instruction to verbalize. For example, the clinician may ask "What are you doing?" If the child responds appropriately, the teacher responds with positive feedback such as "super," and complies with the request by giving the object to the child. If the child responds inappropriately, the teacher provides a model and requires an imitative response. For example, the clinician may say "Say I'm coloring."

Three language delayed preschool children, ages 2;11 to 3;7, served as subjects. The subjects displayed low rates of verbal behavior. Mean length of utterance for each was below

average, however all three had intelligible speech. Rate of child verbalizations and non-obligatory verbalizations were measured. Results showed an increase in total child verbalizations and nonobligatory initiations for two children, though effects were limited for one child.

Milieu training uses a combination of specific strategies such as mand-model procedures and incidental teaching. The procedures follow similar basic steps as described above, though a distinction is made in who initiates the interaction. Within milieu procedures, a training sequence begins when the trainer judges the child to be interested in a planned activity and receptive to prompting. The mand-model procedures and incidental teaching procedures are then used interchangeably. If the child's initiations are low, the mand-model procedure is employed more than incidental teaching. As the child's initiations increase, incidental teaching is used at a greater frequency than mand-model procedure.

Warren and Bambara (1989) investigated the efficacy of milieu language intervention for teaching action-object form. Subjects were three children with developmental delays ranging from borderline to moderately mentally retarded. Results indicated that the subjects learned to produce action-object combinations. However, the responses by the children were most often repetitious responses to training prompts. For example, the clinician said "Say I'm playing," followed by the child saying "I'm playing." The three children showed no evidence of generalization across settings or persons. However,

one subject did increase his use of spontaneous imitations as well as non-direct use of intervention targets.

The research discussed above illustrates the effects of some language interventions using naturalistic procedures. In each, specific forms were targeted, goal attack strategies were used to address the targeted forms using modelling, specific elicitation, and feedback. Goal attack strategies occurred within play or other naturalistic settings. The holistic approach tested in this study uses naturalistic procedures to target development of more complex discourse structure and semantic complexity rather than specific syntactic forms.

As described above, traditional goal setting consisted of targeting specific language forms. In holistic intervention, goals are set to increase the semantic and discourse complexity of language (Norris & Hoffman, 1993). Semantic complexity refers to the distance between the perceptual characteristics of a topic and the level of analysis of the topic being discussed in language. At the level of Indication, a topic is noticed without language through points or gestures. There is little distance between the perception of the object and the gesture used to refer to the object. For example, if a child wants a particular toy, he can express his desire through indication by pointing to the object rather than verbally asking for the toy.

At the level of Label, the physical world is talked about through names of concrete, observable objects and persons. Distance between the physical object and its referent is slightly

greater than at the level of indications. For example, a child may talk about playing with a ball through the label "ball."

The next level, Description, is characterized by more distance between the physical world and the language used to share information than the previous level. Descriptions communicate characteristics of objects, such as "red ball," or communicate relationships of actions or states between objects, agents, or events, such as "ball rolled fast."

At the next level, Interpretation, the information communicated is not directly observable. Interpretations may include goals, states, qualities, or changes. For example, "The mom is mad because the children are dirty," is an interpretation when the child can see a representation of an angry looking mother character looking at dirty children in a picture.

In the next level, Inference, meaning extends beyond what is present or suggested by the context. Language at the inferential level is based on the speaker's knowledge or personal experience. For example, making the prediction "clouds will soon be rolling in," prompted by reading a weather report is an inference.

At the highest level, metalanguage, knowledge regarding properties of language is expressed. The perceptual distance between the topic discussed and available cues is at a minimum. An example of metalanguage is, "Ball begins with the letter 'B' and rhymes with the word tall."

Within holistic intervention, the adult first judges a child's utterances as semantically appropriate or inappropriate.

Feedback is given according to the individual child's responses (Norris & Hoffman, 1990). If the child's utterance is semantically inappropriate, the adult provides information to help the child reorganize information. The adult may model appropriate responses by asking a question with the appropriate response within the question such as "Is the car blue or purple?" Or the adult may provide clarifying information to give the child another opportunity to respond appropriately such as "Those are not feet, those are paws." If the child does not respond, the adult may elicit feedback by allowing the child to physically respond through gestures or pantomime such as "Show me the cow."

If the child's language is semantically appropriate, the adult provides feedback to increase the syntactic, semantic, or discourse complexity of the discussion. The adult uses expansions to provide models of more syntactically complex language. For example, if the child says "he hit," the adult may respond with "He is hitting the boy." The adult uses modeling and cloze procedures to prompt discussions with more complex semantic structure. For example, the adult prompts a label with a cloze like "It is a _____," leaving a pause for the child to fill in the object. The adult prompts a description with a cloze such as "The ball is _____," leaving a pause for the child to fill in a characteristic. The adult prompts an interpretation through a cloze such as "The wolf is coming. I bet that makes the pig _____," leaving a pause for the child to fill in an emotion. The adult prompts for an inference by using clausal prompts such as

"It rains because____," leaving a pause for the child to fill in scientific knowledge.

In addition to increasing the semantic level of the discussion, the adult also seeks to increase its discourse complexity. Discourse complexity refers to the structure that organizes the discussion of the topic. At the lowest level, Collections, there is no central topic. The language is random with no structure imposed. The language used is judged to be both on and off topic by the listener. This is a typical level of organization for preschool children with language delays.

The next level, Descriptive Lists, includes language that is organized by a specific topic or central theme. No temporal, spatial, or causal order unifies the list. For example, the child may describe a birthday party by talking about birthday cakes, presents, and candles with little apparent organization between sentences.

The next level, Ordered Sequences, includes temporally or spatially ordered actions. No causal relationships are incorporated between actions. A child may describe a birthday party by describing a sequence of actions such as "We sing a song. Then he blows out the candles. Then he opens presents."

In a Reactive Sequence, the structure becomes more complex because it includes causal relationships. A child's rendition of a birthday party may include causal links such as, "He blows out the candles so that we can eat the cake."

In the next level, Abbreviated Structures, a central goal directs the sequence of actions. A child would reach this level

if his telling about a birthday party included a goal statement like, "We have birthday parties to make the person feel good."

Complete Structures are stories that include some problem to reaching the stated goal that results in a plan to overcome the problem, attempts to execute the plan, and a resolution of the attempts. A birthday party might include a problem such as the cake being eaten by a pet that causes someone to figure out how to save the birthday party.

Increasing the child's ability to organize discourse structure is a primary goal in holistic language intervention (Norris & Hoffman, 1993). Storybooks and pictures are used repeatedly so that the the same events can be talked about many times. With each repetition of the story, the adult seeks to increase the discussion of the story to higher levels of semantic and discourse complexity. Because of whole-to-part learning, it is hypothesized that this intervention will cause improvement in both syntactic and phonological development as the child speaks more frequently about the same events (Hoffman 1992).

Storybooks may be organized within themes so that concepts are learned from a variety of perspectives, rather than random activities designed for a child to hear and attempt productions of the specific grammatical forms (Norris, Hoffman, & Monjure, in press). Redundancy of concepts and the language forms that refer to them occur in these interactions with the possible effects that the children will learn discourse structure, semantic-syntactic relationships, and phonology.

Current language interventions including focused stimulation, incidental teaching, mand-model, and milieu teaching develop goals addressing discrete morphological or syntactic forms. These goals are attacked in play situations centered around the specific targeted form. On the other hand, language intervention using a holistic approach sets goals addressing discourse structure and semantic complexity that are met through redundant, theme-oriented discourse contexts incorporating causal and temporal relationships. Current phonological interventions continue the tradition of specifically targeting phonemes and phonological processes. The following section will review interventions for phonological delay.

Phonological Intervention

Current phonological treatments stress linguistic function as well as proper articulatory placement and auditory discrimination skills. There are many varieties of phonological intervention including minimal pair contrasts, maximal pair contrasts, and cycles approaches.

One type of intervention includes production and perception of minimal pairs of words. Weiner (1981) engaged two children with phonological impairments in a treatment involving minimal pair contrast procedures in single word productions. The strategy involved confronting the children with the fact that their productions of the two words were the same, resulting in miscommunication. This occurred in a game in which the children were shown pictures contrasting two words such as "bow" and "boat." They were asked to tell the clinician to pick a

certain picture. Miscommunication was apparent if the clinician selected the unintended picture. After two errors, the clinician stopped and offered instruction by modeling the correct production of the word and emphasizing the difference between the child's production and the clinician's production. The procedure was successful in reduction of final consonant deletion, stopping of fricatives, and fronting of velars in treated as well as untreated words.

Saben and Ingham (1991) attempted to determine the efficacy of minimal pair intervention that did not include phonetic placement instruction and modeling used by Weiner. Two children with phonological disorders were taught the meanings of a set of minimal pair words, followed by spontaneous production of the selected words. They found that two children with phonological delays did not change speech production when they were taught the meanings of a set of minimal pair words. Correct production did not occur until phonetic placement cues were provided.

Shifts in productive phonological knowledge of children with phonological delays were further investigated using minimal pair contrasts (Gierut, Elbert, & Dinnsen 1987). Productive phonological knowledge was defined as sound properties learned and stored with rules associating sound with meaning. Six children with phonological delays were described by their overall speech sound pattern. Each child's error sounds were placed on a continuum from most phonologically known,

meaning correct sound production relative to adults, to least phonologically known, meaning omission of sounds.

Minimal pair contrast treatment was employed. Treatment required correct production in an imitative phase involving modeling by an adult and a spontaneous phase without modeling. Baselines and probes were measured for all sounds within each child's continuum throughout the treatment. Target sounds for three children were selected from the most phonologically known end of their speech sound continuum, while target sounds for the other three children were selected from the least phonologically known end of their individual speech sound continuum. Results indicated that generalization was greatest for sounds for which the children had the most phonological knowledge.

Gierut (1989) evaluated a phonological treatment of maximal rather than minimal contrasts. In this approach, phonemic distinctions varied along broad and multiple dimensions of voice, place, and manner. An example of maximal word pair contrasts is "sail-whale." As in the previous study imitative and spontaneous phases were used to treat the targeted sounds. Results indicated generalization to non-target sounds as well as overgeneralization of learned concepts suggesting the child was restructuring his sound system. According to Gierut, the maximal opposition seemed to provide the child with flexibility and control in learning and generalization.

Another approach of phonological intervention is a cycles approach (Hodson, 1991). Hodson's approach targets a process by teaching children to produce words containing phonemes affected by the process. According to Hodson, the use of minimal pair contrasts with highly unintelligible clients is too confusing because at an early developmental level the child is attending to highly contrasted phonemes as he organizes his system rather than minimally contrasted phonemes. As the child's system becomes more organized, he will be able to attend to finer aspects (Hodson & Paden, 1981).

The cycles approach targets the most stimutable sound affected by a process. Cycles are time periods during which all phonological patterns that need remediation are treated. Each process is treated for a short period within the cycle. Treatment occurs in game formats designed to allow single word productions. Research supporting the efficacy of a cycles approach is lacking. Hodson (1992) states most clients in her clinic are dismissed in 18 months after prolonged successful phonological remediation.

In summary, minimal pair contrasts, maximal pair contrasts, and cyclical interventions focus on learning correct production of word forms in contrived situations. However, the interaction between phonological and syntactic delays suggests the need to utilize intervention techniques addressing both language and phonology. The following section reviews literature regarding efficacy of intervention techniques on both language and phonological abilities.

Experimental Assessment of Simultaneous Interventions

Because of the high percentage of children with co-existing language and phonological disabilities, the question of how intervention techniques affect both language and phonology arises. Interventions that successfully remediate both language and phonological problems simultaneously would be highly desirable. To date, four studies have measured phonological and syntactic development resulting from language and/or phonological interventions.

The most recent of these studies investigated the effect of focused stimulation on both grammar and phonology in preschool children (Fey, Cleave, Long, & Hughes, 1994). Grammatical forms were targeted through frequent modeling of the target forms and the use of sentence recasts containing target forms following child productions. Four grammatical forms were targeted in cycles. The clinician conducted drills for ten minutes each week for the targeted forms. Thirty preschool children, ages 3;8 to 5;10 were divided into three groups. One group received remediation from a speech-language pathologist, and a second group received remediation from a parent trained by the speech-language pathologist. Grammatical improvement was measured by the Developmental Sentence Score (DSS) derived from language samples. Both the clinician trained and parent trained groups improved significantly in grammatical complexity compared to a control group over a five month period.

Phonological improvements were measured via percent of consonants produced correctly (PCC). Results showed that the approach used did not significantly effect PCC nor was there a relationship between the DSS and PCC. The researchers further considered effects on children with only mild impairments. Results showed that two mildly impaired children made larger gains in phonology than were typical of the overall group. Additionally, a decrease in initial cluster reduction (ICR) was found in the mildly impaired children, however, no significant correlation was found between ICR and DSS. It appears that focused stimulation may cause limited phonological improvement in mildly impaired children. The focused modeling and stimulation of the target forms in this study occurred in typical preschool contexts. Thus, topic redundancy was not utilized so that same words would recur with possible effects on phonology.

Tyler and Waterson (1991) investigated the effects of phonological and language interventions on both language and phonological abilities of preschoolers. The phonological intervention involved an approach in which phonological processes were targeted and presented to the children in cycles. Cycles were defined as time periods during which phonological patterns needing remediation are treated. The language intervention consisted of a script approach in which a story was read by the clinician, followed by a related activity for which a script had been written targeting syntactic and morphological structures. The children in the language group were

characterized as having an overall severe problem across the domains of language and phonology. The children in the phonological group were characterized as having a mild phonological disorder with a moderate language problem.

In addition to the direct effects of the language intervention on language and the phonological intervention on phonology, indirect effects of language intervention on phonological abilities as well as phonological intervention on language abilities were measured. Measurements of MLU and PCC were gathered pretreatment and posttreatment for each treatment group. No significant differences were obtained for either group.

According to the authors, the results may be due to the different relationships between phonology and language within the two treatment groups. It was suggested that successful treatment of less severe problems could focus on either language or phonology, whereas decisions regarding treatment of more severe, global problems must be made on whether to treat domains separately, simultaneously, or independently. However, they did not show a significant improvement in language or phonology so their intervention was not successful at any level. Furthermore, a whole-to-part indirect effect on phonology would not be expected if the child had not learned morphology. Topics were shifted from week to week, so the children did not have a redundant set of words to learn within the intervention from which they would be able to learn more elaborate phonological forms.

Matheny and Panagos (1978) conducted a study investigating the indirect effects of a grammatical intervention on phonological abilities. Twenty-four children between the ages 5;5 and 6;10 were randomly assigned to three groups. One group received no intervention, the second group received syntactic intervention, and the third group received articulation intervention. The approach used was a tightly structured, imitative program (Gray & Ryan, 1973). Pretest and posttest measures were obtained using standardized language and articulation tests. Gains in both syntax and phonology were significantly greater in the intervention groups than in the control group. Furthermore, the articulation group improved slightly more than the syntax group in articulation, while the syntax group improved slightly more than the articulation group in syntax. The principle of whole-to-part learning may have caused the improved phonological performance within the sentences.

Hoffman, Norris, and Monjure (1990) compared the effects of a minimal pair contrast intervention to a holistic language intervention on language and phonological abilities of two pre-school children. Two brothers, ages 4;1, served as subjects. Both scored in the low-normal range in language abilities with a moderate impairment in phonology according to standardized measures. The brothers participated in three, 50-minute individual treatment sessions per week for six weeks.

The phonological intervention used minimal pair contrasts targeting cluster reduction, while the language intervention

sought to increase semantic and discourse complexity of stories. Dependant measures included standardized assessments of general language and phonological abilities as well as specific phonological and language measures. Phonological measures included the number of correctly produced target sounds from a standardized screening test, the number of consonant clusters in which one or more consonant was deleted, and the number of consonant clusters correctly produced. Language measures included percentages of story-related utterances, sentence fragments, simple sentences, complex sentences, syntactic errors, and morphological errors. Results showed improvements in phonological abilities by both brothers. Improved performance was noted in all phonological measures for each child. However, the child receiving a holistic language intervention showed greater improvement in expressive language measures. Results suggest a language approach using narrative tasks may effectively simultaneously remediate language and phonology. Utilization of narrative tasks may require processing at varying levels of complexity, thus synergistically effecting phonological accuracy.

The two studies showing improved phonological performance also showed improved syntactic performance. Thus, it appears that whole-to-part learning may be operative in language interventions that target relatively complex aspects of language. For example, the child in the Hoffman et al. study learned the overall temporal and causal sequences within the stories. He also learned more refined syntax and phonology. If

this intervention had focused on print in stories, it may facilitate the children's performance in later academic situations. The following section will discuss literature investigating metalinguistic abilities and approaches to facilitating these abilities in children with language and phonological delays.

Academic Intervention

Concern for projected future problems in development of academic skills by preschool children with oral language delays has motivated the development of intervention to directly address these skills. Research literature has investigated the metalinguistic abilities of language and phonologically disordered children because learning the English alphabetic code involves conscious decisions about the sound structure of words and how that sound structure should be represented alphabetically.

Kamhi, Lee, and Nelson (1985) compared children with language disorders to normally developing children matched for mental age and language age. Groups were compared on ability to segment sentences into syllabic units and words. Both control groups performed significantly better than the language disordered children. The authors suggested that metalinguistic awareness should be an intervention target for young pre-school children.

Metalinguistic abilities can be taught in context. Within naturalistic settings, children naturally use play to experiment with the linguistic structure of words (Cazden, 1983). van

Kleeck (1993) proposed that introduction of metalinguistic skills to language delayed preschoolers involve manipulation of three aspects of the context: a) nonlinguistic, b) linguistic, and c) metalinguistic. The nonlinguistic stage is the earliest stage in which language is about the physical actions within routine events. During this stage, metalinguistic skill is introduced naturally within established routines. For example, activities involve the adult using print such as reading a story or making a list of items for an activity. During the linguistic stage, more emphasis is placed on linguistic concepts. At this stage, more complex language organizes the experiences rather than the physical action as in the nonlinguistic stage. Words used to talk about aspects of the language might be introduced. For example, while reading a story, the adult will point out letters and words. By the metalinguistic stage, linguistic and metalinguistic focus increases. Less emphasis is placed on the physical aspects of the routine, and more emphasis is placed on the linguistic aspects. The author suggests using an activity board with which the children can create pictures with print under them.

On the other hand, Catts (1991) suggested that metalinguistic awareness be trained through structured tasks. Suggested activities include segmentation, blending, and sound manipulation tasks. Segmentation activities explicitly ask children to divide words into sound segments. Activities facilitating this goal may include tapping out syllables in words with a wooden dowel. Blending activities require children to put parts of words together. Sound manipulation tasks involve

rearranging the sounds or syllables in words, for example, repeating compound words without one of the words such as "Say clubhouse without the word club."

Dean and Howell (1986) developed an intervention plan to change a child's phonological system by developing metalinguistic awareness. Two phases of awareness were used to develop abilities in the child. Phase 1 emphasized awareness of the sound system by emphasizing long/short contrasts using non-speech sounds, phonemes, and words. During Phase 2, feedback was given regarding the success or failure of a child's message on a word and sentence level. Awareness of communicative failure may motivate a child to repair an utterance, and lead to discovery of underlying language structures.

More research is needed to determine effective approaches to facilitate naturally occurring metalinguistic abilities for later academic success. These interventions are similar to phonological interventions in their focus on sound structures of words, and they might affect children's production of words.

Summary

Intervention for preschool children with language delays should facilitate language, phonological production, and metalinguistic awareness. In the sections that follow, holistic intervention which seeks to affect all levels and components of phonology and language will be discussed. Specifically, goal attack strategies that are centered around child initiations defined as scaffolding strategies will be examined (Norris &

Hoffman, 1990). Scaffolding strategies will be reviewed including general definitions, observations of normally developing children and their parents, and the use of scaffolding techniques in therapy.

Whole Language Intervention

To facilitate an integrated, dynamic language system, intervention should occur in contexts creating opportunities to share information within a meaningful, naturalistic environment. Whole language intervention provides such an environment. The design of this intervention approach involves redundant, predictable discourse contexts such as repeated reading of storybooks, and systematic responses to child initiations defined as scaffolding. The following sections will discuss the use of scaffolding procedures within a storybook context.

Scaffolding Procedures

Adults help children establish language patterns relative to discourse topics within communicative situations. The adult patterns of interaction that help children organize language are called scaffolding (Bruner, 1975). Data suggest that scaffolded interactions between mother and child facilitate language development. Use of such scaffolding strategies systematically and redundantly in language intervention may also facilitate language development. Research has investigated the effects of scaffolding procedures.

Several techniques are employed as scaffolding procedures. Cloze procedures are adult pauses to indicate that the child

should fill in information (Norris & Hoffman, 1990; Snow, 1983). Use of cloze procedures can be used to prompt all semantic language levels. The adult states some information, leaving a pause for the child to continue. The pause may indicate that the child is to fill in a label, description, interpretation, or inference. For example, if the adult is scaffolding a label, the adult could say "It's a _____," pausing for the child to say the fill in an appropriate label such as "cake." If the adult is scaffolding an interpretation, the adult will say "She's mad because _____," pausing for the child to fill in with an appropriate interpretation such as "The animals are dirty."

A second procedure is the binary choice in which the adult states information offering the child two alternate utterances (Norris & Hoffman, 1990). The options are limited for the child and the possibilities are modelled. An example of a binary choice at the level of description is, "Is the cow clean or dirty?" An example of a binary choice at the level of inferences is, "Will the trip take longer if we go to Texas or California?"

Relational terms constitute a third procedure. These are used to mark temporal and causal events (i.e., before, after, because, if-then). Relational terms at the beginning of language acquisition are interpreted in relationship to the context (Nelson, 1985). Though they may be unable to explain them, preschoolers have been found to use these terms within well-organized, familiar events (Carni & French, 1984). Children as young as 2;6 have been found to use causal terms correctly within the context of everyday activities (Hood & Bloom, 1979).

As a scaffolding strategy within a repetitive, contextualized activity, relational terms can prompt the child that more information is needed, and can cue the child about the type of information. For example, if the child says, "He likes birthday parties," the adult could prompt with the word "because" to cue the child that causal information is needed.

Pointing, gazing, or gestures can be used as a scaffolding procedure to facilitate language development (Norris & Hoffman, 1990). Non-verbal gestures are meaningful in interactive routines (Murphy, 1977; Panofsky, 1986). Pointing can serve to direct attention to relevant information, and has been shown to increase comprehension when an adult adds new information in storybook routines (Murphy, 1977; Panofsky, 1986). Mother's use of gaze behavior can serve to determine if the child has comprehended new information (Panofsky, 1986). Non-verbal behavior can be used to reinforce concepts expressed in verbal utterances as well as stand alone to direct or establish attention and determine if clarifications or additional information is needed.

Sixty percent of mother's utterances to children ranging in age from 3-24 months of age are questions (Snow, 1977). Several types of questions can be used as scaffolds for the child. These include constituent questions, comprehension questions, and summarization questions. Constituent questions are used as a scaffolding procedure to elicit specific information from the child (Blank, Rose, & Berlin, 1978; Norris & Hoffman, 1990). Comprehension questions ask for information at higher levels of

semantic discourse (Norris & Hoffman, 1990; Snow & Goldfield, 1983). Finally, summarization questions allow the child a second opportunity to communicate the information (Norris & Hoffman, 1990; Snow & Goldfield, 1983). Furthermore, the adult can evaluate the child's overall comprehension of the information.

A final scaffolding strategy is phonemic cues in which the adult prompts a word or phrase by use of the initial sound or syllable of the word (Norris & Hoffman, 1990).

Scaffolding serves to expand and build on the child's language. Redundancy is an important result of scaffolding procedures. For example, in using cloze procedures, the adult may build on the child's utterance of "red ball" and say "the red ball_____" leaving a pause for the child to fill in an appropriate action such as "rolled." Adult repetition of the child's utterance serves to guide and direct the child's language and experiences while taking advantage of the child's current attention to a topic and the psychological processing the child has already used in the utterance. The use of redundancy by the adult has been shown to be used for many purposes such as: a) expressing semantic content, b), requesting responses, and c) validating child response (Gleason, 1977).

Scaffolding in Normal Development

Research indicates that mothers of normally developing children use both repetitions and clarification questions to focus attention on children's ungrammatical utterances rather than explicitly saying an utterance was grammatically correct or

incorrect. Brown and Hanlon (1970) found that mothers repeat ungrammatical utterances more often than grammatical utterances. Though the study did not show the effect this had on the children's language, it suggests that repetitions may provide feedback regarding grammatic appropriateness as well as provide a model of a more appropriate semantic form.

Demetras, Post, and Snow (1986) studied the use of implicit versus explicit maternal feedback on the language of two year old children. Implicit responses included repetitions, clarification questions, and move-ons, while explicit responses included either approval or correction. It was found that explicit feedback was infrequent and not differentially used to follow syntactically well-formed or ill-formed utterances. The most common feedback to ill-formed utterances were clarification questions. Additionally, repetitions more often followed ill-formed utterances than well-formed utterances of the children, providing corrective information. The findings suggest that implicit feedback exists in higher percentages than explicit feedback, and is produced differentially to well-formed and ill-formed utterances.

