SUBCATEGORIES OF ACTION VERBS IN CHILDREN'S LANGUAGE

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A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF ARTS

Department of Audiology and Speech Sciences

1988

ABSTRACT

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Semantic relational features of children's utterances have been described using global categories which do not adequately describe later language development or reveal differences between language-impaired and normally developing children. The purpose of this study was to apply subcategories of action verbs to the spontaneous language samples of eight nonclinical children and to determine if these subcategories could distinguish the action verbs of two normal and two clinical children matched on the basis of age, sex, and socio-economic status. The results revealed four trends in verb distribution: 1) Movement verbs were more frequent than Nonmovement verbs; 2) Change of State verbs were more frequent than Nonchange of State verbs; 3) among Movement verbs, from most to least frequently occurring, were Change of Locative, Attributive, and Possessive States, respectively; and 4) among Nonmovement verbs, no differences existed among Nonchange of Positional, External, and Possessive States. Significant differences were not found between the normal and language-impaired children.

ACKNOWLEDGMENTS

This project could not have been completed without the assistance of several people to whom I would like to express my sincere gratitude. First, I would like to thank Dr. Ida Stockman, Chairman of my thesis committee, for her insight and guidance throughout this investigation. I would also like to express my appreciation to the members of my thesis committee, Dr. Gloriajean Wallace and Dr. Philip Davidson.

In addition, I am indebted to those children who participated as subjects in this study.

Finally, I would like to thank my family and friends for their patience, love, and support throughout this endeavor.

This work was made possible through research funding from both a National Science Foundation grant (1BNS841-8587) and a Michigan State University All-University Initiation Research Grant, Dr. Ida Stockman, co-principal and principal investigator, respectively.

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INTRODUCTION

During the past two decades, research on early linguistic development shifted its focus from the syntactic structures the child produces to the meaningful relationships expressed by word combinations. Prior to this shift, empirical studies of the 1960s gave rise to syntactic descriptions of language which were often based on Chomsky's (1965) transformational grammar. Using this model, highly structural descriptions of language were provided by analyzing sentences according to their deep underlying structures and transformational rules. As a result, sentences were often described according to their constituent parts. For example, the sentence, "the boy is riding a bike," would be described as "Noun Phrase + Verb Phrase," or more specifically in terms of constituent structure of noun phrase and verb phrase, "Article + Noun + Auxiliary + Verb + Article + Noun." Despite the valuable insight this model provided into the syntax of children's language disorders, there was little consideration given to the meanings underlying these syntactic structures.

A theoretical shift in thinking toward a semantic perspective occurred during the 1970s. Bloom (1970) was one of the first investigators to systematically describe the semantic relational properties of children's utterances. She noted that utterances using the same syntactic properties were produced by children to

express different semantic relationships. Bloom's method involved "rich interpretation" of utterance meaning, derived from examining the utterance's structural characteristics in relation to its nonlinguistic context. The nonlinguistic context referred to the events occurring at the time of the utterance. For example, if a child said "gimme juice," the nonlinguistic context might consist of the child pointing toward a glass of juice in his mother's hand. Thus, semantic relationships extended beyond lexical referential meaning to include meanings expressed by relations between words (Leonard, Bolders & Miller, 1976). For example, Bloom argued that when a child says "mommy sock," his expression may convey something about the relationship occurring between an agent (mommy) and an object (sock), if the situational context of the utterance was that of his mother putting on the sock. The same syntactic utterance could also be used to express the relationship between a possessor (mommy) and a possession (sock). The relational meaning was generated by the combination of at least two words and resulted in a compositional meaning that connoted much more than the lexical meanings of the words alone. On the basis of her research, Bloom (1975) was able to identify the following semantic relations of two-word sentences:

1. Existence
2. Nonexistence
3. Recurrence
4. Agent, Action, Object
5. Possessive

6. Attributive

7. Locative

In addition to these semantic relations, Bloom, Lightbown, and Hood (1975) also identified the following categories as emerging earlier in children's language development:

1. Locative Action

2. Locative State

3. Notice

Following Bloom, Lightbown, and Hood's (1975) research, a variety of systems were developed for categorizing semantic relations. Schlesinger (1971) identified the following eight different semantic relations expressed by two-word utterances in the data he examined:

1. Agent and Action

2. Action and Object

3. Agent and Object

4. Modifiers

5. Negation

6. Dative

7. Ostentation

8. Locative

He suggested that these intention-markers or I-markers are determined by the cognitive capacity of the child, and are universal and innate.

Bowerman's (1973) study of Finnish and English also provided support for a semantic interpretation of the structural relations

expressed in children's early utterances. She noted that in cross-linguistic comparison of children's speech, there were striking similarities in the constructions of their early word combinations.

In 1973, Brown provided a comprehensive review of 19 reports on 13 children observed by a variety of investigators (Braine, 1963; Brown & Fraser, 1963; Brown & Bellugi, 1964; Miller & Ervin, 1964; Brown & Cazden, 1969; Kernan, 1969; Bloom, 1970; Bowerman, 1970; Rydin, 1971; and Tobert, 1972; cited in Brown, 1973). The data were gathered from the spontaneous conversations of children in natural environments with similar MLU values. The various languages studied included American, English, Finnish, Swedish, Samoan, and Spanish. Brown examined the semantic relations expressed in children's utterances during his defined MLU Stage 1. On the basis of this review, he was able to identify the following eight basic semantic relations which accounted for approximately seventy percent of the children's utterances across studies:

1. Agent + Action
2. Action + Object
3. Agent + Object
4. Action + Locative
5. Entity + Locative
6. Possessor + Possession
7. Entity + Attributive
8. Demonstrative + Entity

This suggested that a set of basic semantic relations was universal across unrelated languages.

