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A COMPARATIVE STUDY OF LOCATIVE MEANING PRODUCED BY NORMAL AND LANGUAGE IMPAIRED CHILDREN IN A STRUCTURED ENVIRONMENT: A PILOT STUDY

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Lisa Ann Reath

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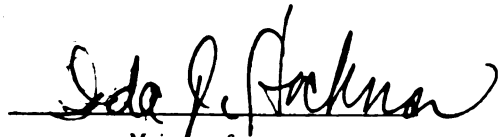

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A COMPARATIVE STUDY OF LOCATIVE MEANING PRODUCED BY NORMAL AND LANGUAGE IMPAIRED CHILDREN IN A STRUCTURED ENVIRONMENT: A PILOT STUDY

By

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ABSTRACT

A COMPARATIVE STUDY OF LOCATIVE MEANING PRODUCED BY NORMAL AND LANGUAGE IMPAIRED CHILDREN IN A STRUCTURED ENVIRONMENT: A PILOT STUDY

By

Lisa Ann Reath

This study compared locative utterances produced by normal and language impaired children on a structured elicitation task. Utterances were analyzed to determine whether group differences were present within global and specific contexts. The effectiveness of the structured task in eliciting the responses was measured.

Three language impaired subjects and three normal control subjects matched by chronological age participated in the study. Their ages ranged from 7;6 to 7;5. The subjects were screened using the Northwestern Syntax Screening Test, Leiter International Profile Score, and Test of Language Development tests. Their screening scores were variable and indicated that the subject groups were heterogeneous.

As was predicted, all subjects evidenced global locative knowledge. However, contrary to what was expected, group differences were not observed within the specific levels of locative knowledge.

The structured task was judged to be average in effectively eliciting locative responses. Improvements for the structured task were suggested.

DEDICATION

This is dedicated to my husband, Mark,

whose emanating love and support was always there,

especially when it was most needed.

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TABLE OF CONTENTS

LIST OF TABLES

Table Page

LIST OF FIGURES

LIST OF APPENDICES

CHAPTER I

BACKGROUND FOR THE STUDY

This research focused on the relational semantic features of normal and language impaired children's language. Relational semantics refers to the various meanings words acquire in relation to other words in syntactic context. For example, "Mark" acts as an agent in the sentence "Mark is cooking," but as an owner in the sentence "This is Mark's car." Over the past decade, the study of language development has expanded its focus beyond linguistic form to include the relational semantic aspects. The following section reviews literature concerning this shift in focus, and its significance to the nature of language impairment.

The Semantic Focus in the Description of Children's Language Acquisition

During the 1960's, much research focused on the development of children's linguistic forms (Freeman & Carpenter, 1976; Leonard, Bolders, & Miller, 1976). This focus was most significant with the emergence of transformational grammars as vehicles for describing child and adult syntax. (See Bowerman, 1973 for literature review.) Transformational grammars were challenged partially because they inadequately described children's productions. For example, they

were unable to explain ambiguous sentences and, consequently, left themselves open to anomalous productions. As a result, their distributional criteria could not predict early word combinations. For a more complete argument, refer to Bowerman (1973).

As a result of this inadequacy, investigative focus shifted from linguistic forms to the semantic concepts underlying the forms. Bloom (1970) was one of the pioneering investigators who systematically examined semantic features of children's early utterances. She used "rich interpretation," which considered both the syntactic structure of the utterance and the nonlinguistic context in which it occurred. It was observed that a sentence with the same syntactic arrangement of words could be interpreted as having several meanings: "Daddy shoe" could mean "this is Daddy's shoe," "Daddy has my shoe," or "Daddy get the shoe." Also, several separate syntactic arrangements could be interpreted as representing one meaning. For example, "Mamma down," "Mamma put me down," "Me down," and "Mama me down" could all convey the message that a child wants to be put down by the mother.

Other investigators, using a semantic research focus, developed varying classification systems to describe the relational meaning of children's language, e.g., Schlesinger (1971). Brown (1973) reviewed 19 reports on 13 children researched by various investigators. Specifically, the goal was to reveal the semantic relations prevalent across languages at early MLU (Mean Length of Utterance) defined stages of language development. The primary data were gathered from spontaneous conversations within natural environments of children

exhibiting similar MLU values. The various languages studied were American, English, Finnish, Swedish, Samoan, and Spanish. When Brown (1973) described the children's utterances according to their semantic relations, it was revealed that a small set of the same relations were expressed by children acquiring the specified languages. Brown listed his minimal two-term semantic relations as follow:

1. agent + action
2. action + object
3. agent + object
4. action + location
5. entity + location
6. possessor + possession
7. entity + attributive
8. demonstrative + entity

These eight basic semantic relations accounted for about 70% of most of the children's utterances, and they were defined semantically, rather than syntactically. That is, there existed no syntactic ordering of these relations. For example, agent + action could also occur as action + agent during a child's early utterance.

Bowerman (1973) argued that the universality of these globally defined semantic relations could serve as the basis for children's independent syntactic development of various language stemming from a universal semantic base.

Arguments for Linkage Between Language Acquisition and Cognition

The evidence that the distribution of children's syntactic forms is determined by the underlying meaning relations prompted questions about the origin of these meanings. That is, if language acquisition is derived from learning, then what is meaning derived from? As

meaning referred to that part of cognition which could be coded by symbols, there arose a renewed interest in Piaget's theory of cognitive development for explaining the origin of meaning. This theory includes a hypothesis about "abstract organizational patterns" created from interaction with the environment (Rice, 1983, p. 348). Piaget believed these cognitive patterns follow a universal development in children (Rice, 1983). It was hypothesized that if language were derived from meaning and meaning were derived from cognition, then language may be derived from cognition.

To support this hypothesis, investigators began to search for evidence demonstrating that language and cognition were linked. This search produced a wide range of results. For example, Slobin (1973, cited in Rice, 1983) observed that children produced new forms to express old meanings and old forms to express new meanings. This type of evidence provided an argument for a strong relation between cognition and language by indicating that children must have meanings in place before they use forms to code the meanings.

However, other investigators (e.g., Casby & Ruder, 1983) observed that first word combinations emerged at the same time as symbolic play. The simultaneous emergence of cognitive and linguistic skills suggested that cognition did not necessarily emerge before language nor did language emerge before cognition. These correlational data provided an argument for a more parallel relationship between cognition and language.

Other observations suggested only a weak link between cognition and language. For example, synonyms are created and used to express

identical meanings--laugh, giggle, roar, chortle, snicker, cackle, break up, split one's sides, and roll in the aisle--all express the same meaning. As another example, a child may have called himself by his name and later refer to himself as "me" or "I" (Cromer, 1976, cited in Rice, 1983). These illustrations suggest that while cognition appear to be the basis for some primary linguistic forms, cognition may not be the basis for all forms children acquire.

Additionally, some observations suggested the relation between cognition and language was more linguistically based. For example, Schlesinger (1982, cited in Rice, 1983) observed that children's general meanings about the world become more specifically shaped and better anchored as they linguistically code the meanings and receive linguistic feedback. This supported the theory that cognitive meanings are anchored through language.

It is clear that the literature varies on the issue of linkages between cognition and language. These various proposals range from a strong to a weak link, and from cognition anchoring language to language anchoring cognition. While these discrepancies remain, the fact that a link exists is generally agreed on. For a more critical discussion of supportive evidence for linkages, see Rice (1983) and Rice and Kemper (1984).

Implications of the Language and Cognition Link for Language Impaired Children

The notion that critical links exist between normal language acquisition and cognition led to the hypothesis that failure to acquire language normally is linked to cognitive impairment. This

reasoning was pursued in two categories of studies. The first category sought to examine closely the cognitive performances of language impaired children who had been judged as having normal nonverbal intelligence, and the second category sought to examine the semantic categories produced by language impaired children.

Examining the Cognitive Performances of Language Impaired Children with Normal Nonverbal Intelligence

The suggestion that specifically language impaired children have cognitive deficits conflicts with the traditional notion that such language impaired children exhibit normal nonverbal cognition. This traditional notion has been supported by the observation that normal range scores are received by language impaired children on conventional cognitive tests, such as the Leiter International Performance Scale (LIPS) (Leiter, 1959).

However, studies have begun to show that such language impaired children exhibit cognitive deficits on nonconventional cognitive tasks. These investigations have compared language impaired children varying in age from 32 months to 12 years with their chronological age matched normal peers. All of these children had performed within normal range on various widely used intelligence tests, such as the LIPS (Leiter, 1959). Language impaired groups have performed poorer than the normal groups on the nonverbal cognitive tasks in the areas of symbolic and imaginative play (Udwin & Yule, 1983; Terrell et al., 1984), anticipatory imagery abilities (Johnston & Savich, 1984), mental rotational abilities (Johnston & Weismer, 1983), and cognitive and semantic processing (Wren, 1982). The results of this research

suggested that children with verbal deficits also possessed coexisting nonverbal cognitive deficits.

However, if these children did have cognitive deficits, the question arose as to why they scored within the normal range on the traditionally used intelligence tests. Johnston (1982) speculated that the widely used intelligence tests were not sensitive enough to reveal the nonverbal cognitive deficits of language impaired children. This claim motivated her review of the LIPS. Johnston observed that the items of the LIPS appeared to consist of two groups: the perceptual items and the conceptual items. She hypothesized that the language impaired subjects would perform better with the perceptual items, and that they would differ in performance from the normal children in both the number and types of items passed. What she observed, however, was that the first hypothesis, and not the second hypothesis, was confirmed by her observation. She proceeded to argue that it would be inappropriate to label children who received scores in the normal range as possessing "normal nonverbal intellectual functioning" and acknowledged that "a child who succeeds in perceptual tasks may or may not show equivalent levels of development in other areas of cognition" (p. 295). Finally, Johnston suggested it would be appropriate to conclude that the children who receive scores within the normal range on the LIPS demonstrated only that they have age-appropriate visual perceptual processing for static events.

In summary, in the first category of studies, the literature demonstrated that language impaired children may have had deficient

nonverbal cognition which is not detected by widely used intelligence tests, such as the LIPS.

Studies Examining the Semantic Categories Produced by Language Impaired Children

The second category of studies compared the semantic relations produced by normal and language impaired children. The population observed in this category of studies also consisted of language impaired children who received scores within the normal range on conventional intelligence tests. In addition, some of the population in these studies included mentally retarded language impaired children. In all of these studies, the investigators compared various groups of language impaired children with their MLU-matched peers. The children generally ranged in utterance length from 1 to 3.6 morphemes.

By comparing normal children to language impaired children, these studies provided implicit evidence for cognitive deficits among the language impaired. Assuming that semantic relations reflect the cognitive organization of experience, the presence of a cognitive/ representational deficit is implied when the full complement of syntactic relations expected at a given age are not represented in impaired language. The following is a description of some of the studies which fall into this category.

Freedman and Carpenter (1976) investigated two-word utterances of language impaired children and normal children matched at the same linguistic level (Brown's Stage I level of linguistic development). They were compared on their use of ten basic semantic relations:

agent + action	possessor + possession
action + object	entity + attribute
agent + object	introducer + entity
action + location	more + entity
entity + location	negation + entity

Type-token ratios for each semantic relation were used to compare the productions of semantic relations between groups. A significant difference was obtained for only one relation, with the language impaired group demonstrating greater diversity in the use of the introducer + entity relation. The investigators concluded from their findings that at the Stage I level of linguistic development, language impaired children demonstrated a linguistic system no different from the system of normal Stage I children.

Duchan and Erickson (1976) conducted another study in which semantic relations were presented in different verbal contexts (expanded, telegraphic, and nonsense) to normal developing and mentally retarded language impaired children matched on their MLU's (between 1 and 2.5). The semantics used in this study were agent + action, action + object, possessives, and locatives. They found no significant differences between the performance of the two groups on the verbal comprehension task.

Leonard et al. (1976) examined semantic relations reflected in language usage as a function of chronological age (3 and 5 years) and linguistic status (normal and language disordered). They discovered that the language impaired children expressed the same relational meanings as their MLU and age matched normal controls. They

interpreted their results as supporting the notion that the language disordered group reflected semantic relations consistent with an earlier level of development.

Coggins (1979) explored the early two-word utterances from Down's syndrome children to determine whether they encode the same relational meanings as children developing normally. Nine semantic categories were used to classify the subjects' two-word constructions:

demonstrative + entity	negation + entity
agent + action	action + object
agent + object	action + locative
entity + locative	possessor + possession
entity + attribute	

Coggins suggested that Down's children concentrate on the same set of relational meanings as normal children.

Fokes and Konefal (1981) researched normal and language impaired children's ability to produce sentences containing specific semantic case relations under two conditions (manipulation and observation conditions). The three groups of subjects consisted of normal children with a mean age of 3;6 years, normal children with a mean age of 5;6 years, and language impaired children with a mean age of 7;0 years. The language impaired group was operating minimally at an educable level on the Wechler Intelligence Test and demonstrated measured MLU's from 1-3.6 morphemes. No attempt was made to obtain scores for mental age.

Manipulation and observation tasks were used to obtain sentences containing the agent + action + object + locative semantic case relations. The language impaired group demonstrated productive usage of all four of the semantic notions, but they had a tendency to produce more single- and two-word utterances. Their production of four-case relation strings increased with the manipulation task. The relations used most frequently by the language impaired group when producing two-word utterances were: action + locative, action + object, and object + locative.

In summary, these comparative studies of language impaired children and their MLU matched peers, collectively, revealed that language impaired children represented the same major categories of semantic relations in their language as normal children. This was true both in the case of the specifically language impaired children and the mentally retarded language impaired children. However, it should also be noted that only a small number of studies compared the semantic relations produced by children. In fact, the five studies just reviewed comprise a large fraction of the existing studies of semantic relations in clinical groups.

Statement of the Problem

In the background section, it was shown that the focus on the semantic features of the language impaired and the accompanying cognitive implications reflected the same focus observed in the literature regarding normal language acquisition. It appears that the literature on language impaired children, which has grown out of

this shift, leads to conflicting positions about the relation between language and the nonverbal cognition assumed to underlay it. The results of the first category of studies suggest that some nonverbal cognitive deficits may be present in language impaired children. However, to the extent that semantic knowledge indexes cognitive representation in normal and language impaired children, it may be inferred from the results of the second category of studies, that these children are essentially equal in nonverbal cognition. This discrepancy indicates the need for further investigation that could reveal the possible linkages between the language performances of language impaired children and their underlying cognition.

There are several possible explanations for why studies of semantic relations have not yielded the same outcomes as the more direct studies of cognitive performances. First, there may be no link between semantic knowledge and cognition; and consequently, cognitive and semantic knowledge may exist as two separate domains of knowledge or skill. Therefore, an existing nonverbal cognitive deficit need not show up as a semantic relational deficit.

Another possibility, which provided the focus for this research, was that the cognitive differences between normal and language impaired children may have existed, but were not revealed because of the global nature of the meaning relations studied. The meaning relations were primary and universal, and they referred only to very broad referent categories. To the extent that these categories are basic and universal, any child could be expected to exhibit them. Stockman (1986) observed,

> Children all over the world probably use their language to reflect their experiences with moving versus nonmoving objects. The notion of universality leads to the expectation that any child's language will reflect such basic semantic features if they tap something that is basic to human representation (p. 1).

As semantic relations coded only very broad cognitive concepts, they may not have revealed the more specific concepts occurring within each relation. Consequently, children who are cognitively different on a specifically defined semantic task may not appear different in their use of globally defined semantic relations. Other investigators have also observed that meaning relations have been described in terms which may be too general to capture developmental differences (Johnston, 1982; Stockman, 1986). For example, Johnston (1982) suggested,

> The taxonomies of meaning relations developed by Schlesinger (1974), Brown (1973), and Fillmore (1968) categorize only the broadest aspects of communicative intention. Applied to normal child language data, such systems have proved rather weak in capturing developmental trends (p. 787).

Also, Stockman (1986) observed that,

> Failure to reveal differences between normal and clinical children may be due partly to the use of a descriptive model that focuses observation on just the general features of meaning. Applying adaptations of case grammar notions (Bowerman, 1973; Bloom, Lightbrown, & Hood, 1975), semantic relational knowledge has been described in terms of broad referent categories (e.g., action, state, locative action, locative state, etc.) represented by two and three term semantic relations that are coded by the major syntactic constituents of early sentences (p. 1).

To further illustrate the global nature of semantic relations, it has been demonstrated that the broad semantic concepts, which served as the base for previous semantic relations studies, could be

divided into more specifically defined semantic subcategories. Stockman and Vaughn-Cooke (forthcoming; cited in Stockman, 1986) illustrated this point in the following examples:

> Consider locative action constructions. They refer to the displacement of objects from one spatial point to another. For example, the constructions, (1) The cat jumps down, (2) the cat jumps from the table, (3) the cat jumps onto the floor or (4) the cat jumps down onto the floor, are all locative action constructions, but they differ in the particular aspect of the locative event coded. Utterance #1 refers to locative direction of movement. Utterance #2 identifies the original place of movement; #3 focuses on locative destination whereas #4 refers to a combination of two of these features (p. 2).

The notion of semantic subcategories that more adequately characterize children's semantic representations is analogous to the more global category of "dog" having subcategories such as "Golden Retrievers," "Labrador Retrievers," and "Doberman Pinchers."

Other researchers also discussed semantic subcategories. For example, Olswang and Carpenter (1982a, 1982b) demonstrated a five-level developmental sequence for the cognitive notion of agent; Huttenlocher et al. (1983) defined eight subcategories of action; and Bloom and Lahey (1978) observed three subcategories of negation.

Therefore, while studies have demonstrated few differences between the language impaired and normal children in their productions of globally defined semantic relations, it was speculated that semantic differences may be revealed by using more detailed descriptive models of semantic representation. While this hypothesis provided the direction for this study, a more immediate consideration

was to determine an appropriate procedure for eliciting language that could test such an hypothesis.