Scaffolding in Delayed Development

Research suggests that mothers of children with language delays interact with their children differently than mothers of their peers with normally developing language. Mothers of children with language delays use more directive utterances and commands than mothers of children with age appropriate language (Laskky & Klopp, 1982). Even when the children with

language delays did not respond to their commands consistently, mothers continued using directive utterances at a high rate. Further, mothers of children with language delays used fewer expansions and imitations of their children's utterances (Lasky & Klopp, 1982; Schodorf & Edwards, 1983). A negative relationship was found between the high use of directive commands and language acquisition in normally developing children thirteen months of age both in terms of comprehension and vocabulary (Snow, 1977).

These findings suggest that children with language delays live in a linguistic environment that functions to maintain the language problems. They are exposed to numerous commands that have reduced syntactic forms and few expansions that would provide models of more elaborate syntax. In language intervention that increases the use of more scaffolding strategies, the child's language development may be enhanced.

The minimal pair intervention discussed earlier is a specific instance of the strategies of repetition and clarification questions. The adult can use a minimal pair to show the child that the communicative intent is not understood. For example, if the child produces a /b/ rather than an /f/ in the word "fighting," the adult may question which word he intended and use the opportunity to draw attention to the difference in the sounds the words. Basing minimal pair strategies within a communicative approach is an effective approach (Weiner, 1981).

Use of minimal pairs within naturalistic language intervention may indirectly effect phonology. Studies have

shown that at a young age children may be sensitive to judgements about form. A two and a half year old child recognized his production of the word jump as different than his father's production (Smith, 1973). Also, a five year old recognized the difference between his production of the word cowboy as different than an adult's production (Brown & DeLoache, 1983).

Yoder and Davies (1990) investigated effects of parental questions and topic continuations on the language of children with developmental delays. Eight children with developmental delays and their parents served as subjects. Parent-child interactions were analyzed during play settings. The study investigated the probability of eliciting a child's reply, the probability of adult continuing prompts and non-prompts as well as initiating prompts and non-prompts, and the effect that the developmentally delayed child had on the parent's use of these strategies. Results indicated that adult topic continuations within conversational contexts facilitated child responses. Furthermore, although all child talk elicited adult continuations, child replies and intelligible child talk were most likely to elicit these strategies. It appeared that elaborating on a topic familiar to the child created a scaffold to support the child's language which resulted in an increased amount of child talk.

Additionally, Yoder (1989) conducted a study to determine the relationship between information seeking and confirmation questions used by mothers. Subjects included five preschool children with language disorders. Two 30 - minute free play

sessions were conducted between the mother and child within a twelve month interval. Results indicated that information seeking questions provided a scaffold for the child by drawing the child's attention to necessary information, thus facilitating mastery of auxiliary use in children. Data supported the use of scaffolded interactions to promote development of linguistic structures.

There continues to be a need for the investigation of intervention techniques within social-interactive context, and specifically use of scaffolding strategies within such context. Data regarding the effectiveness of scaffolding are needed to directly investigate systematic scaffolding procedures within a naturalistic language intervention setting. The following section discusses the use of storybooks as topics of parent-child interactions using scaffolding techniques.

Storybooks as Context

Use of storybooks as a context for intervention serves two purposes. First, storybook reading can facilitate developing discourse knowledge. Repeated exposure to storybooks may enable an understanding of the discourse structure of the story. Additionally, storybooks provide a naturally occurring context for discussion about metalinguistic concepts within storybooks such as words, letters, and sounds. Language development in this context may alleviate some of the language delayed child's projected academic problems.

Illustrated storybooks provide an ideal context for scaffolded interactions. The use of storybooks narrows the

range of possible referents, so the child will more easily stay on topic. Adults use storybooks to establish, monitor, and maintain joint focus and recurring interactive routines can be established (DeLoache & DeMendoza, 1985). Storybook interactions provide a routine that places the child's actions and vocalizations in a context within which they are interpretable and pragmatically effective (Bornstein & Bruner, 1989).

Snow (1983) examined parent-child interactions to demonstrate three characteristics of social interaction in literacy acquisition and training: a) semantic contingency, b) scaffolding, and c) positive accountability procedures. Semantically contingent utterances included expansions, extensions, clarifying questions, and answers to the child's questions. Expansions and extensions serve to build on the child's utterance. For example, if the child says "ball," the adult may respond with, "The ball fell on the ground." Clarifying questions function to reduce miscommunication.

It was found that mothers used these to assist in redirection of child's attention and guidance of an activity. Positive accountability procedures were defined as maternal actions by which the mother demanded the child complete a task. These three characteristics were found to facilitate oral language and literacy development.

Increased exposure to a story results in improved quality of the child's responses (Martinez & Roser, 1985). Case studies were conducted in the home and preschool of four children ranging in age from 4;0 to 5;0. To determined changes in child

responses to familiar and unfamiliar stories, form, whether the utterance was question comment or answer, and focus, whether the utterance was directed toward the story, were measured. Results found that children talked with greater depth of understanding, began to focus on different aspects, and began to talk with increasing familiarity when the story is familiar.

Additionally, the research of Ninio and Bruner (1976) demonstrated that vocabulary development can be enhanced from repeated book reading. The achievement of labelling was investigated in one mother-child dyad interacting during book reading sessions. The mother's key utterances during this activity were attention getting, labelling, wh-questions, and feedback. A reading cycle was initiated with an attention getting comment, followed by a wh-question, and then a label. Feedback always followed the child's response. Each reading cycle contained these elements and was consistently repeated throughout the interactions.

Within a storybook routine the mother was found to guess the child's focus of attention and provide a label within this cycle. Labels were stressed and repeated. As the child began to respond with correct utterances, positive feedback was given. Results indicated that active participation and lexical utterances increased steadily through the sessions.

Joint book-reading conforms to the turn-taking structure of conversation, which was described by Bruner (1975) as crucial to language development. Ninio and Bruner found that turn-taking was virtually perfect from the beginning of the

interactions. It was noted that when the mother-child dyad stepped out of the storybook routine, the mother was less likely to interpret the child's utterance or facilitate the child's utterances.

Snow and Goldfield (1983) found that mother-child interactions revolving around the predictive nature of storybook use facilitated language acquisition. Conversations between a mother and child during storybook reading were analyzed. It was found that specific lexical items and constructions used to talk about the picture were produced by the child in subsequent discussions. This was evidenced in the child providing initial mention of lexical items and constructions during later sessions. Additionally, the child was most likely to acquire what he had heard his mother say if he himself immediately repeated the utterance.

Frequency of repetition with similar information may assist the child in organization of the event. Children with language deficits are frequently less responsive and less reciprocal in their interactions. These deficits lead to fewer opportunities to participate in interactions supporting language development, communication, and social adequacy (Kirchner, 1991). Therefore, consistency of an increased number of opportunities to interact may be critical. Storybooks can be used to provide such consistency.

Lucariello and Nelson (1987) investigated children's use of temporally displaced (TD) talk in relationship to mother-child interactions. Temporally displaced talk is the ability to use

language to share knowledge about concepts that have occurred in the past or will occur in the future. This study observed 2-year old children and their mothers in three different contexts. One context was a scripted context that was highly familiar, whereas the two others were not predictable. The authors proposed that an arranged social context may play a role in acquisition of temporally displaced talk and that scaffolding is more likely to occur in such situations.

The data indicated that the majority of child TD talk and scaffolding occurred in the scripted routine. Maternal talk was characterized by temporal markers, hypothetical and conditional language, conversational routines, and wh-questions (Lucariello and Nelson, 1987). According to the authors, conversational routines and wh-questions reflect general properties of scaffolding, while use of temporal markers and conditional/hypothetical language reflect scaffolding specific to TD topics. Most of the child contributions to the interaction were responses to wh- questions. Results suggest that use of language at higher levels of abstraction develops within a scripted context of scaffolded interactions. Furthermore, children's use of TD talk suggests an increase in the knowledge base. Mothers added to the overall knowledge base of the child by socially mediating world knowledge.

Specific rules characterize the structure of stories. Story grammar is a rule system that describes the regularity of these rules within text (Mandler, 1984). For example, a traditional story begins with a setting that introduces a protagonist.

Episodes containing one or more events form the plot structure. The protagonist reacts to events causing action which leads to more episodes or a final outcome.

As children discover these regularities, they are able to form mental representations of stories. The organization of the child's representation can be demonstrated through his ability to form narrative structure. Narrative development ranges from simple such as random labelling of objects and actions to complex in which all the elements of a narrative are included (Applebee, 1978; Norris & Hoffman 1993). Spatial, temporal, and causal relationships compose the forward movement of the story. As the child develops cohesive narrative structure, these relationships are respectively developed.

Summary

The literature reviewed has supported the premises that language organization problems at one level interact with problems at other levels. In spite of this, both language and phonological interventions have traditionally focused on modeling or elicitation of isolated aspects of language. Though some studies have investigated simultaneous effects of therapy on both language and phonology (Tyler & Waterson, 1991), there continues to be a need for further investigation of intervention techniques and the effects of intervention across varied levels of a child's problem. The importance of the interaction of language organization at higher levels with lower gestural levels suggests the need for the investigation of the relationship between language therapy focused on higher level

language functions and remediation of language and phonology. Further, concern for future academic problems suggests the need for research investigating components of approaches to facilitate developing higher level metalinguistic abilities.

Research Questions

This present study investigated the efficacy of holistic language intervention. The intervention strategy maintains a whole context, story-book reading, in which the development of the language (i.e., syntactic, semantic, and phonological) is facilitated through adult scaffolding. The specific questions addressed by this study are:

1. Will intervention using scaffolding strategies result in greater frequency of utterances in children with language and phonological delays compared to the baseline conditions using wh-questions or awareness to print?
2. Will the effects of intervention using scaffolding strategies result in children's use of higher semantic levels of language compared to the condition using wh-questions or awareness to print?
3. Will the effects of intervention using scaffolding strategies result in children's use of a higher syntactic level of language compared to the condition using wh-questions or awareness to print?

4. Will the effects of intervention using scaffolding strategies result in children's production of more phonologically correct words compared to the condition using awareness to print?

METHODS

This study employed a single-subject alternating treatments design (Barlow & Hersen, 1984) to assess the efficacy of the use of scaffolding strategies during repeated storybook reading as an intervention for delayed language development in preschool children. In this design, each subject is exposed to two conditions that are rapidly alternated in time. The relative efficacy of the two treatments is assessed by comparing the performance of the subjects during the first treatment to their performance in the second treatment during sessions that were near to one another in time. In this particular study, subjects participated in two treatments during each intervention session. Measures of each child's language performance during one intervention were compared to two baseline conditions. If a child showed better language performance in one intervention compared to the other during a statistically reliable percentage of the total number of sessions, it was concluded that one intervention had a larger effect than the other. This judgement was made on a statistical basis using the sign test set at a .05 probability level for each language measure.

As described in the Subjects section below, there were six preschool children in this study, chosen because they exhibited delayed language development with no obvious sensory, cognitive, or motoric cause. The scaffolding strategies intervention, described below in the Procedures section, involved repeated readings of a story book in which the clinician

assisted the child's participation in the reading through conversational turns that included scaffolding strategies. For three of these subjects, the scaffolding strategies intervention was compared to a control condition in which the clinician repeatedly exposed the children to another story book by asking questions about the pictures in the book. The questions were structured to give the children opportunities to produce language across a range of semantic and syntactic complexity. This condition was used to control for any effects on language development resulting from general interaction with an adult and repeated exposure to a particular book without the use of scaffolding strategies. For the remaining three subjects, the scaffolding strategies intervention was compared to an intervention that focused on awareness of print and the development of letter-sound correspondence knowledge during repeated readings of books. This condition controlled for the effects of general adult attention and repeated reading of a book. It also allowed a comparison to an intervention strategy that focused on higher levels of semantic displacement.

Transcriptions of the adult-child interaction in each session were made as described below in the Measurements section. These transcriptions were analyzed for the children's frequency of verbal responding, as well as the semantic, syntactic, and phonological complexity of these verbal responses. The hypotheses tested were that the scaffolding strategies intervention would result in higher levels of

linguistic complexity than the levels occurring in the two control conditions.

Subjects

The subjects were six children who exhibited both language and phonological delays. The subjects were between the ages 2;10 and 4;10 years. Five subjects met the following criteria:

1. Performance one and one-half standard deviations or more below the mean on the Clinical Evaluation of Language Fundamentals-Preschool (CELF-Preschool) (Secord, Wiig, & Semel, 1992);
2. Performance below the 25th percentile on the Goldman-Fristoe Test of Articulation (GFTA) (Goldman & Fristoe, 1986);
3. English as the native language and the language of the home where the child resides;
4. No participation in other language and phonological intervention programs during the period of the treatments;
5. Hearing within normal limits as determined by a pure bilateral tone hearing screening at 20 dB for the frequencies 1000, 2000, and 4000 Hz;
6. No known neurological or oral-motor impairments.

Criteria five and six rule out hearing and oral-motor impairments. The criteria of no participation in other intervention will show the interventions described in this study as primary agents in language development.

The CELF-Preschool (criteria six, above) is a standardized measure that was used to identify the children as language delayed. The CELF-Preschool is a clinical tool used to identify and diagnose children with language deficits. The tool identifies children lacking basic foundations of language form and content. Semantic ability is assessed through linguistic and basic concept subtests, syntactic ability is assessed through word and sentence structure subtests, and auditory memory is assessed through recalling sentences in context. The percentile score on the Goldman-Fristoe Test of Articulation qualifies the subjects as phonologically delayed. The GFTA uses pictures to elicit one word responses. Sounds are targeted in the initial, final, and medial position.

Identifying Subjects

The experimenter contacted local speech-language pathologists who recommended children for participation who had been diagnosed with both language and phonological disorders. Parents of potential subjects were sent an invitation to participate in the study and consent forms to be signed by the parents/guardians. These forms provided informed consent information and indicated whether or not the child would be available for the length of the treatments. They are included in Appendix A.

Based on the returned consent forms, children were evaluated to determine which children met the criteria as described above. Six children most closely matched for age and oral language performance were selected from the pool of potential subjects for inclusion in the treatment. Parents were informed that their child had been selected and arrangements were made.

Following inclusion in the treatment, the subjects were further evaluated using a cognitive assessment and qualitative language assessments. Subjects' reasoning ability was assessed through performance on the Columbia Mental Maturity Scale (CMMS) (Burgemeister, Blum, & Lorge, 1972). The CMMS is a nonverbal assessment of general reasoning abilities of children. The assessment task consists of the child looking and selecting one of several pictured objects that is different. Children unable to perform the task on the CMMS were given the Denver Developmental Screening Test (Frankenburg, Dodds, & Fandal, 1973). The DDST is a standardized test aiding in the discovery of children with developmental disabilities. Personal-social skills are assessed on the DDST through tasks such as the child playing peek-a-boo. Fine motor abilities are assessed through such tasks as building a tower of two cubes. Language is assessed by tasks such as determining if the child can combine two words. Finally, gross-motor ability is assessed through tasks determining if the child can walk up steps.

Language performance was further evaluated through performance on the Preschool Language Assessment Instrument

(Blank, Rose, & Berlin, 1978). The PLAI assesses the child's ability to use language according to four levels of abstraction. The levels range from least abstract to most abstract. Level I, matching perception, requires the ability to respond to questions with labels such as "What is that called?" Level II, selective analysis of perception, requires the ability to respond to questions with descriptions such as "What do we do with that?" The next level, reordering perception, requires the child to answer questions using interpretations such as "What should she say?" The final level, reasoning about perception, requires the child to answer questions with inferences such as "Why did you pick that one?" Finally, performance on a language sample was obtained by requiring the child to tell a story using a picture from Apricot 1 series with no adult prompting. The child's language was described qualitatively using the following semantic levels: labels, descriptions, interpretations, or inferences. A measure of mean length of utterance was also determined from the language sample.

Subject Descriptions

Subject One was a 4;1 year old male. S1 was described by his mother as a well-behaved, outgoing child. Results on the PLAI indicated a strong ability to label and describe as evidenced by scores of 2.4 and 2.0 (strong) for levels I and II. Abilities in higher levels of abstraction were characterized as weak, a score of .9 in both level III and IV. His language sample was consistent with these results in that S1 used primarily labels and descriptions with an MLU of 1.7. S1 scored within

normal limits on the CMMS. Analysis of results of the GFTA indicated speech characterized by omissions and stopping with a percentile rank of 13. Furthermore, S1 substituted /f/, /h/, and /d/ for many phonemes.

Subject Two was a 4;2 year old male. He was described by his mother as inattentive and unresponsive. Results on the PLAI indicated a strong ability to label with a score of 2.2 for level I. Scores for levels II, III, and IV were characterized as weak and were below 1.0. His language sample was consistent with these results in that labels were the primary level of response with an MLU of 1.4. S2 demonstrated a six month delay on the DDST in all subtests except language. Results on the language subtest indicated a two year delay. Analysis of results of the GFTA demonstrated speech characterized by omissions and substitutions with percentile rank of 1. S2 substituted phoneme /s/ for many phonemes.

Subject Three was a 4;1 year old male. He was described by the parent as a well-behaved, outgoing child who enjoyed interacting with adults and peers. Language elicited in the language sample was characterized by labels with one description with an MLU 1.5. Scores on the PLAI were 2.4 and 2.0 (moderately strong) for levels I and II respectively and .9 (weak) for both levels III and IV. Performance on the CMMS was within normal limits. S3's speech performance on the GFTA was characterized by omissions, syllable deletion, and substitutions. He obtained a percentile rank of -1.

Subject Four was a 3;3 year old male who was described by his parents as shy. Performance on the PLAI demonstrated an ability to label as evidenced by a strong score of 2.3 on level I. A moderately weak score of 1.3 on level II indicated some difficulty with descriptive concepts. Performance characterized as weak for levels III and IV indicated an inability to use higher level abstract language. S4's language sample was characterized by labels with few descriptive actions with an MLU of 1.6. Performance in the CMMS was within normal limits. Analysis of results on the GFTA indicated speech characterized by omissions and cluster reductions with a percentile rank of -1.

Subject Five was a 4;10 year old male described by his mother as a difficult child who does not attend to her. Performance on the PLAI demonstrated an ability to label as evidenced by a strong score of 2.1 on level I. Performance on level II tasks indicated some difficulty with descriptive concepts as determined by a moderately weak score of 1.2. Performance was characterized as weak for levels III and IV indicating an inability to use higher level abstract language. S5's language sample was characterized by labels and descriptions with a MLU of 1.8. Performance on the CMMS was an 84, slightly below normal limits. Analysis of results on the GFTA indicated speech characterized with substitutions and syllable reductions with a percentile rank of 25.

The sixth subject was a special case. This subject was included in the study to investigate treatment effects on a child with no verbalizations. This subject met criteria one through

four as listed above. A parent interview was conducted, and the child was described to have a vocabulary of 8-10 words. No words were elicited when a language sample was attempted. The child scored within normal limits on the DDST, with the exception of language development subtest. Subject Six was a 2:10 year old female described as outgoing.

Materials

This study used two storybooks with each child. One book was used as part of the scaffolded oral language intervention. The second book was used for the alternating treatment sequence, that is, as a baseline for the scaffolded treatment. The books selected for the study contained stories that were told with a reactive sequence discourse structure. A reactive sequence is defined as describing events in which actions cause unplanned effects (Norris & Hoffman, 1993). The order between events is important, but not determined by an overall goal or intent. The books contained a setting, problem, sequence of actions, and a final result.

The stories were from The Story Box Series distributed by The Wright Group. The first, Mrs. Wishy Washy (Cowley, 1990) told a story of three animals and the woman who cares for them. The setting was a farm where the animals play in the mud. A problem arises when Mrs. Wishy Washy becomes angry at the animals appearance and gives the animals baths. The animals respond by jumping back in the mud. The second story, The Red Rose, (Cowley, 1990) is a story about a rose in a garden. The

setting is the garden. A sequence of animals come to the garden beginning with a caterpillar who wants to eat the rose, followed by a bird who decides to eat the caterpillar, a cat who decides to eat the bird, and a dog who decides to chase the cat. The garden's owner arrives creating a problem when he picks the rose, thus causing each animal to leave the garden in turns. The result occurs when the garden's owner, Mr. Singh, gives the rose to his wife. Mrs. Wishy Washy was used as the storybook for intervention SS , while The Red Rose was the storybook used for the alternated condition WH or treatment PA. Both books were matched by the following criteria:

1. Each story was organized with a reactive sequence story structure.
2. Each page contained a close relationship between picture and text.
3. The text on most pages had 6-9 morphemes with two pages in Mrs. Wishy Washy having 12-13 morphemes and two pages in The Red Rose having 12-15 morphemes.
4. Each story contained name markers. Example: Mr. and Mrs.
5. Each story contained dialogue. For example: "Oh, lovely mud," said the pig.
6. Each story used regular and irregular past tense markers.

Procedures

Subjects were engaged in twelve sessions, 30 minutes per session. The sessions continued through four weeks, with three sessions each week. Sessions were conducted by a single speech/language pathologist. Each session included the intervention SS and either condition WH or treatment PA divided into two fifteen minute intervals. Children were randomly assigned to one of the two control conditions. Three of the subjects had as the alternate baseline, condition WH, while the other three had treatment PA. A coin toss was made to determine the order of the treatments to insure randomization of treatment order. Because of the chances of maintaining the same order throughout the study, a limit of three consecutive occurrences of a treatment was set (Herson & Barlow, 1985). Treatment order is profiled in Table 1.

Condition Using Scaffolding Strategies

Condition SS consisted of using scaffolding strategies within adult-child reading of the storybook. Scaffolding strategies occurred within an interactive cycle shown in Figure 1. The interactive cycle was initiated with a general comprehension question asked by the adult to assess the level of the child's ability to communicate ideas about the storybook concepts. For example, the adult might say, "What's happening on this page?"

Following the child's response, a series of decisions were made regarding type of feedback and scaffolding. If the child responded appropriately, the adult provided feedback to increase

Table 1.

Treatment Order Assigned to Subjects

Subject One	WH-SS-SS-WH-WH-SS-WH-SS-WH-SS-WH-WH.
Subject Two	WH-WH-SS-WH-SS-SS-WH-SS-WH-WH-WH-SS
Subject Three	SS-WH-WH-WH-SS-WH-SS-SS-WH-SS-SS-WH
Subject Four	PA-SS-SS-SS-PA-PA-SS-PA-PA-SS-SS-SS
Subject Five	SS-PA-SS-PA-PA-SS-SS-PA-SS-PA-SS-PA
Subject Six	PA-SS-SS-SS-PA-PA-PA-SS-PA-SS-SS-SS

SS = Scaffolding Strategies

WH = Wh-Questions

PA = Print Awareness

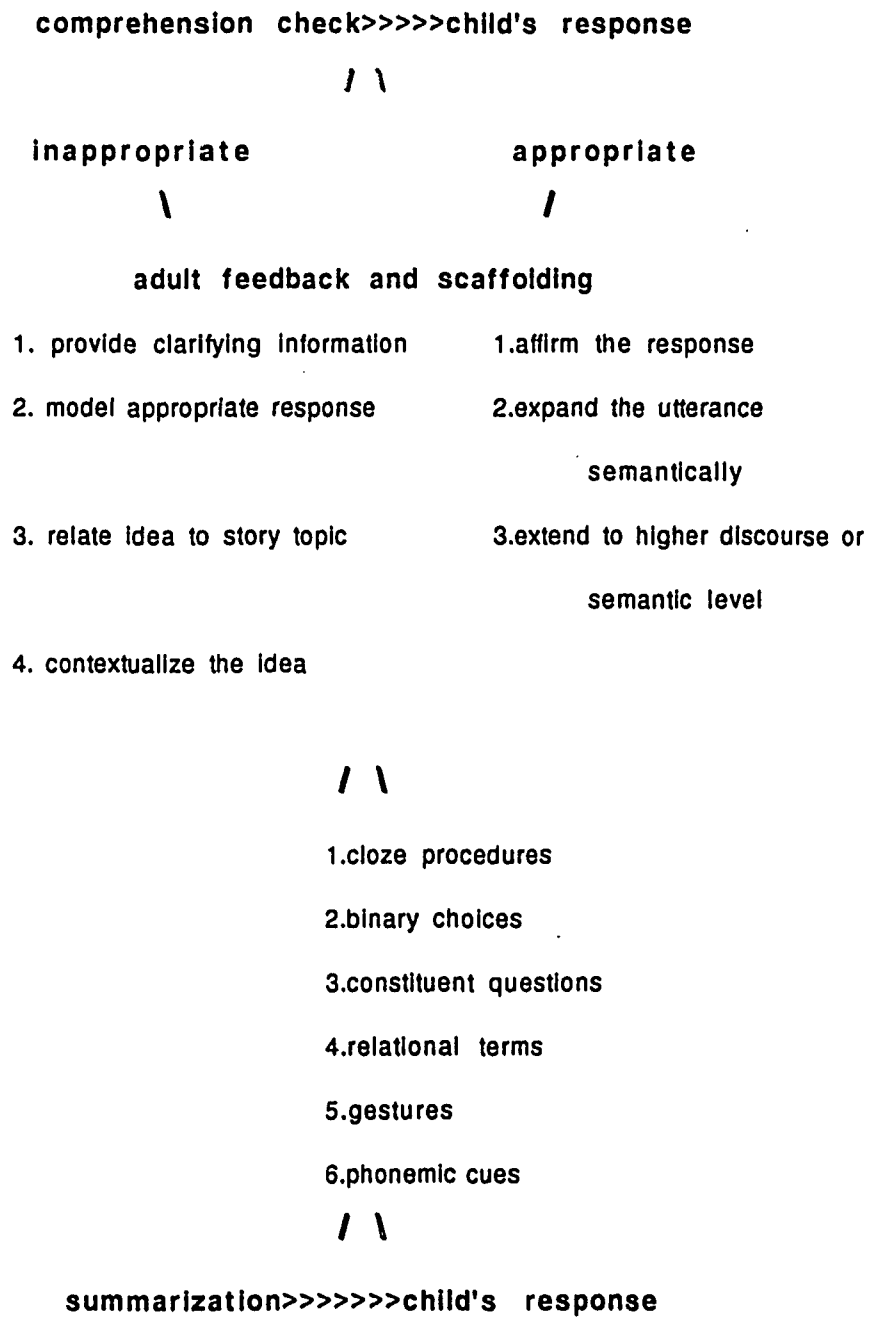


Figure 1. Schema of the interactive cycle

the semantic complexity and/or discourse complexity of the utterance. The examiner affirmed the response, expanded the child's utterance semantically or extended the child's idea by adding another aspect of discourse structure. See Table 2 for examples of feedback to appropriate responses.