Although the notion of the semantic relational category has provided an invaluable base from which to explore and describe early language development, it should not be assumed that these semantic relations adequately represent the complex and multi-faceted nature of language, as the following section will show. This study was an attempt to expand the description of semantic relational categories in children's language.

Statement of the Problem

While the semantic relations developed by Bloom (1970), and Brown (1973), were excellent first attempts in the description of semantics of language they have one basic shortcoming. Casual observation of these semantic relations, reveals that they are extremely "global" in nature. The use of global categories results in assigning a wide range of utterances to a single category even though they are very different in meaning. For example, the verbs "breaking" and "sleeping" could be classified under the semantic category of action. However, on closer inspection, the meanings expressed by these words intuitively seem to be different. "Breaking" is an action which requires movement but results in an external change of the attributive state of an object. However, "holding" is an action that neither requires movement nor results in an external change in the state of the person involved. There are other examples of action that code different aspects of meaning, yet a global category would classify them as being the same.

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One can also identify various aspects of meaning within the global category of location. For example, "the dog jumped off the chair," "the dog jumped down," "the dog jumped on the chair," would all be classified under the semantic category of location or locative action. However, closer inspection of these utterances reveals that each utterance has slightly different shades of meaning from the other. The original location of the dog is highlighted in the first example, "the dog jumped off the chair," whereas, the directional location of the dog's movement is identified in the second example, "the dog jumped down." In the third example, "the dog jumped on the chair," it is the destination of the dog which is emphasized. Within a global system of semantic categories, these utterances all would be placed in a single category, and the differences in their meanings would not be revealed.

These examples point to the possibility that the global semantic categories described by Bloom (1975), Bloom, Lightbown, and Hood (1975), and Brown (1973) can be further differentiated into more fine-grained subcategories which could better describe the various aspects of meaning coded by a global category description. It seems reasonable to assume that more differentiated categories could capture developmental differences. The next section explores the consequences of a global model for 1) the description of later language development, and 2) the differentiation of normal and language-impaired children.

The Use of Global Semantic Categories in the Description of Later Language Development

The basic semantic relations of Bloom (1970) and Brown (1973), do not adequately describe later semantic development. This conclusion is not surprising given the assumption that semantic relations such as agent, action, location, negation, etc., are assumed to be basic and universal features of language. Therefore, they would be expected to occur in some form in all children at an early age. In fact, these semantic categories were developed as a description of children's language at early stages of development. The children in the studies reviewed by Brown (1973) were all at a defined MLU Stage I of development which spanned the ages of 1;7 and 2;6 years. Brown concluded that

> Stage I utterances in all languages for which studies exist, concentrate on the same set of meanings, a set far short of the meanings that languages are able to express and in adult usage, do express (p. 173).

This would suggest that while Brown's (1973) semantic relations are descriptive of children's utterances during Stage I of development, they are unable to account for the meanings the child acquires later in development.

These results were supported by Stockman and Vaughn-Cooke (1982) in their comparison of data on working class Black children, with the data collected by Bloom, Lightbown, and Hood (1975), Miller (1982), and Blake (1984) on working class and middle class White children. Their review indicated that the majority of the children

in Mid Stage I (19-23 months) had reached the criterion of productive usage for the following semantic categories:

1. Existence
2. Action
3. Locative Action
4. State
5. Locative State
6. Negation
7. Possession
8. Attribution
9. Notice
10. Intention
11. Recurrence

Because these basic semantic relations are acquired early in language development, one is left with the question of what happens later in the development of language. Do children simply add more forms once a category is acquired, or is there a qualitative difference in the type of forms acquired at various stages of development?

If global categories of semantic relations cannot distinguish among normally developing children beyond the earliest stages of language development, then one might wonder about their effectiveness in identifying semantic differences between language-impaired and normally developing children.

The Use of Global Semantic Categories in the Differentiation of Normal and Language Impaired Children

Language assessment in clinical contexts base the determination of normal versus language-impaired on normal language developmental data. The assumption that global semantic categories are unable to adequately describe differences among normally developing children predicts that they also will not differentiate between normal and delayed development. The absence of a differentiated way of looking at semantic relations, therefore, has implications for understanding the nature of language-impairment.

The cognitive/representational hypothesis is among current views regarding the nature of language-impairment. The fundamental premise of this hypothesis is that a cognitive deficit is at the base of language-impairment. Language has been thought to be related to cognition primarily in the semantic system within contemporary interpretations of this relationship (Vygotsky, 1962; Bloom, 1970; Slobin, 1973; Schlesinger, 1974). This line of argument suggests that if cognitive deficits exist among the language-impaired, then the semantic system should reflect these deficits.

While there has been a great deal of support for the presence of cognitive deficits among language-impaired children, the literature has not provided support for a corresponding semantic deficit. The remainder of this section will first consider the evidence suggesting that cognitive deficits may be characteristic of

language-impairment, and then the evidence suggesting that semantic deficits may not be characteristic of language-impairment.

Evidence Suggesting Cognitive Deficits May Be Characteristic of Language Impairment

Several researchers have attempted to investigate the cognitive abilities of language-disordered children by comparing their performances on various nonverbal tasks to the performances of age-matched children with normal language development. In spite of documented normal nonverbal intelligence, the language-impaired groups performed more poorly than the normal groups in the areas of anticipatory imagery (Savich, 1984), mental rotation abilities (Johnson & Weismer, 1983), symbolic play (Udwin & Yule, 1983), haptic recognition (Kamhi, 1981; 1984), discrimination-learning problems (Nelson, Kamhi, & Apel, 1987), and cognitive and semantic processing (Wren, 1982). These results suggest that nonverbal cognitive deficits do exist in children with specific language-impairments.