Both standardized and nonstandardized approaches have been used to elicit language in clinical settings. The advantages and disadvantages of these two approaches were also observed by Bloom and Lahey (1978), Lucas (1980), and Mecham and Willbrand (1979). Standardized approaches provide procedures which are repeatable by more than one person. This is achieved by structuring the elicitation conditions, including the stimuli and the responses. However, the result is a rigid format for revealing linguistic knowledge.

More recently, nonstandard approaches have emerged in an attempt to provide an alternative to the structure exercised over the responses elicited from children. The goal of these approaches is to create an environment which places less control over the stimuli and the responses than the standard approaches. Therefore, the subjects are allowed to produce utterances of any form in an unrestricted manner.

Danwitz (1981) observed that both approaches have their advantages and disadvantages. Within a structured testing environment language performance does not reflect an accurate picture of a child's linguistic knowledge. Danwitz argued further that the child is limited by the context surrounding the testing. The environment does not allow the child to freely express experiences across various contexts. As a result, the nature and degree of a language disorder are not revealed.

However, nonstandard procedures also have disadvantages (Danwitz, 1981). For example, the language sampling procedure does not provide enough structure. As a result, factors influencing the elicited productions are not controlled. Such factors include the environmental setting where the testing occurs, the stimulus materials used, the topics of conversations, and the way in which the topics are discussed (e.g., object description, conversational, free play, etc.). Therefore, while the language sampling is not limited by structural constraints, the use of nonstandard elicitation procedures yield variable and unpredictable responses. The data are unpredictable because no constraints operate on the child to make the utterances predictable. For example, during unstructured language sampling, not even the topics of conversation are controlled. As a consequence, the sampling may not be completely representative of the child's linguistic knowledge. For example, consider the situation in which a child produces the word "up" during a sample, but not "down." It would be difficult to determine whether or not the child had "down" within his system if the context facilitating the production of "down" were never presented.

Advantages of each approach exist. The standardized approaches may be more successful than nonstandardized procedures in revealing the limits of linguistic knowledge. For example, if a subject does not produce "down" within a task, that probes the word "down," one might be more confident that the word is not known. On the other hand, failure to elicit "down" in a naturalistic context could be due to the lack of opportunity and not the unavailability of the form.

The direction of this investigation incorporated the two approaches by creating a structured elicitation task that systematically probed for existing linguistic knowledge while preserving the spontaneity of the responses elicited. This task was not too restricting in that the child was able to respond in an open-ended manner. However, there was enough structural context to guide the child in the direction of desired responses if he had knowledge to express them.

In sum, the general goal of this study was to pilot a standard protocol for eliciting a more detailed representation of children's locative expressions. Its effectiveness, practicality, and accuracy benefits were then weighted against the outcome of a spontaneous sampling procedure.

Semantic Category Targeted

Locative utterances were chosen as the test case for examining the efficacy of a structured elicitation procedure to reveal group differences for three reasons. First, an expanded descriptive model of locative subcategories was available for use. These subcategories (dynamic and static: origin, direction, and position) will be discussed in further detail in the following section.

Second, locative expressions are frequently the targets of language assessment and therapy. However, frameworks for assessing locative knowledge are undeveloped in two major ways. First, they have a global focus. For example, assessment of spontaneous language samples typically classify locative semantic relations using only

global definition (e.g., action + location or entity + location). Second, they present only a partial analysis of a child's locative system by focusing on a small subset of common locative words (see Stockman, 1985 for a review of lexical studies). As Stockman (1985) noted,

> Despite the relatively long research track record on normal children's locatives, the largest number of studies has focused on acquisitional meaning of small subsets of locative prepositions such as "in," "on" and "under"--typically in isolation of the broader semantic/syntactic context in which they occur. On the other hand, prepositional meaning has been ignored by the small set of studies that has focused on sentential locative meaning (p. 29).

Third, not many studies focusing on locative expressions of clinical groups have been conducted. Stockman (1985) observed that with the exclusion of the studies using mentally retarded subjects, just four studies were found which focused on children with a specific language impairment. These studies were Duchan and Siegel (1979), Leonard, Bolders, and Miller (1976), Freedman and Carpenter (1976), and Fokes and Konefal (1981). As noted previously, none of the studies employed a developmental focus, and all of them restricted observations to global locative categories.

Implications for Developing a Structured Task to Elicit Locative Utterances

Testing locative utterances using a structured elicitation task has clinical and theoretical implications. Theoretically, the data gathered can add to the body of literature concerning language impaired children's nonlinguistic cognition. For example, difference

found between the locative subcategory productions of the language impaired and normal children would support the theory that nonlinguistic abilities of language impaired children may not be within the normal range.

Clinically, an efficient method for gathering and analyzing such data may be developed. Its use on a larger scale could provide a more specific analysis of children's locative productions in clinical settings. Also, goals for treatment can be guided by the definition of normal developmental stages with the verification that such a stage model is applicable to impaired performance.

Purpose of the Study

The purpose of the study was to investigate the efficacy of a structured elicitation procedure in revealing differences between language impaired and nonimpaired groups within the locative domain. This investigation was guided by the following questions:

Research Question 1: Does a structured elicitation task reveal differences between normal and language impaired groups in:

a. the presence or absence of utterances in the two globally defined dynamic and static locative categories of meaning

b. the presence or absence of utterances in the more specifically defined subcategories of dynamic and static meaning: namely, static position, static perspective, dynamic origin, dynamic destination, and dynamic direction

c. the distribution of words elicited within each of the specifically defined locative subcategories, and

d. the appropriateness and specificity of responses elicited for the specifically defined locative subcategories?

Research Question 2: Do the results of the structured task parallel the content of the language sampling in:

a. the number and type of locative subcategories evidenced, and

b. the distribution of words within each locative subcategory?

CHAPTER II

REVIEW OF LITERATURE ON SUBCATEGORIES OF LOCATIVES

The purpose of this literature review is to provide the reader with more detailed information about the prior investigations that have focused on locative subcategories, particularly as considered from a semantic relational perspective. While this is a relatively new area, the literature review provides a framework for the kind of research that is proposed. The locative subcategories are defined within this section.

Background History of Locative Subcategories

Leech (1970) described locative subcategories demonstrated in the adult English language. He described the various ways provided by the language for coding static locations (i.e., locations not involved with movement). They include reference to position and dimensionality, relative position, extremities and parts of locations, compass points, and orientation.

When describing location with respect to movement, Leech explained that the movement must be discussed in terms of a goal. For example, "He is coming" refers to movement; but is not associated with a goal, and therefore, is not identified as locative. However, if the words "here" or "to the store" were added (i.e., "He is coming to the store"), then this movement is associated with a goal, and

would be identified as a locative. These particular movement locatives are referred to as "dynamic."

Leech made note that dynamic locatives can be viewed "in two lights: as a transition into a state, or as a transition out of an opposite state" (p. 194). This means that movement locatives can refer to either the origin from which the movement is taking place (i.e., He jumped from the house), or the destination to which the movement is arriving (i.e., He jumped onto the table). Leech also noted that a path of a movement can also be described in the English language (i.e., The boy walked in front of me). The path is neither the origin nor destination of the movement. Finally, Leech discussed resultative position which he defines as "static position resulting from movement." He used "The picture is off the wall" or "He's just out of jail" as examples (p. 194). Leech suggested these examples were static and dynamic locatives occurring in combination.

Following Leech, Bloom and Lahey (1978) describe the semantics relating children's language in terms of dynamic and static locative meaning. The definitions separating the dynamic and static locatives were similar to those of Leech. The distinction was based on the presence of a movement or nonmovement verb when a locative preposition or adverb was being used. In the four children used as subjects, they observed that two of the children encoded dynamic locatives before static. The other two children already had both types of locatives at the time of observation.

Unlike Leech, Bloom and Lahey did not identify utterances referring to locative paths, destinations, or origins. However,

other research did observe some of these more specific locative subcategories. Macrae (1976) investigated locative words used to complement diectic movement verbs (go and come). The subjects were seven children ranging in age from 1;3 to 2;9. They were visited weekly in their home, and their spontaneous utterances and the nonlinguistic contexts were recorded. Macrae noted "The children paid little attention to destinations . . . they took account of direction (coming up) without committing themselves to the termination of the movement" (cited in Stockman, 1985, p. 203). Also, Bowerman noted in her study of two Finnish children that "locative nouns never named a location away from which the referent was moving" (1973, pp. 108-109). More recently, Stockman and Vaughn-Cooke (1983, 1984) observed and defined eight locative subcategories. The results of their research, which provides the model for this study, is summarized in more detail in the following section.

Dynamic and Static Locative Subcategories in Normal Language Acquisition

Stockman and Vaughn-Cooke (1983, 1984; cited in Stockman, 1985) investigated eight subcategories in a preliminary study of 12 working-class children who were observed during natural play activities at home. Their descriptive framework followed the basic locative distinctions in the adult language described by Leech (1970) and Bennett (1975) (cited in Stockman, 1985). A dynamic and static locative expression can exist in terms of the following meaning subcategories:

1. Static origin (e.g., he is off the house)
2. Static direction (e.g., the cat is down from here)
3. Static destination (e.g., it is on the table)
4. Static combinative (e.g., it's down on the table)
5. Dynamic origin (e.g., he jumped off the house)
6. Dynamic direction (e.g., the cat jumps down)
7. Dynamic destination (e.g., I set it on the table)
8. Dynamic combinative (e.g., I set it down on the table)

Stockman and Vaughn-Cooke's subjects were subdivided evenly into three separate groups according to age (1;6, 3;0, and 4;6 years). The children were observed for two hours in their respective home settings. Their language samples were video recorded, and later their utterances were extracted and recorded on paper. The locative utterances were identified, and the contexts in which these utterances occurred were recorded.

Their first major finding was that the younger subjects (1;6 years) referred only to locatives within the dynamic context, whereas the older subject groups (3;0 and 4;6 years) produced locatives within both the dynamic and static locative contexts. These findings were consistent with Bloom, Lightbown, and Hood (1975).

The investigators observed further that the locative words used in the two contexts (static vs. dynamic) differed, depending on the child's age. Certain words, such as "up" and "down," were used within the dynamic context almost exclusively at the younger ages (1;6 and 3;0 years) whereas other words, such as "behind" and "under," were used mainly within the static locative context. The

older subjects began to use a particular word within both static and dynamic contexts.

The investigators also noted "that the distributional cluster of locative words seemed to reflect shared semantic fields" (Stockman, 1985, p. 31). For example, at the earliest ages, the words reflecting the dynamic locative notion appeared to code directionality or orientation of movement (e.g., the ball is going up, the ball is coming down). With the older subjects, the dynamic expressions also included a group of words that referred to positionality (e.g., behind and under). Furthermore, these positional words coded the destinative aspects of the movement (e.g., the doll is being put on the table; the ball is landing in the pool).

Developmentally, Stockman and Vaughn-Cooke found that the locative expressions advanced from almost exclusive usage of dynamic locative utterances to the additional use of static locative utterances. They found within the dynamic locative context that the subcategory of locative origin and direction emerged earlier than that of locative destinative position. Also, single category expressions appeared before combinative category expressions. Within the static locative context, the emergence of locative concepts occurred in the order of positional locative expressions, combinative, directional, and finally, original locative expressions.

CHAPTER III

EXPERIMENTAL PROCEDURES

Subjects

Subject Description

The study included six male children in the age range of 6;7 to 7;5. Three of the subjects were language impaired and three were normal controls matched by chronological age. The subject characteristics are presented in Table 1, and are more completely described in Appendix A. The subjects were selected from low income backgrounds, as indexed by parental occupation and estimations of associated incomes. They were chosen from existing school populations of Lansing, Michigan, and had no frank neurological insult or physical, sensory, or motor disabilities, as indicated by clinical records or parental reports. No severe difficulties were observed with the subjects' oral periphery, verbal and nonverbal behavior, such as speech intelligibility, vocal attributes, or response to verbal commands as determined by the investigators' subjective judgments during the screening session (see Phase 2 of Screening Selection section in this chapter).

The subjects had no history of chronic ear infections as determined by parent interviews. The research was approved for use

Table 1

Subject Characteristics

	LI Subjects			N Subjects		
	S_1a	S_2a	S_3a	S_1b	S_2b	S_3b
Age	6;10	6;7	7;4	6;9	6;11	7;5
Race	black	white	white	black	white	white
MLU	4.0	7.0	3.7	3.7	8.0	7.4
NSST:						
expressive-	<10%	>25% <50%	<10%	25%	>25% <50%	<10%
receptive-	10%	>25% <50%	<10%	<25%	<25%	<10%
LIPS	>6;0	>6;7	5;3	>7;3	>7;3	>7;6
TOLD	below average	below average	below average			

Note: Five of the subjects tested through appropriate ages on the Leiter International Performance Scale and upper boundaries were not obtained. Test of Language Development results indicate composites scores. LI = language impaired; N = normal; MLU = mean length of utterance measured in morphemes; NSST = Northwestern Syntax Screening Test; LIPS = Leiter International Performance Scale; TOLD = Test of Language Development.

of human subjects by the Michigan State University committee on human subjects (see Human Subjects' Affidavit, Appendix B).

The normal subjects tested at age appropriate levels on the Leiter Internal Performance Scale (LIPS), a nonverbal intelligence test, and had no reported history of speech-language impairment or therapy. Their Northern Syntax Screening Test (NSST) scores ranged from below the 10th percentile to between the 25th and 50th percentiles expressively and from below the 10th percentile to below the 25th percentile receptively. Their mean length of utterance (MLU) as measured in morphemes ranged from 3.7 to 8.0.

Two of the language impaired subjects tested at age appropriate level on the LIPS. One subject received a Leiter IQ score of 5;3 (approximately two years below his chronological age). The language impaired subjects' NSST scores ranged from below the 10th percentile to between the 25th and 50th percentile on both expressive and receptive measures. Their MLU scores ranged from 3.7 to 7.0. Language impairment status was judged by one school clinician whose language program the subjects were enrolled in. The clinician based her judgment partly on scores from the Test of Language Development (TOLD). Composite TOLD scores as reported by the school clinician ranged from 1% to 63% (mean = 18%). Two of the subjects had some difficulty with tongue control on the oral peripheral examination. Previous history of ear infections ranged from one to four infections.

It can be noted that there was a wide range of variability within each group and that group NSST scores overlapped. Given the

practical time span in which to choose subjects, children were chosen as they became available to participate. As a result, few of the identified children actually met criterion for participation in this study.

Subject Selection Procedures

Subject selection involved two phases of screening activity. The goal of the first phase was to identify clinical and nonclinical children who could serve as potential subjects. The goal of the second screening phase was to aid in selecting the most appropriate subjects. Three graduate students of Michigan State University's Speech-Language Pathology program were instructed about the screening procedures and shared in conducting the screening activity.

Phase 1 of Screening Activity

The first phase of the screening activity involved the classroom teachers and speech-language pathologists in the Lansing School District. (See Lansing Public School District Project Approval Form in Appendix C.) It was requested that they complete a brief questionnaire (see sample in Appendix D) on every child in the age ranges of interest. The classroom teachers restricted questionnaire information to children who have never been referred to speech therapy or special education classes. The speech-language pathologists completed questionnaires for the language impaired children.

The questionnaire required yes/no responses to questions about demograhic features (e.g., age, sex, educational placement, health, history, and socioeconomic status), professional judgments, and

access to the child's school records. From the questionnaire data, children were randomly selected for further screening in the second phase. The children's identity remained anonymous to the investigators responsible for determining the pool of potential subjects.

Phase 2 of Screening Activity

The second phase of screening activity involved the administration of the NSST and the LIPS (refer to test screening forms in Appendix E). The LIPS was administered because it (a) has been used frequently by investigators of language impairment, and (b) is assumed not to penalize intelligence scores. Therefore, the use of the LIPS in this study permitted the selection of subjects who were comparable with those used in other studies. The NSST was used because it is a quick measure of receptive and expressive linguistic abilities.

In addition, a language sample of at least 50 utterances was collected; and an informal observation of body structure integrity was conducted to assist in subject selection. The informal observation included the oral periphery, verbal and nonverbal behavior, such as speech intelligibility, vocal attributes, and response to verbal commands as determined by subjective judgments. A standard checklist was used for the purpose of applying the same core of observations to each child screened (see test screening forms in Appendix E).

The testing during this phase was conducted in the home environment. Written parental consent was obtained prior to investigator contact (see parental consent form in Appendix F). Language impaired subjects were selected first. Then an attempt was made to select normal children who were comparable, except for language status.

Description of Stimuli and Tasks

Responses were elicited under two conditions. First, a structured task was used to elicit locative responses in a standard way. Second, a language sample was obtained to observe spontaneous locative responses. The language sample was taken for the purpose of validating the results gathered from the structured task. In the following section, the structured elicitation task is described first, and the spontaneous language sampling procedure is described second.

Operational Definitions of Locative Subcategories Targeted

As reviewed in the literature, Stockman and Vaughn-Cooke (1983, 1984; cited in Stockman, 1985) described eight locative subcategories. Four of these subcategories were dynamic, and four were static in nature. Of these eight subcategories, five were targeted (static locative position, static locative perspective, dynamic locative origin, dynamic locative direction, and dynamic locative destination) during this investigation. Operational

definitions for the dynamic and static subcategories targeted appear in Tables 2 and 3, respectively.

Description of Structured Task

Twelve stimulus events were constructed to elicit spontaneous responses that reflected the five categories of dynamic and static locative meanings. The twelve events required the child to attend to a simulated landscape scene with movable objects that included a dog, a bone, and two to three doghouses. The landscape scene, made of plaster, contained a hill, a tunnel, and a river. Props, such as trees and fences, were included on the scene. This scene was mounted on a 32 x 48 plywood base, and was positioned on plastic boxes about 12 inches from the floor. This height allowed the child easily to touch and manipulate the props.

The task required the child to attend to the stimuli placed on the landscape scene. He was asked to describe the locative position of the dog with respect to the doghouses and the bone in response to various questions that related to each stimulus event. The events were engineered to elicit particular types of locative responses as described in the succeeding sections.