If the child responded inappropriately, the adult provided feedback to assist in the child's interpretation and organization of information. The examiner provided clarifying information, modelled appropriate responses, related the idea to the story topic, and contextualized the idea by using gestures and pantomimes. Feedback facilitated children's use of discourse structure through the use of causal, temporal, and action-object relationships. Feedback regarding syntactic production was also a component. For example, expression of temporal relationships requires the use of verb+ed forms or words such as "will." See Table 3 for examples of the feedback to inappropriate responses.

The adult engaged the child in this cyclical storytelling by using scaffolding strategies described in Table 4. In addition to those listed, the adult used minimal pair contrasts. For example, if the child misarticulated a word, the adult contrasted the child's production with the correct production within a meaningful situation. For example, if the child said the word "biting" instead of the word "fighting," the adult said "You said "biting," not "fighting." These children are not biting with their teeth, they are fighting with their fists."

Furthermore, if the child was unable to understand concepts and ideas using the context of the storybook, the adult

Table 2.
Scaffolding Strategies Used in Reply to Semantically
Appropriate Child Responses

Strategy	Example
Affirmation of the response.	Child: He's falling in. Adult: That's right, he's falling.
Expanding the utterance	Child: He hit. Adult: Yeh, he's hitting the boy.
Extending the utterance	Child: He picked the rose. Adult: He picked the rose, so the caterpillar left.

Table 3.
Scaffolding Strategies used in Reply to Semantically Inappropriate Child Responses

Strategy	Example
Providing clarifying information.	Adult: What are those? Child: Scratches. Adult: These are band-aids.
Modelling appropriate responses.	Adult: What's that? Child: No response Adult: Is it a car or a tractor?
Relating idea to the story topic.	Child: I have a beauty and the beast watch. Adult: It has a rose in it just like our book.
Contextualizing the idea.	Adult: It's a pogo stick. Child: No response. Adult: You can jump on a pogo stick. (jumps with child)

Table 4.

Scaffolding Strategies used in SS Condition

Strategy	Method
Cloze procedures	Adult's pause indicates that the child fill in the information Can be used on all language levels (i.e. labeling, describing interpreting inferencing)
Binary choices	Offers the child alternate utterances; Options are limited Possibilities are modelled
Relational terms	Prompts that tell the child more information is needed Cues the child about the type of information
Constituent questions	Elicits specific information Includes wh-questions Sets the level of language complexity.
Gestures	Provides the child with nonlinguistic cues
Phonemic cues	Prompts by use of the initial sound or syllable of the word

introduced objects to represent characters in the storybook. A toy cow, pig, and duck were utilized. The storybook pictures may have been too abstract, therefore, concrete objects were used to contextualize actions occurring in the book. The toy objects were used infrequently with Subjects Three, Four, and Five, frequently for Subject Six, and not at all for Subjects One and Two.

The interactive cycle ended with another comprehension check or summarization to determine if the child organized his/her language at a higher level of functioning. It allowed for more opportunities for the child to reorganize the same information. Summarization allowed the child to restate information. Figure 1 is a schema of the interactive cycle.

Decision making within this framework is based on the language level of the child's response. Furthermore the type of feedback and response varied from moment to moment depending on the child's ability to organize his/her language in relation to both the interaction and the storybook. A sample interactive cycle follows.

First, the adult checks for comprehension by saying "Tell me about this story." Then, the examiner evaluated the child's responses for appropriateness. For example, the child may shrug, so the examiner decides this is inappropriate. This is followed by adult feedback and scaffolding. The following adult-child exchange exemplifies adult scaffolding and feedback.

Adult: Its about a jigaree and a- Provides clarifying
information

	Uses cloze procedures and gestures
(points to boy in picture)	
Child: Boy.	Judged as appropriate
Adult: That's right.	Affirmation
The jigaree's grabbing his-	Extension ; Uses cloze procedure
Child: leg.	Judged as appropriate
Adult: He's saying-	Extension; Uses cloze procedures
(gestures "no" and points to leg)	Uses gestures
Child: Get off.	Judged as appropriate
Adult: my-	Uses cloze procedures
(points to leg)	Uses gestures
Child: my leg.	Judged as appropriate
Adult: Poor Jigaree.	Adds information
He wants to be-	Extension; Uses cloze procedure
Child: happy	Judged as appropriate
Adult: He wants to be happy	Affirmation of response
and he wants to be his-	Extension; Uses cloze procedures
Child: friend.	Judged as appropriate
Adult: Yeh he wants to be	Affirmation of response
his friend.	
The interactive cycle ends with a final comprehension check and summarization such as:	
Adult: So the story is about-	

Child: (points to picture) boy-jigaree

Adult: The jigaree (points to picture)

Child: is on his leg

Adult: but-

Child: the boy say get off my leg

Adult: Poor-

Child: Jigaree

Adult: He wants-

Child: friend

Control Using Wh-questions

Treatment WH consisted of the clinician presenting wh-questions and answers. This treatment served as a baseline measure for comparison to the scaffolded interaction. Wh-questions elicited specific information at varying levels of semantic complexity. Types of wh-questions used on the level of labeling included, "What's that?" or "Who is in the story?" Questions used to elicit descriptive information included, "What color is the ball?" or "What are they doing?" Types of wh-questions used on the level of interpretations were, "What happened?" or "What's he going to do?" Wh-questions used to elicit inferences included, "Why did she do that?" or "How did that happen?." A list of wh-question used is found in Appendix B.

As the child talked, neutral conversational markers were used to cue the child to continue or to acknowledge his response. Conversational markers consisted of "mmhm," "yeh," or "oh." If

the child did not respond, or responded inappropriately, the answer was given. No scaffolding was involved.

A partial sample interaction of the WH control follows. First the child is asked to tell the story. Then, the examiner asks a series of questions ranging from labels to inferences such as:

Child: It's about a rose

Adult: What else is in the story?-label

Child: a worm

Adult: mmhm-conversational marker

Child: a birdie

Adult: What are they doing?-description

Child: look at the rose

Adult: Why are they looking at the rose?-inference

Child: No response

Adult: Who's rose is it?-label

Child: him (points)

Adult: What is he going to do?-interpretation

Child: give it to his friend

Control Using Print Awareness

Treatment PA consisted of adult attention to print awareness and sound/symbol correspondence as well as wh questions used in the WH control condition. It also served as a baseline of comparison for the scaffolded interaction. The following techniques were used for instruction of print awareness and sound/symbol correspondence, a) matching specific words in text to the picture; and b) matching the symbol

to the sound. For example, if the child said the word "dow" rather than the word "cow," the adult matched words to text saying, "It is cow. This word tells me cow." The adult matched the symbol to the sound by saying, " This tells me rose. See this /r/ makes my mouth go /r/-/r/ rose."

The treatment was initiated by the adult reading and pointing to the text. Wh-questions and answers were used. A partial sample interaction of the PA control follows:

Adult: I can see the jigaree. What's the jigaree doing?

Child: dum

Adult: He's jumping. See, this /p/ tells me to say jump.

Child: Dump hi.

Adult: This /r/ tells me he jumped here. Where did he jump?

Child: Da boy dump hi

Adult: He sure did jump high. What's he trying to do?

Child: dump h

In each treatment the adult included the use of wh-questions and conversational markers. The variable distinguishing SS from WH and PA controls was the use of adult feedback and scaffolding. Control PA consisted of attending to the text with a focus on sound/symbol correspondences. The variable distinguishing WH and PA was attention to print. This focus on phonological awareness may affect lower levels of the phonological intervention discussed above. See Table 5 for a listing of the order of use of the treatments in the alternating design.

Measurements

The purpose of the data analysis was to determine if children with language and phonologically delays used higher levels of semantic, syntactic, and phonological complexity during intervention using scaffolding strategies than during either condition using wh-questions or treatment using print awareness techniques. Dependent variables included measurements of a) semantic level of utterance; b) syntactic level of utterance; and c) number of words articulated correctly in utterances.

Transcribing Sessions

The experimenter transcribed each session. All story related statements were included in the analysis.

Reliability

To establish transcript reliability, a sample of one session per child was randomly selected for independent transcription by a second examiner. One-half of each session was transcribed. Interexaminer agreement for transcript reliability was 90%. Reliability for the five subjects ranged from 85% to 98%. The lowest reliability percentage was due to subject intelligibility.

Because Subject Six produced no verbalization, an independent analysis by a second examiner calculated amount of non-verbal story related gestures made. As stated above, one-half of a randomly selected session was analyzed. Interexaminer agreement for the analysis was 97%.

Utterances included in the transcripts were coded according to semantic level, mean length of utterance, and the

Table 5

Listing of Components used in Treatments

Treatment SS	Treatment WH	Treatment PA
+scaffolding	-scaffolding	-scaffolding
+wh-questions	+wh-questions	+wh-questions
+conversational markers	+conversational markers	+conversational markers
-print awareness	-print awareness	+print awareness

number of words articulated correctly. The following sections will discuss these measurement procedures in detail, as well as frequency of response comparison.

Frequency of Response Measurements

Frequency of responses was measured to investigate differences between intervention using scaffolding strategies compared to the condition using wh-questions or the print awareness treatment. This measurement is relevant because frequent opportunities to speak with higher levels of semantic complexity and complex grammatical structures have been theorized to result in development of the child's language system (Vygotsky, 1962). Differences between the scaffolded intervention and the alternated condition will indicate which better facilitated the subject's ability to interact and communicate concepts. The raw number of utterances from both the intervention and alternated condition or treatment were calculated from each session.

Semantic Level Measurements

Semantic levels were coded for each of the child's utterances. Utterances were coded from the lowest level of indications to the highest level of inferences. Metalinguage was not included because no subject used language at this level.

Indications are nonlinguistic communications used to share external information. Examples include pointing to a picture in the story or shrugging to indicate a misunderstanding of information. If the indication consisted of a gesture and

verbalization such as "no," the utterance was coded as an indication.

The next level coded, Labels, included naming concrete objects or agents such as "pig" or "flower." The third level coded, Descriptions, expressed relationships of an action or characteristic of an object. For example, the utterance, "pig jump in mud" was coded as a description.

The fourth level, Interpretations, consisted of information not stated in the context, but predicted from personal experience. For example, the utterance, "He's mad because the rose is gone" was coded as an interpretation. Inferences include information obtained from personal or common knowledge that is not context bound. For example, "Mrs.- Wishy Washy screamed and hurt her throat so she might have to go to the doctor" was coded as an inference.

Following the coding, frequencies were counted for each semantic level during both SS and the WH and PA controls.

Reliability

To establish reliability, a sample of one session per child was randomly selected for independent analysis by a second examiner. Interexaminer agreement for the dependant variable, indications, was 100%.

Interexaminer agreement for the dependant variable, labels, was 90%. Reliability for the five subjects ranged from 85% to 96%.

Interexaminer agreement for the dependant variable, descriptions, was 92%. Reliability for the five subjects ranged from 86% to 100%.

Interexaminer agreement for the dependant variable, interpretations, was 96%. Reliability for the five subjects ranged from 91% to 100%.

Interexaminer agreements for the dependant variable, inferences, was 100%.

Syntactic Level Measurements

Mean length of utterance was calculated to evaluate syntactic complexity. Because Subject Six did not produce story related utterances, mean length of utterance was not calculated. The following procedures were used to assigning morphemes in child utterances (Miller, 1981):

1. Use fully transcribed utterances.
2. Include exact utterance repetitions. Count repeated words once as their most completed form. When the word is repeated for emphasis count all occurrences.
3. Do not count fillers such as mm or oh. Count no, yeah, and hi.
4. Count compound words, proper names, and ritualized reduplications as single words (i.e., birthday, bye-bye, see saw).
5. Count as one morpheme all occurrences of verb+irregular past tense.

6. Count all occurrences of noun+diminutives as one morpheme (doggie, mommie).
7. Count all auxiliaries (i.e., have) and catenatives (i.e., gonna) as separate morphemes. Count possessives, plurals, third person singular, regular past, and progressive as separate morphemes.

Reliability

To establish reliability, a sample of one session per child was randomly selected for independent analysis by a second examiner. Interexaminer agreements for the dependant variable, mean length of utterance, was 92%. Reliability for the five subjects ranged from 89% to 95%.

Phonological Measurements

In addition to the above measures, the percentage of words articulated with appropriate phonological form was calculated. The percentage of words produced correctly was obtained during SS and WH and PA controls. Because Subject Six did not produce story related utterances, number of words produced correctly was not calculated.

Reliability

To establish reliability, a sample of one session per child was randomly selected for independent analysis by a second examiner for number of words produced correctly. Interexaminer agreements for the dependant variable, percentage of words correct, was 91%. Reliability for the five subjects ranged from 85% to 96%.

Data Analysis

Each measure of language performance was analyzed using the same procedure for each subject. First, the data points for each condition were plotted as a function of session. The data points from the SS condition were connected to form a line plot display as were the data points from the alternate condition. Visual inspection of these displays with reference to the raw numbers was used to determine the number of sessions in which the SS condition produced higher levels of language use or complexity compared to the alternate condition. The probability that the number of sessions led by the SS condition would have occurred by chance was judged using the sign test set at a .05 level of confidence (Haber & Runyun, 1973). For example, for a child who attended all 12 sessions, the SS condition would have to produce higher levels of language performance in 10 of the sessions to meet the .05 level of confidence criterion.

RESULTS

This study investigated the efficacy of language intervention using scaffolding strategies (SS) compared to two control conditions using an alternating treatment design. For three subjects, the SS intervention was compared to a control condition in which the experimenter asked wh-questions, the WH Control. For the other three subjects, the SS intervention was compared to a control condition in which the experimenter asked wh-questions as well as focusing attention on print awareness, the PA control. Dependent measures were made of each child's language performance during each intervention condition and each session of the intervention. These measures included the frequency of child utterances, the level of semantic abstraction of each child's utterance, the mean length of utterance in morphemes, and percentage of words correctly articulated. For each measure it was hypothesized that the SS intervention would result in more frequent and more complex child language than the two control conditions.

The presentation of results that follows includes sections for each of the measures of language and phonological performance. First, results regarding the frequency of child utterances will be presented. Within each section the data for the three subjects in which the scaffolded strategies intervention was compared to the print awareness control will be presented first, followed by the three subjects in which the scaffolded strategies intervention was compared to the wh-question control.

Frequency of Child Utterances

Frequency of child utterances was measured because it is hypothesized that more frequent opportunities for the child to talk at higher levels of semantic displacement or discourse complexity would result in more rapid refinement of the child's internal organization of language (Vygotsky, 1962). This section will first present results for the children who participated in the SS and PA Control followed by results for the children who participated in SS and WH control.

The first three children, Subject 1, Subject 2, and Subject 3, all participated in the SS and the PA control. Subject 1 produced more utterances during the SS condition than during the Control condition during all 12 sessions (see Figure 2). Subject 2 produced more utterances than during the SS Control condition during 11 out of 12 sessions (see Figure 3). Subject 3 produced more utterances in 9 of the 10 SS sessions (see Figure 4). All of these differences were statistically reliable at the .05 level of confidence as judged by the sign test (Haber and Runyun, 1973).

The second three children, Subject 4, Subject 5, and Subject 6, all participated in SS and the WH Control. As seen in Figure 5, Subject 4 produced more utterances in the SS than the WH Control in 7 out of 7 sessions ($p < .05$). Subject 5 produced more utterances in the SS than WH Control in 6 out of 10 sessions (see Figure 6). This difference was not statistically reliable at the .05 level. Subject 6 produced few if any verbal responses in any of the sessions, regardless of condition. As a

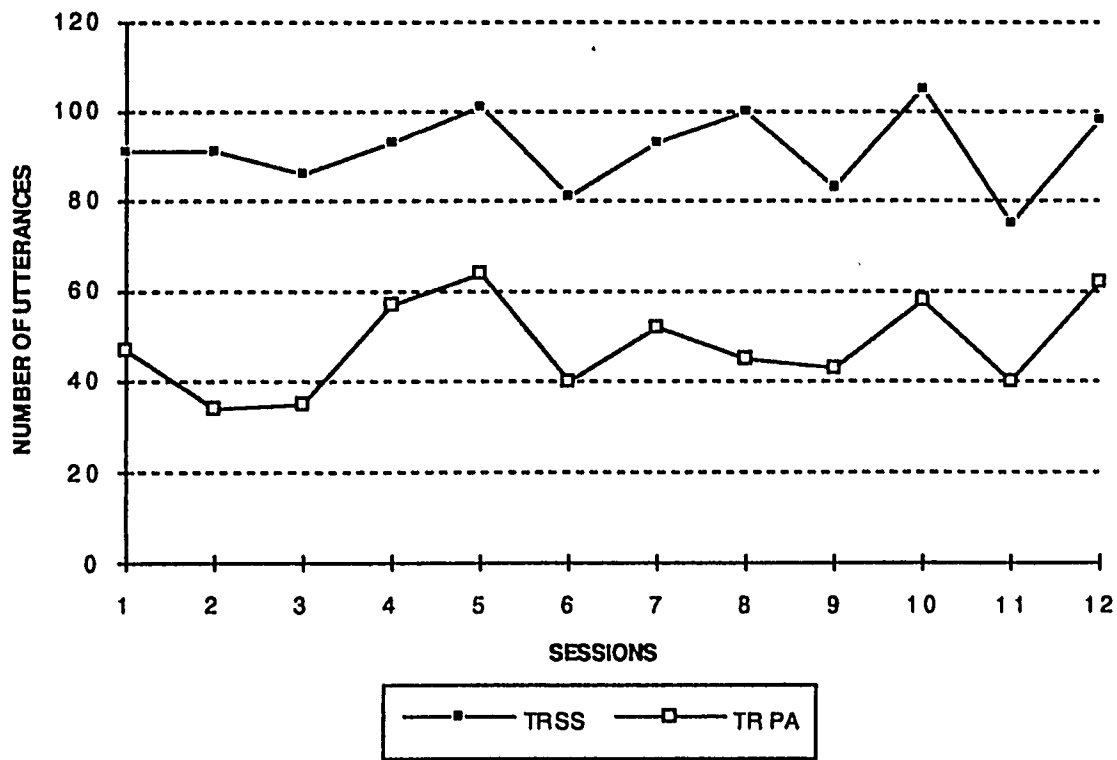


Figure 2. Frequency of utterances in each of the scaffolding strategies (SS) and phonological awareness (PA) sessions for Subject 1

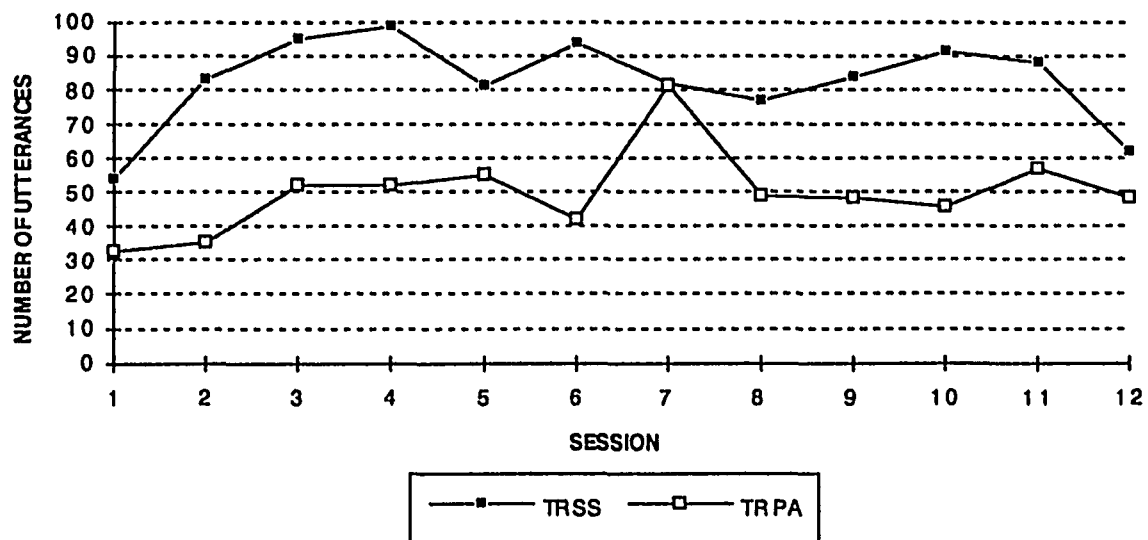


Figure 3. Frequency of utterances in each of the scaffolding strategies (SS) and phonological awareness (PA) sessions for Subject 2

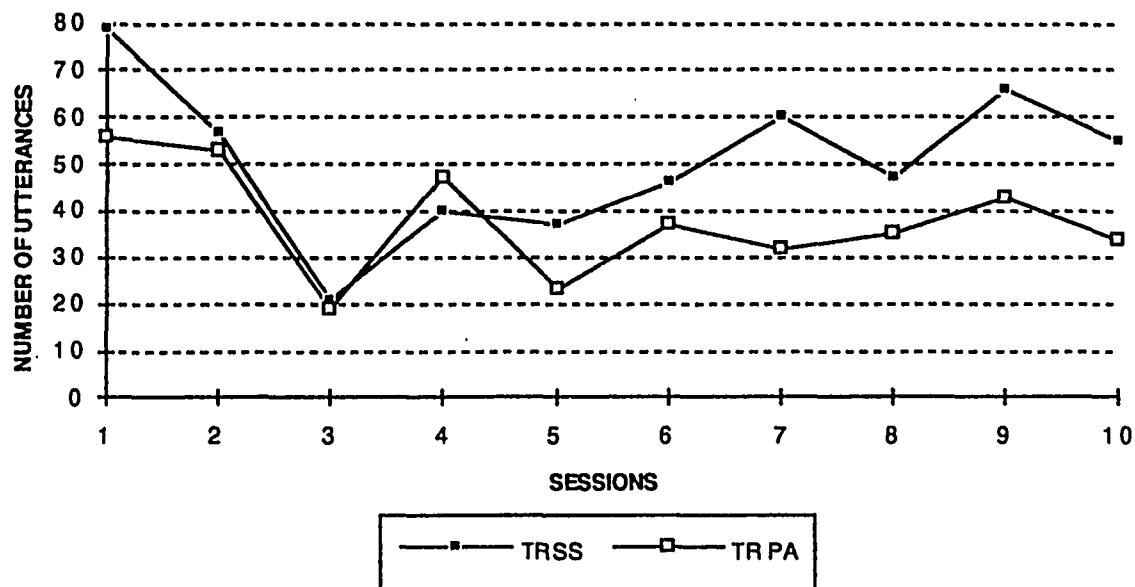


Figure 4. Frequency of utterances in each of the scaffolding strategies (SS) and phonological awareness (PA) sessions for Subject 3