This notion of related nonverbal cognitive deficits in children with language disorders is at variance with current definitions of specific language impairment. Specific language impairment is defined as a delay in a child's comprehension and production of language in the absence of any sensory, perceptual, emotional, or cognitive impairment (Stark & Tallal, 1981). Language-impaired children are different from mentally-retarded children, in that they

don't have a general cognitive deficit, and it isn't known why the language problem exists.

This discrepancy between research findings that support a cognitive deficit in language-impaired children, and the perception that they have normal cognitive abilities may be related to the way that cognition has been measured. Nonverbal cognitive abilities are often measured by intelligence scales such as the Leiter International Performance Scale (LIPS, Leiter) (Leiter, 1959). Johnston (1982) analyzed the LIPS items and found that they fell into two groups depending on the types of cognitive processes that they entail. One group included perceptual items which required only the recognition of physical resemblance, and the other group included conceptual items, which required that the picture be interpreted according to prior spatial, numerical, or classificatory knowledge. Johnson administered the LIPS to 16 language-disordered children matched to 16 children with normal language, on the basis of chronological age, sex, and Leiter IQ. The results revealed that the language-disordered group was more successful on those items requiring only the perception of physical similarity. Therefore, language-impaired children may exhibit deficits in other areas of nonverbal cognitive functioning although their visual perceptual processing skills may be age appropriate. If this were the case, these children would receive age appropriate scores on tests such as the LIPS because the test did not tap into the nonverbal cognitive functions with which the child has difficulty.

Thus, the notion that specifically language-impaired children have normal nonverbal cognitive abilities is questionable, given the possibility that inadequate measures of cognition have been used. The hypothesis that cognitive deficits are at the base of language-impairment has received support in the literature. If cognitive deficits are at the base of language-impairment, then semantic deficits should be a characteristic of language-impairment. However, studies do not support this expected corresponding deficit in the semantic system of language-impaired children, as the following section reveals.

Evidence Suggesting Semantic Deficits May Not Be Characteristic of Language-Impairment

A review of the literature reveals that there are relatively few studies comparing the semantic relations used by normal and language-impaired children. Although these studies were few in number, all convincingly argued that semantic deficits were not evident in language-impaired children.

One such study was conducted by Freedman and Carpenter (1976), in which the semantic relations expressed by four language-impaired children were compared to those of four normally developing children matched on the basis of level of linguistic development, social position, and sex. All children were Stage 1 according to Brown (1973) as determined by an MLU of 1.4 to 2.1 morphemes. Three hundred non-imitated two-word utterances were collected from each child and categorized into one of the following semantic relations:

introducer + entity, more + entity, negation + entity, agent + action, action + object, action + locative, entity + locative, possessor + possession, and entity + attribute. A significant difference was revealed in only one relation, introducer + entity, with the language-impaired group demonstrating greater diversity in usage than the normal group. No other significant differences were obtained between the two groups on the remaining nine relations. These results indicated that, at the Stage I level of language development, the language-impaired children demonstrated at least as much flexibility in their usage of different semantic relations as their language-matched peers.

Fokes and Konefal (1981), examined the use of the case relations, "agentive," "action," "objective," and "locative" in seven language-disordered children (ranging in age from 5;0 to 7;0 years) compared to ten normal age-matched children (ranging in age from 5;0 to 6;0 years) and six normal younger children (ranging in age from 3;0 to 4;0 years). The case relations were elicited by having the children describe both observed activities and self-manipulated activities to a blindfolded doll. Their results indicated that the language-disordered group produced more single and two-word utterances than the three and four case relations. However, all four case relations were produced by the language-impaired group.

In 1976, Leonard, Bolders, and Miller compared the semantic relations reflected in the language usage of 10 language-disordered and 10 normal children ranging in age from 2;11 to 4;2 years, and 10

language-disordered and 10 normal children ranging in age from 4;8 to 5;8 years. A 50 utterance language sample was obtained from each subject by asking five standard questions to elicit stories about 10 different pictures. The utterances were categorized using the semantic relations: agentive, instrumental, dative, locative, objective, and essive. The results revealed that when the subjects were matched for age, the normal and language-impaired subjects did not differ in the type of semantic relations used by each group, but some differences in the frequencies with which semantic categories were produced, were evident between groups. When the subjects were matched for mean length of utterance, the normal and language-disordered subjects did not differ in the frequency with which their language usage reflected the different semantic relations.

Duchan and Erickson (1976) investigated the semantic relations produced in twelve normal and twelve language-disordered mentally-retarded children matched for mean length of utterance. A 60-item comprehension test was developed in which the subjects were required to manipulate various familiar objects in response to verbal stimuli. The semantic relations agent-action, action-object, possessive, and locative, were equally represented. No significant differences were found between the mentally-retarded children, and the normally developing children in their comprehension of these four semantic relations.

Coggins (1979) examined the semantic relations produced by four Down's Syndrome mentally-retarded children, two of whom were placed into Early Stage 1 on the basis of MLU's of 1.25 - 1.50 morphemes

and two of whom were placed into Late Stage 1 based on MLUs of 1.60 - 2.00 morphemes. Two-word non-imitated utterances were transcribed from language samples and classified using the following semantic categories: demonstrative-entity, negation-entity, agent-action, action-object, action-locative, entity-locative, possessor-possession, and entity-attribute. The results revealed that all subjects encoded at least a few instances of each relation while most of the categories were represented by a large number of different two-word utterances. Thus, it appears that Down's Syndrome children at Stage 1 of linguistic development concentrate on the same small set of relational meanings as in normal children's early two-word combinations.