Criteria for Constructing Events

Two factors were considered in structuring the events. First, the events were structured to evoke particular subcategories of locative utterances in response to standard questions. The question-response format is discussed in the next section.

Table 2

Operational Definitions and Linguistic/Contextual Criteria Used to Assign Utterances to the Global Category of DYNAMIC LOCATIVE UTTERANCES

Locative Category	Operational Definition	Linguistic Criteria	Contextual Criteria	Examples
Dynamic Locatives	Locative reference specifies change in the location of an object as a result of some movement.	Single locative word or syntactic frame which includes a motion verb + locative complement. May be a phrase or a single lexical form.	The referent object is displaced or can be displaced during the speaking event.	They are going down. You go in (to) the store. They are going from home.
Dynamic Direction	Locative reference specifies the orientation of an object along a spatial path of movement.	Single locative word or a syntactic frame which includes a motion verb + locative complement; the locative complement has the semantic feature of direction.	The directional plane referred to is evident from the movement of the object or the referent object can move in the spatial direction referred to.	They are going down. Put it across the table.
Dynamic Destination	Locative reference specifies the place or point to which an object is displaced; i.e., the destination of a displaced object.	A single locative word or a syntactic frame which includes a motion verb + locative complement; the locative complement has the semantic feature of direction or path to + place.	The referent object is displaced to an observable position at the time of the utterance or it can be displaced to the referred place or site.	You go in (to) the store. Put it on the table.
Dynamic Origin	Locative reference specifies the place or position in space from which the referent object is displaced.	A single locative word or a syntactic frame which includes a motion verb + locative complement; the locative complement has the feature of direction or path from + place.	The direction and place of referent object's location is or can be away from the place or site referred to.	They are going from home. I took it off.

Source: Stockman, I. J. (1985). Locative Distinctions of Normal and Clinical Children, p. 44. Grant Application, Michigan State University. Submitted to the National Institutes of Health. Adapted with permission.

Table 3

Operational Definitions and Linguistic/Contextual Criteria Used to Assign Utterances to Global Category of STATIC LOCATIVE UTTERANCES

Locative Category	Operational Definition	Linguistic Criteria	Contextual Criteria	Examples
Static Locatives	Locative reference specifies existing location of object, without reference to the movement that may have resulted in the location.	Single locative word or syntatic frame which includes a nonmotion verb + locative complement; the locative complement may be a phrase or single lexical form.	The referent object is not displaced or relocated during the speaking event.	They are down. You are in the stove. They are from home.
Static Perspective	Existing location specified in terms of the spatial path of another object.	Single locative word or syntactic frame which includes a nonmotion verb + locative complement; the complement has the semantic feature of position and directional orientation.	The referent object is placed or can exist at a site specified by the path marker.	They are down. It is across the table.
Static Position	The existing place or point at which an object is located.	Single locative word or syntactic frame which includes a nonmotion verb + locative complement; the complement has the semantic feature of place.	The referent object is already placed at an observable site at the time of the utterance or it can exist at the referred site or place.	You are in the stove. It is on the table.

Source: Stockman, I. J. (1985). Locative Distinctions of Normal and Clinical Children (p. 43). Grant Application, Michigan State University. Submitted to the National Institute of Health. Adapted with permission.

Second, the events were structured to sustain the child's maximum attention by using appropriate and interesting stimuli, and minimizing the time spent on the tasks associated with each event. In order to use appropriate and interesting stimuli, the chosen props were manipulable. For example, the dog was a popular product of a leading manufacturer, and had movable extremities. During pilot testing in the Summer of 1986, it was observed that the task stimuli, including the dog, the bones, and the landscape scene stimulated the children's interest.

To reduce the time needed to obtain targeted responses, multiple locative subcategories were tested within an individual event. For example, the locative subcategories of static position, dynamic origin, dynamic direction, and the dynamic destination locatives were collectively targeted within one event as described in the following sections.

Description and Presentation of Events

The twelve stimulus events were defined by a particular locative position of one or more props on the landscape scene. The events were divided evenly among two series of tasks (A series and B series), each targeting six events. The A and B series differed from each other in a variety of ways. First, they differed in the number and type of subcategories targeted.

The A series targeted the locative subcategories of static position, dynamic origin, dynamic direction, and dynamic destination

locative subcategories. The B series targeted the static direction perspective subcategory only.

Also, they differed in the type and manipulation of the stimuli as described as follows:

1. Type of stimuli: The A series used a dog, bone, and one to three houses. The B series used only a dog and a bone.

2. Manipulation of stimuli: The A series varied the positions of both the dog and the bone across each of the six events presented. Within the B series, the bone remained in the same position in five of the six events presented, whereas the dog changed positions for each event.

For the B series, the bone did not change positions because the locative target was defined by the change in spatial perspective relative to the dog's position. That is, the changing position reflected the changes in the directional paths formed between the dog and the bone. A more complete description of each series follows.

To orient subjects to the stimuli, they engaged in about 10 to 15 minutes of spontaneous play prior to the actual testing. During this time, the subjects were familiarized with the objects used on the set, thus minimizing the effect of object unfamiliarity on task performance. The subjects were then oriented to the events through a phrase such as "OK, now I'm going to put the dog and bone in different places, and I want you to answer some of my questions." The testing then began. No training events were used to familiarize the subjects with the procedures. It is later recommended that such events be presented.

Description of events IA-VIA. Table 4 identifies events IA-VIA. Events IA-VIA were developed to target the following sets of locative words from their respective locative subcategories as shown in Table 5.

Each event targeted dynamic and static positional locative words (e.g., front, in, back, under, between, and on) corresponding to the position of the dog and bone(s), as well as directional locative words (e.g., along, up, around, across, down, and through) corresponding to the possible path that the dog's movement could take when going from the existing doghouse position to the position of the bone or another house. Thus, multiple responses representing different locative subcategories were targeted in each event as further illustrated in Table 4 (e.g., event IA targeted front and in within the positional subcategories of SPOS, DDEST, and DO, and along within the DDIR directional subcategory). Events IA-VIA targeted words in four major categories of meaning: static locative position; dynamic locative origin; dynamic locative direction; and, dynamic locative destination.

During the testing activity of events IA-VIA, the child was asked questions designed to elicit the targeted locative words (refer to Table 4). For example, consider the presentation of stimulus event IA. The targeted locative words and their respective locative subcategories for this event are shown in Table 6.

The stimuli used for this event were two identical doghouses, a dog, and a bone. The two doghouses were placed beside the same bank of the river, and approximately twelve inches apart with their

Table 4

Table 4

Description of A Events

Event	Position of Dog	Position of Bone	Target Locative Word	Target Locative Subcategory	Question Asked Subject to Prompt Locative Response
IA	front of doghouse at back of scene, left of river (doghouses are facing each other)	inside of doghouse at front of scene, left of river	front	SPOS	1. Where is the dog?
					2. How did the dog get his bone?
			in	DDEST	3. Where did he go to?
			along	DDIR	4. Where did he walk?
			front	DO	5. Where did the dog come from?
IIA	in doghouse at bottom of hill left of river (doghouses are facing each other)	on doghouse at top of hill left of river	in	SPOS	1. Where is the dog?
					2. How did the dog get his bone?
			on	DDEST	3. Where did he go to?
			up	DDIR	4. Where did he walk?
			in/out	DO	5. Where did the dog come from?
IIIA	behind doghouse at right side of hill	behind doghouse at front of hill	behind	SPOS	1. Where is the dog?
					2. How did the dog get his bone?
			behind	DDest	3. Where did he go to?
			around	DDIR	4. Where did he walk?
			behind	DO	5. Where did the dog come from?

Table 4 cont.

Table 4

Description of A Events (Continued)

Event	Position of Dog	Position of Bone	Target Locative Word	Targer Locative Subcategory	Question Asked Subject to Prompt Locative Response
IVA	under the doghouse at front of scene, left of river (fences are placed between the doghouses such that the dog must cross the fence to get his bone)	between two doghouses at back of scene, left of river	under	SPOS	1. Where is the dog?
					2. How did the dog get his bone?
			between	DDEST	3. Where did he go to?
			across	DDIR	4. Where did he walk?
			under	DO	5. Where did the dog come from?
VA	between doghouse on top of hill	front of doghouse at bottom of hill	between	SPOS	1. Where is the dog?
					2. How did the dog get his bone?
			front	DDEST	3. Where did he go to?
			down	DDIR	4. Where did he walk?
			between	DO	5. Where did the dog come from?
VIA	on the doghouse at front entrance of tunnel (right of river)	under the doghouse near bridge left of river	on	SPOS	1. Where is the dog?
					2. How did the dog get his bone?
			under	DDEST	3. Where did he go to?
			through	DDIR	4. Where did he walk?
			on	DO	5. Where did the dog come from?

Note. The first follow-up question for all main questions is "Can you tell me using other words?" then the main question is repeated. Question 5 has a second follow-up question which is "Where was the dog?"

SPOS = Static position, DO = Dynamic origin, DDIR = Dynamic direction, DDEST = Dynamic destination

Table 5

Locative Words Targeted for Each Locative Subcategory Within the A Events

Event	Static Locative Position	Dynamic Locative Destination	Dynamic Locative Direction	Dynamic Locative Origin
IA	front	in	along	front
IIA	in	on	up	in
IIIA	back	back	around	back
VA	between	front	down	between
VIA	on	under	through	on

Table 6

Locative Words Targeted for Each Locative Subcategory Within Event IA

Target Locative Word for Event IA	Target Locative Subcategory for Event IA
front	static locative position
inside	dynamic locative origin
along	dynamic locative direction
front	dynamic locative destination

doorways facing each other. This arrangement was intended to create an inherent path along the river between the houses. This path was designed to elicit the word "along" upon questioning of the child. To elicit the locative words "front" and "inside," the dog was placed in front of one doghouse, and the bone was placed inside the other doghouse. The following prototype dialogue occurred between the investigator (I) and the child (C):

Dialogue	Target Locative Words and Subcategory intended by Investigator's Question
I: Where is the dog.	front--static position
C: The dog is in front of the doghouse.	
I: Move the dog to his bone.	
C: (Moves the dog from the front of one doghouse to inside the other doghouse where the boneis.)	
I: What happened:	any word--any subcategory
C: I moved the dog to his bone.	
I: Where did he go to?	in--dynamic destination
C: He went in the house.	
I: Where did he walk?	along--dynamic direction
C: He walked along the river.	
I: Where did he come from?	front--dynamic origin
C: He came from the front of his house.	

The investigator's questions were engineered such that if the child did not respond with the targeted locative word, a follow-up

question was asked. This question followed the subject's response and began as, "Can you tell me using other words?" The original question was then repeated. All questions followed the same format, except the last one. The last question flowed as follows:

Question: Where did he come from?

Subject: Insufficient response

Question: Can you tell me using other words? Where did he come from?

Subject: Insufficient response

Question: Where was the dog?

Subject: Responds

Consider the following scenario where all the follow-up questions were asked:

Dialogue	Type of Question	Target Word/ Target Subcategory
I: Where is the dog?	Main	front/SPOS
C: Right there.		
I: Can you tell me using other words? Where is the dog?	Follow-up	
C: The dog is in front of the doghouse.		
I: Move the dog to his bone		
C: (Moves the dog from the front of one doghouse to inside the other doghouse where the bone is.)		

Dialogue	Type of Question	Target Word/ Target Subcategory
I: How did the dog get his bone? C: I moved the dog to his bone.	Main	any word/ any subcategory
I: Where did the dog go to? C: I moved him there I: Can you tell me using other words? Where did he go to? C: He went in the house.	Main Follow-up	in/DDEST
I: Where did he walk? C: He went here to here to here I: Can you tell me using other words? Where did he walk? C: He walked along the river.	Main Follow-up	along/DDIR
I: Where did he come from? C: He came from his doghouse. I: Can you tell me using other words? Where did he come from? C: From right there. I: Where was the dog? C: He came from the front of his house.	Main Follow-up Follow-up	front/DO

After the subject was given the last follow-up question, questioning continued to the next main question: whether or not the child responded appropriately.

The presentation format allowed the investigator to delete main questions from the dialogue when a targeted locative form was

provided in response to an earlier question. Consider the following illustration for event IA:

I: How did the dog get his bone?

C: The dog went (from in front of the house), (along the river), (to inside the house).

The child responded with locative words relating to the subcategories of (1) dynamic locative origin (from in front), (2) dynamic locative direction (along), and (3) dynamic locative destination (to inside). Since the remaining questions were intended to target these last two locative subcategories, they would have been deleted and the testing continued to event IIA.

In summary, there were six "A" events (IA-VIA). Each event was developed for the purpose of targeting locative words representing four different locative subcategories (static locative position, dynamic locative origin, dynamic locative direction, and dynamic locative destination). Therefore, for each of these four subcategories, six locative words were targeted, creating the possibility for a total of 24 locative responses.

Description of events IB-VIB. Events IB-VIB were developed to target the category of locative utterances having static perspective meaning (refer to Table 7). This category targeted responses coding the static position of an object from the directional perspective of another object. For example, the subject could describe the bone's position (which remains constant) as being "down the hill" or "up the hill" with respect to the dog's changing position. In a more

Table 7

Table 7

Description of B Events

Event	Position of Dog	Position of Bone	Target Locative Word	Target Locative Subcategory	Question Asked Subject to Prompt Locative Response
IB	front of hill right side of scene	back of scene next to tunnel entrance	around	SPERSP	Tell the dog where his bone is.
IIB	on top of hill	unchanged	down	unchanged	unchanged
IIIB	below landscape scene on floor	unchanged	up	unchanged	unchanged
IVB	front of scene next to tunnel entrance	unchanged	through	unchanged	unchanged
VB	left of river	unchanged	across	unchanged	unchanged
VIB	back of scene near bridge	bones spread along river	along	unchanged	unchanged

Note: The follow-up question is "Can you tell me using other words?" The original question would then be repeated. The follow-up question is the same for each event.

SPERSP = Static Perspective.

familiar context, one might state the university's position (which remains constant) as being "South or North of here," depending on one's changing position relative to the university. The category of static direction or perspective can be contrasted with dynamic locative direction which involves movement while referring to a direction (e.g., "We are driving through the tunnel").

The specific locative words targeted in the B stimulus events were up, down, through, across/over, around, and along. These events used only the dog and the bone as stimuli. Unlike the events of series A in which the positions of both the dog and the bone changed, the events in the B series involved changing the dog's position while the bone remained in the same position in five of the six B events: behind the hill near the tunnel opening. For one B event, several bones were presented and placed in positions along the river to elicit the word along. (Along is a locative that is used to express a positional relationship of objects [e.g., bones] distributed among various locations relative to a main object [e.g., a river]). The dog was positioned differently for each event according to the static locative word targeted (refer to Table 7). These positions were intended to create various inherent paths between the dog and the bone.

The dog was always placed in such a way that it was not facing the bone (i.e., the dog could not "see' the bone). The subject being tested was told that the dog didn't know where its bone was. He was then requested to "Tell the dog where the bone is." If the child's

response included the targeted locative words, it was accepted and the testing proceeded to the next event. If the child's response did not include the targeted words, a follow-question was asked. The follow-up question occurred after the child's response, and was in the form, "Can you tell me in other words? Tell the dog where his bone is." Each event followed this same procedure. The variable between events was the different stimulus arrangement of the dog and the different specific locative words targeted (refer to Table 7).

In summary, there are six "B" events (IB-VIB). Each event was developed for the purpose of targeting a locative word representing the static locative direction subcategory. Therefore, a total of six locative words were targeted.

Testing Conditions

All testing took place in the Language Sciences Lab at Michigan State University. The subjects were first administered the A series of events and then the B series. Each series was administered in ascending numerical order. As stated previously, no training events were used; however, uniform orientation procedures were presented (please refer to the section Description and Presentation of Events). Each of the events took place on the simulated landscape scene. During presentation of the test, an attempt was made to keep reinforcement of the subjects' responses neutral. However, a trend was observed in which subject's correct responses were positively reinforced with verbal praise. The time of testing took 45 minutes to an hour.

Typically three people were in the testing room: one subject and two investigators. One investigator was responsible for administering the structured task, whereas the other investigator was responsible for making an audiovisual record of the child's responses to the task using the most current model of a Sony portable color camera (#ECM2200).

Since the video cassette was contained in the camera, the investigator was able to track the child's movement freely during the task presentations. However, to insure optimum audio fidelity, a tape recorder (Sony #TC205) and tie tack microphone (Sony #ECM150T) attached to the child's clothing also was used. The subjects' guardians were allowed to observe the testing through an observation window.

Subjects were not tested in any specific order, rather they were tested at times that were convenient for them. Therefore, the testing periods were interspersed among the normal and language-impaired subjects. The examiners were graduate students of Michigan State University studying speech-language pathology. One examiner administered the task to two language impaired subjects and one normal control subject; the other examiner administered the task to the remaining three subjects (one language impaired and two normal subjects). The examiners generally knew in advance whether the subjects they were testing were language impaired or normal.

Responses to the Structured Task

Audiovisual recordings of the subjects' elicited and spontaneous responses to the structured task were reviewed and hand recorded on standard data sheets. In addition, the context pertaining to each of these utterances was recorded (e.g., recording that the subject pointed to an object while answering). The responses were evaluated in four ways: (1) in terms of presence versus absence of general locative knowledge, (2) in terms of presence versus absence of specific locative knowledge, (3) in terms of the distribution of the lexicon elicited within each of the specifically defined locative subcategories, and (4) in terms of the appropriateness and specificity of responses elicited for the specifically defined locative subcategories.

Presence versus Absence of General Locative Knowledge

To determine presence versus absence of general locative knowledge, the data were searched for evidence of dynamic and static locative productions. If any two separate locative words were used to code one of the locative subcategories (dynamic or static), then the subject was said to have evidence of locative knowledge for that subcategory. For example, if the utterances "It is here" and "It is there" were observed, the subject would be given credit for demonstrating knowledge of the static locative subcategory. This is because here and there were two separate words used to code the static locative subcategory.