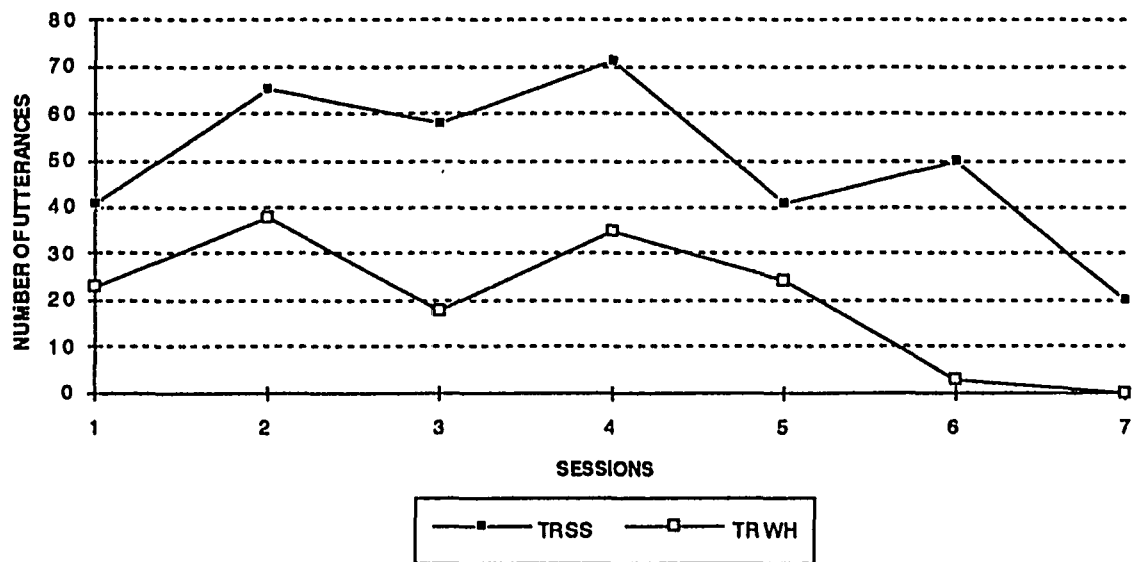


Figure 5. Frequency of utterances in each of the scaffolding strategies (SS) and wh-questions (WH) sessions for Subject 4

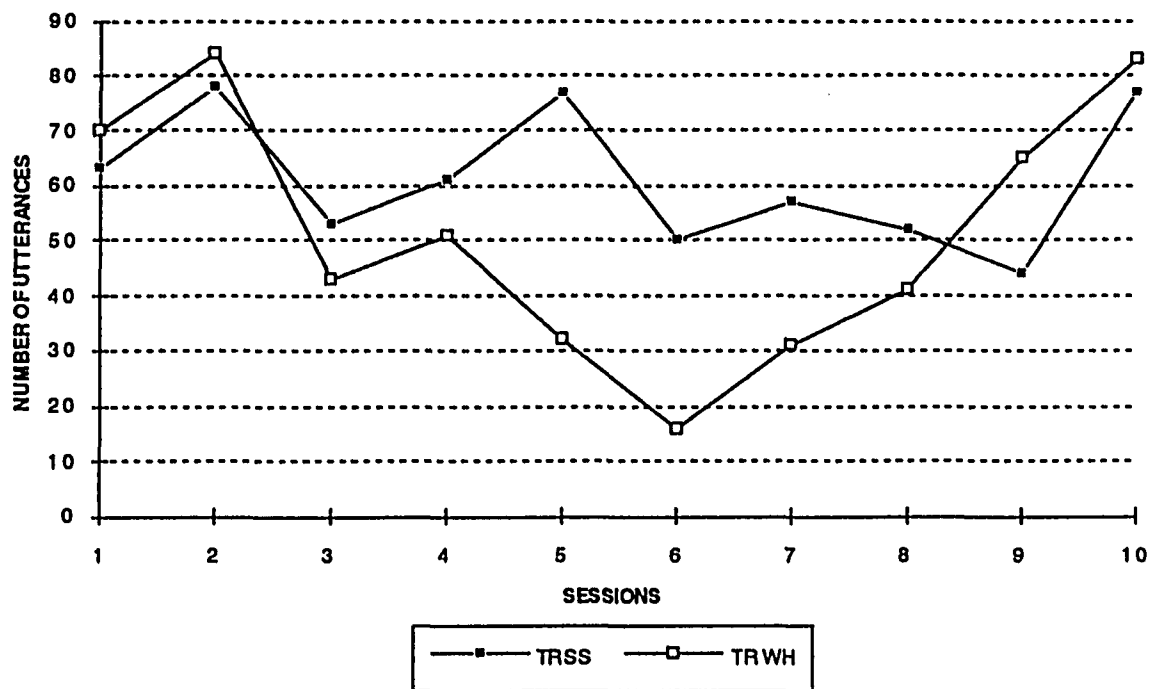


Figure 6. Frequency of utterances in each of the scaffolding sStrategies (SS) and wh-questions (WH) sessions for Subject 5

result, Subject 6's degree of participation was judged using her number of indications during each condition. As seen in Figure 7, this was higher in the SS than PA Control condition 11 out of 11 sessions ($p < .05$).

In summary, five of the six subjects showed increased verbal or nonverbal participation in the SS treatment than the two control conditions. This suggests that children were more active language users, and potentially more active language learners, during the SS intervention than during the control conditions. The following sections will further analyze subjects' utterances for semantic, syntactic, and phonological complexity.

Semantic Analysis

The second question addresses the efficacy of SS in increasing the use of higher levels of semantic displacement. This question was answered by calculating the numbers of indications, labels, descriptions, interpretations, and inferences per session and comparing the frequency of each in the SS condition with the two control conditions.

SS Condition Compared with PA Control

Subject 1

The frequency of indications in the SS and PA Control for Subject 1 is shown in Figure 8. The SS treatment produced more indications in 3 out of 10 sessions ($p < .07$). Frequencies of indications for sessions 5 and 11 were equal in both the SS and PA Control conditions. Results of frequency of indications for S1 are not statistically reliable.

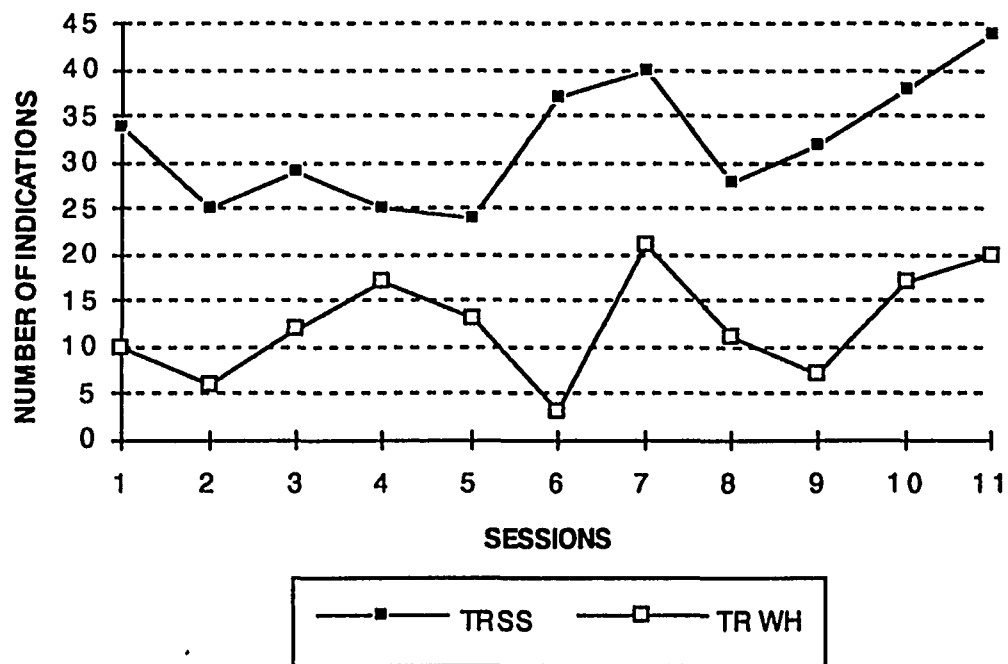


Figure 7. Number of indications in each of the scaffolding strategies (SS) and wh-questions (WH) sessions for Subject 6

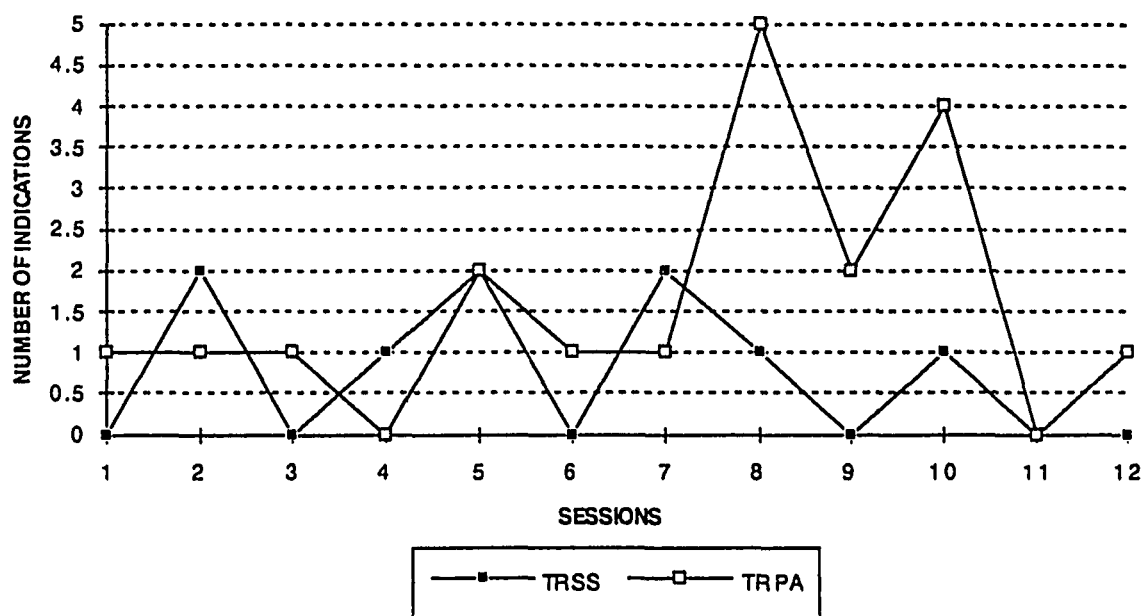


Figure 8. Number of indications in each of the scaffolding strategies (SS) and phonological awareness (PA) sessions for Subject 1

The frequency of labels in the SS and PA Control for Subject 1 is shown in Figure 9. The SS treatment produced more labels in 9 out of 11 sessions with one tied session ($p < .033$). For example, during session 2, S1 produced 36 labels during SS including "cow," "mud," and "feet." Only 13 were produced during PA during session 2.

The frequency of descriptions in the SS and PA Control for Subject 1 is shown in Figure 10. The SS treatment produced more descriptions in 10 out of 12 sessions ($p < .019$). S1 used descriptions of actions such as "jump in da mud" or "paddle in da mud" during the SS condition. On the other hand, though descriptions were used during PA Control, the frequency of use was less than during SS. For example, descriptions related to animals being in the mud were used 15 times during session 3. During the same session, S1 used a similar type description about the caterpillar on a leaf only once during the PA condition.

The frequency of interpretations in the SS and PA Control for Subject 1 is shown in Figure 11. The SS treatment produced more interpretations in 12 out of 12 sessions ($p < .001$). S1 used interpretations such as "Kuz soap in der eyes," when asked "Why is the duck mad?" During session 12, he used 40 interpretations during SS, but he only used 19 interpretations during PA. An example of an interpretation used during PA is, "Kuz him hana eat bird." However, the majority of responses were labels.

The frequency of inferences in the SS and PA Control for Subject 1 is shown in Figure 12. The SS treatment produced more inferences in 11 out of the 12 sessions ($p < .003$). S1 used

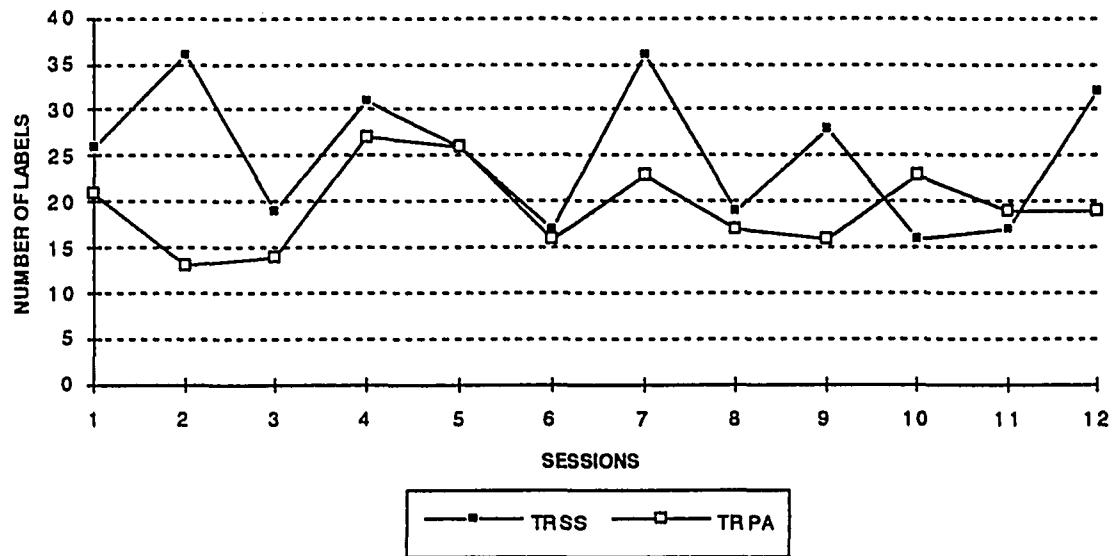


Figure 9. Number of labels in each of the scaffolding strategies (SS) and phonological awareness (PA) sessions for Subject 1

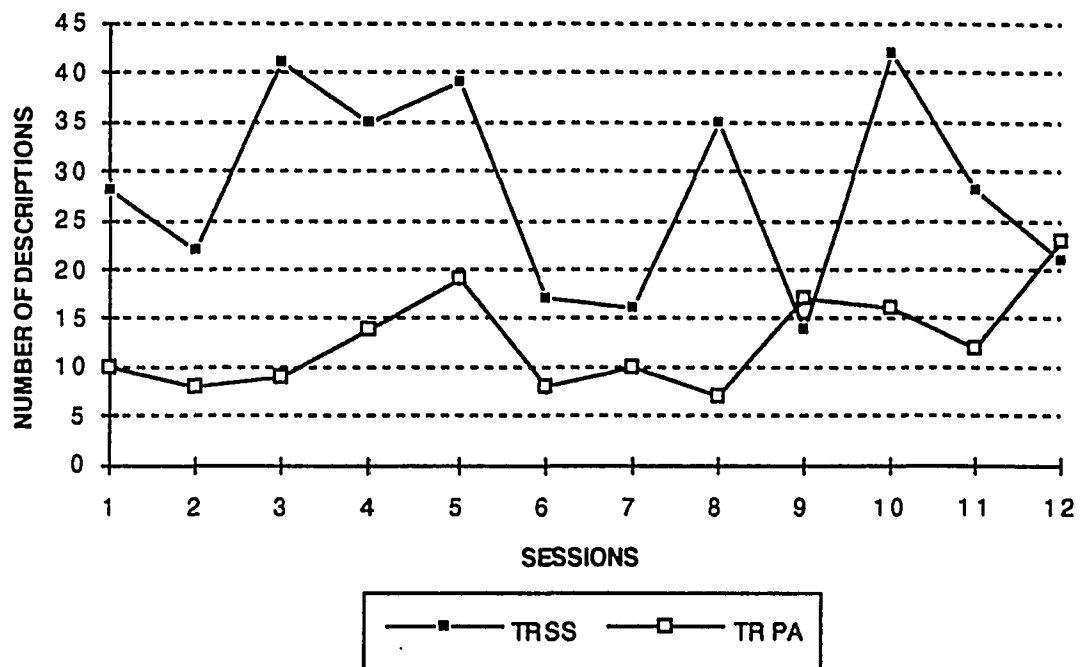


Figure 10. Number of descriptions in each of the scaffolding strategies (SS) and phonological awareness (PA) sessions for Subject 1

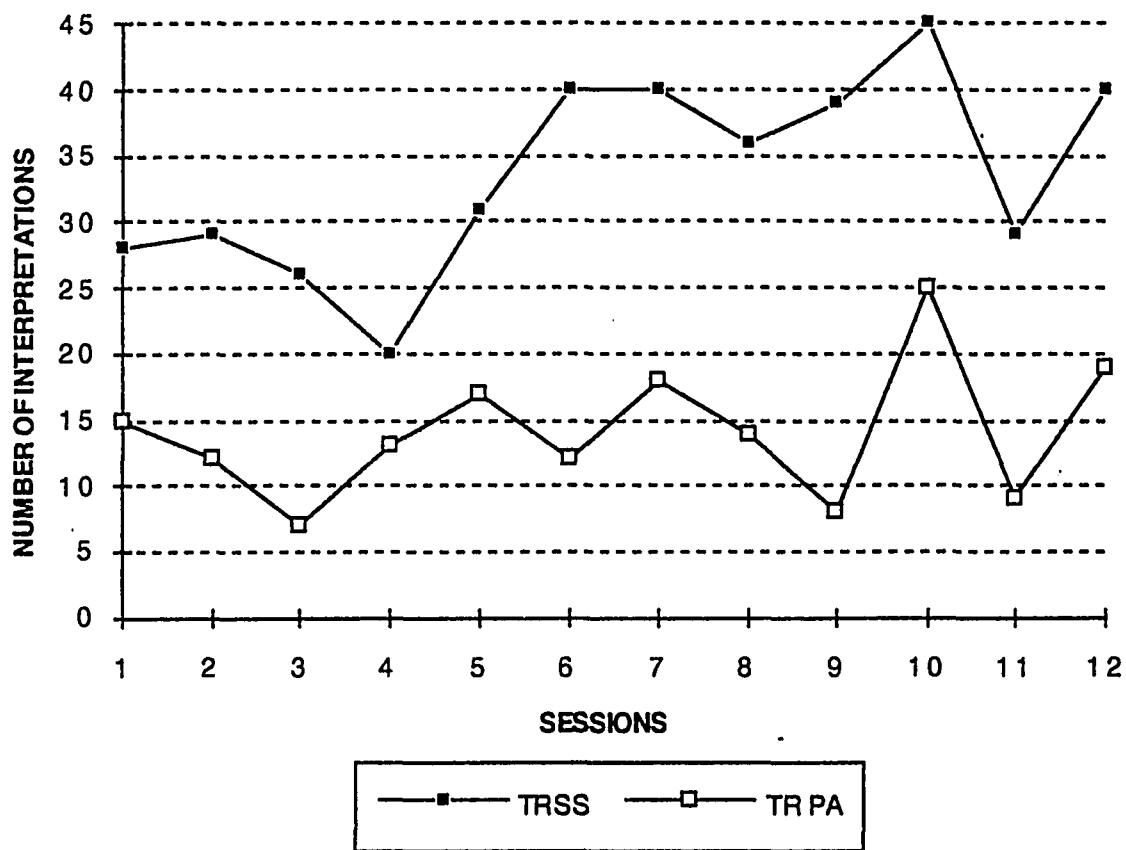


Figure 11. Number of interpretations in each of the scaffolding strategies (SS) and phonological awareness (PA) sessions for Subject 1

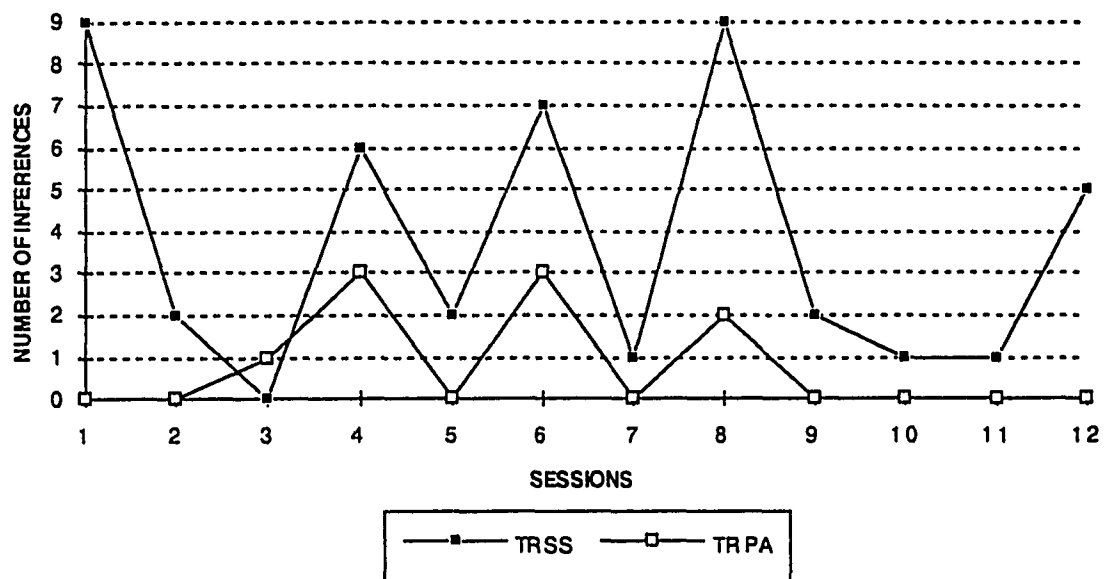


Figure 12. Number of inferences in each of the scaffolding strategies (SS) and phonological awareness (PA) sessions for Subject 1

inferences such as "milk an' butter come out a dere for me" when asked "What comes from an utter?"

In summary, Subject 1 produced more labels, descriptions, interpretations, and inferences within the SS condition with statistical reliability. Thus, for this subject, the SS intervention increased his use of higher levels of semantic displacement. The SS condition was shown to be significantly more effective in eliciting higher semantic level use than the PA Control.

Subject 2

The frequency of indications in the SS and PA Control for Subject 2 is shown in Figure 13. The SS treatment produced more indications in 4 out of 12 sessions with one tied session, which was not a statistically reliable difference ($p < .613$).

The frequency of labels in the SS and PA Control for Subject 2 is shown in Figure 14. The SS treatment produced more labels in 10 out of 12 sessions ($p < .019$). For example, during session 1, S2 produced 25 labels during SS such as "feet" and "pocket". Though labels were produced such as "pond", only 14 were produced during the same session for the PA condition.