In summary, these studies indicated that language-impaired children encode the same semantic relations as do their MLU matched peers. This has been demonstrated in both specifically language-impaired children and mentally-retarded children. In fact, Leonard, Bolders, and Miller (1976) did not even find significant differences in the type of semantic relations used by age-matched language-impaired and normally developing children.

It is interesting to note, however, that all of these studies examined semantic categories using global frameworks. Possibly a more differentiated set of subcategories would be able to reveal semantic deficits in language-impaired children. Until more defined subcategories are developed and applied to language-impaired children, the question of whether semantic deficits are characteristic of language-impairment will remain unanswered.

This study attempted to shed some light on this issue by expanding the description of one global semantic category -- namely the category action. The following section will discuss the definition of action as viewed by various researchers and why it is important to look more closely at action.

Definition of Action

Many definitions of "action" include the notion of volitional or purposive behavior (see for example, Brandtstadter, 1984; Huttenlocher, Smiley, & Charney, 1983; Chafe, 1970). In his conceptualization of verbs as states, processes, and actions, Chafe discussed action as "something which someone does" (p. 100). Within this perspective then, an action utterance requires an agent, and is able to answer the question, "What did the agent do?" However, classifying verbs according to the type of noun they take (i.e. agent, patient, instrument, experiences, etc.) seems to be a reflection of the semantic meanings of nouns, rather than a reflection of the meaning of the verb itself. To classify "falling" as an action in the sentence, "the man is falling," and as a process in the sentence, "the blocks are falling" because "man" is an animate object, and "blocks" are inanimate patients, disregards the fact that "falling" in both instances is recognizable as the same type of movement, with the same resulting change in location. In both instances, the objects are capable of independent movement. Movement and change are not always under the control of animate agents. The forces of nature can also cause things to move or

change as in the examples, "the leaves are falling," "the child is growing." These statements refer to happenings or events, and can answer the question, "What is X doing?" where "X" is a noun.

Bloom and Lahey (1978) did not include the notion of intentional behavior in their definition of action. Action referred to voluntary or involuntary movement that affects only the person or object engaged in the movement or both the object engaged in movement and another person or object. The concept of including only those verbs involving movement in the category of action is not consistent with Chafe's (1970) discussion of action as "something which someone does." Verbs such as "sleeping, sitting, or thinking" obviously are things which someone can do, but do not require movement.

While specific points in the definition of action are not consistent across various interpretations, there appears to be general agreement that action refers to happenings or events as opposed to conditions or states of being.

Justification for Looking at Subcategories of Action

It seems appropriate to select action as the semantic relational category of choice. Children talk, overwhelmingly, about what they are just about to do, what they are doing, or what they are trying to do and, less often, about what they see other people doing (Bloom & Lahey, 1978). This notion has been supported in the literature by Rodgon, Jankowski, and Alenskas (1976), and

Huttenlocher, Smiley, and Charney (1983). Several studies have indicated that the earliest words to develop in children refer to moving objects (Huttenlocher, 1974; Nelson, 1973). Thus, it appears that the child's performance of action is a crucial factor in the child's development of receptive and expressive language skills.

In addition, action has been prominent in theories of cognitive development, and in discussions of language development in both normal and clinical children. The following sections call attention to the role of action in these areas.

Action as Represented in Cognitive Development

Action is central to Piaget's theory of intelligence. Piaget (1963, 1970, as cited in Morehead & Morehead, 1974) maintains the primacy of action over perceptual and symbolic structures as the primary contact with, and organizer of reality. According to Piaget's theory of sensori-motor development, the child under 1;6 years of age learns by applying action schemes to experiences in his world. In the process of manipulating things, they are transformed from an existing state to an alternative state, and as a result of the transformations, the child comes to discover the properties and relations of objects and events in reality (Morehead & Morehead, 1974). Perception is regarded as necessary only for recognition, whereas actions are necessary for understanding or meaning. The result of acting on objects and with objects is that children become aware of their relationships to one another, and in relation to their own actions. In this way, the child is able to organize his

mental schemes around relations among objects. Therefore, it is important that action, in the form of sensorimotor schemes is the principal mode by which the child interacts with his world.

In Nelson's (1982, 1986) revised Functional-Core Model of natural concept formation, the importance of action in conceptual and language development also is emphasized. She suggests that children's conceptual development is built around "event structures" which are basically sequences of actions. The "event structure" and not the "object structure" is primary, because objects are first known in their relation to the events of which they are a part. Nelson argues that, while perceptual information is important to language learning, little language learning would occur if the child were presented with just the pattern of objects. "The place of the object in the pattern of activity represented by the child's event scripts, needs to be established for the child to confer meaning on the object within his or her own conceptual system" (p. 353). Thus, the basic form of conceptual representation is that of event representation involving sequences of action.

In both Piaget's (1963, 1970, as cited in Morehead & Morehead, 1974) and Nelson's (1982, 1986) theories of cognitive development, action plays a critical role.

Action as Represented in Normal Language Development

Because of the important role that action plays in the child's early cognitive development, it would be natural to assume that words coding action would dominate early language development.

While it is generally agreed that the action is one of the first semantic categories to develop in young children (for example, Nelson, 1973; Benedict, 1979; Fokes & Konefal, 1981), a considerable body of research has reported that children learn a large number of object names when developing language (Nelson, 1973; Goldin-Meadow, Seligman, & Gelman, 1976; Leonard, 1976; Huttenlocher & Lui, 1979; Schwartz & Leonard, 1984). These observations suggest that objects, not actions, are important to the child's concept of the world. If action, as proposed, is at the base of development, one might wonder why action words do not dominate early vocabularies, as do object words.