Presence versus Absence of Specific Locative Knowledge

The more specific level of locative knowledge existed as a subset of the general knowledge. For example, within the static locative subcategory exists the SPERSP and SPOS locative subcategories. Also, within the dynamic locative subcategory exists the DO, DDEST, and DDIR locative subcategories. As with the general locative knowledge, to exhibit knowledge of these locative subcategories, two separate words were used as the criterion of emergent performance. For example, if the same two phrases were observed ("It is here" and "It is there"), the subject would be credited with demonstrating knowledge of the SPOS locative subcategory, as well as the general static locative subcategory. However, these two utterances wouldn't be enough evidence to credit the subject with the SPERSP locative subcategory.

The criterion was set at a minimum of two separate locative words for each subcategory because an individual may have learned to produce one locative word within only certain contexts. This criterion minimized the chances of crediting an individual with knowledge of a locative word from a locative subcategory without truly having knowledge of that subcategory as a kind of semantic field.

In sum, responses were tracked for the following levels of locative subcategories:

General Level

Static	Dynamic
Specific Level	Specific Level
Static Position	Dynamic Origin
Static Perspective	Dynamic Direction
	Dynamic Destination

A code of pluses and minuses was used to represent the presence or absence of evidence for a locative subcategory within a subject's linguistic system.

Distribution of Lexicon

The locative utterances elicited for each of the specific locative subcategories were analyzed in terms of the distribution of locative words represented. For example, the SPOS locative subcategory targeted six locative words (on, in, under, in front, behind, and between). Each one of those words was tracked in terms of presence or absence within that locative subcategory. All targeted words were tracked in the same manner for each of the locative subcategories. Pluses and minuses were used to indicate their respective presence and absence within the subcategory.

Identification of Appropriateness and Specificity of Locative Response

Appropriateness and specificity of the locative responses were determined and assigned a numeric value. The assigned values took

into account more than just presence versus absence of locative knowledge. It was an attempt to measure the quality of the responses elicited by capturing the varying degrees of both the lexical and semantic locative knowledge revealed during the testing. This scoring system credited the subjects for the variety of locative words used within a locative subcategory and the specificity with which the locative event was conveyed. Numeric values were assigned to response categories as described below.

Responses were assigned to a particular response category in terms of presence or absence of locatives, semantic accuracy, the subcategories coded, and the specificity with which the location was coded. The following is a description of each of the response categories.

1. Category Name: No Verbal Response/Nonlocative Response

Description: This category contained two types of responses. The first type occurred when no verbal response was offered by the subject upon questioning. Pointing or gesturing responses were not included as verbal responses and were, therefore, also included in this response category.

The second type of response was one which was verbal, but not locative. While the answers given may have been plausible, they did not explicitly offer the locative information the structured task was designed to elicit. For example, in reference to the question, "How did the dog set the bone?" a response could have been "He walked." While the response would be accurate, it would also be nonlocative and be included in this category.

2. Category Name: Incorrect Locative Response

Description: This category included locative responses that were incorrect relative to the semantic context. For example, when the target response was behind, the subject's response may have been, "The dog is in front of the doghouse. Other examples of incorrectly used locatives included in for under, behind for in front and in for between.

3. Category Name: Nontargeted Locative Subcategory Response

Description: This category included the locative responses that were correct and plausible. However, the specific locatives words represented a locative subcategory different from the targeted subcategory. Consider, for example, the question "Where did the dog go to?" This question was designed to elicit a response from the DDEST locative subcategory. A response such as "He walked from his doghouse" would refer correctly to the locative event. However, it would code the original locative position from which the dog moved rather than the destinative position to which the dog was moved to. This response would be included in this response category.

4. Category Name: General Locative Response to the Targeted Subcategory

Description: This category included those responses that contained general locatives to explain the location of the object. General locatives offered little information as to the surrounding spaces interacting with the object. These locatives did not convey locations of spatial boundaries or their contacts with the object.

Some examples of general locatives include here, there, and to (refer to Appendix G for a more complete discussion about general locatives). Also, the general locative used in the response must have been derived from the same locative subcategory that was targeted for the testing. These responses were correct and plausible, but did not indicate with sufficient specificity the location of the object.

5. Category Name: Nontargeted Locative Response to the Targeted Subcategory

Description: This category represented those responses that used a correct and specific locative word to describe the location of the object. The specific words were clear in describing the locations of objects. They were clear because the surrounding spatial boundaries and their contacts were conveyed through their use. For example, it was clear that a spatial boundary existed beneath an object, but not in contact with the object when over was used to indicate its location (refer to Appendix G for a more complete discussion about specific locatives). The locative word in the response was derived from the targeted locative subcategory.

However, while the locative used is plausible, it was not the exact locative word that was targeted. Nor was it a synonym for the targeted word. For example, consider a setting in which two trees were on the top of a hill. Consider further that the dog was sitting between the trees. The target word for this locative event was "between." However, upon questioning, the subject indicated that

the dog was sitting on top of the hill. Such a response was judged as both specific and appropriate to the targeted subcategory event (in this case, static locative position). The only problem with this response was that the targeted specific locative word (between) was not the locative word produced (on top).

6. Category Name: Semantic Sense Response to Targeted Locative Subcategory

Description: This category characterized those responses which did not include a particular locative word to convey the location of the object. Rather the response contained a set of words or phrases used synonymically to convey the full sense of the location event. An example was, "in the middle of" as opposed to "between." This kind of response indicated that the subject had very specific knowledge of the spatial boundaries, but could not offer the specific word to convey the meaning. It is apparent that the individual responding in this manner could not recall or did not know the exact locative word to code the context. Using the words he could recall, the individual accurately described the object relative to its spatial surroundings as best as possible.

7. Category Name: Targeted Locative Word Response

Description: The final category included those responses which offer the locative information that is targeted. For example, a question is devised to elicit the word on within the static positional locative subcategory. The subject's response offers this information as he says "The dog is on the doghouse."

Also included in this category are those responses which replaced the targeted locative word with a synonym. For example, "The dog came out of the house" can be substituted for "The dog came from in the house." When considering synonyms, one needs to observe whether the synonym is as specific as the targeted word. For example, the minimum specifications conveyed with the word in consists of the number of spatial boundaries. Also, in does not refer to the positions or contacts of these boundaries relative to the object. The locative out conveys the same spatial information as in. Therefore, out is considered a synonym as from in. However, under is more specific than in. It identifies the position of the minimum spatial boundary. Therefore, under indicates minimum number and position of spatial boundaries; out indicates only minimum number of spatial boundaries. As a result, out would not be considered a synonym for from under.

The order in which the categories were described corresponded to their assumed levels of increasing knowledge maturity. This order ranged from no locative concept coded to the targeted locative word coded. Of those categories encompassing correct locative responses (Nontargeted Locative Subcategory Response, General Locative Response to the Targeted Subcategory, Nontargeted Locative Response to the Targeted Subcategory, Semantic Sense Response to Targeted Locative Subcategory, and Targeted Locative Word Response), the corresponding numerical values increased according to the increasing locative linguistic command they represented. For example, if a subject used

"here" rather than "in" to represent a location, it supported the notion that he understood the locational concept and was able to demonstrate some linguistic understanding of the event, but was not credited with linguistic mastery of the specifically targeted word. These values started at zero with one additional point assigned for each consecutive level. The assigned point values for the response levels were as follows:

Response Category	Numeric Value
No Verbal Response/ Nonlocative Response	0
Incorrect Locative Response	1
Nontargeted Locative Subcategory Response	2
General Locative Response to the Targeted Subcategory	3
Nontargeted Locative Response to the Targeted Subcategory	4
Semantic Sense Response to the Targeted Locative Subcategory	4
Targeted Locative Word Response	5

It can be observed that two of the response categories were worth the same number of points. These were the Nontargeted Locative Response to the Targeted Subcategory and the Semantic Sense Response to the Targeted Locative Subcategory response categories. Because neither subcategory appeared to characterize one response level or another as conveying a higher linguistic command of locative knowledge, it was felt appropriate to assign them the same numeric

value. Research needs to be conducted to understand the developmental differences between the two categories.

As discussed previously, the testing was devised to elicit six targeted locative words for each locative subcategory (refer to the Description and Presentation of Events section). Therefore, there were six responses to categorize for each subcategory. The maximum value of each response was 5 points, and the minimum value was 0 points. These points were assigned according to the response category the response belonged to. The maximum points each subject could attain was 30. This occurred when each response was worth 5 points for each of the six locative words targeted in the subcategory (5 x 6 = 30).

During each event, a series of questions was asked to elicit various targeted locative words that represented different locative subcategories (refer to the Description and Presentation of Events section). The subjects' responses were then assigned to their respective response categories and given a numeric score. These scores were totaled by subcategory to a maximum of 30 points as discussed previously. In the event that two types of responses were elicited for one question, the subject was always given the benefit of his best response produced within that event.

For example, consider the following scenario. During Event IA the question, "How did the dog get his bone?" is asked. The subject answers, "By walking between his houses." This response reflects the Targeted Locative Word Response category and is worth 5 points.

Following this response, but still during Event IA, the subject is asked, "Where did the dog go to?" The subject then answers, "To the middle of his houses." This answer falls into the Semantic Sense Response to the Targeted Locative Subcategory response category and is worth 4 points.

There now exist two responses given in reference to the same testing event (Event IA). Each of these responses is assigned a different numeric value. When such situations occur in the data, the subject is given the benefit of his best answer within the same event, and therefore, given the higher value. In the example presented, the subject would be assigned 5 points for his response.

There are other instances when a subject may produce two separate responses similar to those just described. However, the better response is produced at a time during the testing not occurring within the same event. In this instance, the subject does not get the benefit of his best answer, and is assigned the lesser value. The reason for this is because the better answer occurred outside of the event designed specifically to elicit that response. While it is true that the subject demonstrated knowledge of a particular locative within a particular context, it is important that the same knowledge is conveyed during the context in which the task was designed.

For example, a subject says during the testing session "Look at the ceiling up there." This response reflects the locative word up within the static perspective locative subcategory. However, when

trying to elicit up for the same subcategory, the subject says, "The bone is right there." The first response contained the correct specific locative word, and was derived from the targeted locative subcategory. While this response was worth more numerically, it occurred in a different context. Therefore, the second response is used for recording the numeric value. The second response reflected the subject's best answer within the testing event.

It is important to consider responses only occurring within the event. This will help to reduce responses which are context dependent and help to create a standard format for scoring. This method reflects knowledge among the subjects within a standard environment.

Reliability

To determine the reliability of the testing, a second administration of the testing was given to one normal subject. The procedures for administering the task were identical to those executed during the first testing session. To minimize the effect of developmental maturity on the subject's performances, the second testing session occurred seven days after the first session. The parents reported that they did not discuss the initial testing during the elapsed time.

Spontaneous Language Sampling

In order to determine if the locative responses from the structured test were among those used spontaneously by the child, a

language sample was taken on the same day immediately following the structured testing. The samples ranged from 30 minutes to an hour. The following sections explain the language sampling in further detail.

Elicitation Procedure

Each child's language sample was organized around the same core set of toys and made use of the landscape scene. There were three main phases of the language sampling. During all phases the investigators introduced the objects and acted as the subject's peer during the interaction. The subjects were allowed to lead the play activities according to their own interests.

The first phase consisted of a picnic setting. Objects introduced were a family of dolls, utensils, plates, food, and other picnic accessories. The second phase moved into a transportation context. The subjects were introduced to a jeep, an airplane, a helicopter, boats, and horses. These objects were introduced one at a time, and the subjects were given time to play with each object separately.

The final phase of the language sampling was a farm setting. The subjects were introduced to animals, tractors, and trucks. Among the other items used to help build a farm atmosphere were a building, gravel, and fences. Following each phase, all objects used for that phase were put away. This helped prevent overwhelming the subjects with too much play stimuli.

Recording the Data

Each language sample was video taped using the same recorder as the standard structured testing. A checklist was devised for purposes of tracking the locatives within their contexts (refer to Appendix H). Each of the 12 words targeted on the structured task were tracked in the language sample in terms of the locative subcategory they represented (SPOS, SPERSP, DO, DDIR, and DDEST). However, only the first occurrence of a targeted locative word within a particular locative subcategory was included in the data base. Before its inclusion, each phrase had to be used appropriately. To validate the appropriate use of a phrase, the context in which it occurred was reviewed on video. If the context verified that the locative was used appropriately, all other subsequent productions for that locative word within that locative subcategory were disregarded.

For example, if the utterance "Put it in there" was tracked, the locative word in would have been categorized as a dynamic destinative locative with verification from the video context. Subsequent to this phrase, the phrase "He walked in the house" may have been observed. The word in would have been categorized as a dynamic destinative locative again. This phrase would have been disregarded since a phrase already existed within the same locative subcategory.

However, the locative word in may have been again observed during the subsequent phrase "It's in there." In this context, the locative word in would have been defined as a static positional locative. Because the locative word in was not previously used

within the static positional context, this phrase would have been included as part of the data base. Of course, this phrase too must have been cross referenced by the context in which it occurred.

As a final example, the phrase "I put it on the table" may have been subsequently tracked. The locative word on would have been defined within the dynamic destinative locative subcategory. This was the same subcategory that the first phrase was categorized into. As can be recalled, the first phrase used the locative word in. The most recent phrase, using on as its locative word, would have remained as part of the data base because it existed as a separate locative word from in.

General locative words observed in the language sample were tracked in the same manner. For example, "I put it here" would demonstrate the use of a general locative within the DDEST context. If the context validated the utterance, all subsequent productions of "here" used within this context would be disregarded. The purpose for this was to keep track of which locative subcategories were used independent of the lexicon used to convey them.

At the completion of gathering the data base, the checklist was completed. The checklist then indicated what meaning subcategories were conveyed in the language sampling, and which of the twelve targeted locative words were elicited.

Evaluating the Language Sample

The purpose for evaluating the data was to determine those locative subcategories which were evident during the language

sampling session and the distribution of the targeted locative words produced for each locative subcategory. To determine this distribution, the 12 locative words targeted during the sampling were tracked in terms of what locative subcategory they coded. The process of tracking the distribution of the locative words was the same as that used for the structured task. A system of pluses and minuses indicated which words were elicited within each locative subcategory.

To determine whether the subcategories were evident within the subjects' linguistic systems, criteria used were identical to those used during the structured testing. As discussed previously, to acknowledge that a subcategory is evident within the subjects' linguistic systems, the criteria required that at least two separate locative words be produced within that subcategory. The same system of pluses and minuses used to represent data on the structured task was used for the language sample data.

CHAPTER IV

RESULTS

The general goal of this study was to pilot a structured elicitation task for revealing normal and language impaired group differences in locative expressions. The structured task data were compared to the spontaneous language sampling data with respect to the distribution of locative subcategories evidenced and their respective inventories of locative words. The results are organized around each of the six questions posed for the investigation.

Structured Task Data

Research Question 1a: Does a structured elicitation task reveal differences between normal and language impaired groups in the presence or absence of utterances in the two globally defined dynamic and static locative categories of meaning?

Table 8 identifies the subjects in each group who met criteria for acquired use of static and dynamic locative utterances. Refer to the Responses to the Structured Task section. The pluses on the table designate presence of locative knowledge. As predicted, the linguistic systems of both groups exhibited dynamic and static locative meaning as globally defined. Consequently, no group differences were observed.

Table 8

Subjects Who Exhibited the General Categories of Dynamic and Static Locative Responses to the Structured Task

	Static	Dynamic
LI Subjects		
S_1a	+	+
S_2a	+	+
S_3a	+	+
N Subjects		
S_1b	+	+
S_2b	+	+
S_3b	+	+

Note: Static = Static Locative Subcategory

Dynamic = Dynamic Locative Subcategory

LI = Language Impaired

N = Normal Control

\+ = Elicited Locative Knowledge

Research Question 1b: Does a structured elicitation task reveal differences between normal and language impaired groups in the presence or absence of utterances in the more specifically defined subcategories of dynamic and static meaning: namely, static position, static perspective, dynamic origin, dynamic destination, and dynamic direction?

Table 9 identifies the subjects who met criteria for acquired use of the dynamic and static subcategories of locative meaning. These consisted of the static perspective (SPERSP) and static position (SPOS) subcategories. Among static locative expressions, these included the dynamic origin (DO), dynamic direction (DDIR), and dynamic destination (DDEST) subcategories. The pluses and minuses on the table, respectively, designate the presence and absence of the locative subcategory.

With two exceptions, all the subcategories were represented for every subject in both groups. The two exceptions included one language impaired subject who did not meet criterion for the SPERSP subcategory and one normal subject who did not meet criterion for the DDIR and SPERSP subcategories. The data revealed comparable performances of the two groups in the number of subjects who exhibited presence and absence of locative subcategories.

Research Question 1c: Does a structured elicitation task reveal differences between normal and language impaired groups in the distribution of words elicited within each of the specifically defined locative subcategories?

Table 10 shows the distribution of words elicited within each of the three locative subcategories that targeted a positional locative, whereas Table 11 shows the distribution of words elicited for the two subcategories that targeted directional locatives. The pluses and minuses, respectively, designate the production of elicited and

Table 9

Subjects Who Exhibited the Specific Categories of Locative Response to the Structured Task

	SPOS	SPERSP	DO	DDEST	DDIR
LI Subjects					
S_1a	+	+	+	+	+
S_2a	+	+	+	+	+
S_3a	+	-	+	+	+
N Subjects					
S_1b	+	-	+	+	-
S_2b	+	+	+	+	+
S_3b	+	+	+	+	+

Note. SPOS = Position Locative Subcategory

DO = Dynamic Origin Locative Subcategory

DDEST = Dynamic Destination Locative Subcategory

DDIR = Dynamic Direction Locative Subcategory

SPERSP = Static Perspective Locative Subcategory

NC = Normal Control

LI = Language Impaired

\+ = Elicited Locative Knowledge

\- = No Elicited Locative Knowledge

Table 10

Positional Locative Words Elicited During the Structured Task

	Front	In	Behind	Under	Between	On	Mean
Static Position Subcategory							
Language Impaired Group							
S_1a	-	+	+	-	-	-	33%
S_2a	+	+	+	+	+	+	100%
S_3a	+	-	+	+	+	+	67%
					Group Mean:		67%
Normal Group							
S_1b	-	+	-	-	+	-	33%
S_2b	-	+	-	+	+	+	67%
S_3b	-	+	+	+	+	+	83%
						Group Mean	61%
Dynamic Origin Subcategory							
Language Impaired Group							
S_1a	+	+	-	-	-	-	33%
S_2a	-	+	+	-	+	+	67%
S_3a	-	+	-	-	-	+	33%
					Group Mean:		44%
Normal Group							
S_1b	-	-	-	-	+	-	17%
S_2b	-	+	-	+	+	-	50%
S_3b	-	+	-	-	+	+	50%
					Group Mean:		39%

Table 10. Continued.