The frequency of descriptions in both the SS and PA Control for Subject 2 is shown in Figure 15. The SS treatment produced more descriptions in 10 out of 12 sessions with one tied session ($p < .02$). S2 used a variety of descriptions such as "duck git all wet" or "him sail (tail) getting wet" during the SS treatment. On the other hand, though descriptions were used during the PA Control, the frequency of such use

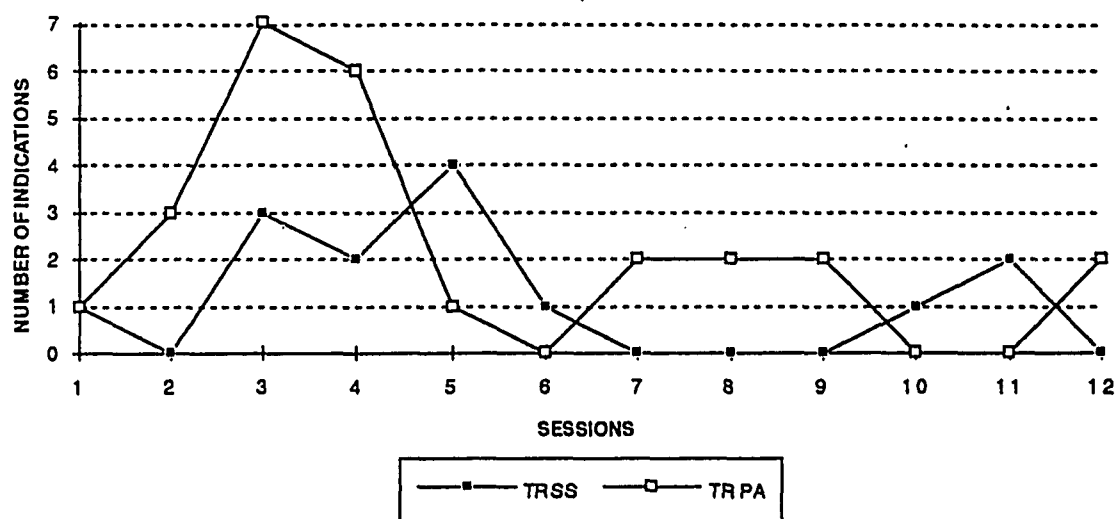


Figure 13. Number of indications in each of the scaffolding strategies (SS) and phonological awareness (PA) sessions for Subject 2

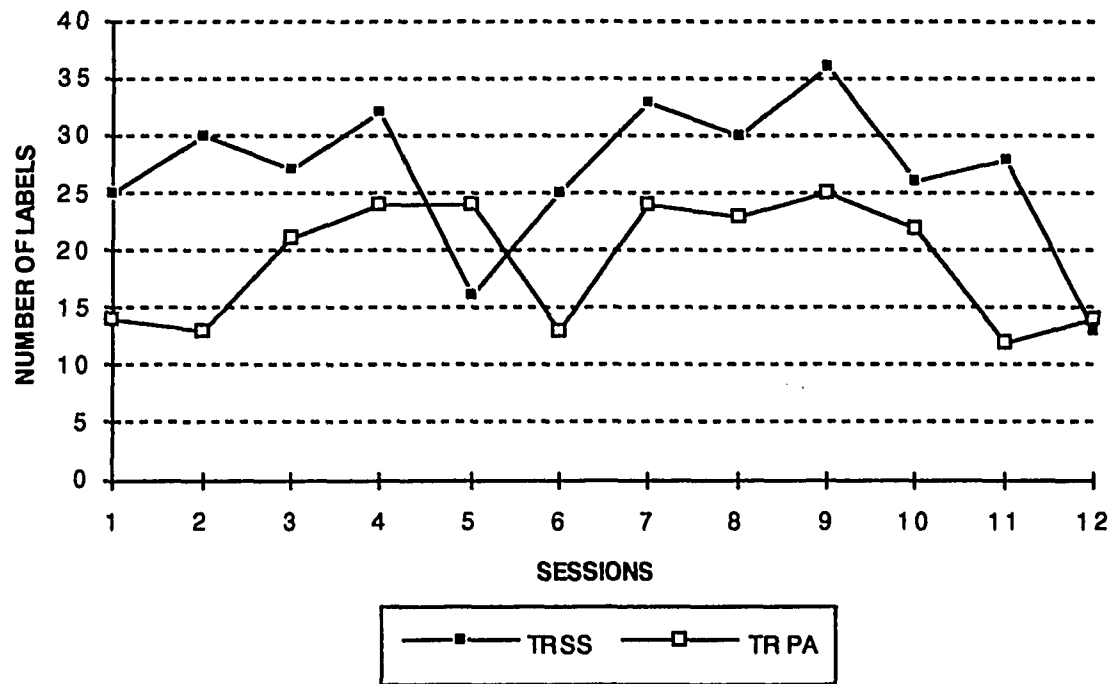


Figure 14. Number of labels in each of the scaffolding strategies (SS) and phonological awareness (PA) sessions for Subject 2

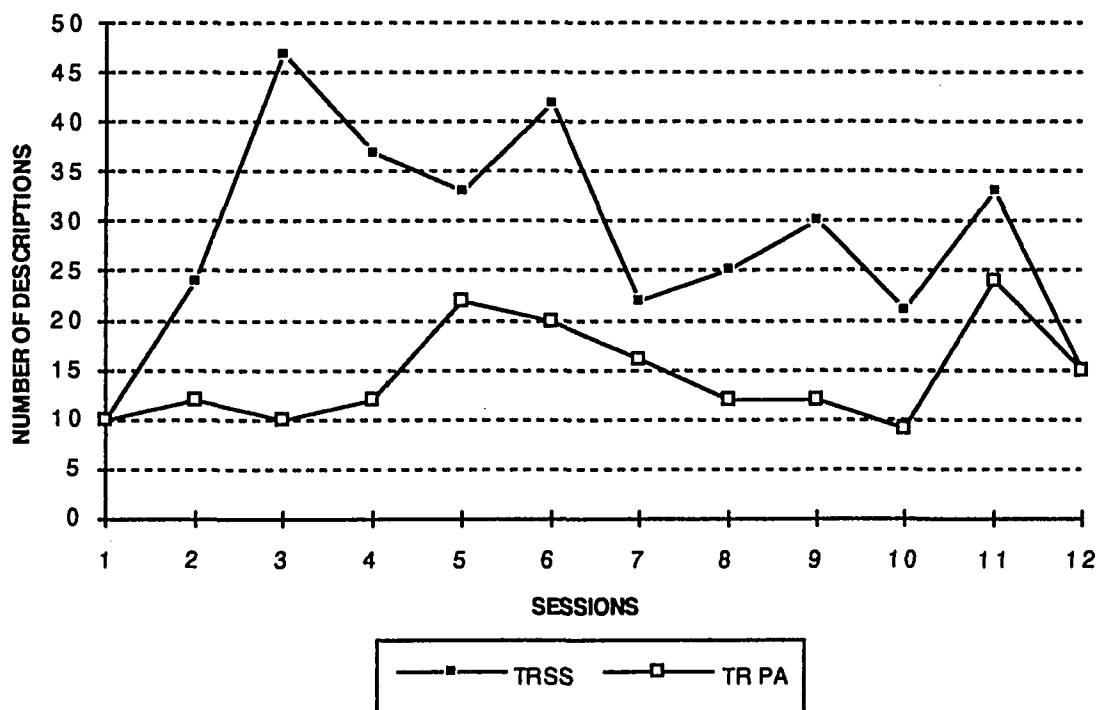


Figure 15. Number of descriptions in each of the scaffolding strategies (SS) and phonological awareness (PA) sessions for Subject 2

was less than during SS. For example, descriptions were used 25 times during session 8 in the SS treatment. During the same session, S2 used descriptions only twelve times during PA.

The frequency of interpretations in the SS and PA Control for Subject 2 is shown in Figure 16. The SS treatment produced more interpretations in 11 out of 12 sessions ($p < .006$). Examples of interpretations produced by S2 during SS condition included "doz (those) bubbels il (will) get in him sace (face)" or "pig don't ike (like) basub (bathtub)." During the PA control, the majority of responses were labels, though some interpretations were made such as "him wanted pick sik (stick) up."

The frequency of inferences in the SS and PA Control for Subject 2 is shown in Figure 17. The SS treatment produced more inferences in 2 out of 3 sessions. During all other sessions there were no inferences in either condition. Not enough data points with a difference were obtained to make a statistical statement.

In summary, Subject 2 produced more labels, descriptions, and interpretations in the SS intervention than in the PA Control with statistical significance.

Subject 3

The frequency of indications in the SS and PA Control for Subject 3 is shown in Figure 18. The SS treatment produced more indications in 5 out of 10 sessions, which was not statistically reliable ($p < .623$).

The frequency of labels in the SS and PA Control conditions for Subject 3 is shown in Figure 19. The SS treatment produced

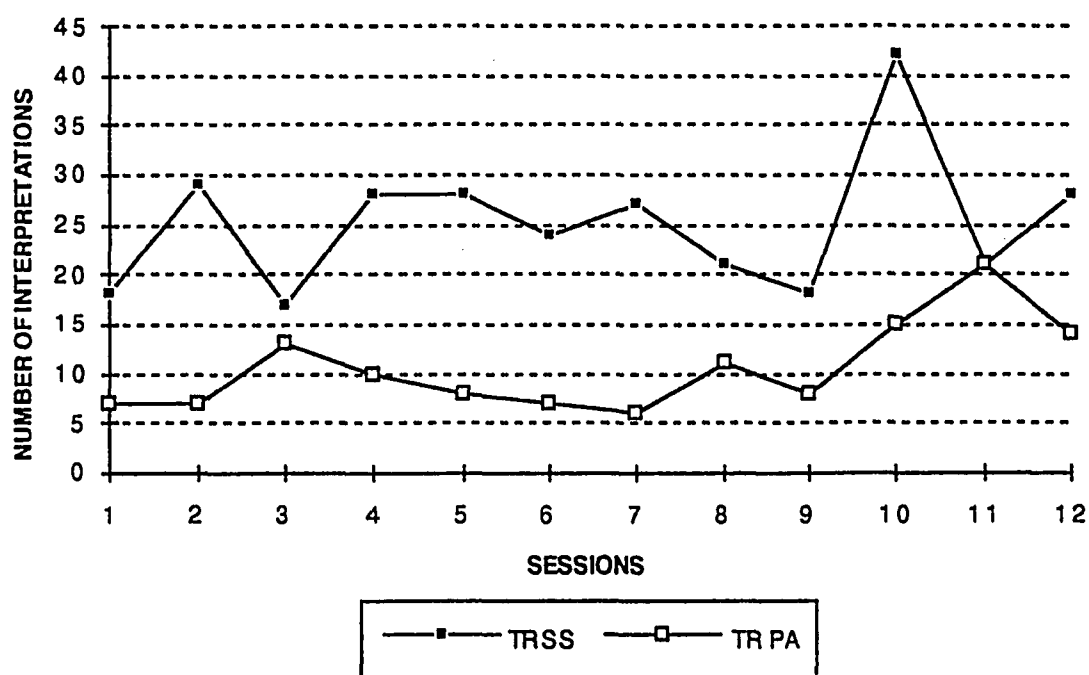


Figure 16. Number of interpretations in each of the scaffolding strategies (SS) and phonological awareness (PA) sessions for Subject 2

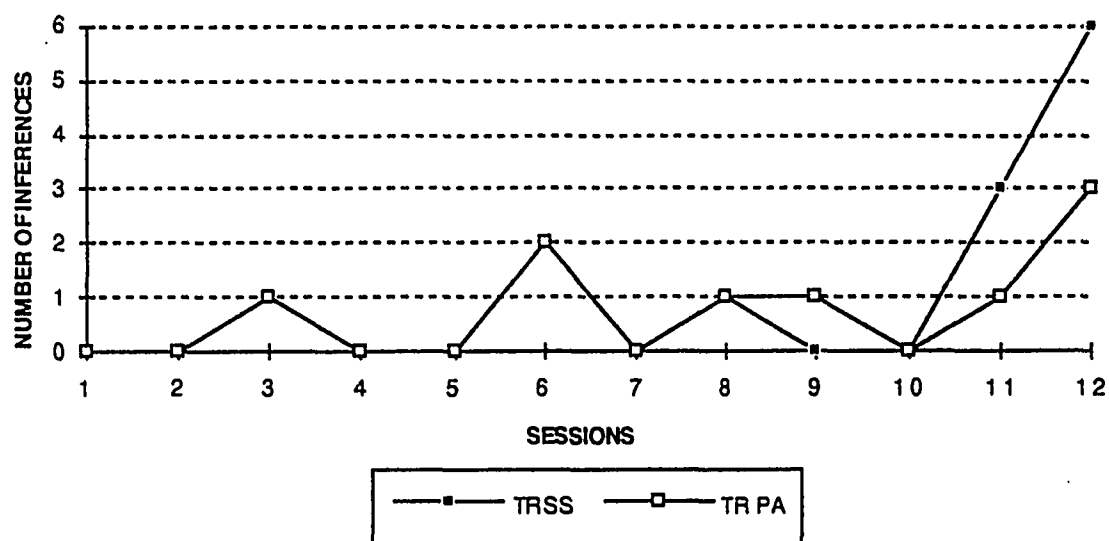


Figure 17. Number of inferences in each of the scaffolding strategies (SS) and phonological awareness (PA) sessions for Subject 2

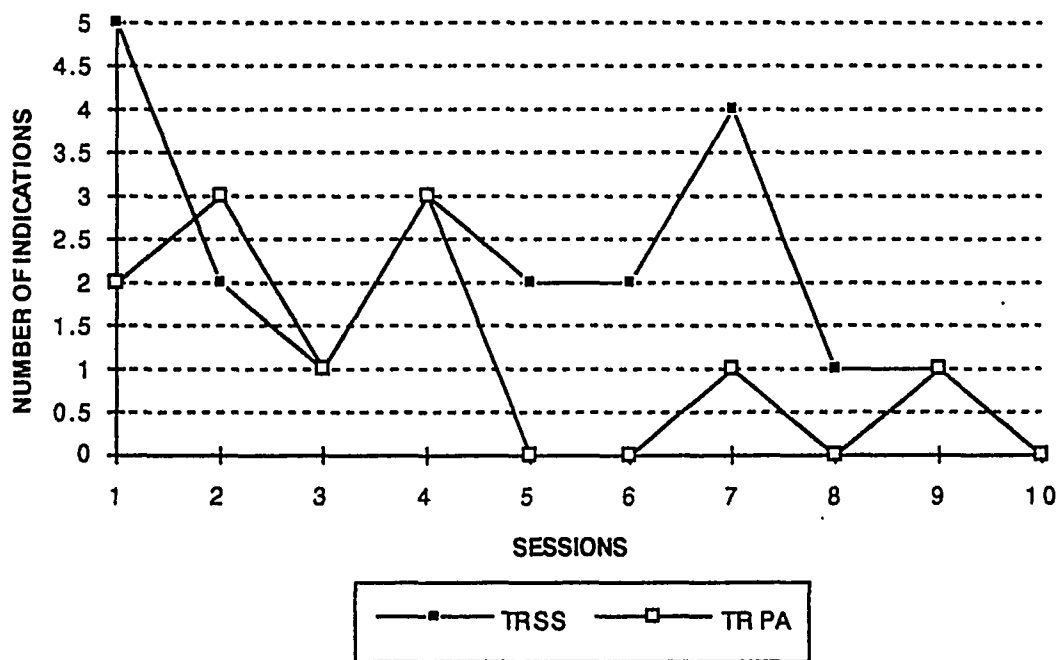


Figure 18. Number of indications in each of the scaffolding strategies (SS) and phonological awareness (PA) sessions for Subject 3

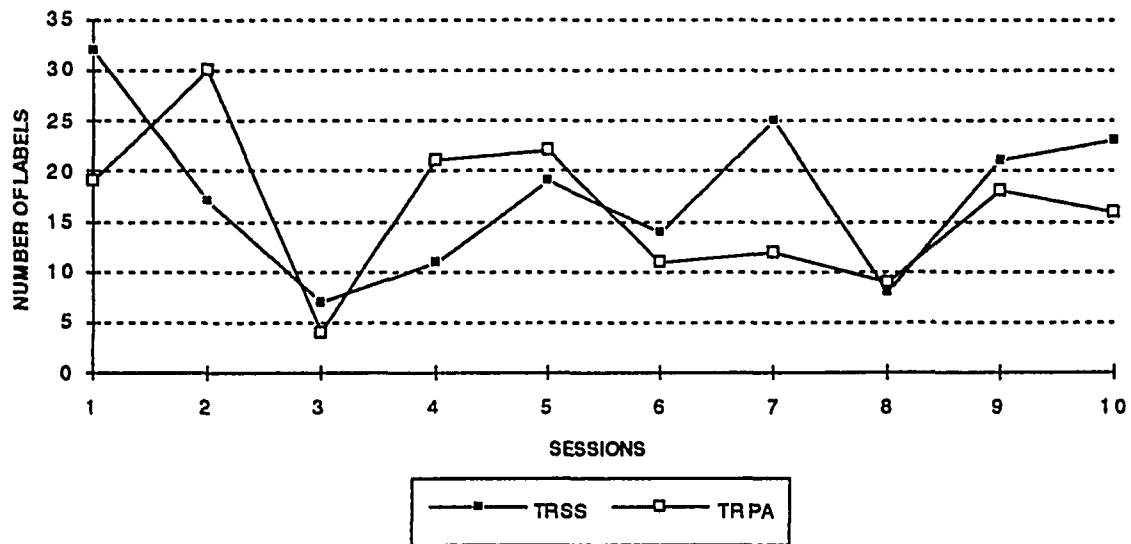


Figure 19. Number of labels in each of the scaffolding strategies (SS) and phonological awareness (PA) sessions for Subject 3

more labels in 6 out of 10 sessions, which was not statistically reliable ($p < .337$).

The frequency of descriptions in the SS and PA Control for Subject 3 is shown in Figure 20. The SS treatment produced more descriptions in 8 out of 9 sessions with one tied session ($p < .016$). Examples of descriptions produced by S3 during SS condition included "feet dirty" or "cow jump."

The frequency of interpretations in the SS and PA Control for Subject 3 is shown in Figure 21. The SS treatment produced more indications in 8 out of 10 sessions ($p < .055$). Because inferences were not produced by Subject 3, an analysis was not conducted.

The trend in Subject 3's data was toward the production of more descriptions and interpretations in the SS than control condition. However, only for descriptions did the differences reach a level of statistical reliability.

SS Condition Compared with WH Control

Subject 4

The frequencies of indications in the SS and WH Control for S4 is shown in Figure 22. The SS treatment produced more indications in 7 out of 7 sessions ($p < .008$). S4 was more responsive to the story book during the SS condition than during the WH Control. This is shown in the greater number of indications used. When he was unable to respond verbally, S4 used gestures to continue participation. Indications were used more during the initial three sessions than during sessions four, five, and six.

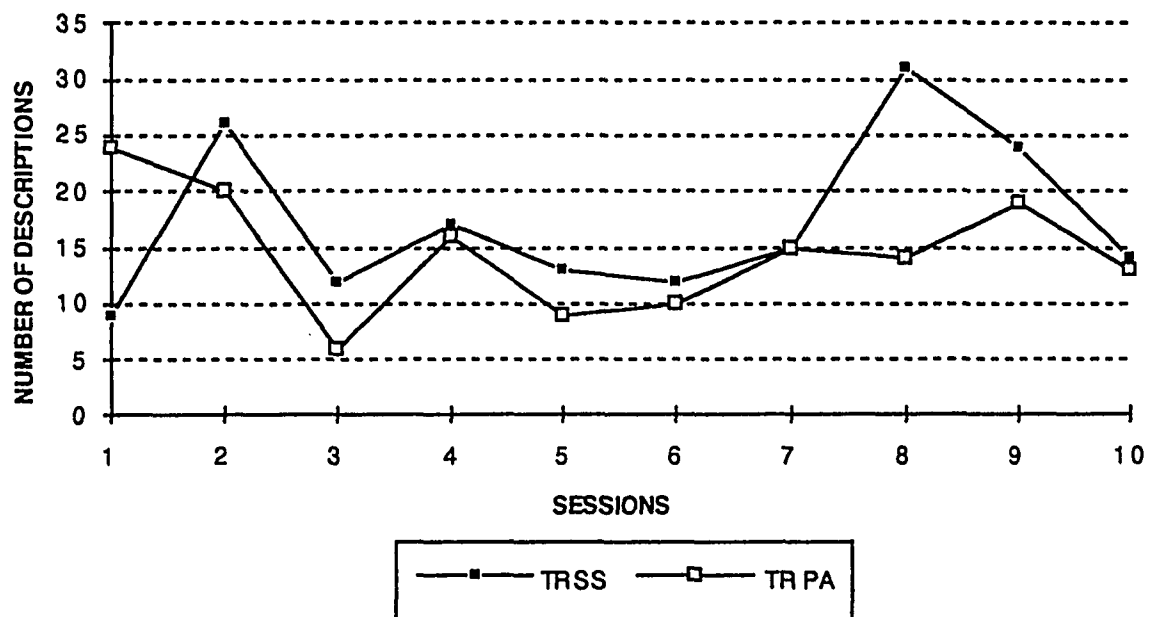


Figure 20. Number of descriptions in each of the scaffolding strategies (SS) and phonological awareness (PA) sessions for Subject 3

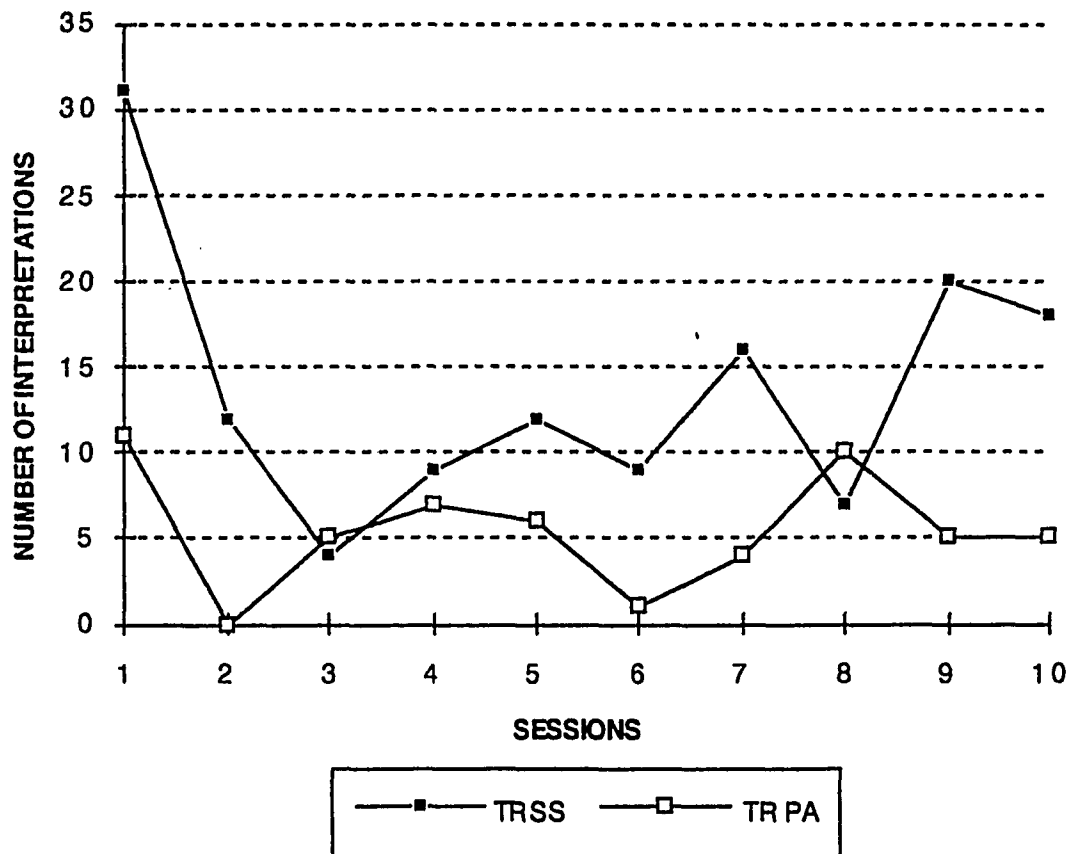


Figure 21. Number of interpretations in each of the scaffolding strategies (SS) and phonological awareness (PA) sessions for Subject 3

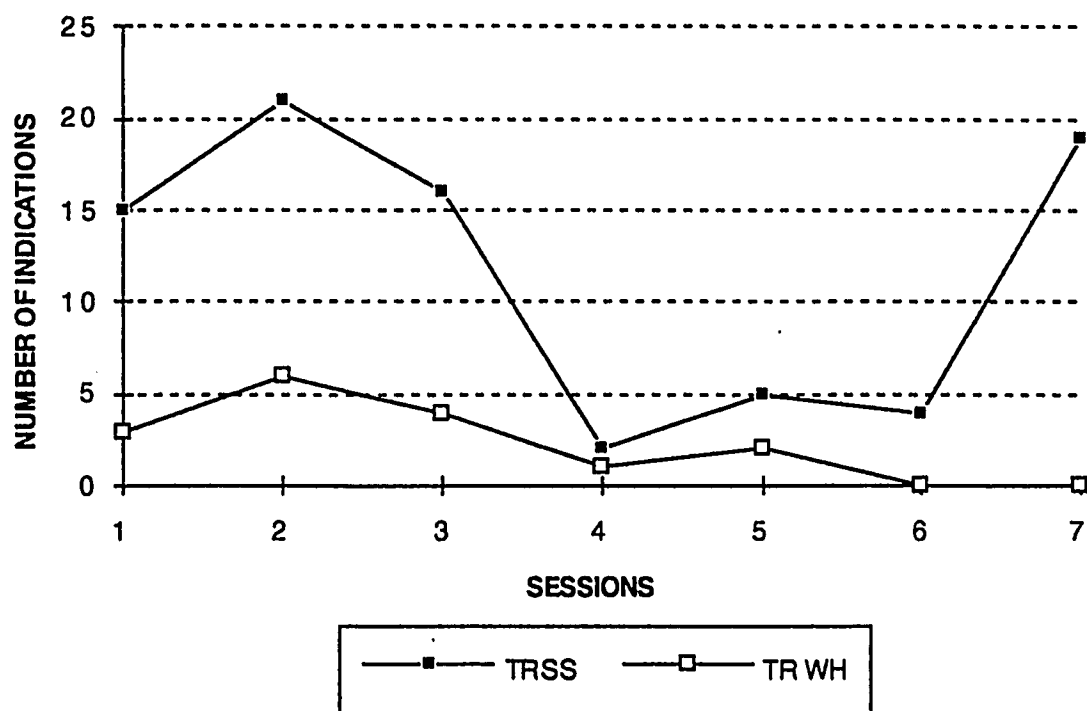


Figure 22. Number of indications in each of the scaffolding strategies (SS) and wh-questions (WH) sessions for Subject 4

The frequency of labels in the SS and WH Control for S4 is shown in Figure 23. The SS treatment produced more labels in 5 out of 6 sessions ($p < .109$). Data points for session 2 were equal. Though he used labels during both SS and WH, he responded more often during the SS condition than the WH condition. S4 used a variety of labels such as "cow," "pig," and "mud" during the SS condition.

The frequency of descriptions in the SS and WH Control conditions for Subject 4 is shown in Figure 24. The SS treatment produced more descriptions in 6 out of 6 sessions with one tied session ($p < .031$). S4 used descriptions during both conditions; however he responded more often during the SS than WH conditions. He used a variety of descriptions that were repeated often such as "dirty" and "jum in da mud." Descriptions during WH were inconsistent and not frequently repeated, so labels made up the majority of the utterances such as "ka" for the word "cat" and "do" for the word "dog."

The frequency of interpretations in the SS and WH Control conditions for Subject 4 is shown in Figure 25. The SS treatment produced more interpretations in 6 out of 6 sessions with one tied session ($p < .031$). The number of interpretations increased during sessions four, five, and six. S4 used interpretations such as "ni baf" for "need bath" when asked "What does the cow need?" or responding with "misis witi wati ma a cow" meaning "Mrs. Wishy Washy mad at cow." Because inferences were not produced by Subject 4, an analysis was not conducted.