In addressing this issue, Nelson (1982) offered three explanations. First, the nature of communication interaction between parent and child lends itself to the labelling of objects. Adults may teach children to attend to object names because objects are more concrete to point out to children, than are actions. The attention of a parent and/or child can focus more easily on objects than on actions. In addition, it appears that there are many more nouns than verbs in the adult language system and therefore one would expect nouns to appear more frequently than verbs in the child's first vocabulary. Nelson (1982) argues,

> the fact that object terms are learned predominantly does not reflect the fact that objects are a predominant part of the conceptual representation, but rather that they are a salient aspect for the adult and child to focus upon in an on-going action sequence (p. 356).

Nelson's second explanation for the predominance of object words in children's early vocabulary, is that the child may be using

an object label to refer to any part of a situation, not simply the object itself. In early language development, many children appear to use a word to refer to any aspect of a given situation, or to a given function rather than to the object. Thus, while adults may be labeling the object within a given situation, the child may conceptualize that label as representing the action being carried out by the object.

A third explanation for the predominance of objects in early lexical acquisition, as put forth by Nelson (1982), is the fact that objects may be more variable than actions within a given situation. As the child attempts to decontextualize aspects of a situation, "objects become named, because objects are variables. Actions, however, are specified by the situational context" (p. 357).

Thus, while action words may not dominate early developing lexicons, the concept of action appears to be critical in the child's cognitive and language development.

Action as Represented in Language-Impairment

The close relationship between the child's ability to act on the environment and his early conceptual development has provided a theoretical base for interesting research currently taking place in St. Gallen, Switzerland.

Dr. Felicia Affolter at the Center for Perceptual Disturbances in St. Gallen, Switzerland and a multidisciplinary team have developed a treatment framework for the language-impaired within

which perception plays a critical role (Stockman, 1986). They propose that

> not only must the environment present new situations to the child in the sense that they offer problems to be solved, but the child must have enough sensory information to perceive the situation as having an unfamiliar aspect, and therefore presenting a problem to be solved. From all sensory input associated with successful problem-solving activity comes knowledge about the world--the functional properties of objects and their relationships, how to plan events, change and reconstruct them, and finally, what aspects of events are encoded through language. Therefore, problem-solving exploratory activity is viewed as the developmental root for verbal and nonverbal behavior (p. 16).

The St. Gallen team argues that developmental problems for many children can be traced to their inability to explore the environment adequately for learning, because of perceptual handicaps. Further, their research has shown that tactile-kinesthetic deprivation and its lack of central integration with other sensory systems has a more adverse impact on the learning of complex skills than do visual or auditory deprivation (Stockman, 1986).

The strong link between action and cognitive development (Piaget, 1952), and action and language development (Rodgen et al., 1976; Bloom & Lahey, 1978; Huttenlocher et al., 1983), support St. Gallen's theoretical view of learning.

Summary

The shift toward the semantic description of language provided a better description and a greater understanding of children's language acquisition in the earlier stages. Unfortunately, the semantic categories of Bloom (1970), and Brown (1973) are too

"global" in nature to identify developmental patterns within categories or to describe later stages of language acquisition. It is possible that if more refined subcategories of semantic relations were developed, more could be learned about normal acquisition of semantic categories, and consequently provide a better understanding of language-impairment.

It would seem particularly valuable to devise a system of subcategories of action because of the central role that action plays in some theories of cognitive development and in discussions of language development and language-impairment. In fact, the semantic category of action is one of the earliest categories to emerge, and although action words do not dominate early lexicons, there are very good reasons for this, as provided by Nelson (1982).

If a system of action subcategories were devised, it could be used in developmental studies of language acquisition to identify trends in the acquisition of action relations. Given the centrality of action in the organization of a child's symbolic system, action would likely be a target for assessment in clinical settings. Thus, a system of subcategories of action could also provide pertinent information that would be valuable for a language assessment. However, the first step is to develop a system of subcategories of action which can describe the majority of action utterances produced by children.

Purpose

Therefore, the purpose of this study is two-fold:

1. Can a set of action subcategories be developed from the observation of the action relations expressed by normally developing children?

2. Can the application of such action subcategories reveal differences between normal and language-impaired children?

REVIEW OF THE LITERATURE

This study has been based on the premise that the semantic categories devised by Bloom (1970) and Brown (1973) are too global in nature to provide an adequate description of normal language development, or language impairment. This study focused on the global semantic relational category of action to determine whether it can be described in terms of a set of more differentiated subcategories. It is therefore relevant to take a look at other attempts to identify semantic subcategories to determine whether such a notion has yielded useful outcomes. This chapter reviews those studies that have described subcategories of semantic relations.

The notion of subcategories of semantic relations is not a new one. Various subcategories of semantic relations have been developed both from a linguistic perspective on the basis of the adult language system and within the context of normal language acquisition.

Subcategories Based on the Adult Language System

Because this study focused on the subcategorization of action, this section considers those works dealing exclusively with this semantic category. Chafe (1970), Edwards (1974), and Miller and

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Johnson-Laird (1975) have attempted to subcategorize the semantic category of action, based upon the adult language system.

Chafe (1970) reflected upon the semantic nature of verbs by looking at the semantic nature of the nouns accompanying the verbs. He noted that verbs specifying state are accompanied by a noun which is a patient. For example, in the sentence, "the wood is dry", the patient (wood) is said to be in a certain state or condition (dry). Chafe distinguished nonstate from states by the fact that nonstates answer the question "What happened?", "What's happening?", etc. A nonstate was defined as a "happening", or event. For example, the sentence, "the wood dried", can answer the question "What happened?", whereas the sentence "the wood was dry", cannot.