	Front	In	Behind	Under	Between	On	Mean
Dynamic Destination Subcategory							
Language Impaired Group							
S_1a	-	+	-	-	-	+	33%
S_2a	-	+	-	+	+	-	50%
S_3a	-	+	-	-	-	-	17%
					Group Mean:		33%
Normal Group							
S_1b	-	+	-	-	+	-	33%
S_2b	-	+	-	-	-	+	33%
S_3b	-	-	+	+	+	+	67%
					Group Mean:		44%

Note: + = target locative elicited

\- = target locative not elicited

Table 11

Directional Locative Words Elicited During the Structured Task

	Along	Up	Around	Down	Across	Through	Mean
Dynamic Direction Subcategory							
Language Impaired Group							
S_1a	-	-	-	-	+	-	17%
S_2a	-	+	-	+	-	+	50%
S_3a	-	+	-	+	+	-	50%
						Group Mean:	39%
Normal Group							
S_1b	-	+	-	-	-	-	17%
S_2b	-	+	-	+	+	+	67%
S_3b	-	+	-	+	+	+	67%
						Group Mean:	50%
Static Perspective Subcategory							
Language Impaired Group							
S_1a	-	-	-	-	+	-	17%
S_2a	-	+	-	+	+	-	50%
S_3a	-	-	-	-	-	-	0%
						Group Mean:	22%
Normal Group							
S_1b	-	-	-	-	-	-	0%
S_2b	-	+	-	-	+	-	33%
S_3b	-	+	+	-	+	-	50%
						Group Mean:	28%

Note: + = target locative elicited

\- = target locative not elicited

nonelicited locative words within a given subcategory during the structured task. The production of an elicited word would translate into a score of 5 when considering the Targeted Locative Word response category it is assigned to (refer to Identification of Appropriateness and Specificity of Locative Responses section in Chapter III) (see Appendix I for raw data).

Optimally, if subject groups were to show differences, the language impaired group would produce 0% of the targeted words (i.e., the tables would show minuses) and the normal group would produce 100% of the words (i.e., the tables would show all pluses). However, such an optimal group difference was not observed. The tables show that on no task were all the words elicited for either group. For example, within the SPOS locative subcategory, just one word ("behind") for the language impaired group and two words ("in" and "between") for the normal group were produced by all the subjects in the respective groups. The table further shows that the words produced or not produced on one task by a group were not necessarily the same words produced or not produced in a different task. That is, the words produced appear to be task dependent. For example, four of the six subjects produced "under" within the static position subcategory, but only one of the six produced this word within the Dynamic Origin Subcategory and two of the six produced it within the Dynamic Destination Subcategory.

The percentages on the tables reflect the similarity of group performance on each task; distributions of the percentage values for

each group overlapped. For example, the static position subcategory percentages for the language impaired group ranged from 33% to 100%; and for the normal group, they ranged from 33% to 83%. The means were 67% and 61%, respectively. A rank sums statistic (Senders, 1958) was applied to the distribution of mean percentage values across tasks and groups.* The mean values for the normal group were not statistically different in their rank order from those shown for the clinical group ($T_1 = 25$; $T_2 = 30$; refer to Appendix J for the raw data.)

Research Question 1d: Does a structured elicitation task reveal differences between normal and language impaired groups in the appropriateness and specificity of responses elicited for the specifically defined subcategories?

Table 12 shows each group's total score means and standard deviations for each locative subcategory (refer to Appendix I for raw data). Across subcategories, mean scores ranged from 19 to 25.3 for the normal control group, and from 17.3 to 27 for the language impaired group. A rank sums test (Senders, 1958) applied to the mean scores across the subcategories and groups did not reveal significant group differences in score rank order ($T_1 = 29$, $T_2 = 26$, $p \geq .05$). Refer to Appendix K for raw data.

Figure 1 shows the range of scores about the means for each group. The amount of score overlapped for the normal and language impaired on every targeted subcategory provides additional support for the acceptance of the null hypotheses.

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*The Senders (1958) recommendation of subjecting the T values to the probability table for n values less than eight was followed.

Table 12

Task Scores for Each Subject by Locative Subcategory

	SPOS	DO	DDEST	DDIR	SPERSP
			Language Impaired Subjects		
S_1a	23	23	22	25	17
S_2a	30	25	23	23	23
S_3a	28	24	20	23	12
M	27	24	21.7	24	17.3
SD	2.94	0.82	1.3	0.96	4.5
			Normal Control Subjects		
S_1b	22	20	22	15	12
S_2b	26	22	22	26	22
S_3b	28	26	26	26	23
M	25.3	22.7	23.3	22.3	19
SD	2.5	2.5	1.9	5.2	4.97

Note: Total possible points for each subcategory is 30.

SPOS = Static Position Locative Subcategory

DO = Dynamic Origin Locative Subcategory

DDEST = Dynamic Destination Locative Subcategory

DDIR = Dynamic Direction Locative Subcategory

SPERSP = Static Perspective Locative Subcategory

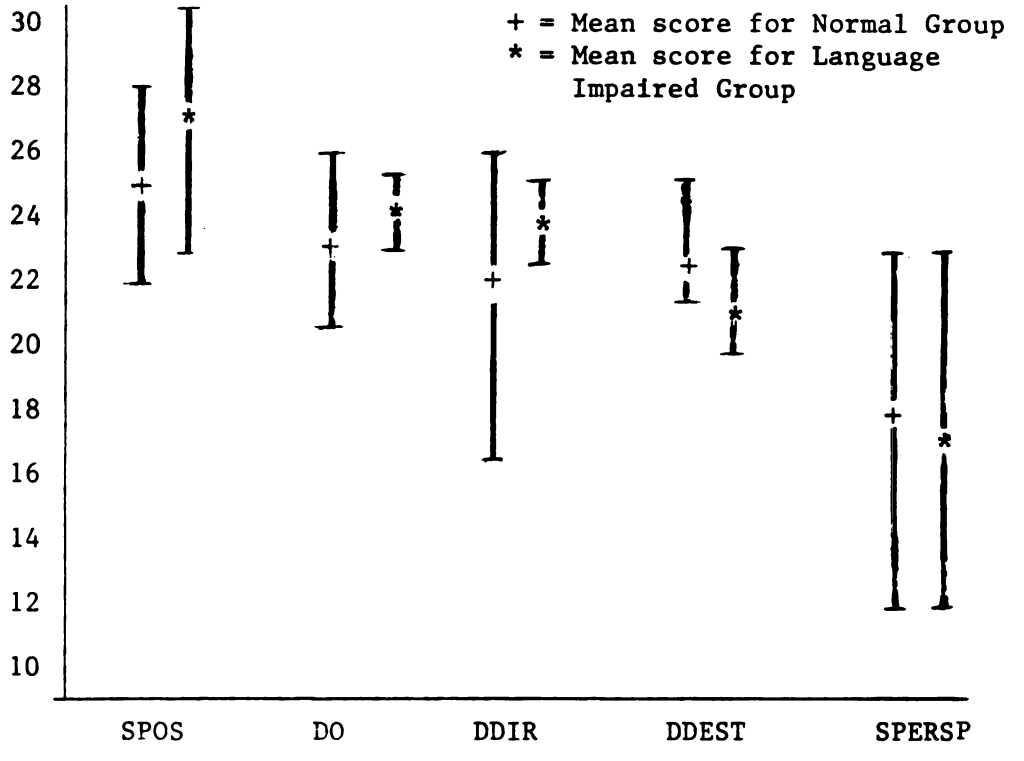

Figure 1. Range of Structured Task Score for Language Impaired and Normal Groups by Locative Subcategory.

Note. Scores did not fall below 12 points.

SPOS = Static Position Locative Subcategory

DO = Dynamic Origin Locative Subcategory

DDEST = Dynamic Destination Locative Subcategory

DDIR = Dynamic Direction Locative Subcategory

SPERSP = Static Perspective Locative Subcategory

N = Normal Control Group

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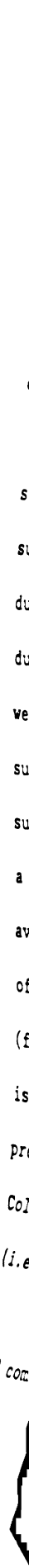


Research Question 2a: Do the results of the structured task parallel the content of the language sample in number and type of locative subcategories evidenced?

Table 13 permits one to compare subcategories of locative knowledge represented in the structured task and language sample. Refer to the Responses to the Structured Task section for a review of the criteria. The pluses and minuses on the table, respectively, designate the presence and absence of such knowledge.

Each subject provided five opportunities for evaluating similarities of the locative knowledge exhibited. For example, subject 1a (S_1a) received a "+" within the SPOS locative subcategory during the structured task, and an "+" for the SPOS subcategory during the language sampling. On this task, identical performances were observed. However, a difference is observed for the same subject when the SPERSP subcategory is considered. Within this subcategory, the subject received a "+" for the structured task, and a "-" for the language sampling task. Of the five responses available for comparison (from each of the five subcategories) four of them show identical outcomes for the two elicitation conditions (from the SPOS, DO, DDEST, and DDIR subcategories). Thus, agreement is shown for 80% of the comparisons. The remaining five subjects provided opportunities for comparison in the same manner. Collectively, the six subjects provided a total of 30 comparisons (i.e., five responses per each of the six subjects).

When the data are inspected, it can be observed that 25 of the 30 comparisons yielded identical outcomes for the two elicitation

Table 13

Specific Locative Subcategories Elicited in Structured Task and Language Sample

	SPOS	SPERSP	DO	DDEST	DIR
Structured Test					
LI Subjects					
S_1a	+	+	+	+	+
S_2a	+	+	+	+	+
S_3a	+	-	+	+	+
N Subjects					
S_1b	+	-	+	+	-
S_2b	+	+	+	+	+
S_3b	+	+	+	+	+
Language Sample					
LI Subjects					
S_1a	+	-	+	+	+
S_2a	+	+	+	+	+
S_3a	+	-	+	+	+
NC Subjects					
S_1b	+	+	+	+	+
S_2b	+	+	-	+	+
S_3b	+	-	+	+	+

Note: SPOS = Static Position Locative Subcategory
DO = Dynamic Origin Locative Subcategory
DDEST = Dynamic Destination Locative Subcategory
DDIR = Dynamic Direction Locative Subcategory
SPERSP = Static Perspective Locative Subcategory
NC = Normal Control
LI = Language Impaired
\+ = Evidence of Locative Knowledge
\- = No Evidence of Locative Knowledge

procedures. Overall, then, the table shows that the two tasks were more similar than different in their effect on performances.

The five differences observed were the product of four subjects (one language impaired subject and three normal subjects). Of these four subjects, three exhibited presence of locative knowledge for the structured task (from the SPERSP, DO, and DDIR subcategories) but not for the language sampling.

Research Question 2b: Do the results of the structured task parallel the content of the language sample in the distribution of words in each locative subcategory?

The distribution of locative words elicited for each subcategory were compared for the structured task and language sampling data but were not compared between subject groups. Since the previous analyses revealed no group differences, the data for the two groups were pooled to gain a clearer picture of similarities or differences existing between the two test procedures for the distribution of locative words.

Table 14 and 15 reflect, respectively, the percentage of the six subjects who correctly produced the positional and directional target words within the target subcategories. For example, 33% of the six subjects correctly produced "front" within the SPOS locative subcategory during both the structured task and the language sampling (refer to Appendix L for raw data). It was predicted that the language sampling data would reflect percentages that were equal to or higher than the structured task data. However, Table 14 shows that the language sampling percentages were both higher and lower than the structured task percentages. For example, 0% of the

Table 14

Mean Percent of Subjects Who Produced Positional Locative Words During the Structured Task and Language Sampling

	Front	In	Behind	Under	Between	On
			Structured Task			
SPOS	33%	83%	50%	67%	83%	67%
DO	17%	67%	17%	17%	67%	50%
DDEST	0%	83%	17%	33%	50%	50%
			Language Sampling			
SPOS	33%	100%	50%	50%	0%	67%
DO	0%	100%	0%	0%	17%	67%
DDEST	17%	100%	33%	67%	17%	100%

Note: SPOS = Static position locative subcategory
DO = Dynamic origin
DDEST = Dynamic destination locative subcategory

Table 15

Mean Percent of Subjects Who Produced Directional Locative Words During the Structured Task and Language Sampling

	Along	Up	Around	Down	Across	Through
Structured Task						
DDIR	0%	83%	0%	67%	67%	50%
SPERSP	0%	50%	17%	17%	67%	0%
Language Sampling						
DDIR	0%	83%	33%	100%	100%	33%
SPERSP	0%	50%	0%	33%	67%	0%

Note: DDIR = Dynamic direction locative subcategory

SPERSP = Static perspective locative subcategory

subjects produced "between" within the SPOS subcategory during the language sampling, whereas 83% of the subjects produced it during the structured task. Conversely, 100% of subjects produced "on" during the language sampling for the DDEST subcategory, but only 50% of the subjects produced it during the structured task. In other instances, the two tasks yielded identical outcomes. Note that the words along and through were not elicited by either procedure within the SPERSP locative subcategory. A rank sums test (Senders, 1958) was applied to the distribution of percentage values for the five subcategories. That is the distribution of mean percentage values were ranked for the two elicitation procedures for each of the five subcategories. The two elicitation procedures were not statistically different in the rank order of mean values on any of the five subcategories tested (T_1 values ranged from 34.5 to 44.5, and T_2 values ranged from 33.5 to 43.5; $p \geq .05$) (refer to Appendix M for the raw data.)

Temporal Reliability

Table 16 shows the scores received during the first and second testing sessions. The score ranges were 15-23 and 12-26, respectively. Test-retest score differences were not statistically significant (Senders, 1958, $T_1 = 28$, $T_2 = 21$, $p \geq .05$) (refer to Appendix K for raw data).

Table 16

Test-Retest Scores Obtained by One Nonclinical Subject

Subcategory	First Test Results	Second Test Results
SPOS	22	26
DO	20	22
DDEST	22	22
DDIR	15	12
SPERSP	23	18

Note: SPOS = Static Position

DO = Dynamic Origin

DDEST = Dynamic Destination

DDIR = Dynamic Direction

SPERSP = Static Perspective

CHAPTER V

DISCUSSION

It was hypothesized that semantic knowledge and nonverbal knowledge were linked. The literature review showed that cognitive knowledge had been shown to differ among the subject groups (Udwin & Yule, 1983; Terrell et al., 1984; Johnston & Savich, 1984; Johnston & Weismer, 1983; Wren, 1982). To the extent that semantic knowledge indexes cognitive representation, it follows that semantic differences may be expected between normal and language impaired groups.

Group differences, however, were not observed in studies that have compared the semantic relations expressed by normal and language impaired children (Freedman & Carpenter, 1976; Duchman & Erickson, 1976; Leonard et al., 1976; Coggins, 1979; Fokes & Konefal, 1981). This study was motivated by the argument that the global nature of the semantic categories tested was not sensitive to the differences. It was argued further that if semantic categories were more specifically defined, possible differences would be observed.

The purpose of this study was to pilot a structured elicitation task for comparing language impaired and normal groups locative utterances. It was predicted that group differences would not be observed when locative categories were globally defined as dynamic

and static locatives, but that differences would be observed in the distribution of locative subcategories SPOS, SPERSP, DO, DDIR, and DDEST within the global categories of dynamic and static locative reference.

As predicted, no significant differences between the groups were demonstrated at a global level. However, unlike what was predicted, group differences still were not observed at a specific level of locative knowledge.

A secondary goal of this study was to determine if the structured task elicited locative responses comparable to a spontaneous language sample. To accomplish this, the data gathered from the structured task were compared with those gathered from the language sampling.

The data comparison yielded similarities and differences. Both procedures were similar in that they revealed subjects' use of dynamic and static utterances. They differed in the kinds of locative subcategories revealed and in some of the targeted words elicited within a subcategory.

The accuracy of the structured task for eliciting locative knowledge was gauged by a temporal reliability check. This reliability check was accomplished by administering the structured task twice to the same subject on separate occasions. Results from both sampling forms were comparable.

This chapter addresses why subject group differences were not revealed and why the structured and spontaneous elicitation procedures showed particular differences and similarities within

their data. In addition, suggestions for improving the structured task are offered.

Explanations for Subject Group Differences Not Revealed Among the Subcategories of Locative Knowledge

Three reasons are offered for the failure to reveal group differences among the subcategories of locative knowledge. These involve alternate theoretical hypotheses, subject group characteristics, and the nature of the targeted locative subcategories. The following sections discuss these proposed reasons.

Alternate Hypotheses

In the absence of observed group differences, we are led to conclude that language impaired children are not semantically deficient for locatives. Consequently, we must entertain the notion that: (1) language impaired children's cognitive deficiency is not at the base of their language impairment, or, (2) language impaired children are cognitively deficient in ways that do not pertain to semantics. More research needs to be conducted focusing on either the semantics of language impaired children or on language impaired children who exhibit specific cognitive deficits.