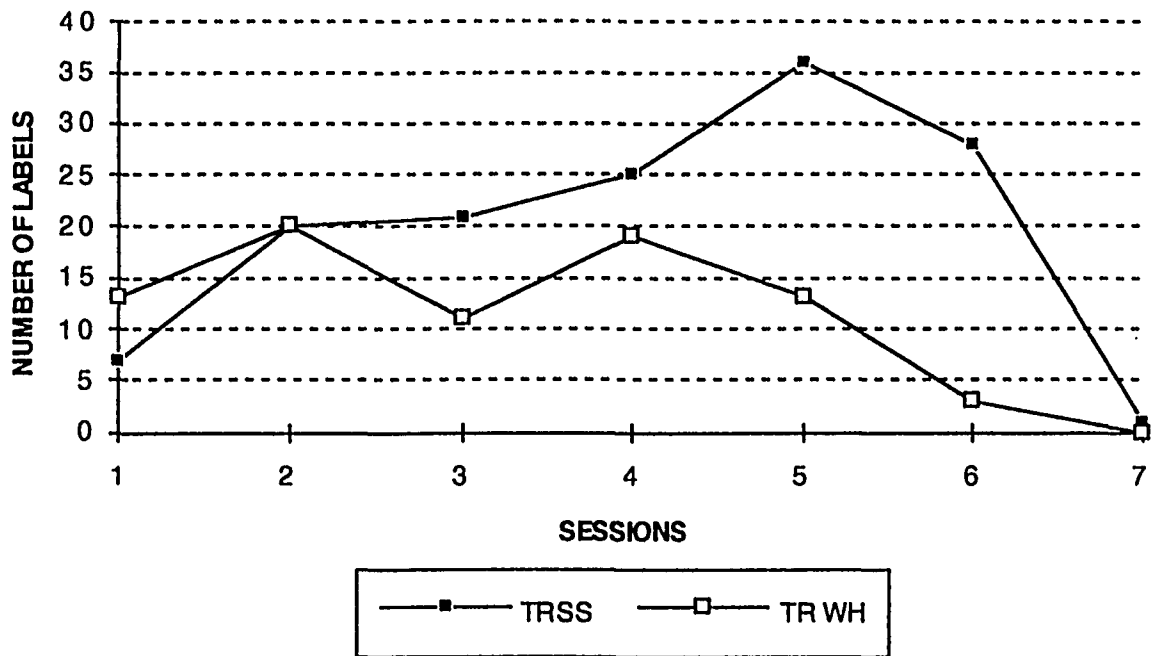


Figure 23. Number of labels in each of the scaffolding strategies (SS) and wh-questions (WH) sessions for Subject 4

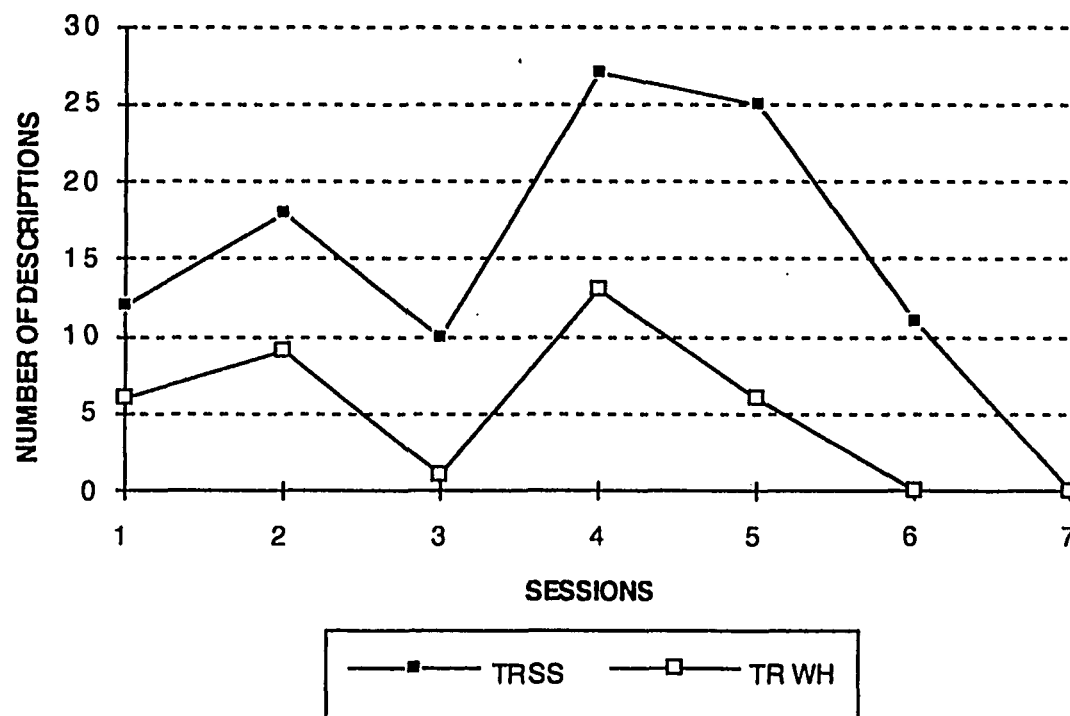


Figure 24. Number of descriptions in each of the scaffolding strategies (SS) and wh-questions (WH) sessions for Subject 4

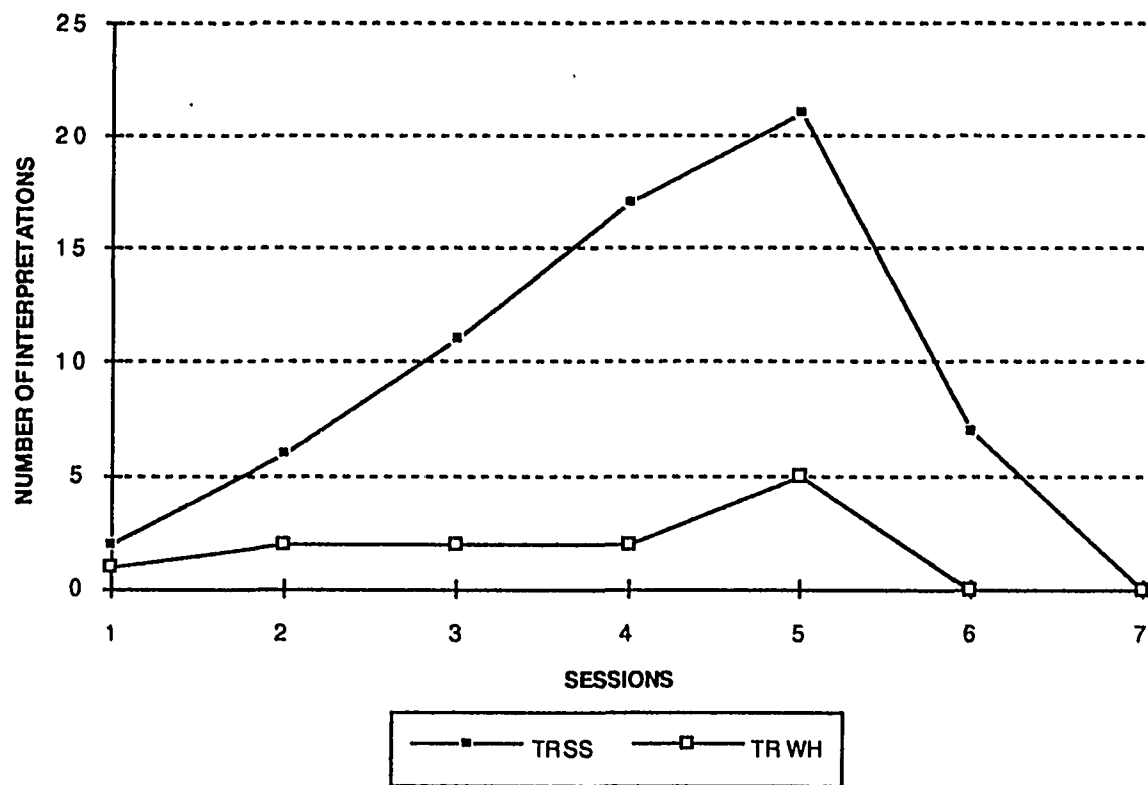


Figure 25. Number of interpretations in each of the scaffolding strategies (SS) and wh-questions (WH) sessions for Subject 4

Analysis of results for Subject 4 demonstrated that a greater number of indications, descriptions, and interpretations were produced during SS than during WH Control. Differences were shown to be statistically reliable. During the SS condition, as the lowest semantic language level, indications, decreased during sessions four, five, and six, the frequency of the higher semantic language levels increased. During session seven, the final session, it should be noted that Subject Four was sick, thus measurements revealed a greater number of indications during SS and a lower number of labels. No descriptions or interpretations were produced during session seven.

Subject 5

The frequency of indications in the SS and WH Control for Subject 5 is shown in Figure 26. The SS treatment produced more indications in 6 out of 10 sessions, which was not statistically reliable ($p < .377$).

The frequency of labels in the SS and WH Control for Subject 5 is shown in Figure 27. The SS treatment produced more labels in 4 out of 10 sessions, which was not statistically reliable ($p < .828$).

The frequency of descriptions in the SS and WH Control for Subject 5 is shown in Figure 28. The SS treatment produced more descriptions in 7 out of 10 sessions, which was not statistically reliable ($p < .172$).

The frequency of interpretations in the SS and WH Control for Subject 5 is shown in Figure 29. The SS treatment produced more interpretations in 7 out of 10 sessions ($p < .172$). Because

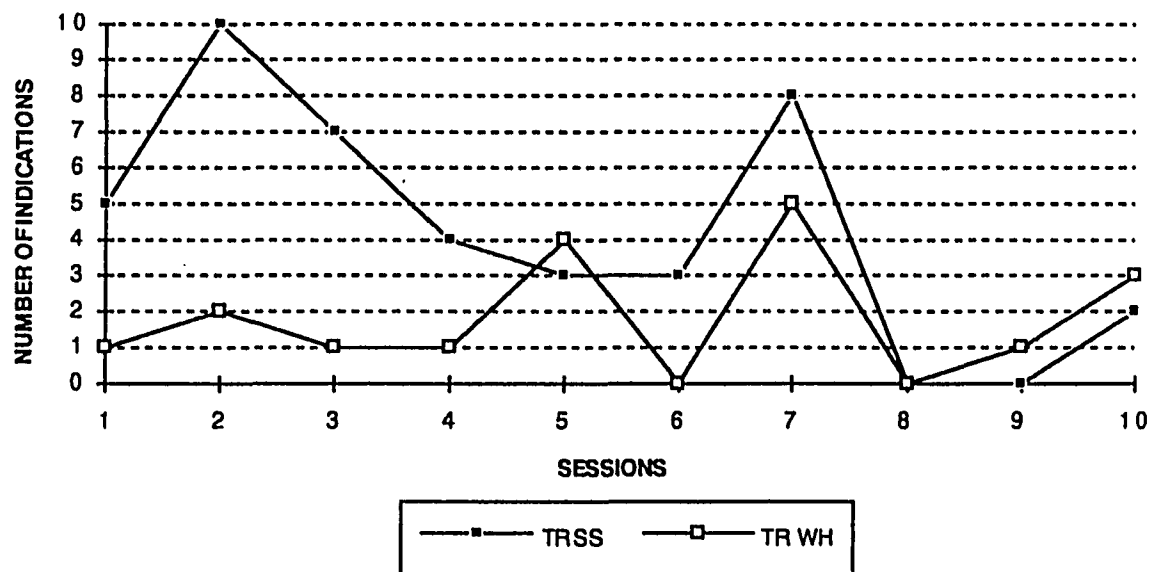


Figure 26. Number of indications in each of the scaffolding strategies (SS) and wh-questions (WH) sessions for Subject 5

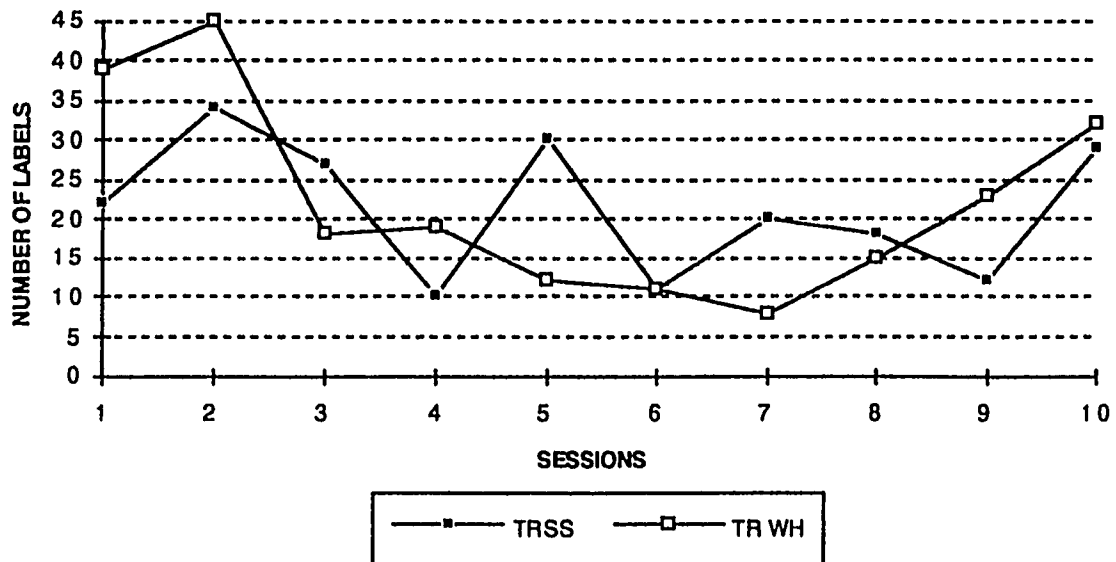


Figure 27. Number of labels in each of the scaffolding strategies (SS) and wh-questions (WH) sessions for Subject 5

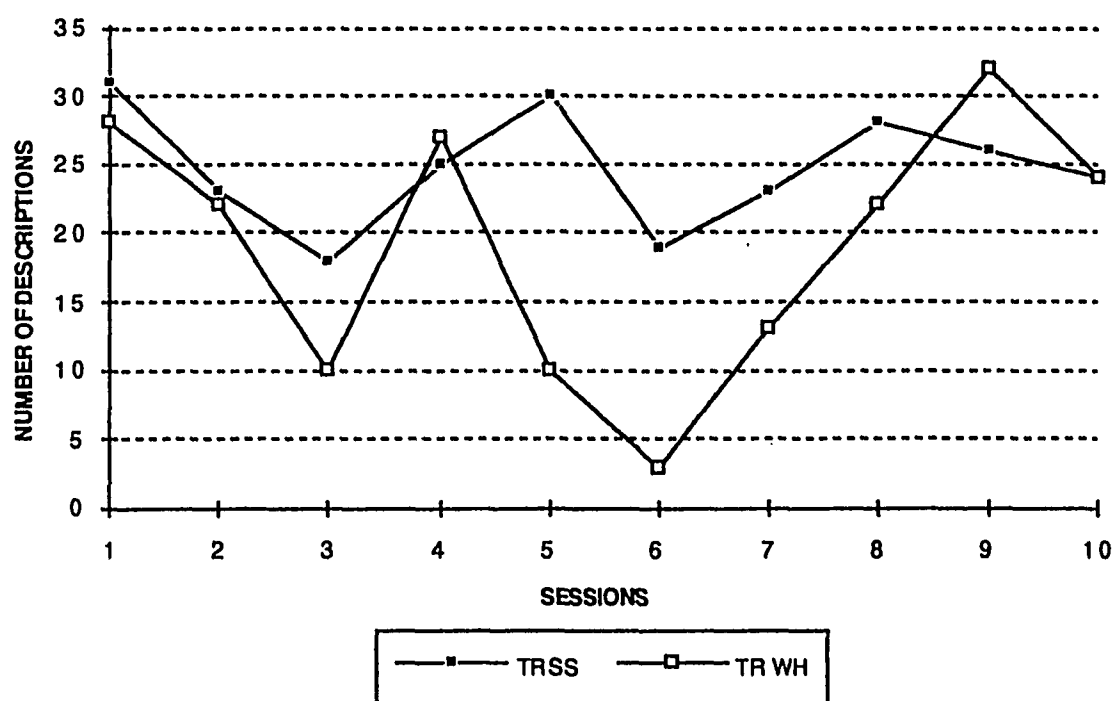


Figure 28. Number of descriptions in each of the scaffolding strategies (SS) and wh-questions (WH) sessions for Subject 5

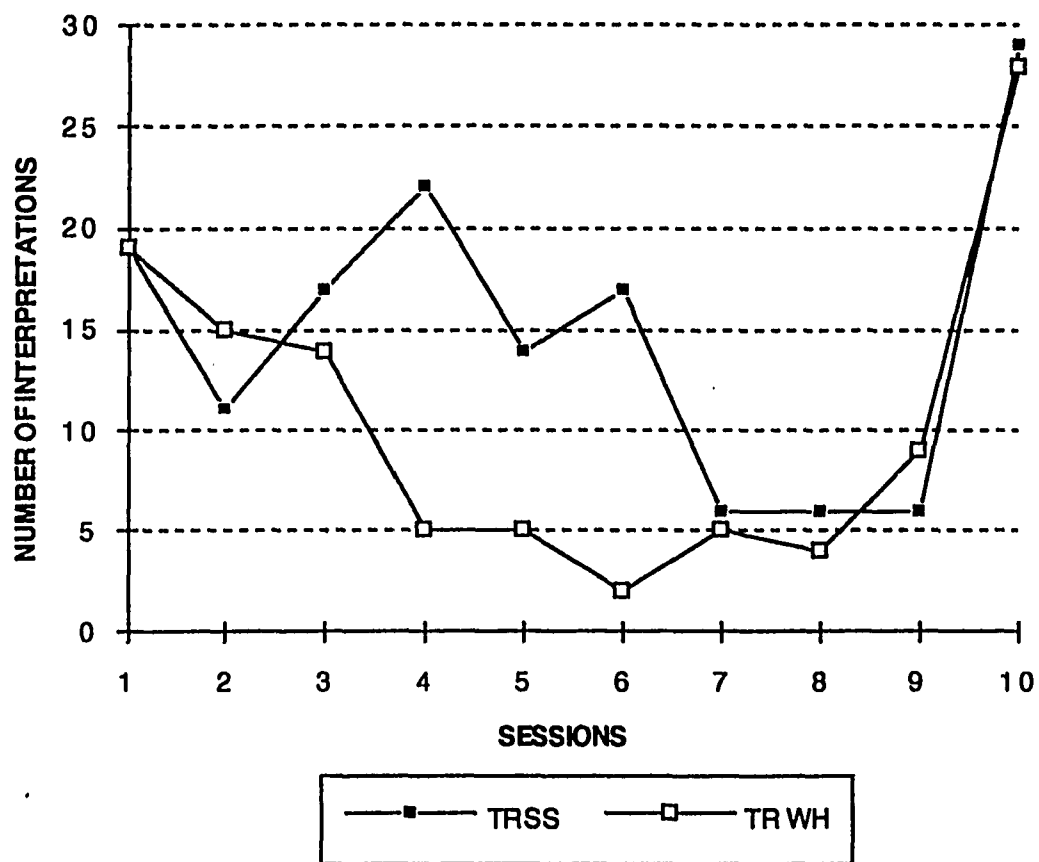


Figure 29. Number of interpretations in each of the scaffolding strategies (SS) and wh-questions (WH) sessions for Subject 5

inferences were not produced by Subject 5, an analysis was not conducted.

Analysis of results for S5 demonstrated a fluctuating pattern with no clear differentiation between the intervention and control conditions. The subject's behavior fluctuated during the sessions ranging from self-stimulation to active participation with changes in behavior shifting moment to moment during the sessions. The subject was able to use the range of semantic levels to some degree as evidenced by the measurements of semantic levels during both the intervention and control condition. However, neither the use of scaffolding strategies nor the wh-questions appeared to engage the subject's attention in a distinctive, clear manner. Though differences were not noted, results did reveal an upward trend in the number of interpretations and labels for both the intervention and control conditions.

Subject 6

The frequency of indications in the SS and WH Control conditions for Subject 6 is shown in Figure 7. The SS treatment produced more interpretations in 11 out of 11 sessions ($p < .001$).

Though Subject 6 began to produce some verbalizations, no utterances produced were coded as labels, descriptions, or interpretations. Verbalizations consisted of unintelligible utterances when pointing at a picture. Verbalizations also consisted of words such as "no" and "bye." Furthermore, verbalizations increased during the final three sessions for both SS and WH Control.

Overall, a greater number of indications were produced during SS than during WH Control. Results indicated that Subject 6 was more able to attend and participate during SS as evidenced by the greater number of indications produced during SS.

In summary, five of the six subjects confirmed the hypothesis that the SS intervention would effectively increase the children's use of higher levels of semantic displacement. Subject 1 increased his use of labels, descriptions, interpretations, and inferences. Subject 2 increased his use of labels, descriptions, and interpretations. Subject 3 increased his use of descriptions and interpretations. Subject 4 increased his use of indications, descriptions, and interpretations. Subject 6 increased her use of indications. The subject who did not respond to in this fashion, Subject 5, was often inattentive to the interventions. The difference may have been due to lower reasoning scores as determined by the CMMS. Additionally, the child would persevere on items or colors in the environment. For example, during a session, he wore an LSU tiger shirt. He was unable to draw his attention away from the tiger and the color yellow to actively participate in the storybook.

Syntactic Analysis

The third question addressed the efficacy of SS in increasing the use of complex syntactic structures. This question was answered by calculating the mean length of

utterance per session and comparing the MLU in the SS condition with the two control conditions.

The mean length of utterance produced by Subject 1 in the SS and PA Control is shown in Figure 30. The SS treatment produced higher MLU in 9 out of 11 sessions ($p < .033$). MLU for the initial session was equal in the two conditions. Examples from the transcriptions of SS showed that increased use of interpretations resulted in higher MLU. For example, "Misi hishi hashi jump in da mud." Utterances from PA transcriptions show more descriptions, therefore less syntax than those from the SS condition, such as "hent back home."

The mean length of utterance produced by Subject 2 in the SS and PA Control is shown in Figure 31. The SS treatment produced higher MLU in 12 out of 12 sessions ($p < .001$). Examples from transcription included complex utterances such as "misi asi saw duck padel in mud" during SS intervention. Example utterances from PA Control included simple sentence construction such as "zump on dat."

The mean length of utterance produced by Subject 3 in the SS and PA Control is shown in Figure 32. The SS treatment produced higher MLU in 5 out of 10 sessions ($p < .623$).

The mean length of utterance produced by Subject 4 in the SS and WH Control is shown in Figure 33. The SS treatment produced higher MLU in 5 out of 7 sessions with two tied sessions ($p < .031$). Examples from transcription revealed more complex utterances such as "hook (look) at a mud" during SS intervention, than utterances from PA Control such as "eat it."