Chafe (1970) went on to point out major differences between two types of nonstate sentences. He identified verbs as processes, wherein the noun is said to have changed its state or condition. The nouns in these sentences are also the patient of the verb. For example, the sentence "the wood dried" describes a patient (wood) which has undergone a process (dried) resulting in a change of state.

Chafe (1970) also identified verbs which expressed an activity or action, something which someone does, that has nothing to do with something which performs the action. The nouns in these sentences are agents because they specify either a state or a change of state. For example, "the man laughed" describes an agent (man) who performed an action (laughed). Chafe distinguished the actions from processes in that an action sentence will answer the question "What did N do?", where N is some noun and often a simple process sentence

will answer the question, "What happened to N?" For example, the question "What did Harriet do?" can be answered appropriately by the sentence "she sang" (action) but not by "she died" (process). Conversely, the question "What happened to Harriet?" can be answered appropriately by the sentence, "she died." (process), but not by "she sang" (action).

Chafe (1970) further described sentences in which the verb is, simultaneously, both a process and an action. In these instances, the action is expressed by what someone, its agent, does, and the process involves a change in the condition of a noun, its patient. For example in the sentence, "Harriet broke the dish" the agent (Harriet) performed an action (broke) resulting in the change of state (broke) of the patient (dish).

Edwards (1974) discussed a systematic way of organizing verbs in terms of two orthogonal dimensions, which were: 1) the type of state or relation (locative, possessive, attributive); and 2) whether the given state or relation was an unchanging state of affairs, one that involves change or one that is caused to change or happen by an agent and/or instrument. Verbs were classified as either "actional verbs" which lack any inherent specification of any necessary change of state or of spatial position of the object affected, and "stative verbs" which describe a state of affairs or a changing state of affairs where the establishment of a new state is implied. The "actional verbs" were further subcategorized into "direction action verbs" such as "hit," "stroke," "punch," which describe a type of physical contact between instrument and object,

and "movement verbs," such as "roll," "turn," "walk," which describe the type of motion or activity gone through by the object. "Static verbs" were classified as "possessive" (e.g., buy, own, give), "locative" (e.g., on, enter, evacuate), and "attributive" (e.g., fat, break, shattered) depending upon the type of state of affairs they describe, or in which they describe a change. Edwards applied this classification system across static, dynamic, and causative events . The dynamic, and causative events were distinguished by the fact that the nouns in dynamic events are instruments, objects, or experiences, whereas the nouns in causative events are always agents.

In 1975, Miller and Johnson-Laird attempted to subcategorize action in their discussion of verbs of motion, possession, vision, and communication. Verbs of motion (e.g., walking) were described as "how people and things changed their places and their orientations in space" (p. 527). Verbs of possession (e.g., give) were primarily a conceptual matter going beyond perception (p. 588), in contrast to verbs of vision which referred to the sensory modality of perception (p. 601). Verbs of communication (e.g., saying) were considered verbs that "talk about talking" (p. 619).

Unfortunately, Chafe (1970), Edwards (1974), and Miller and Johnson-Laird (1975) devised systems of classification which were theoretically based without empirical data to determine their effectiveness in revealing developmental change in children's language.

Subcategories Based on Normal Language Development

Subcategories of semantic relations developed within the context of normal language development have included the differentiation of the global semantic category negation, location, and action.[1] These subcategories have proven effective in revealing the developmental changes among children.

Subcategories of Negation

In 1970, Bloom redefined the category of negation into the subcategories of nonexistence, rejection, and denial. Nonexistence was coded when "the referent was not manifest in the context, where there was an expectation of its existence" (p. 173). Rejection was coded when "the referent existed or was imminent within the contextual space of the speech event and was rejected or opposed by the child" (p. 173). In instances where "the negative utterance asserted that an actual (or supposed) predication was not the case," denial was coded (p. 173).

For example, the utterance "no doggie" could express rejection if the child wished to play with the toy cat and was given the toy dog, or denial if the child was given the toy cat and told that it was a toy dog. Nonexistence would be coded in the utterance "no

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[1]Bloom and Lahey (1978) also discussed categories of state relations as including possessive state (e.g., the book is mine), attributive state (e.g., the hat is brown), internal state (e.g., she likes ice cream), and external state (e.g., it is dark). However, developmental study of children's acquisition of these categories was apparently not completed. Therefore, they will not be elaborated further.

doggie" if the dog a child was playing with walked out of the room. While these utterances can all be coded within the global semantic category of negation, it is clear that the subcategories are able to differentiate between the more subtle aspects of meaning coded in these utterances. Within the course of a child's language development, Bloom (1970) found that the order of acquisition for negation was specified as nonexistence, rejection, and denial.

Subcategories of Location

More recently, Stockman and Vaughn-Cooke (1984, 1987) and Stockman (forthcoming) have investigated subcategories of locative utterances. The following eight locative subcategories were identified:

1. static origin
2. static direction
3. static destination
4. static combinative
5. dynamic origin
6. dynamic direction
7. dynamic destination
8. dynamic combinative.

A locative utterance could be dynamic in which movement is coded, or static in which no movement is taking place. A locative expression (dynamic or static) could exist in terms of a place of origin (dynamic: the ball fell off the table, static: shells come from the ocean), the direction of movement (dynamic: the cat jumps

down, static: the college is south of here), a place of destination (dynamic: I set it on the table, static: it is on the table), or any combination of the above three terms (dynamic: I set it down on the table, static: it's down on the table).