Subject Characteristics

Subject characteristics may also explain why the data did not reveal group differences. While an attempt was made to create homogeneous language impaired and nonimpaired groups, subjects in

each group exhibited wide variability in their screening test scores. These variations were reluctantly accepted after realizing that the time available for the study was a limiting factor. Despite efforts to find children from all available channels, few were available to select for testing purposes.

Heterogeneity was observed in both cognitive and linguistic skills. Some of the children in the language impaired group demonstrated higher than expected linguistic skills and lower than expected Leiter IQ scores. On the other hand, variables could also have entered into the test scores obtained through the school clinicians where no control over the types of tests used to determine pathology nor over the conditions for testing the children was present.

The children in the normal group were also heterogeneous. Some scores from this group were lower than expected for both the linguistic and cognitive skills. The two group characteristics merged as the reduced scores from the normal group combined with increased scores from the language impaired group. As group characteristics overlapped, distinguishing characteristics were minimized. Similar subject group characteristics would be expected to yield similar group performances on the locative tasks of this study.

Nature of the Targeted Locative Subcategories

It was hypothesized that group differences would be revealed if semantic concepts were tested at a specific level. Since the five

targeted locative subcategories were assumed to be specific in nature, group differences were expected to be observed. However, group differences may not have been revealed because the targeted subcategories were still too broadly defined to capture more finely tuned differences. That is, smaller divisions may exist within the locative subcategories. For example, just as "Put it here" codes a destinative position in a dynamic sense, it may also code a more specifically defined subcategory within a dynamic destinative sense. Such finely tuned subcategories of locative utterances, however, need to be identified.

Explanations for Why the Structured and Spontaneous Elicitation Procedures Showed Particular Similarities and Differences

The results gathered from the structured task and the language sample were compared to determine the accuracy with which each elicited the targeted lexicon and the general and specific locative categories. The comparison revealed similarities and differences among the responses to the two tasks. Differences occurred in the kinds of locative subcategories evidenced and their respective targeted words elicited.

It is difficult with the small number of subjects participating in this study to determine the accuracy of these results or to draw strong conclusions from them. However, plausible explanations supporting the conclusions are offered. The first explanation attempts to reason why differences were observed within the kinds of subcategories of locative knowledge evidenced. This explanation

involves the number of opportunities available for the subjects to respond.

The more opportunities available to exhibit knowledge, the higher the probability that knowledge will be exhibited. Consider the following hypothetical example of a child who has SPOS locative knowledge. Two investigators attempt separately to elicit this knowledge from a child. The first investigator, who positions 100 identical objects on top of identical toy houses and questions the child 100 different times about the object locations, is more likely to reveal the child's knowledge than the second investigator who has only six of the same stimuli for questioning the child.

This same idea can be related to the DDIR, DO, and SPERSP locative subcategories. For each subcategory, more opportunities were available for the children to demonstrate their knowledge during a particular task. The language sampling provided more opportunities to reveal DDIR locative knowledge, whereas the structured task offered more for revealing DO and SPERSP locative knowledge.

On the structured task, prompt questions created opportunities to respond within a particular locative subcategory. Approximately 12 to 18 opportunities to respond to questions within the DDIR context existed for the subjects during the structured testing. But it appeared that the language sample appeared to offer even more opportunities. For example, some of the common questions heard from the investigators during the language samples were "Where are they going," "Where are they driving," and "Where are they walking?" It

seemed that the language sample was naturally facilitive to the DDIR locative responses.

However, the opposite seemed apparent for the SPERSP and DO locative subcategories. While only 12 to 18 opportunities were available for the subjects to respond during the structured task, there were fewer opportunities for them to respond during the language sampling. Because fewer spontaneous prompt questions were used, the number of response opportunities were reduced.

It appeared that increased structure of the environment led to a greater number of prompt questions for the SPERSP and DO subcategories. Therefore, the probability that responses would occur in these locative subcategories is increased.

One difference was observed among the targeted words elicited between the structured and spontaneous elicitation procedures. Within the three positional subcategories (DO, SPOS, and DDEST), the structured task elicited the word between 67% of the time and the language sample elicited it 11% of the time. The mean difference between the two procedures in eliciting this word was 56.

This large difference suggests that the structured task is more accurate than the language sampling in eliciting between within the three positional categories. This may be due to the spontaneity of the language sampling which seldom offered opportunity for such a word to occur. It appeared that the environment needed to be purposefully planned to foster such a response.

Similarities also existed among the targeted words elicited between the structured and spontaneous elicitation procedures. For the two locative subcategories targeting directional words (DDEST and SPERSP); along was not elicited by either procedure. Also, for the SPERSP subcategory specifically, through was not elicited by either procedure.

There are several possibilities why such similarities would be observed. One possibility involves the normal developmental aspect for acquiring these words. These words may not be fully developed by the age of 7 or they may exist only within restricted contexts. Such restricted contexts were evidenced when several of the subjects were questioned in a nonstandard way following the testing session. Although they did not produce the word along during the structured task, they all were able to move the dog along the river upon request. The possibility exists that these children had knowledge about along only under very specific conditions and could not generalize along to more abstract situations. The more abstract conditions probably were present during both procedures, causing these words (along and through) not to be reflected within either set of data.

Recommended Changes for the Structured Task Procedure

Following the administration of the structured task and upon reviewing the results, procedural changes are recommended in addition to those previously discussed. These recommendations change the

scoring system and the test presentation format used. The changes are thought to make the testing procedures more succinct and more reflective of locative knowledge.

Recommended Changes for the Scoring System

The existing scoring system was developed for recording all targeted subcategories in the same format. However, upon reviewing the data, it appeared that all the subcategories could not conform to the one format. In particular, the breakdown in this format occurred with the allowance of points for responses using general locative words such as here and there in contrast to specific words, such as on and under. Such responses would be categorized within the General Locative to the Targeted Subcategory response category.

It is argued that such general lexicon does not exist for the directional locative subcategory. The basic definition of a general locative could not logically apply to the direction of the movement, since any direction by definition is specific. The Webster definition (Webster's New Collegiate Dictionary, 1979) of direction is "the line or course on which something is moving or is aimed to move or along which something is pointing or facing" (p. 320). To semantically convey such a definition, a specific locative must be used.

To support this argument, data were reviewed for general locatives elicited in a directional sense. It was found that no such locatives were elicited. An attempt was made by the investigator to

arrive at an existing directional general locative using all available information. No general locative could be observed.

Considering this notion, it seems moot to appropriate points to a response category which does not exist. It would seem more appropriate to modify the scoring format for the directional subcategory such that no points are allocated to a General Locative Response Category.

The observation did not bias the comparisons made with the test scores because they occurred only within a particular subcategory (e.g., "intra-subcategory analysis") not between the subcategories (e.g., "inter-subcategory analysis"). This latter type of comparison is discouraged since the two subcategories are qualitatively different.

A further modification of the present scoring system would be to appropriate points which are sensitive to variations in responses across targeted locative words within the SPERSP locative subcategory. For example, a subject may use the response "over there" to convey each targeted word for the SPERSP locative subcategory. While this response is correct, it lacks variety and does not convey the changing perspective occurring with each event. In contrast, another subject responds with "Over the grass," "Over the river," and "Over the fence" for three separate targeted locative words. These responses vary in that they identify the object that defines the perspective in each event.

The present scoring system records these responses as equal in numeric value. However, since the essence of the SPERSP locative

subcategory is change in perspective, it is suggested that responses such as these be differentiated in terms of quality and numeric value. This differentiation should be conveyed through the scoring system.

In sum, it seems appropriate to use the same scoring format for the positional locative subcategories only (SPOS, DO, and DDEST). Because of the nature of directionality, the remaining two subcategories (SPERSP and DDIR) should be scored apart from the positional locative subcategories. In addition, each of the two directional subcategories should have a separate scoring format. This is because the SPERSP locative subcategory has changing perspectives as part of its nature, whereas the DDIR subcategory does not.

Recommended Changes to the Test Presentation Format

To make the presentation possibly more succinct, it is proposed that the underlying format for presentation be modified. At present, this basic format consists of targeting four locative subcategories within one event. This format is present for all of the six A events. Such a design was in the interest of minimizing time for administering the task. However, in retrospect, it is questionable whether such a format served this purpose. It is necessary within such a format to present multiple stimuli in one event. That is, one movement transports the dog from an originating location, in a particular direction, to a destinative position. After such a movement, the subject is questioned about all three aspects of this

movement. At this point, the subject is expected to remember all aspects of the movement and relate the prompt questions to the aspect. Breakdown is possible within the recall process or the ability to relate such questions to the appropriate aspects of the movement.

Three solutions to this problem are proposed. One is to introduce a training event prior to testing, a second is to interject questions at different times, and the third is to reduce the number of stimuli presented within each event. The training event would serve as an example for the child to learn the relative nature of the responses. To reduce training specific locative words, words occurring later in the task may be used within this event. It would be improbable that the subject would remember the target locative words by the last event if he did not already have them within his linguistic system.

For this structured task, for example, on, under, and through were the last words to be targeted. For the training event, the dog and bone should be set in a manner to elicit these words and the prompt questions should be asked. What would be significant about this training event would be the treatment of inaccurate answers. As the subject responds with an answer not relative to the targeted response, inaccurately, or insufficiently, the investigator would be allowed to inform the subject what answer is expected.

For example, consider the following situation where the prompt question, "Where did the dog come from?" is asked and the response

is, "From his house." The investigator would then be allowed to say, "That's correct, but I'm looking for a more specific answer like, 'The dog is on his house.'" After this training example, the events would be followed in the original manner.

Another way to aid the subject in understanding what aspects of the event are important is to change the time at which the questions are interjected. The structured task was designed such that all dynamic questions were asked after the movement. However, it may have been helpful within the DDIR subcategory to interject a prompt question while the movement was occurring. At this moment, the question, "Where is the dog walking?" (asked to elicit the DDIR subcategory) would offer a more concrete referent for responding to the questions. Further investigation would need to be conducted in this area to determine the effectiveness.

A final suggestion to aid the subjects in understanding what aspects of the event are important is to reduce the amount of stimuli presented at one time. To accomplish this, it is suggested that only one locative subcategory be presented within each event. For example, one series of events could be designed for the purposes of targeting the DDEST locative subcategory only. Stimuli could consist of a dog and a house separate from the outdoor setting. The dog for each event is moved to the house in a straight path. The dog's originating position would be constant for each event. However, the destinative position would be variable. The sole varying aspect with each event is related to the locative word targeted.

For example, for one event the dog is moved to the top of the house and the subject is asked, "Where did the dog move to?" This event would target the word on. The next event consists of the dog's moving under the house. The same question is again asked for purposes of eliciting the word under. With only one aspect of the motion changing with each event, the targeted stimuli could become more salient for the subject. Therefore, the subject can more easily relate the prompt question to the appropriate aspect of the movement and respond appropriately.

It cannot be calculated whether such a format will be more time consuming. The existing format typically takes 45 minutes to an hour to administer. Only further research with this format can estimate the time needed for testing.

A final modification recommended is to change the stimuli presented. It has been noted that part of the stimuli used for the structured task consists of a set simulating on outdoor setting. Designed into this setting were obstacles (e.g., a hill, a tunnel, and a river) meant to facilitate directional locative words. However, upon reviewing the data, particular directional locatives words were not elicited often relative to the remaining directional locative words. These words were along and around and may not have been elicited because of the obstacles designed to facilitate their production.

To facilitate the production of along, a river was placed in the natural setting. This river was fairly long and winding. The

assumption was that the subject would walk the dog along the river bank and comment on this motion upon questioning. However, no subject was observed to move the dog in this manner. Instead, the subject often took a direct path from one end of the river to the other. Therefore, instead of following the winding bank, the dog was often observed to go over the grass. Indeed, this was the directional response frequently observed among the subjects (e.g., "The dog walked over the grass").

It is proposed that the river be redesigned such that moving the dog along the river is a natural inclination. Such a river may consist of just one large curve which would force the subject to walk the dog around its outer circumference, and therefore, along the river bank.

To facilitate the production of around, a hill was placed on the set. The hill was to provide a curvature which the dog was to walk around. In fact, the design of the hill accomplished its purpose and all the children walked the dog around a bend of the hill to reach the bone. However, this movement did not seem to facilitate the production of around.

It is hypothesized that possibly the motion of walking around the hill was not salient enough to elicit such a response. This may, in part, be due to the circumference of the hill at its base. This circumference is small relative to the motion needed to move the dog around it. It may be beneficial to increase the diameter to the point where moving the dog in a curving motion is clearly salient.

APPENDICES

APPENDIX A

DESCRIPTION OF SUBJECTS

APPENDIX A

DESCRIPTION OF SUBJECTS

Following is a detailed description of the language impaired and normal subject groups. Their family, medical, and educational histories are foregrounded, and their screening results and any significant observations are presented.

Language Impaired Subjects

Subject 1A: CC

Age at Testing: 6;10

Background History: CC is the oldest of two children. He experienced two ear infections during his childhood to date. Medication was administered for one to two weeks during the infections. It is unknown whether pressure equalization tubes were used. CC has Hay Fever and uses medication to relieve the symptoms. Family history of speech disorders was reported. Other medical and developmental history is unremarkable.

Speech and Language History: It was reported that CC began using first words meaningfully at the age of three. The use of two-word sentences began at four years old.

CC was enrolled in therapy through his school district for approximately two months. It was reported that this therapy focused on articulation. CC's mother reports that he has difficulty understanding instructions and believes this difficulty is persistent during school.

Screening Results:

MLU (in morphemes): 4.0
Observation Checklist: Not remarkable
Oral Peripheral: Diadochokinetic rates slightly below average

20 Repetitions	10 Repetitions
[p] - 8 seconds	[p t k] - 14 seconds
[t] - 8 seconds	(this sequence difficult
[k] - 9 seconds	for CC to perform)

NSST:

Expressive Score: 5/22--below 10th percentile
Receptive Score: 14/22--at 10th percentile

LIPS: tested through at least age 6;10

Responsiveness to Testing (subjective): average

School Test Results: Test of Language Development (TOLD)
sentence imitation--2nd percentile
word discrimination--9th percentile
grammatic closure--9th percentile
grammatic completion--2nd percentile
oral vocabulary--37th percentile
picture vocabulary--1st percentile

composite scorers:
syntax--66
speaking--72
spoken language--67
listening--67
semantics-- 76

Subject 2A: MF

Age at Testing: 6;7

Background History: MF is the oldest of three children. He experienced one ear infection as an infant. Medication was administered for one week during the infection. MF was described as a late starter in relation to his general motor development. Other medical and developmental history is unremarkable.

Speech and Language History: It was reported that MF began using first words meaningfully at the age of 1;5 years. However, his talking stopped for a period, and he began talking again at the age of 2;0. Two-word phrases began at 2;6 years. It was reported that MF stutters when he is upset. MF has been enrolled in therapy since kindergarten.

Educational History: MF was enrolled in Head Start for one year. He attended kindergarten for two years.

Screening Results:
MLU (in morphemes): 7.0
Observation Checklist: not remarkable
Oral Peripheral: difficulty following model for tongue protrusion, retraction, elevation, depression, and lateralization.

NSST:
Expressive Score: 18/22--between 25th and 50th percentile
Receptive Score: 17/22--between 25th and 50th percentile

LIPS: tested through at least age 6;7

Responsiveness to Testing (subjective): good

School Test Results: Test of Language Development (TOLD)
sentence imitation--9th percentile
word discrimination--16th percentile
grammatic closure--25th percentile
grammatic completion--25th percentile
oral vocabulary--50th percentile
picture vocabulary--63rd percentile

composite scores:
syntax--83
speaking--87
listening--97
semantics--103

Subject 3A: SS

Age at Testing: 7;4

Background History: SS is the second oldest of four children. He experienced numerous ear infections between the ages of one and three years. Pressure equalization tubes were placed in his ears at 6 months of age. Medication was used to clear his infections. SS was stressed during the birth process. However, no drugs or instruments were used. SS was slow to meet general motor development milestones as described by his mother. It was reported that SS appears to be uncoordinated with his fine motor skills and it is observed that his mouth opens while concentrating on fine motor tasks.

At the ages of 4 months and 7 months, SS experienced 105 degree fevers. Tylonol was administered to relieve the fevers. His fever at 7 months was associated with seminella poisoning. SS also has suffered form chicken pox.

Educational History: SS has attended school since 2 years of age. During his kindergarten year, he attended regular education for half a day, and special education for the other half.

Speech and Language History: It was reported that SS began using first words meaningfully at 8 months, and talked in two-word phrases shortly after reaching 2 years of age. Speech learning appeared to stop between the ages of 2 and 4, it was commented that he did not have clear pronunciation during this period. SS has been in speech therapy since the age of 2.

Screening Results:

MLU (in morphemes): 3.68
Observation Checklist: not remarkable
Oral Peripheral: not remarkable

NSST:

Expressive Score: 3/22--below 10th percentile
Receptive Score: 12/22--below 10th percentile

LIPS:

Basal: III
Ceiling: VII
IQ: 5;3
Interpretation--It is suspected that his lowered IQ score reflects visual perceptual impairments rather than mental disorder.

Responsiveness to Testing (subjective): good

School Test Results: Test of Language Development (TOLD)

sentence imitation--1st percentile
word discrimination--5th percentile
grammatic closure--16th percentile
grammatic completion--16th percentile
oral vocabulary--37th percentile
picture vocabulary--5th percentile

composites scores:
syntax--72
speaking--76
spoken language--74
listening--76
semantics--82

Normal Control Subjects

Subject 1B: BD

Age at Testing: 6;9

Background History: BD is the oldest of two children. BD suffered from Chicken Pox at the age of 5 years. Other medical and developmental history is unremarkable.

Speech and Language History: BD is reported to have developed age appropriate speech and language skills.