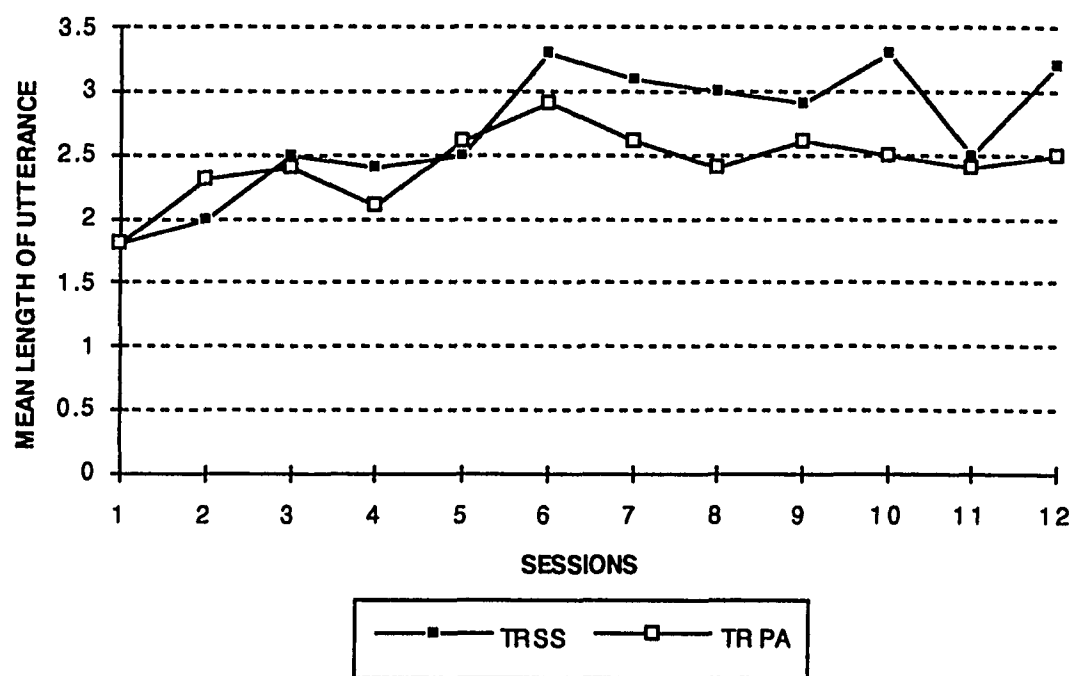


Figure 30. Mean length of utterance in each of the scaffolding strategies (SS) and phonological awareness (PA) sessions for Subject 1

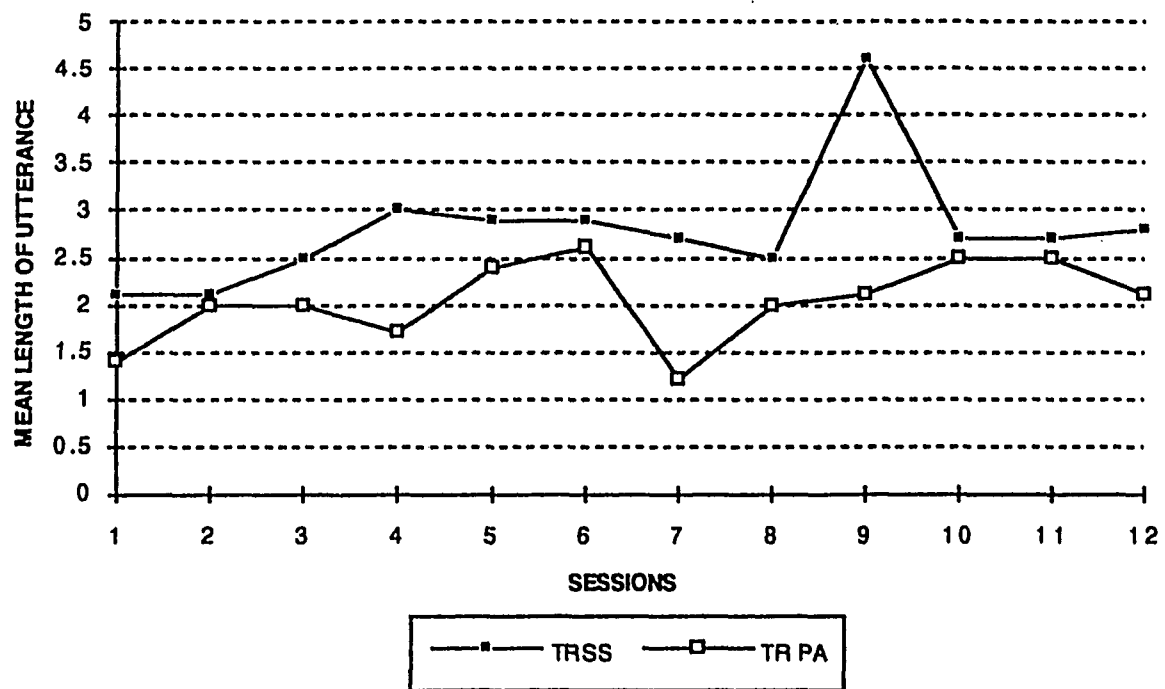


Figure 31. Mean length of utterance in each of the scaffolding strategies (SS) and phonological awareness (PA) sessions for Subject 2

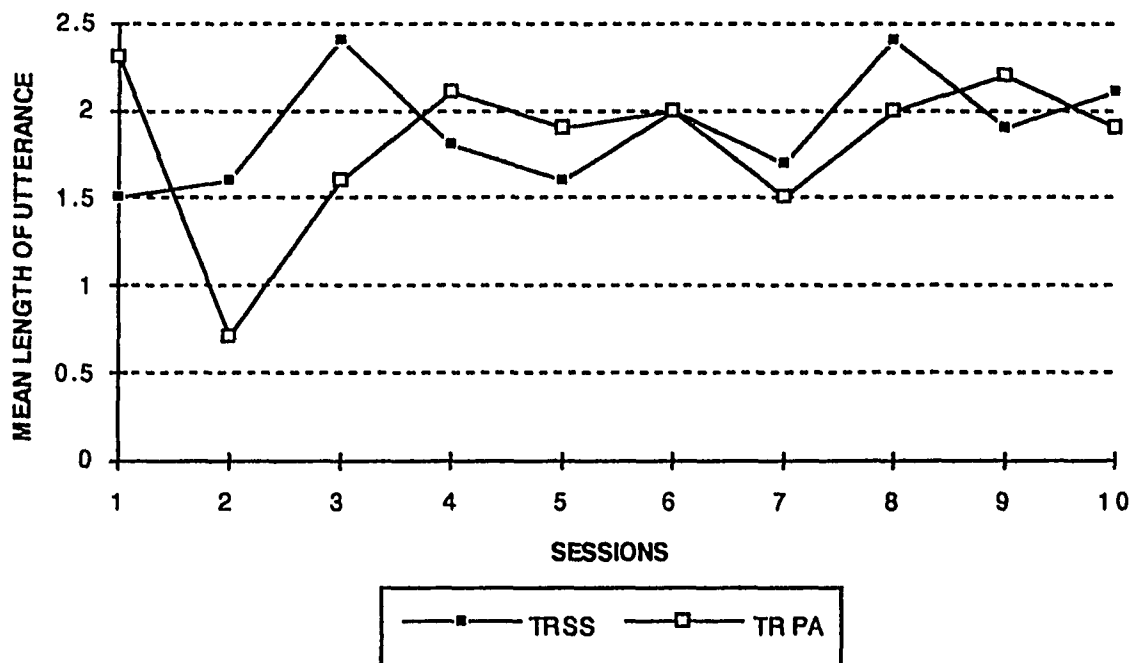


Figure 32. Mean length of utterance in each of the scaffolding strategies (SS) and phonological awareness (PA) sessions for Subject 3

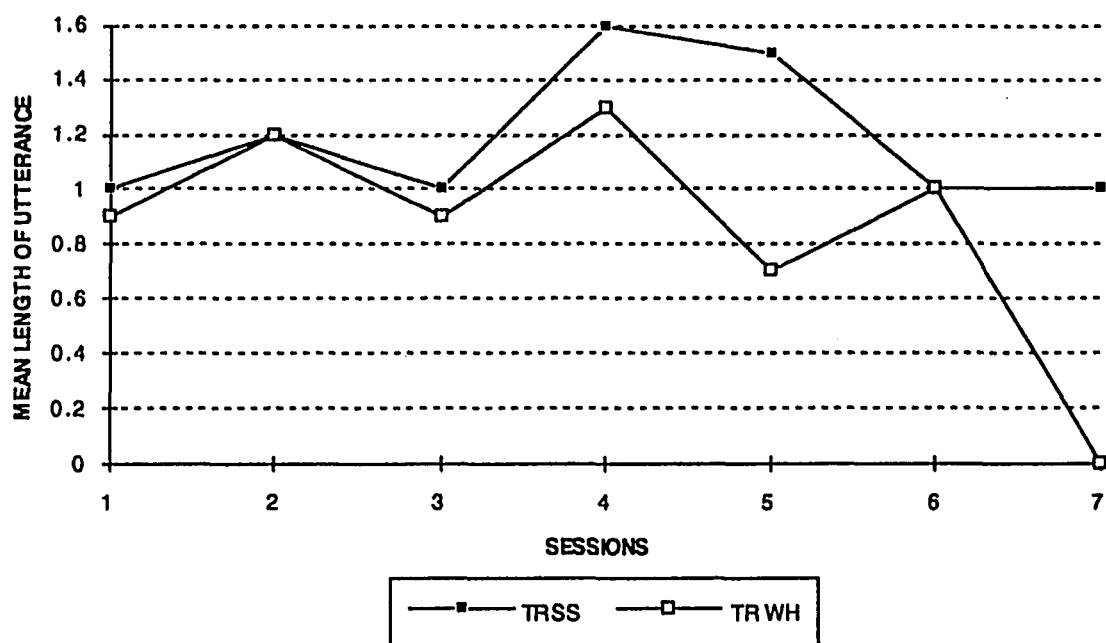


Figure 33. Mean length of utterance in each of the scaffolding strategies (SS) and wh-questions (WH) sessions for Subject 4

The mean length of utterance produced by Subject 5 in the SS and WH Control conditions is shown in Figure 34. The SS treatment produced higher MLU in 3 out of 10 sessions ($p < .172$).

In summary, 3 of the 5 subjects showed an increased MLU in the SS condition compared to the control conditions. These were three of the four subjects who also increased their use of descriptions and interpretations.

Phonological Analysis

The fourth question addressed the efficacy of SS in the articulation of words correctly. This question was answered by calculating the percentage of words correct per session and comparing the amount of each in the SS condition with the two control conditions.

The percentage of words produced correctly in the SS and PA Control for Subject 1 is shown in Figure 35. The SS treatment produced a greater percentage of words correct in 12 out of 12 sessions ($p < .001$). Examples from the transcriptions of SS during session 1 show production of "washy" as "hashy;" however by session 12, S1 used phoneme "w" in some initial positions such as "washy" and "water." Changes were not as evident during PA. For example, S1 produced "hif" for "leaf" throughout the sessions.

The percentage of words produced correctly in the SS and PA Control for Subject 2 is shown in Figure 36. The SS treatment produced a greater percentage of words correct in 11 out of 12 sessions ($p < .001$). Many of S2's articulations were

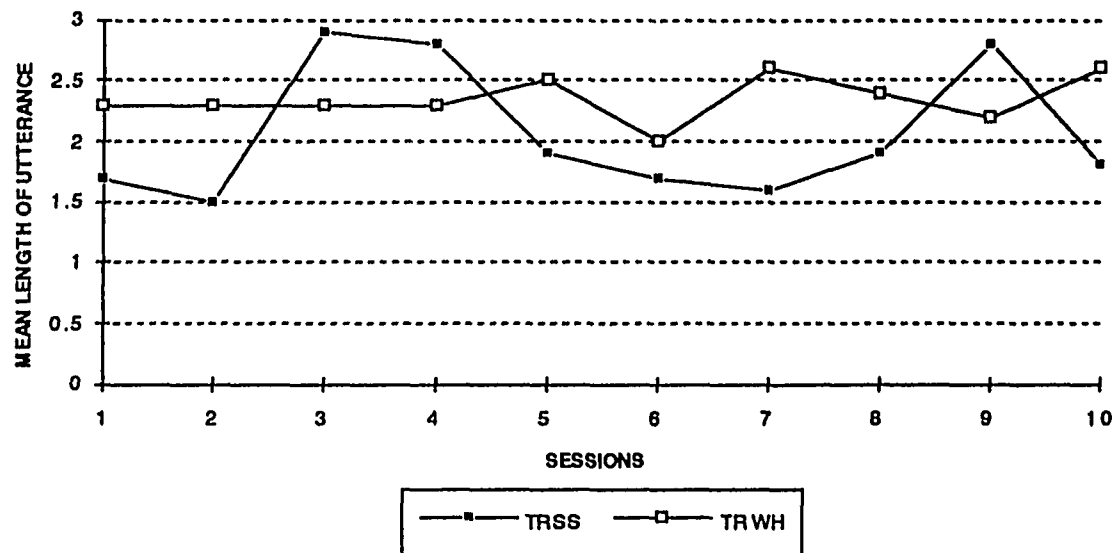


Figure 34. Mean length of utterance in each of the scaffolding strategies (SS) and wh-questions (WH) sessions for Subject 5

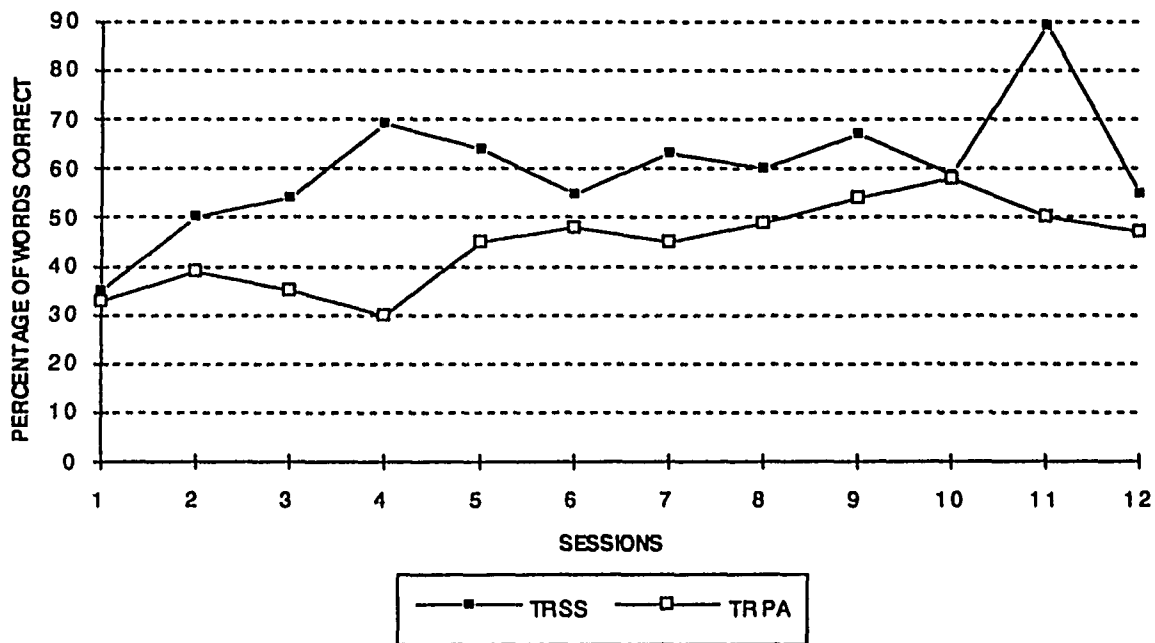


Figure 35. Percentage of words correct in each of the scaffolding strategies (SS) and phonological awareness (PA) sessions for Subject 1

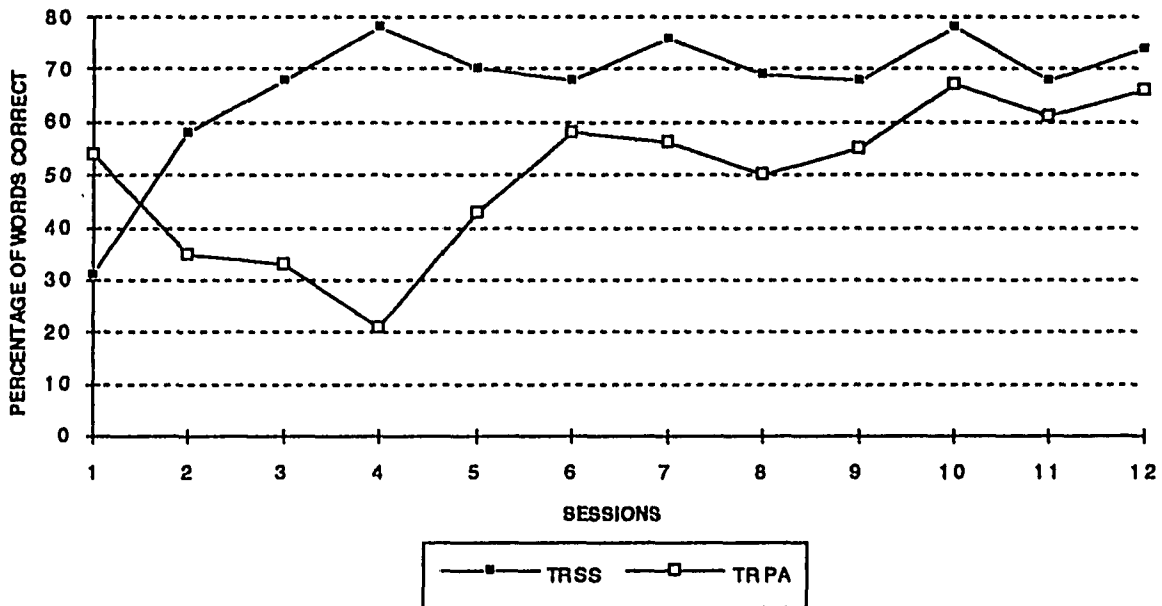


Figure 36. Percentage of words correct in each of the scaffolding strategies (SS) and phonological awareness (PA) sessions for Subject 2

characterized by substituting phoneme "s" for "f" or "t." As sessions proceeded, he began correctly producing initial sounds in words such as "face" and "towel" during SS Condition.

The percentage of words produced correctly in the SS and PA Control for Subject 3 is shown in Figure 37. The SS treatment produced more words correct in 9 out of 10 sessions ($p < .001$). An example from SS intervention showed S3 using final consonants on some words such as "pig" and "mud" during later sessions.

The percentage of words produced correctly in the SS and WH Control for Subject 4 is shown in Figure 38. The SS treatment produced more words correct in 6 out of 6 sessions ($p < .031$). Data points for session 7 were equal. An example from SS intervention showed S4 using final consonants on some words such as "pig" during later sessions.

The percentage of words produced correctly in the SS and WH Control for Subject 5 is shown in Figure 39. The SS treatment produced more words correct in 6 out of 10 sessions ($p < .377$).

In summary, 4 out of 5 subjects showed an increase in the percentage of words produced correctly in the SS condition.

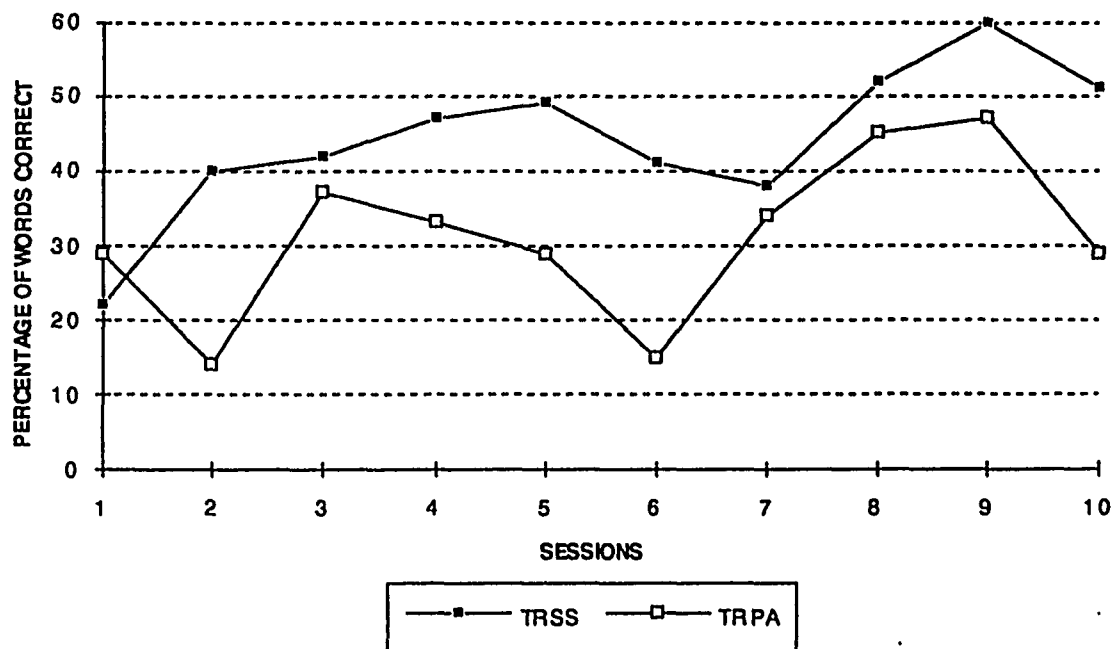


Figure 37. Percentage of words correct in each of the scaffolding strategies (SS) and phonological awareness (PA) sessions for Subject 3

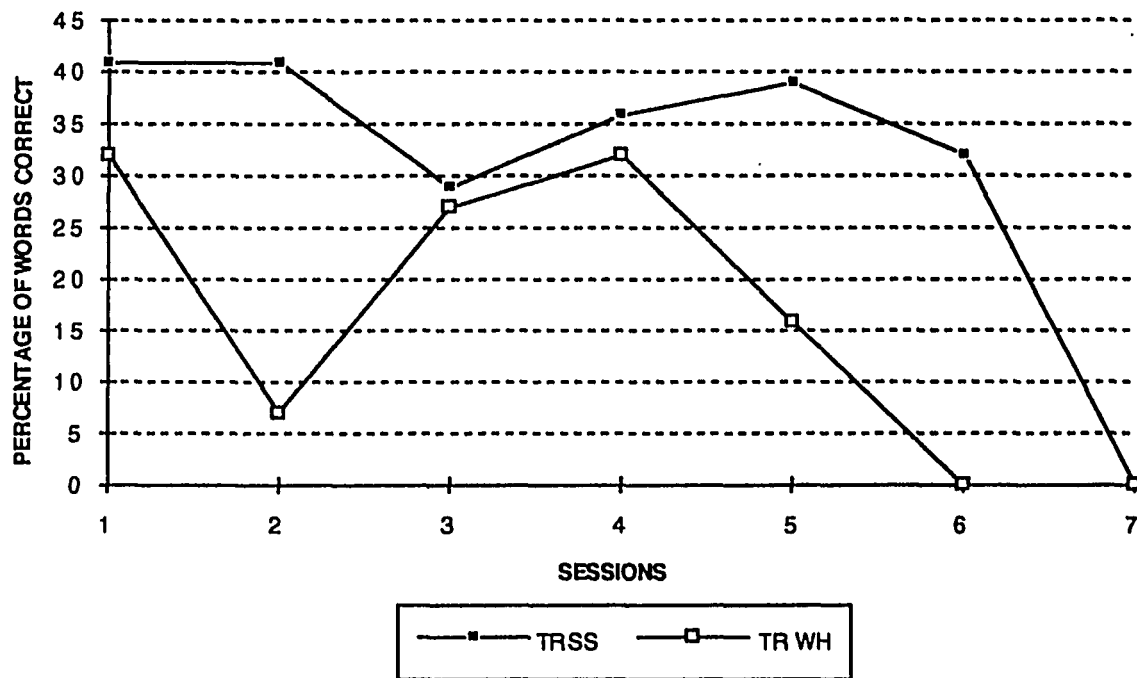


Figure 38. Percentage of words correct in each of the scaffolding strategies (SS) and wh-questions (WH) sessions for Subject 4

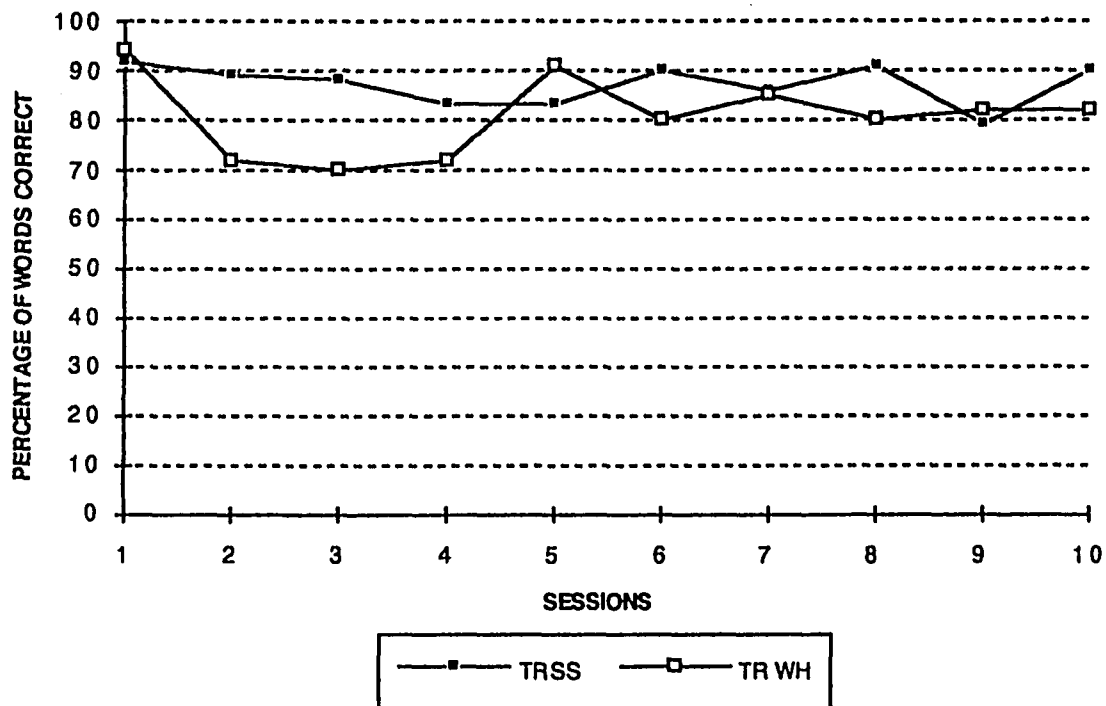


Figure 39. Percentage of words correct in each of the scaffolding strategies (SS) and wh-questions (WH) sessions for Subject 5

DISCUSSION

Many currently utilized and researched language and phonological interventions focus on individual aspects of a child's problem, rather than concurrently addressing the child's whole language system. Language interventions have been developed to target syntactic and morphological forms (Fey, 1986). Phonological interventions have been developed to target specific phonemes or phonological patterns (Hodson, 1991; Weiner, 1981). Interventions to promote metalinguistic awareness have been developed to specifically increase rhyming and syllable or word segmentation skills (Catts, 1991). However, research shows that interactions occur across these levels of language within children's development and use of language (Panagos et al., 1979). Therefore, it has been suggested that interventions address these interacting components simultaneously (Norris & Hoffman, 1993).

Adult scaffolding within holistic language intervention has been described as an effective strategy to simultaneously address both language and phonological goals (Norris & Hoffman, 1990). It is hypothesized that the reorganization of language at higher levels of meaning will affect lower language levels through whole-to-part relationships. That is, learning to produce and understand more complex semantic relationships entails the use of more complex syntax which entails more complex morphology and phonology. Goals are set to address the child's use of higher levels of language organization. Lower

levels are scaffolded as parts of the larger whole as the interventionist aids the child's organization of the whole.