When these subcategories of locative utterances were applied to children's normal development of language, the developmental nature of the subcategories was revealed. In the category of locative action children talked about the source from which objects move or the path of movement before they talked about the destination to which objects move. In addition, they used one locative word to refer to one aspect of the locative event before they combined locative words to refer to more than one locative aspect of the same event. Within the category of locative state, children talked about the immediate position of an object before they talked about the object's position from the directional perspective or from the perspective of a former locative site.

Subcategories of Action

Gentner (1978) and Huttenlocher, Smiley, and Charney (1983) attempted to identify subcategories of action in children's language. Gentner (1978) addressed the issue of action subcategories by examining the "subpredicates" of verbs which are intended to express the almost inevitable inferences made in verb comprehension (p. 989). In particular, she investigated the action verbs coding change in possession: "give," "take," "pay," "trade," "buy," "sell." She asked children aged 3;6 to 8;6 years to act out sentences such as "Make Ernie buy a car from Bert," using dolls with

toys and money. Her results indicated that the verbs were acquired in order of complexity, with the simpler verbs "give" and "take" being acquired earlier than the more complex verbs "buy" and "sell." For example, all the meaning components of "give" are also contained within the representation of "sell." While this study recognized that subcategories of action exist, Gentner chose to investigate the acquisition of one subcategory rather than identify a variety of subcategories.

Huttenlocher, Smiley and Charney (1983) attempted to identify broader classes of subcategories of action. They categorized the verbs that young children produce into verbs coding change and verbs that did not code change. "Nonchange" verbs were defined in terms of characteristic movements by an initiator (e.g. walk, wave), whereas "change" verbs (e.g. open, get) were defined in terms of changes caused by an initiator. The context was also considered in terms of "self action," defined as when a person acts, as a subject experiencing a goal, and "observed-action," defined as a person as an observer witnessing movement by an initiator. They conducted their study in three parts.

Part 1 of the Huttenlocher et al. (1983) study examined the comprehension of verbs in relation to observed action. They randomly presented 69 children ranging in age from 1;10 to 3;6 years, ten pairs of verbs, four times within the test. Each action was presented within a videotape stimulus. The experimenter named both actions and then asked the child to identify the target action.

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Results indicated that children apply movement verbs to observed behavior earlier than they apply change verbs.

In Part 2 of their study, Huttenlocher et al. (1983) examined the contexts in which sixteen children ranging in age from 24 to 28 months, used verbs. Four hours of spontaneous production data was obtained from each child during a normal day's activities. Of the 1,066 utterances with verbs, 90% were produced when the child was participating in the action in some way. The children rarely used verbs to encode observed behavior. Another interesting finding was that, while the subjects did not describe actions of others that involve change, they did describe their own actions involving change. On the contrary, while the comprehension data indicated that children use movement verbs to encode observed action, children did not spontaneously produce these verbs to describe either their own movements or observed movements.

The purpose of Part 3 of the Huttenlocher et al. (1983) study was to determine whether verbs that encode characteristic motions, like verbs that encode change, apply first to the child's own actions. Ten children were followed longitudinally, beginning when they were one year old and ending when their MLU's were 2.3. During monthly visits, the children were tested in their comprehension of the verbs "sit down", "run", "kick", "jump", and "wave bye bye" in relation to self and others. In addition, 14 of the children were also tested on the verbs "put down" and "get" in relation to self and others. Each verb was presented as an instruction and in the movie task used in Part 1. The children were tested each month

until they succeeded on one of the tasks, three times in succession. The results indicated that verbs encoding movement are also acquired first for the child's own actions.

In summary, results of the Huttenlocher et al. (1983) study, indicate that children comprehend and produce both verbs encoding movement and verbs encoding change in relation to their own action before observed action. Verbs of movement are comprehended earlier than verbs of change, in both contexts of self-action and observed-action. However, verbs encoding movement are rarely produced in either context.

While these authors have provided some basis for looking at subcategories of action, casual inspection of the categories proposed by Gentner (1978) and Huttenlocher, Smiley, and Charney (1983) suggests that they will not account for all the action utterances produced by young children. For example, "standing" cannot be categorized within verbs of possession or change. While it appears that "standing" could be classified as a nonchange verb under the Huttenlocher et al. (1983) system, it does not meet their definition of coding a characteristic movement. It appears that a more comprehensive system of subcategories has yet to be developed which can account for all the meanings coded in children's action relations.

Summary

The investigations utilizing subcategories of semantic relations have provided a much more detailed and accurate

description of semantics than was accounted for within more global systems. Developmental trends, that had previously gone undiscovered, were revealed by the use of these subcategories in the description of normal language acquisition. These results would suggest that the differentiation of global semantic relations into more refined subcategories is a promising area for further investigation.

While the studies examining subcategories of negation (Bloom, 1970) and subcategories of location (Stockman, 1986) encompassed all aspects of their respective categories, those studies examining subcategories of action (Gentner, 1978; Huttenlocher, Smiley, & Charney, 1983) analyzed only restricted aspects of action. A more comprehensive system of subcategories of action has yet to be developed.

PROCEDURES

The following section outlines the procedures employed to answer the questions posed in this study. The first part of this section discusses the procedures used in the development of a set of verb subcategories that could account for the majority of action utterances produced by normally developing children. The procedures employed in the application of these verb subcategories to a comparative analysis of the action utterances of language-impaired and normally developing children, are outlined in the second part of this section.

Part I - Action Verb Subcategories in a Normative Sample

A set of verb subcategories was developed to describe the range of the action relations expressed by normally developing children between 4;3 and 4;6 years. A data base containing cross-sectional/ longitudinal data on children's spontaneous utterances was utilized in this endeavor. The data were collected in Washington, D.C., between December, 1980 and June, 1982, by Stockman and Vaughn-Cooke (1982) for the purpose of studying a wide range of developmental linguistic issues that require naturalistic data sampling.