Screening Results:
MLU (in morphemes): 3.7
Observation Checklist: not remarkable
Oral Peripheral: not remarkable

NSST:
Expressive Scores: 16/22--25th percentile
Receptive score: 16/22--< 25th percentile

LIPS: Tested through at least age 7;3

Responsiveness to Testing (subjective): extremely shy and quiet

Subject 2B: SR

Age at Testing: 6;11

Background History: SR is the second of three children in his family. SR suffered from Chicken Pox at the age of 3 months. Other medical and developmental history is unremarkable.

Speech and Language History: SR is reported to have developed age appropriate speech and language skills.

Screening Results:

MLU (in morphemes): 8.0
Observation checklist: not remarkable
Oral Peripheral: enlarged tonsils

NSST:
Expressive Score: 18/22--> 25th percentile
Receptive Score: 15/22--< 25th percentile

LIPS: tested through at least age 7;3

Responsiveness to Testing (subjective): average

Subject 3B: JS

Age at Testing: 7;5

Background History: JS is the second oldest of four children in his family. JS suffered from Chicken Pox at the age of 6 years. Other medical and developmental history is unremarkable.

Speech and Language History: JS is reported to have developed age appropriate speech and language skills.

Screening Results:
MLU (in morphemes): 7.4
Observation checklist: not remarkable
Oral Peripheral: Not remarkable

NSST:
Expressive Score: 17/22--below 10th percentile
Receptive Score: 12/22--below 10th percentile

LIPS: Tested through at least age 7;6

Responsiveness to Testing (subjective): good

APPENDIX B

HUMAN SUBJECTS AFFIDAVIT

MICHIGAN STATE UNIVERSITY

UNIVERSITY COMMITTEE ON RESEARCH INVOLVING
HUMAN SUBJECTS (UCRIHS)
238 ADMINISTRATION BUILDING
(517) 355-2186

EAST LANSING • MICHIGAN • 48824-1046

December 1, 1986

Dr. Ida J. Stockman
Audiology & Speech Sciences
378 Communication Arts Building

Dear Dr. Stockman:

Subject: Proposal Entitled, "Locative Distinctions of Clinical and Normal Children"

UCRIHS' review of the above referenced project has now been completed. I am pleased to advise that since the reviewers' comments have been satisfactorily addressed, the conditional approval given by the Committee at its November 3, 1986 meeting has now been changed to full approval.

You are reminded that UCRIHS approval is valid for one calendar year. If you plan to continue this project beyond one year, please make provisions for obtaining appropriate UCRIHS approval prior to November 3, 1987.

Any changes in procedures involving human subjects must be reviewed by the UCRIHS prior to initiation of the change. UCRIHS must also be notified promptly of any problems (unexpected side effects, complaints, etc.) involving human subjects during the course of the work.

Thank you for bringing this project to our attention. If we can be of any future help, please do not hesitate to let us know.

Sincerely,

Henry E. Bredeck, Ph.D.
Chairman, UCRIHS

HEB/jms

APPENDIX C

LANSING PUBLIC SCHOOL DISTRICT

PROJECT APPROVAL FORM

LANSING
SCHOOL
DISTRICT
Committed to Quality

November 25, 1986

Ida J. Stockman, Ph.D.
Associate Professor
Department of Audiology & Speech Sciences
378 Communication Arts & Sciences Building
Michigan State University
East Lansing, MI 48824

Dear Dr. Stockman:

In regard to your research study titled, "Locative Distinctions of Abnormal and Clinical Children", the request to conduct the study in the Lansing School District has __X__ been approved, _____ has not been approved.

The following comments apply to your study:

Any teacher participation must be clearly voluntary. Written parent permission for student involvement must be on file in the (each) school.

If you have any questions or need additional information, please contact me (374-4347).

Thank you.

Pat Petersen
Evaluation Specialist

PP/mlc

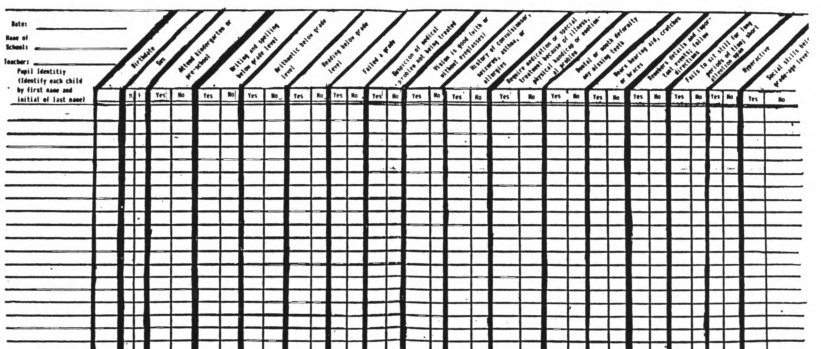
cc: Research Review Committee Members

Research & Evaluation Services Office
500 W. Lenawee St.
Lansing, Michigan 48933

APPENDIX D

TEACHER QUESTIONNAIRE FORMS

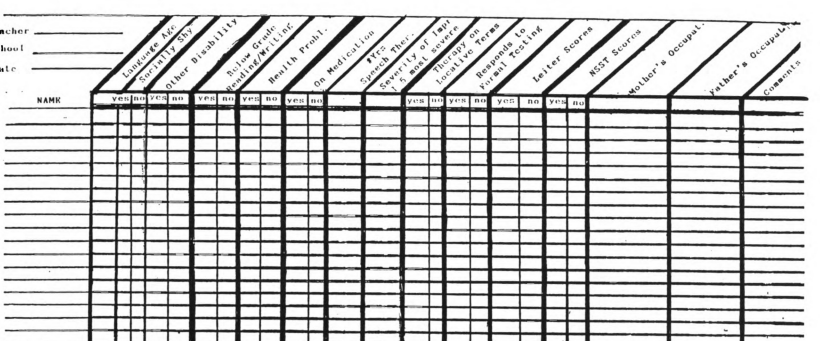
INSTRUCTIONS: You are asked to provide information on the following categories on each child in your classroom. Please place a check (✓) in the appropriate space indicating your judgment in that category. If you are uncertain about how to judge a category, place a question mark (?) in the space instead of a check. Please identify each child by initials only. You may be assured that all information provided by you will be kept confidential. Thank you for your cooperation.



Teacher _____

School _____

Date _____



INSTRUCTIONS: You are asked to provide information in the following categories for the language impaired children on your caseload who you feel will meet our subject selection criteria. This list should not include children who receive therapy just for articulation problems. Place a (√) in the space corresponding to your judgment. If school records do not permit a certain judgment, place a (?) in the space. Please identify each child by first name and list name initial only. All information provided by you will be kept confidential. Thank you for your cooperation.

Teacher __________

School __________

Date __________

NAME	Birthdate	Sex		English Spoken		Bilingual Home		Expressive Prbl.		Receptive Prbl.		Spch Hard to Understand		First Born		Only Child		Slow Learner		Evidence of Brain Damaged		Hyperactive		Learning Disabled		Hearing Aid or Crutches		Mouth Deformity		Emotional Probl.		Seizures	
		M	F	yes	no		no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no

Date: ____________

Name of School: ____________

Teacher: ____________

	Measured IQ	English speaking		Speech is clearly under-stood by teacher and others		Two or more languages spoken in child's home		Has trouble hearing speech, music or environmental sounds		Has received or currently receiving speech therapy		Learning disabilities diagnosed or suspected		Slow learner		Sibling status: FB=first born LB=last born O=other			Personality: S=shy O=out going AT=average temperament			Father's occupation	Mother's occupation	Comments
		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	FB	LB	O	S	O	AT			

APPENDIX E

TEST FORMS USED DURING THE SCREENING

APPENDIX E

TEST FORMS USED DURING THE SCREENING

Observation Checklist

1. Ability to formulate and produce the CV syllable /p^/, /t^/, and /k^/.
2. No extraneous vocalizations present during speech.
3. Points to nose, leg, and chair when asked a "where" question.
4. Absence of drooling.
5. Symmetry of the facial features.
6. Symmetric mouth retraction.
7. Symmetric tongue protrusion.
8. Ability to lateralize tongue and move tongue up and down.
9. No obvious paralysis of muscles.
10. Normal gait.

RECORD CARD
For the Leiter International Performance Scale — Cat. No. 37041R
(1948 Revision)

Name ..... Sex ..... Race .....

Date of Examination ..... M.A. ..... I. Q. .....

Date of Birth ..... C.A. ..... Present School Grade .....

Place of Birth ..... or highest Grade completed .....

TEST SUMMARY

Years	*Months*
II	
III	
IV	
V	
VI	
VII	
VIII	
IX	
X	
XII	
XIV	
XVI	
XVIII	
TOTAL	

NOTES ON THE EXAMINATION

Time Begun ..... Finished ..... Time Required .....

Cat. No. 37041R Printed in U. S. A. C. H. Stoelting Co., Chicago, Ill., U.S.A.

Name _____

YEAR II
(4 tests, 3 months each)

1. Matching colors (Present one Block at a time)
2. Block design (Present one Block at a time)
3. Matching pictures (Present one Block at a time)
4. Matching circles and squares (Present one Block at a time)

YEAR III
(4 tests, 3 months each)

1. Four forms (present one block at a time)
2. Block design
3. Picture completion (demonstrate first notch)
4. Number discrimination (one of three forms; a demonstration follows each failure)

YEAR IV
(4 tests, 3 months each)

1. Form and color
2. Eight forms (present one block at a time)
3. Counts four (two of three forms)
4. Form, color, number

YEAR V
(4 tests, 3 months each)

1. Genus
2. Two color circles (colors only correct)
3. Clothing
4. Block design (colors only)

YEAR VI
(4 tests, 3 months each)

1. Analogous progression
2. Pattern completion test (Demonstrate Form A; corrections allowed on marked notches in form A)
3. Matching on a basis of use
4. Block design

YEAR VII
(4 tests, 3 months each)

1. Reconstruction (demonstrate sigma)
2. Circle series
3. Circumference series
4. Recognition of age differences

YEAR VIII
(4 tests, 3 months each)

1. Matching shades of gray
2. Form discrimination
3. Judging mass (two of three forms)
4. Series of radii

YEAR IX
(4 tests, 3 months each)

1. Dot estimation
2. Analogous designs
3. Block design (angles +)
4. Line completion (Demonstrate first notch)

YEAR X
(4 tests, 3 months each)

1. Foot print recognition
2. Block design (in 5 minutes)
   Time_____
3. Concealed cubes (demonstrate first notch)
4. Block design (in 5 minutes)
   Time_____

YEAR XII
(4 tests, 6 months each)

1. Block design (in 4½ minutes)
   Time_____
2. Similarities; two things
3. Recognition of facial expressions
4. Classification of animals

YEAR XIV
(4 tests, 6 months each)

1. Concealed cubes
2. Analogous designs
3. Memory for a series
4. Form completion

YEAR XVI
(4 tests, 6 months each)

1. Code for a number series (demonstrate, using practice set and key; see manual)
2. Reversed clocks (demonstrate; see manual)
3. Dot estimation
4. Block design (in 2½ minutes)
   Time_____

YEAR XVIII
(6 tests, 6 months each)

1. Position analogy
2. Dot estimation
3. Form completion (give practice set)
4. Concealed cubes
5. Spatial orientation
6. Concealed cubes (demonstrate first two notches)

Lee, L. Evanston, Ill.: Northwestern University Press, 1971.

Ratusnik, D. L., Klee, T. M., & Ratusnik, C. M. JSHD, 1980, 45, 200-208.

SHORT FORM: Northwestern Syntax Screening Test (NSST-S)

NAME:_____ SEX:____ DATE:_____ DOB:_____ C.A.:_____

RECEPTIVE SCORE:_____ PERCENTILE:_____ EXPRESSIVE SCORE:_____ PERCENTILE:_____

FATHER'S OCCUPATION:_____ MOTHER'S OCCUPATION:_____

EXAMINER:_____ TESTING LOCATION:_____

RECEPTIVE ITEMS			EXPRESSIVE ITEMS		
1. The boy sees himself. The boy sees the shelf.*	d a		1. She sees the car.* He sees the car.	b a	
2. The car hits the train. The train hits the car.*	d a		2. The dog is on the box. The dog is in the box.*	a b	
3. The boy writes. The boys write.*	b c		3. This is their wagon.* This is his wagon.	b a	
4. The girl will drink.* The girl is drinking.	d c		4. This is my dog.* That is my dog.	b a	
5. The boy is pushed by the girl.* The girl is pushed by the boy.	b c		5. The boy will throw.* The boy is throwing.	a b	
6. The milk spilled. The milk spills.*	c d		6. Mother says, "Look who I found." Mother says, "Look what I found."*	a b	
7. Mother says, "Where is that girl?"* Mother says, "Who is that girl?"	a b		7. The cats play. The cat plays.*	b a	
8. Mother says, "Look who is here." Mother says, "Look what is here."*	c b		8. The boy is pulled by the girl.* The girl is pulled by the boy.	a b	
9. This is my hat.* That is my hat.	a c		9. This is a baby doll.* This is baby's doll.	a b	
10. The dog is in the box. Is the dog in the box?*	b a		10. The boy jumped. The boy jumps.*	a b	
11. The mother shows the kitty the baby.* The mother shows the baby the kitty.	d a		11. Has the boy found his ball? The boy has found his ball.*	a b	
	TOTAL			TOTAL	

COMMENTS:

APPENDIX F

PARENTAL CONSENT FORM

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF AUDIOLOGY AND SPEECH SCIENCES
378 COMMUNICATION ARTS AND SCIENCES BUILDING

SPEECH AND HEARING CLINIC
101 WILSON ROAD

EAST LANSING • MICHIGAN • 48824-1212

Dear Parent or Guardian:

I am conducting a study of children's language development. In particular, I want to observe how children talk about where objects are located in space at different ages. This kind of information is often used when planning school instruction and writing books for children to read at different ages. This kind of information is also helpful in identifying children who have language problems.

Basically, three observations of your child will be required. The first observation can be scheduled in your home. At that time, we want to listen to your child talk in a natural play situation and we will administer very simple test materials that reveal your child's knowledge of particular language features. The second and third observations will be done at Michigan State University in the Department of Audiology & Speech Sciences. During these observations, we will again observe your child's talking in a natural play situation. In addition, we will allow him/her to move objects around on a play set that has been created and talk about where the objects are moved to.

Each observation should last no more than two hours and for each observation, you will be paid $20 plus transportation costs. You will be able to observe your child for the entire observation if desired. Further details are spelled out on the permission form itself.

I invite you to call me at one of the telephone numbers below if you have questions about the project before giving consent.

Department of Audiology & Speech Sciences
(517)- 353-6764 of 353-7175 (secretary for messages)
351-2134 (Home after 6:00 P.M. Evenings)

Respectfully,

Ida J. Stockman, Ph.D.
Associate Professor

SUBJECT CONSENT FORM FOR PARTICIPATION IN STUDY

I _____consent for _____
parent or guardian child's name

to participate in a study of children's language development. I understand that the goal of the study is to determine how children at different ages talk about where things are located in space. I understand that my child's participation in the study will require at least two but not more than three observation sessions and that each session will last between one to two hours.

I understand further that the first observation session could take place in my home if I request it. I understand that during the first visit, my child will be given two standardized tests of language and language related skills if these tests have not already been given to him/her. The two tests will be the Leiter International Scale and the Northwestern Screening Syntax Test.

I understand that the second and third observation sessions must take place at Michigan State University in the Department of Audiology & Speech Sciences. During these observations, my child will be videotaped while he/she plays with toys and talks to the clinicians about the toys.

I understand further that I may obscrve every observation session with my child. Each session will be scheduled at my convenience within a one month time span and will respect my child's tolerance for the play sessions. I understand further that I will be paid $20 for each observation session and be reimbursed for transportation costs at a rate of 21¢ per mile for the use of my car or reimbursed for the entire amount of taxifare.

I understand that my child's participation is voluntary and that consent may be withdrawn at any time without recrimination.

I understand that the results of the observations will be used for research purposes and <u>not</u> for educational placement. I understand that the results of observations made on my child will be made available to me and to appropriate school officials at my request.

I understand that report of these observations will respect my child's right to privacy by not revealing his/her identity.

APPENDIX G

DEFINITION OF GENERAL AND SPECIFIC

LOCATIVE WORDS

APPENDIX G

DEFINITION OF GENERAL AND SPECIFIC LOCATIVE WORDS

Specific Locative Words

Specific locative words describe the spatial relations of an object with more specificity than general locative words. These specific words indicate certain spatial boundaries. The number of spatial boundaries indicated varies depending on which locative word is coded. However, the minimum specification is one.

For example, suppose a dog's interacting spatial boundaries are walls. An individual may desire to convey the relationship between these walls and the dog. If the individual says the dog is inside, then aspects of that relationship are conveyed. The locative word inside, offers the information that the dog is bounded in space by at least 3 walls. The positioning of these walls may change and the number of walls may vary. Three walls may be positioned on the vertical planes in front of him and on both sides of him. They also can be positioned such that one wall is over him horizontally, one under him horizontally, and the other in front of him vertically. Three additional walls may be present such that a box is now surrounding the dog. Among all these variables, what is stable, and what is specific about the word inside is the indication of a minimum of three surrounding spatial boundaries.

Specific locative words can become more specific by not only defining the minimum number of spatial boundaries that are to be present, but also defining the position in space of those boundaries. For example, under is considered to be more specific than in. The minimum number of bounded spaces under indicates is one. In addition, under implies that this bounded space must be positioned above the object. This is more specific than in because it indicates both minimum number of bounded spaces and positions, whereas in only indicates number of bounded spaces.

The most specific locative word is one which indicates minimum number of spatial boundaries, positions of the boundaries, and contacts of the boundaries. The locative word on, for example, indicates a minimum number of one spatial boundary which is

positioned below the object. In addition, the spatial boundary must be in contact with the object. In contrast, in does not indicate contacts between the boundaries and the object. For example, the dog may be floating in the middle of a house, or may be touching the lower boundary by sitting on the floor of the house.

In sum, specific locative words indicate at least one bounded space about the object. These words vary in specificity among each other. These variations depend on how much information about the bounded space is conveyed through the word. The most specific locative word is one which conveys the minimum number, position, and contact of the bounded spaces.