The higher levels of language organization include discourse contexts including temporal, spatial, and causal relationships such as those found in storybooks. This study investigated the efficacy of using scaffolding strategies within storybook discourse contexts to increase the language abilities of language and phonologically delayed preschool children. Efficacy was determined by comparing the scaffolding strategies intervention to an alternate baseline condition using wh-questions that repeatedly probed the children's knowledge across semantic levels. Additionally, the SS condition was compared to a treatment promoting isolated metalinguistic skills. Differences between the intervention and controls were determined through measurements of children's language for semantic levels, syntactic ability, and phonological forms of words. The following sections will discuss the results relative to current intervention strategies, the theoretical constructs underlying those strategies, practical applications, and future studies.

Summary of Findings

It was hypothesized that the use of scaffolding strategies would be effective in facilitating the use of higher levels of semantic abstraction, complex syntactic structures, and phonological production of words. Five out of the six children demonstrated significant differences between the scaffolding strategies and control conditions for the frequency of child

utterances. Five of the six children showed differences between SS and the Control condition in higher level semantic language use. Three of the six children showed differences for the measurement of mean length of utterance. Finally, four of the six children demonstrated significant differences for the number of words produced correctly.

Comparison to Current Intervention Literature

Typically, interventions for children identified with language or speech delays have targeted separate levels of language. Results of studies of efficacy of language interventions have indicated gains in increasing targeted forms when the intervention was applied compared to control groups or to untreated aspects of syntax (Fey et al., 1993; Warren et al., 1984). Results of studies of the efficacy of phonological interventions have indicated success in the suppression of phonological processes (Gierut, 1989; Weiner, 1981). Additionally, language and phonological interventions have been investigated to determine if targeting one aspect will affect the other resulting in mixed results in that some interventions showed improvements in both language and phonological development (Hoffman et al., 1990; Matheny & Panagos, 1979) while others showed improvement in only the targeted domain (Fey et.al., 1993; Tyler & Waterson, 1991). Concern for predicted future academic difficulties in this population has led to the development of interventions targeting metalinguistic skills (Dean & Howell, 1986). The following section will

compare the results of this investigation to studies investigating simultaneous intervention, phonological intervention, and metalinguistic intervention.

Results from this investigation supported the relationship found in Matheny and Panagos (1979). Language intervention affected both syntax and phonology. The intervention procedure used by Matheny and Panagos was a tightly structured, imitation based intervention targeting specific grammatic structures. Changes in the articulation development of the children in the study may may have resulted from the process of imitation of sentences during the language intervention. While intended to provide practice in syntactic organization, this methodology also provided practice in speech sound production. For example, syntactic drills targeting production of the verb+ing phrases simultaneously involves practice in production of multisyllabic words, final consonants, and velar place of articulation. This practice would tend to improve the phonological productions of children who delete syllables, delete final consonants, or front velars.

Results of this investigation were similar to the results of Hoffman and colleagues in an intervention using narrative construction tasks. When compared to Fey and colleagues (1994) investigation regarding the efficacy of focused stimulation, this investigation found more significant results across several areas of language. Fey and colleagues found improvement for the targeted grammatic forms, but not in other language measurements, including phonological measurements. Similarly,

results of Tyler and Waterson (1991) indicated no improvement in phonological performance resulting from syntactic intervention. A possible interpretation of the lack of significant results across levels in Fey et al.'s and Tyler and Waterson's investigations was that the children's delays were severe compared to those of the child studies in Hoffman et al. (1990). Had the delays been less severe, changes in the children's language and phonology may have been noted (see Fey et al., 1994; Tyler & Waterson, 1990, for discussion). However, children used in this investigation exhibited severe delays and significant changes in language and phonology were obtained.

Interventions used in Matheny and Panagos, Tyler and Waterson, and Fey et al. differed from this intervention in that specific grammatic forms and phonemes were targeted. Language intervention focused on specific grammatic forms, and phonological intervention focused on specific phonemes. Neither intervention overlapped including aspects of phonological intervention with language intervention. The intervention used in this study incorporated contrast words within the holistic language intervention. Within the interaction if the child misarticulated a word, the examiner contrasted the incorrect production with the correct production. For example, the examiner contrasted the production "hater" with the correct production "water." Production errors resulted in communicative breakdowns within the whole of the discourse context. Results of this study suggest that this technique effectively facilitated a variety of language levels.

This difference in study results may have resulted from the use of a redundant discourse context in which children repeatedly discussed the same story. Hoffman et al.'s intervention used such a discourse context. Results of this study support the findings of Hoffman et al.'s (1990) investigation. Their study suggested that the use of narrative tasks within language intervention may effectively remediate language and phonology. Utilization of narrative tasks requires processing at varying levels of language complexity, thus synergistically affecting semantic, syntactic, and phonological complexity. The results of this investigation showed such an effect.

One difference between the Hoffman and colleagues study and this study is the degree of severity of language and speech delays in the children. The subjects in Hoffman et al.'s study had low to average language abilities whereas the children in this study all had moderate to severe delays. Thus, the present study extends the results of Hoffman and colleagues results from children with mild delays to those children with moderate or severe delays.

Findings from Hoffman et al. and this study support the efficacy of holistic language intervention to improve language and phonological abilities. Results show that multiple aspects of semantic, syntactic, and phonological organization can be simultaneously addressed in intervention. This investigation supports the use of scaffolding strategies that build on the child's initiations to facilitate the use of higher level language.

Furthermore, the holistic intervention used in this study incorporated contrast words to facilitate correct production. This occurred within scaffolded interactions surrounded by meaningful language. Geirut (1987), Hodson (1991), and Weiner (1981) used contrast words to facilitate correct phonological production. Weiner (1981) used minimal pairs, Geirut (1987) used maximal pairs, and Hodson (1991) used a cycles approach. Each found that the use of contrast words facilitated phonological development. However, measurements of improved phonology were limited to production of isolated words. This study found improved phonological performance within utterances in which phonemes were not targeted or directly elicited. The redundancy of words and opportunities to attempt production in meaningful language context may have facilitated effectiveness in this investigation.

Results of some current interventions demonstrated improvement in isolated areas of language use such as action-object relationships or isolated word production. This investigation demonstrated the efficacy of scaffolding strategies within holistic intervention across higher and lower levels of language processing.

Support for Theoretical Constructs

All intervention strategies depend on theoretical constructs. Evidence in support of different constructs should be reflected in changes in intervention approaches as well as models of language acquisition. The scaffolding strategies

intervention was based on interactive language parts, whole-to-part learning, connectionism, and Vygotsky's Zone of Proximal Development.

Interaction of Language Parts

Research has demonstrated that an interaction exists between language parts during development. As syntactic complexity increases, the number of speech sound errors increases (Panagos et al., 1979; Panagos & Prelock, 1982). Research has shown that children with oral language delays are likely to experience difficulty with written language (Aram & Nation, 1980; Bishop & Adams, 1990).

The results of this intervention study support an interaction among language parts. Significant improvements in measurements of semantic levels, syntactic complexity, and phonological complexity suggest that learning to express higher level of semantics caused improvements in lower levels of syntax and phonology that are component parts of the semantic relationships. In contrast to the interventions seen in previous studies, both syntactic complexity and correct phonological production increased rather than support the premis that production of larger language units negatively affected the ability to produce phonological parts correctly. Children in this study were simultaneously increasing their abilities at a variety of levels.

Additionally, results showed that children in the PA Control had difficulty attending to and understanding print. More long-term research is needed to determine if holistic language

intervention using scaffolding facilitates written language abilities in later academic situations.

Whole-to-Part Learning

Nelson (1985) viewed the learning process as a parsing of parts from a whole event. As children participate in routine events, initially, they use single words to represent the whole. Gradually children understand the detailed concepts and relationships within the events. The learning of language parts emerges as children develop conceptual knowledge about the whole-to-part relationships that exist across a number of events.

The children's development in this study appeared to follow a pattern in which the parts are learned from most to least concrete. The pattern shows them learning from labels to descriptions to interpretations and inferences. The use of a storybook as a routine activity allowed the children to discover parts within the whole such as characters, events, and temporal and spatial relationships. Language forms that refer to these parts were used frequently and became a part of the children's representation for the study. Children appeared to learn from the most observable to the least observable. During the initial sessions of the intervention, the children used labels to represent the whole event. For example, the picture of a cow was the most observable object on one page. Use of the word "cow" may represent the whole event of the cow jumping in the mud and being happy with repeated scaffolding. The children added more complex, abstract concepts. Language was used to

express completed actions that were not entirely observable, and then intentions which were not observable. The use of adult scaffolding facilitated the parsing of language and was based on the child's interactions. If children initiate with the most observable object, the adult parses more complex relationships surrounding that object to guide the child's use of more complex relationships.

Phonological information was further parsed from the language forms. As miscommunications occurred, the adult parsed phonemes within the words that created the miscommunication. Many opportunities are given for the children to attempt production, so phonological abilities developed from simple CV word to more complex productions. This premise was observable in the results. For example, the emergence of final consonants was documented.

Connectionism

Connectionist theory assumes a learning model that has a basic structure of a network of nodes (Tierson, 1990). Nodes influence each other positively or negatively within this network. The strength of connections between nodes varies as learning occurs. Input, output, and hidden units are the three classes of processing units. Input units accept sensory information. Output units produce actions and send feedback to the hidden units. Hidden units are internal and react to information from input and output units. Patterns of connection weights are formed among the hidden units.

The occurrence of parsing parts from the whole can be explained through this system. Whole event representations are the total of the perceptual inputs to the system and the child's actions within the event. Scaffolding focuses attention to parts and the relationships of the parts that increase the connection strengths for the parts within the pattern. These parts are constantly being intertwined to form hidden units for the varying levels such as words and phonemes. As more complex relationships are formed among these parts, they become more abstract. An interpretation like "happiness" would be represented via relationships to events that make a person happy, actions associated with happiness (smiling), and actions, objects, or people within events associated with happiness (friends).

Furthermore, vocabulary development is not a restricted set of definitions, but an interrelated knowledge of a topic that is cross referenced to many patterns of connections. For example, size, shape, and texture of balls are different in contexts of a child's room, a soccer game, or a baseball game. Holistic language intervention facilitates this type of learning in a connectionist system because information is interrelated in an overall context. Concepts and ideas are reinforced and connected within the context. For example, the concept of the color red can be introduced and reinforced within the context of a story that includes red objects. The information is presented in a redundant manner, thus strengthening connections and relationships to the color red.

Use of scaffolding strategies within holistic language intervention also facilitates learning within a connectionist system. Social mediation using scaffolding parses out relevant information for children. When scaffolding is based on the child's initiation, the input information repeats the concept already within the child's network and expands the concept. Connections are built and strengthened within the existing concept. For example, if the child says the word "cow," the adult responds with an expatiation and a cloze procedure such as "Right. A cow. The cow is big. The cow is ____." A connection is built between the concept of "big" and the concept of "cow." Information is reinforced through scaffolding, so connection weights are potentially strengthened. Another example is the use of phonemic cues in context. The adult may prompt by producing the initial sound a word in the story. Nodes are activated at a phonemic level such as "p," exciting the overall pattern of "pig."

Results support the theoretical construct of connectionism. Holistic intervention uses language that is connected to a central theme. Initiations and responses are not random. Therefore, connections are made within the network according to the whole event in which language and learning are occurring. Concepts are interconnected, language referring to those concepts are interconnected, and phonology within the language is interconnected. Results showed an increase in complexity within these interconnected areas of language and phonology.

Zone of Proximal Development

Results of this investigation support Vygotsky's assertion that more frequent opportunities for the child to talk at higher level of semantic displacement or discourse complexity would result in more rapid refinement of the child's internal organization of language (Vygotsky, 1962). Results suggested that the subjects produced a greater number of utterances during the intervention using scaffolding strategies than during the alternated control and that this was accompanied by increased language complexity. The results suggest that the subjects were more able to respond during the intervention using scaffolding strategies. In effect, results show that the more often a child has opportunities to respond, the more likely the ability to use higher levels of semantic abstraction. Intervention using scaffolding strategies provides such opportunities. Social mediation using such scaffolding strategies helps the child parse complex, detailed relationships from the whole.

Results support the construct of Vygotsky's zone of proximal development (1962) because subject's language behavior exemplify the ZPD. As stated previously, an important feature of the process of learning is the zone of proximal development. The ability to learn when provided assistance by an adult is the child's potential developmental level. The actual developmental level is that learning which has already been completed. The distance from the actual level to the potential level is the zone of proximal development. The zone defines those functions that have not yet completely matured, but are in

the process of development. It is within this zone that social mediation and scaffolding can facilitate the child through various levels of learning.

At the level of labeling, S1, S2, S3, and S4 were functioning at the actual level of development. It is at this point the subjects responded independently using concepts in which the learning has been completed. This is evidenced by the small gap between SS and PA Control. During the alternated Control, S1, S2, S3, and S4, were able to independently produce labels without adult assistance.

At the other end of the zone, inferences, S1 and S2 were functioning at their potential level of development. S3 and S4 were functioning at their potential level of development at the semantic level of interpretations. At the level of inferences, S3's and S4's abilities were out of the zone, such that the subject was not at a point in development to use inferences. No utterances were coded as inferences during either SS or WH.

The subjects were able to learn and produce inferences and interpretations with adult assistance. However, these levels of learning were not completely developed in that the subjects were less able to use inferences and interpretations without adult mediation than with adult scaffolding. It is at these points that the gap between SS and the Control was the greatest.

Use of language at the level of descriptions and interpretations for S1 and S2 fell between the actual and potential levels of development. Use of language at the level of describing fell between the actual and potential levels of

development for S3 and S4. The use of descriptions and interpretations had not completely matured, but were in the process of developing. At this point, the gap between SS and PA Control began to gradually increase. As semantic levels of abstraction increased to the upper end of the zone, descriptions and interpretations, data points for PA decreased, while data points for SS increased. On the other end, the level of indication was below the zone. Indications were characterized as below the zone of proximal development for S1, S2, S3, and S4. Each subject was able to use indications easily, however they were not dependent on indications to communicate.

Results of S6 showed a significant difference between the SS and WH for the dependent measurement of indications. However, this subject did not respond with language coded as labels, descriptions, interpretations, or inferences during either the condition or intervention. The zone of proximal development was lower than the subject's described above. Using indications to interact was within the zone, but other semantic levels were above the zone. With adult assistance, the subject was able to attend to the activity and respond to the storybook and the speech/language pathologist. This is evidenced in the significant difference between SS and the WH Control on this measurement. Though the subject responded during the alternate control, the subject exhibited inattentiveness indicating less comprehension of the story used during WH Control than during SS Condition. The inattentiveness is reflected in fewer indications produced during WH condition.

Lack of language at higher semantic levels suggests that the intervention setting was inappropriate. This subject needed concrete activities within a situation involving symbolic representations as found in a storybook. For example, an intervention setting may have included many concrete representations of characters and items found in the storybook. Additionally, other activities reinforcing concepts from the story may be included. For example, using bubbles, soap, and water to reinforce the concept of clean and dirty.

Though the subject did not use higher level language during this investigation, it is apparent that intervention using scaffolding strategies facilitated responses at the upper end of the subject's zone of development. With a more concrete intervention setting, use of scaffolding strategies may have promoted higher levels of language use. During WH, questions asked were above the subjects ability to respond. The subject responded with indications, but she became inattentive quickly.

Results derived from Subject 5 demonstrated no significant differences on any semantic measurement. Furthermore, no difference was indicated and data points tended to randomly diverge and overlap with no clear, distinct pattern. Subject 5's frequency of response showed no difference, meaning opportunities to use higher levels of semantic abstraction, complex syntax, and correct word production were reduced during SS. There are two possible reasons for this outcome. First, S5 had lower reasoning scores as determined by the CMMS. Additionally, the child would persevere on a variety of items

or colors in the environment. For example, the subject often repeated the word 'yellow' while fixating on a particular object in the story or in the room.

These two factors may have contributed to the lack of significant differences. More concrete materials may have been needed to facilitate higher level language use for S5. The situation, which focused primarily on a storybook, was at a higher level than a situation focused on concrete representations of characters in a storybook.

Practical Applications

Research has shown an interaction among higher and lower levels of language processing ranging from a meaning level to a gestural level. The use of scaffolding strategies has been shown to be effective in facilitating language along this continua. Use of scaffolding strategies was shown to be effective in facilitating higher level semantic language, more complex syntactic structures, and correct production of words. Results suggest that scaffolding strategies can be used clinically to facilitate language without specifically targeting syntactic, morphological, or phonemic forms. Goals can be set at higher levels of language use while addressing all levels of language.

This investigation supports the theoretical construct of the zone of proximal development. It is evident that this theoretical structure can be implemented in practical applications of assessment and intervention. Children can be assessed descriptively by analyzing the children's zone. The

clinician can use a storybook to ask wh-questions to determine the child's language abilities at the actual level of development. Then, the clinician can use scaffolding strategies to determine language abilities with adult assistance at the potential level of development.

Based on this analysis, goals can be set to elevate the zone. For example, assessment of S4 indicated that the child's actual level of development was at the level of labelling. Intervention was designed to promote development of higher levels of language, thus shifting his overall zone. This can be achieved through scaffolding strategies within holistic language intervention.

Additionally, results suggest the use of whole-to-part learning in intervention as evidenced by increases in semantic, syntactic, and phonological complexity. Using a whole event from which ideas were parsed affected various language parts. This suggests using a central event or theme to drive the intervention with activities chosen to reinforce concepts related to the theme.

Toy objects representing characters in the storybook for the SS interventions were used infrequently with S3, S4, and S5, and frequently for S6. Contextualizing the characters and events in the discourse context may be necessary for children who are unable to use language in symbolic situations such as storybooks. Concrete representations may be needed in the situation. This will facilitate an understanding of the event and language surrounding the event. As children begin to organize

language at higher levels of semantic abstraction, the clinician can introduce less abstract situations such as using miniature representations of a storybook. As the context becomes more abstract such as using the storybook without concrete representations, scaffolding strategies are needed to facilitate language organization and use. As language abilities increase within concrete situations, language can be further scaffolded in subsequent abstract situations. Future research is needed to examine such interactions. The following section will suggest such research.

Finally, results suggest that intervention that targets specific metalinguistic skills may be inappropriate for this group of children. Children with language delays are not developmentally able to respond to such tasks for extended periods of time. Results of this study suggest that facilitating higher levels of language function will eventually facilitate the emergence of language at a metalinguistic level. A holistic approach to language intervention using scaffolding strategies will assist the child with language and phonological delays in the organization of language within a whole continua including metalinguistic awareness. There is a question of how the semantic dimension can be used to lead children to the metalinguistic level. An intervention may highlight metaphonological knowledge by including concepts such as rhyming words or sound/symbol correspondence within the discourse context. As children achieve greater semantic displacement, such concepts may be parsed from the whole.

More research on such an intervention strategy is needed. The following section will present such ideas for future research.

Future Studies

The results of this study yielded suggestions for future research exploring theoretical issues as well as applications for intervention. Because the study was replicated only six times, future studies using more children may provide more information regarding the efficacy of scaffolding within holistic language intervention.

One child in this study who failed to progress showed cognitive abilities below normal limits. Future studies are needed to determine the efficacy of holistic language intervention using scaffolding strategies on children with varying levels of cognitive ability and the manipulation of the situational context that may be required for these children.

One child in this study had no expressive language. More research is needed regarding children with varying levels of language abilities. Such research should include the manipulation of the situational context. Perhaps an investigation may include more contextualized activities surrounding a storybook context.

Another question to be addresses is whether are not the types of scaffolding strategies affected the child's responses differentially. Because the use of scaffolding is dependent on child initiations within a dynamic intervention, future research should be investigated to determine if there is a correlation

between specific adult scaffolds and the semantic level of the child's response.

This study showed increases in children's semantic functions. It is hypothesized that as semantic displacement increases, metalinguistic abilities will increase. Future research is needed to determine if holistic language intervention will facilitate such skills. A study may include children using higher levels of language such as interpretations, and apply print awareness techniques within the scaffolded intervention.

This investigation supported the construct of whole-to-part learning. It was suggested that children appeared to be adding parts together rather than parsing from the whole. An explanation for this was that the adult focused on particular parts leading the child to create larger parts within the whole. More research using a variety of adults to lead interventions may give further insight to this conflict and explanation.

Different adults may focus and parse concepts in a different manner.

Additionally, this study supported the construct of an interaction between language parts. Research supports an interaction in which increased syntactic demands cause phonological abilities to decrease (Shriner et al., 1969). Results of this investigation showed development of both syntactic and phonological dimensions. More indepth syntax and phonology analysis should be conducted to determine specifically which grammatical forms emerged and changed. Further measures of phonology should be conducted to determine syllable and

phonemic shifts that occurred in the phonology of the subjects as well as in which words did phonological shifts occur.

Additionally, further investigation will strengthen support for the use of Vygotsky's Zone of Proximal Development. An investigation could assess a variety of children using the ZPD. Analysis could be conducted on children's abilities with and without adult scaffolding to establish either end of their zone. Then, intervention could be implemented according to the assessment using holistic intervention with scaffolding strategies.

Additionally, intervention during this study occurred over a short period of time. Further research should investigate longer durations of intervention using a control group. Information regarding maturational effects may be obtained. Questions such as whether or not the zone of development may shift regardless of adult intervention may be answered.

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APPENDIX A

CONSENT FOR PARTICIPATION FORMS

Dear Parents:

Your child is invited to participate in a special project sponsored by LSU and approved by the superintendent of Asension Parish School Board. The purpose of this project is to discover what effects of reading storybooks with children has on their language development.

Your child and a speech therapist will sit together and read storybooks. The speech therapist and your child will talk about the pictures and story. The speech therapist will ask your child questions about the story as it is read.

Participating children will be given tests that measure language ability at the beginning of the program. The results of these tests will be treated confidentially. They will only be shared with you. The results of the project will appear in written reports, but your child's name will not be used in any results.

We will have limited space in the summer program to help children with their language. Depending on the test results, your child **MAY** be selected to participate. To participate in the program, your child must be available between June 14 to July 9. The program will be three days a week for 35 minutes at Gonzales Primary campus in individual sessions.

Your child will benefit in several ways from this project. You will receive information on your child's language abilities and your child will receive help in his/her language development.

ASSURANCE OF CONFIDENTIALITY

The information that we collect from this study will be treated confidentially. Your child's name will not appear anywhere in the written reports.

WITHDRAWAL FROM THE STUDY

Participation in this project is voluntary. If you decide to participate, you are free to withdraw your consent and discontinue at any time.

YOU ARE VOLUNTARILY MAKING A DECISION WHETHER OR NOT TO ALLOW YOUR CHILD TO PARTICIPATE. YOUR SIGNATURE INDICATES THAT YOU HAVE READ THIS INFORMATION AND ARE WILLING TO PARTICIPATE. YOU WILL RECEIVE A COPY OF THIS CONSENT FORM TO KEEP.

NAME OF CHILD:_____

SIGNATURE OF PARENT/GUARDIAN:_____

DATE:_____

RELATION TO SUBJECT:_____

RESEARCHER: MONICA BRADSHAW 343-5516

APPENDIX B

SAMPLE WH-QUESTIONS FOR CONTROL CONDITIONS

Labels

1. What's that?
2. Who is this?

Descriptions

1. Where is that?
2. What is he doing?
3. What color is that?
4. How does that feel?
5. What's happening?
6. How can you tell the animals are wet?

Interpretations

1. How does she feel?
2. Why is he happy/sad/mad?
3. Why did she get a towel?
4. Why did Mr. Singh go outside?
5. Where are they going?
6. What do you think that cow/pig/duck is saying?

Inferences

1. Why does the caterpillar want that rose?
2. Why do the animals like the mud?
3. What might happen in the book tomorrow?
4. Why do dogs chase cats?

5. What would Mrs. Wishy Washy say if she saw the animals back in the mud?
6. Why is this rose small and this rose is big?

VITA

Monica L. Bradshaw is a Speech-Language Pathologist with the Lockhart Independent School District. She earned a Bachelor of Science degree from McNeese State University in 1989.


DOCTORAL EXAMINATION AND DISSERTATION REPORT

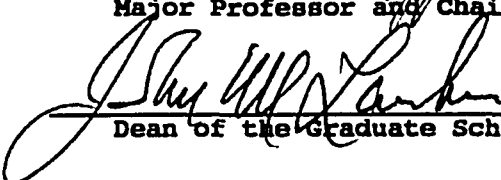
Candidate: Monica Lynne Bradshaw

Major Field: Communication Disorders


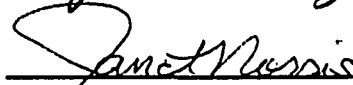
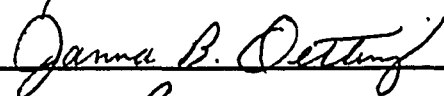

Title of Dissertation: The Efficacy of Scaffolding Strategies in Holistic Language Intervention on Language and Phonologically Delayed Children

Approved:


Major Professor and Chairman


Dean of the Graduate School

EXAMINING COMMITTEE:

Date of Examination:

01/17/95