General Locative Words

As it has been demonstrated that specificity can vary among specific locative words, they still can be distinguished from general locative words. General locatives offer little information as to the surrounding spaces interacting with the object. These locatives do not indicate minimum number of spatial boundaries, nor their positions or contacts with the object.

At best, a general locative indicates if an object is in the vicinity of a certain location (e.g., at the house). However, often much less information is indicated. This is particularly so with the locative words here and there. When using these words, the receiving individual often must see the object to gain a sense of the location. Pointing gestures often accompany these locatives to guide the individual in looking at the location.

In addition, general locatives (e.g., here, there, and to) lend themselves to being used in a multitude of situations. For example, if a dog walked to the top of a house, an individual can say "The dog walked to the house." If the dog walked inside the house, the individual can use the same sentence "The dog walked to the house." In fact, the child can use the same sentence if the dog walked under, in front, or behind the house.

In sum, general locatives give little sense about the actual location of the object and the surrounding bounded spaces. Also, they can be used in a variety of situations where the number, positions, and contacts of the bounding spaces vary; and where the specific locative words used to describe the varying spatial boundaries need to change forms.

APPENDIX H

LANGUAGE SAMPLE SCORE FORM

APPENDIX H

Language Sample Score Form

Name:
Age:
Date of Testing:

Session #:

		in	on	front	behind	under	around	across	up	down	along	through
STATIC	Position											
	Perspective											
DYNAMIC	Origin											
	Direction											
	Destination											

Comments:

APPENDIX I

SUBJECT SCORES FOR INDIVIDUAL

TARGETED LOCATIVE WORDS

Table I.1

Subject Scores for Individual Targeted Directional Locative Words

Subject	Numeric Value for Each Targeted Word for the STATIC PERSPECTIVE LOCATIVE Subcategory*						Subject Total
	around	down	up	through	across	along	
LI Group:							
S_1a	4A	2	2	2	5	2	17
S_2a	4A	5	5	2	5	2	23
S_3a	2	2	2	2	2	2	12
Group Total							52
Mean							17
N Group:							
S_1b	2	2	2	2	2	2	12
S_2b	2	4B	5	2	5	4A	22
S_3b	5	2	5	4A	2	4B	22
Group Total							56
Mean							19

*Numeric Values Assigned to the Response Categories

0 - No Verbal Response/
Nonlocative Response
1 - Incorrect Locative Response
2 - Nontarget Locative Subcategory Response
3 - General Locative Response to the Targeted Subcategory
4B - Nontarget Locative Response to the Targeted Subcategory
4A - Semantic Sense Response to the Targeted Subcategory
5 - Targeted Locative Word Response

Table I.2

Subject Scores for Individual Targeted Directional Locative Words

Subject	Numeric Value for Each Targeted Word for the DYNAMIC DIRECTION LOCATIVE Subcategory*						Subject Total
	around	down	up	through	across	along	
LI Group:							
S_1a	4A	4A	4A	4A	5	4A	25
S_2a	4B	5	5	5	2	2	23
S_3a	4A	5	5	2	5	2	23
Group Total							71
Mean							24
N Group							
S_1b	2	2	5	2	2	2	15
S_2b	4A	5	5	5	5	2	26
S_3b	2	5	5	5	5	4A	26
Group Total							67
Mean							22

*Numeric Values Assigned to the Response Categories

0 - No Verbal Response/
Nonlocative Response
1 - Incorrect Locative Response
2 - Nontarget Locative Subcategory Response
3 - General Locative Response to the Targeted Subcategory
4B - Nontarget Locative Response to the Targeted Subcategory
4A - Semantic Sense Response to the Targeted Subcategory
5 - Targeted Locative Word Response

Table I.3

Subject Scores for Individual Targeted Locative Positional Words

Subject	Numeric Value for Each Targeted Word for the STATIC POSITION Locative Subcategory*						Subject Total
	front	in	behind	under	between	on	
LI Group:							
S_1a	3	5	5	1	4A	5	23
S_2a	5	5	5	5	5	5	30
S_3a	4A	5	4A	5	5	5	28
Group Total							81
Mean							27
N Group:							
S_1b	3	5	3	3	5	3	22
S_2b	3	5	3	5	5	5	26
S_3b	3	5	5	5	5	5	28
Group Total							76
Mean							25

*Numeric Values Assigned to the Response Categories

0 - No Verbal Response/
Nonlocative Response
1 - Incorrect Locative Response
2 - Nontarget Locative Subcategory Response
3 - General Locative Response to the Targeted Subcategory
4B - Nontarget Locative Response to the Targeted Subcategory
4A - Semantic Sense Response to the Targeted Subcategory
5 - Targeted Locative Word Response

Table I.4

Subject Scores for Individual Targeted Locative Positional Words

Subject	Numeric Value for Each Targeted Word for the DYNAMIC ORIGIN Locative Subcategory*						Subject Total
	front	in	behind	under	between	on	
LI Group:							
S_1a	5	5	3	3	3	5	24
S_2a	3	5	5	3	5	5	26
S_3a	3	5	3	3	5	5	24
Group Total							74
Mean							25
N Group							
S_1b	3	3	3	3	5	3	20
S_2b	3	5	3	5	5	1	22
S_3b	4A	5	5	3	5	5	27
Group Total							69
Mean							23

*Numeric Values Assigned to the Response Categories

0 - No Verbal Response/
Nonlocative Response
1 - Incorrect Locative Response
2 - Nontarget Locative Subcategory Response
3 - General Locative Response to the Targeted Subcategory
4B - Nontarget Locative Response to the Targeted Subcategory
4A - Semantic Sense Response to the Targeted Subcategory
5 - Targeted Locative Word Response

Table I.5

Subject Scores for Individual Targeted Locative Positional Words

Subject	Numeric Value for Each Targeted Word for the DYNAMIC DESTINATION Locative Subcategory*						Subject Total
	front	in	behind	under	between	on	
LI Group:							
S_1a	3	5	3	3	3	5	22
S_2a	3	5	3	5	5	2	23
S_3a	3	5	3	3	3	3	20
Group Total							65
Mean							22
N Group							
S_1a	3	5	3	3	5	3	22
S_2b	3	5	3	3	5	3	22
S_3b	3	3	5	5	5	5	26
Group Total							70
Mean							23

*Numeric Values Assigned to the Response Categories

0 - No Verbal Response/
Nonlocative Response
1 - Incorrect Locative Response
2 - Nontarget Locative Subcategory Response
3 - General Locative Response to the Targeted Subcategory
4B - Nontarget Locative Response to the Targeted Subcategory
4A - Semantic Sense Response to the Targeted Subcategory
5 - Targeted Locative Word Response

APPENDIX J

RANK ORDERING OF GROUP MEAN PERCENTAGES

AVERAGED ACROSS ALL FIVE TASKS

Table J.1

Rank Ordering of Group Mean Percentages Averaged Across All Five Tasks

Group Mean Percentages	Rank	Group	LI Group	N Group
22	1	LI	1	
28	2	N		2
33	3	LI	3	
39	4.5	LI	4.5	
39	4.5	N		4.5
44	6.5	LI	6.5	
44	6.5	N		6.5
50	8	N		8
61	9	N		9
67	10	LI	10	
			T_1=25	T_2=30
			n_1= 5	n_2= 5

Note. The percentages reflect the ratio of correct responses to the total number of response opportunities.

N = Normal Control

LI = Languagee Impaired

Source: Senders, 1958, pp. 437-440.

APPENDIX K

RAW DATA USED FOR THE RANK SUMS TEST (SENDERS, 1958) FOR STRUCTURED TASK MEAN SCORES BETWEEN THE SUBJECT GROUPS AVERAGED ACROSS ALL FIVE TASKS

Table K.1

Raw Data Used for the Rank Sums Test (Senders, 1958) for Structured Task Mean Scores Between the Subject Groups Averaged Across All Five Tasks

Mean Scores	Rank	Group	LI Group	N Group
17.3	1	LI	1	
19	2	N		2
21.7	3	LI	3	
22.3	4	N		4
22.7	5	N		5
23.3	6	N		6
24	7.5	LI	7.5	
24	7.5	LI	7.5	
25.3	9	N		9
27	10	LI	10	
			T_1=29	T_2=26
			n_1= 5	n_2= 5

Note. LI = Language Impaired

N = Normal Control

APPENDIX L

DISTRIBUTION OF LOCATIVE WORDS ELICITED FOR THE FIVE TARGETED LOCATIVE SUBCATEGORIES DURING THE STRUCTURED AND SPONTANEOUS LANGUAGE SAMPLING TASKS

Table L.1

Distribution of Locative Words Elicited for Static Position Locative Subcategory During the Structured and Spontaneous Language Sampling Tasks

	Front	In	Behind	Under	Between	On
Structured Task Data						
Language Impaired Group						
S_1a	-	+	+	-	-	-
S_2a	+	+	+	+	+	+
S_3a	+	-	-	+	+	+
Normal Group						
S_1b	-	+	-	-	+	-
S_2b	-	+	-	+	+	+
S_3b	-	+	+	+	+	+
Total Mean	33%	83%	50%	67%	83%	67%
Language Sample Data						
Language Impaired Group						
S_1a	-	+	-	-	-	+
S_2a	+	+	+	-	-	-
S_3a	-	+	-	+	-	+
Normal Group						
S_1b	+	+	+	+	-	-
S_2b	-	+	+	+	-	+
S_3b	-	+	-	-	-	+
Total Mean	33%	100%	50%	50%	0%	67%

Note. + = Target Locative Elicited
- = Targeted Locative Not Elicited

Table L.2

Distribution of Locative Words Elicited for Dynamic Origin Locative Subcategory During the Structured and Spontaneous Language Sampling Tasks

	Front	In	Behind	Under	Between	On
Structured Test						
Language Impaired Group						
S_1a	+	+	-	-	-	-
S_2a	-	+	+	-	+	+
S_3a	-	+	-	-	-	+
Normal Group						
S_1b	-	-	-	-	+	-
S_2b	-	+	-	+	+	-
S_3b	-	+	-	-	+	+
Total Mean	17%	67%	17%	17%	67%	50%
Language Sample						
Language Impaired Group						
S_1a	-	+	-	-	-	-
S_2a	-	+	-	-	-	+
S_3a	-	+	-	-	+	+
Normal Group						
S_2b	-	+	-	-	-	+
S_2b	-	+	-	-	-	-
S_3b	-	-	-	-	-	+
Total Mean	0%	100%	0%	0%	17%	67%

Note. + = Target Locative Elicited
- = Targeted Locative Not Elicited

Table L.3

Distribution of Locative Words Elicited for Dynamic Destination Locative Subcategory During the Structured and Spontaneous Language Sampling Tasks

	Front	In	Behind	Under	Between	On
Structured Task Data						
Language Impaired Group						
S_1a	-	+	-	-	-	+
S_2a	-	+	-	+	+	+
S_3a	-	+	-	-	-	-
Normal Group						
S_1b	-	+	-	-	+	-
S_2b	-	+	-	-	-	+
S_3b	-	-	+	+	+	+
Total Mean	0%	83%	17%	33%	50%	50%
Language Sample						
Language Impaired Group						
S_1b	-	+	+	-	-	+
S_2b	-	+	-	+	-	+
S_3b	-	+	-	+	-	+
Normal Group						
S_1b	+	+	+	+	+	+
S_2b	-	+	-	+	-	+
S_3b	-	+	-	-	-	+
Total Mean	17%	100%	33%	67%	17%	100%

Note. + = Target Locative Elicited
- = Targeted Locative Not Elicited

Table L.4

Distribution of Locative Words Elicited for Dynamic Direction Locative Subcategory During the Structured and Spontaneous Language Sampling Tasks

	Along	Up	Around	Down	Across	Through
Structured Task Data						
Language Impaired Group						
S_1a	-	-	-	-	+	-
S_2a	-	+	-	+	-	+
S_3a	-	+	-	+	+	-
Normal Group						
S_1b	-	+	-	-	-	-
S_2b	-	+	-	+	+	+
S_3b	-	+	-	+	+	+
Total Mean	0%	83%	0%	67%	67%	50%
Language Sample Data						
Language Impaired Group						
S_1a	-	+	-	+	+	-
S_2a	-	-	-	+	+	-
S_3a	-	+	+	+	+	-
Normal Group						
S_1b	-	+	+	+	+	+
S_2b	-	+	-	+	+	+
S_3b	-	+	-	+	+	-
Total Mean	0%	83%	33%	100%	100%	33%

Note. + = Target Locative Elicited
- = Targeted Locative Not Elicited

Table L.5

Distribution of Locative Words Elicited for Static Perspective Locative Subcategory During the Structured and Spontaneous Language Sampling Tasks

	Along	Up	Around	Down	Across	Through
Structured Task Data						
Language Impaired Group						
S_1a	-	-	-	-	+	-
S_2a	-	+	-	+	+	-
S_3a	-	-	-	-	-	-
Normal Group						
S_1b	-	-	-	-	-	-
S_2b	-	+	-	-	+	-
S_3b	-	+	+	-	+	-
Total Mean	0%	50%	17%	17%	67%	0%
Language Impaired Group						
S_1a	-	-	-	-	+	-
S_2a	-	+	-	+	-	-
S_2a	-	-	-	-	+	-
Normal Group						
S_1b	-	+	-	-	+	-
S_2b	-	+	-	+	+	-
S_3b	-	-	-	-	+	-
Total Mean	0%	50%	0%	33%	67%	0%

Note. + = Target Locative Elicited
- = Targeted Locative Not Elicited

APPENDIX M

RANK ORDER FOR MEAN NUMBER OF SUBJESCTS PRODUCING THE TARGETED LOCATIVE WORDS FOR ALL FIVE SUBCATEGORIES BETWEEN THE STRUCTURED TASK AND LANGUAGE SAMPLING PROCEDURES

Table M.1

Static Positional Locative Subcategory

Percentage	Rank Number	Group	Structured Task Ranks	Language Sampling Ranks
0	1	LS		1
33	2.5	LS		2.5
33	2.5	S	2.5	
50	5	LS		5
50	5	LS		5
50	5	S	5	
67	8	S	8	
67	8	S	8	
67	8	LS		8
83	10.5	S	10.5	
83	10.5	S	10.5	
100	12	LS		12
			T_1=44.5	T_2=33.5
			n_1=6	n_1=6

Note. The percentages represent the number of subjects who produced a targeted locative word divided by the total number of subjects (6).

LS = Language Sampling

S = Structured Task

Table M.2

Dynamic Direction Locative Subcategory

Percentage	Rank Number	Group	Structured Task Ranks	Language Sampling Ranks
0	2	LS		2
0	2	SS	2	
0	2	SS	2	
33	4.5	LS		4.5
33	4.5	LS		4.5
50	6	SS	6	
67	7.5	SS	7.5	
67	7.5	SS	7.5	
83	9.5	SS	9.5	
83	9.5	LS		9.5
100	11.5	LS		11.5
100	11.5	LS		11.5
			T_1=34.5	T_2=43.5
			n_1= 6	n_2= 6

Note. The percentages represent the number of subjects who produced a targeted locative word divided by the total number of subjects (6).

LS = Language Sampling

S = Structured Task

Table M.3

Dynamic Origin Locative Subcategory

Percentage	Rank Number	Group	Structured Task Ranks	Language Sampling Ranks
0	2	LS		2
0	2	LS		2
0	2	LS		2
17	5.5	LS		5.5
17	5.5	S	5.5	
17	5.5	S	5.5	
17	5.5	S	5.5	
50	8	S	8	
67	10	S	10	
67	10	S	10	
67	10	LS		10
100	12	LS		12
			T_1=44.5	T_2=33.5
			n_1= 6	n_2= 6

Note. The percentages represent the number of subjects who produced a targeted locative word divided by the total number of subjects (6).

LS = Language Sampling

S = Structured Task

Table M.4

Dynamic Direction Locative Subcategory

Percentage	Rank Number	Group	Structured Task Ranks	Language Sampling Ranks
0	1	SS	1	
17	3	SS	3	
17	3	LS		3
17	3	LS		3
33	5.5	LS		5.5
33	5.5	SS	5.5	
50	7.5	SS	7.5	
50	7.5	SS	7.5	
67	9	LS		9
83	10	SS	10	
100	11.5	LS		11.5
100	11.5	LS		11.5
			T_1=34.50	T_2=43.5
			n_1= 6	n_2= 6

Note. The percentages represent the number of subjects who produced a targeted locative word divided by the total number of subjects (6).

LS = Language Sampling

S = Structured Task

Table M.5

Static Perspective Locative Subcategory

Percentage	Rank Number	Group	Structured Task Ranks	Language Sampling Ranks
0	2.5	LS		2.5
0	2.5	LS		2.5
0	2.5	SS	2.5	
0	2.5	SS	2.5	
17	5.5	SS	5.5	
17	5.5	SS	5.5	
33	7	LS		7
50	8.5	LS		8.5
50	8.5	SS	8.5	
67	10.5	SS	10.5	
67	10.5	LS		10.5
100	12	LS		12
			$T_1 = 35$ $n_1 = 6$	$T_2 = 43$ $n_2 = 6$

Note. The percentages represent the number of subjects who produced a targeted locative word divided by the total number of subjects (6).

LS = Language Sampling

S = Structured Task

APPENDIX N

RAW DATA USED IN THE RANK SUMS TEST (SENDERS, 1958)

BETWEEN TEST-RETEST SCORES

Table N.1

Raw Data Used in the Rank Sums Test (Senders, 1958) Between Test-Retest Scores

Scores	Rank	Group	Test	Retest
12	1	Retest		1
15	2	Test	2	
18	3	Retest		3
20	4	Test	4	
22	6.5	Retest		6.5
22	6.5	Retest		6.5
22	6.5	Test	6.5	
22	6.5	Test	6.5	
23	9	Test	9	
26	10	Retest		10
			T_1=28	T_2=27
			n_1= 5	n_2= 5

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