Naturalistic spontaneous language samples were desirable for this study for two reasons. First, in order to obtain as valid a

picture as possible, it was necessary to look at children's language when no restrictions were placed on what they could talk about. Until we learn about children's naturalistic language, we will not know what types of information would be worthwhile to highlight in a more restrictive, experimental fashion. The value of spontaneous data for the initial investigation of semantic relations had been demonstrated by the classic work of Bloom (1970), Brown (1973), and Bowerman (1973), as well as many others. Second, spontaneous language samples seem to be an effective method of collecting data specifically on action verbs. Research has indicated that children primarily communicate about their own actions (Rodgon et al., 1976) and use action verbs to code their own actions before they use them to code the actions of others (Huttenlocher et al., 1983).

Description of the Data Base

General Subject Characteristics of the Data Base

The twelve subjects in the data base were children from working class families in the Washington, D.C. area. The longitudinal database extended over an 18-month period and represented three cross-sectional age groups. Three groups of four children, with two boys and two girls in each group, were the ages 1;6, 3;0, and 4;6 years at the beginning of the sampling. At the end of the sampling period these groups of children were 3;0, 4;6, and 6;0 years, respectively.

The children were selected from families affiliated with Headstart Programs in the Washington, D.C. area. The school personnel were required to provide information regarding children's

health status, history, educational progress, and general functioning, using standard written questionnaires. The subjects used in the data base were then randomly selected from among the children who met the normalcy criteria.

Procedures Used to Collect the Data Base

One- to two-hour language samples, containing at least 400 utterances, were collected at four- to six-week intervals from each of the twelve children over an eighteen-month period. Audio-visual records were made of each language sample. In order to represent as clearly as possible the equipment used to collect the data base, a direct quotation has been taken from Stockman and Vaughn-Cooke (1984).

> The field equipment consisted of a portable color camera (JVC-G-71US) equipped with view finder and automatic light control and a video-cassette recorder (Sony SLO-323). Video clarity was maximized by supplementing home lighting with high voltage lamps where required. Further, a portable television monitor provided continuous onsite feedback about video quality. A tie tack microphone (ECM-31 with frequency response range of 50 to 13,000 Hz) was attached to the child's clothing - typically the collar - at distances permitting clear and undistorted audio quality. The microphone and camera cables permitted the child to move freely within an eighteen foot area.

Samples were obtained during routine play activity involving the subject in social interaction with children and adults, including an investigator. A core set of toys including a doll house, basic house furniture, assorted wooden blocks, a ball, balloons, etc., was used with all the children, in an attempt to facilitate comparability of data among the children with respect to what they talked about. The child was encouraged to play with toys

and objects in his own environment, in addition to the toys provided by the investigators. Little or no structure was imposed on the child's actions during the sampling. They were free to play with, and talk about, whatever they wished (p. 12).

In all, approximately 75,000 utterances for analysis were included in the data base, spanning a relatively early to late developmental period of 1;6 to 6;0 years of age. This provided a substantial corpus from which action utterances could be selected for analysis.

Selection of Data for Study of Action Subcategories

For this study, the utterances extracted from the data base included the first hour of the language sample taken from eight children (4 boys, 4 girls) at the age of 4;3 to 4;6 years. For four of the children, the data represented the first sampling period, and for the remaining four the data represented the eighteenth sampling period. As estimated, this selection of data provided 1,627 utterances (or approximately 200 per child) from which to select action utterances for analysis.

Treatment of the Data for Analysis

Form of the Data for Analysis

The data were available in two forms. Audio-visual records of the language samples were available in color on Beta video cassettes. The audio-visual record provided the situational and linguistic context in which the child's action utterances were

produced. It was determined what was said before and after each of the child's utterances and what the child and other participants were doing before, during, and after the utterances. This was very helpful in interpreting the meaning of the child's utterances. For example, the utterance "the boy go here" produced within the context of the child moving a toy doll from one position to another could code action. On the other hand, the same utterance, "the boy go here," produced within the context of the child pointing to the toy doll could code state when interpreted as "the boy belongs here."

The language samples were also available in written form. All utterances had been transcribed orthographically onto standard forms. The standard form provided space for the utterance number, counter number, contextual notes, the utterance itself, and the semantic categories represented by the utterances. General and specific contextual notes for locative action utterances were transcribed (see Appendix A for a sample of the transcript form).

Procedures for Identifying Action Utterances

The utterances coding action were identified by reviewing the audio-video tape in conjunction with the written form. The written form was helpful because it provided one investigator's interpretation of what words the child was saying. A prior utterance gloss was particularly useful if the child was not very intelligible. A review of the audio-visual tape helped to confirm the transcription of the language sample and ensured that no action utterances were overlooked. Equally important, the audio-visual

record provided the communicative and situational contexts needed to verify action meaning of the utterances.

Operational Definition. It is generally assumed that action information is explicitly carried in the verb of a sentence (see for example, Bloom, 1970; Chafe, 1970). For example, in the sentence, "the boy runs to the store," the action performed by the agent is coded in the verb "runs."

In this study, an utterance was considered to code action if the following criteria were met:

1. the verb referred to a happening or performance;
2. the utterance was able to answer the question, "What did X do?" or "What is X doing?", where "X" is an agent or object.

This operational definition focussed on the act itself rather than the cause of the act. It reflected elements of both Chafe's (1970) and Bloom and Lahey's (1978) concepts of action.

Chafe (1970) suggested that nonstate verbs referred to a happening or performance. He then differentiated nonstate verbs into actions and processes. Action was defined as "something which someone does" (p. 100), and therefore required an animate agent. The notion that an action requires an animate agent was not included in the operational definition applied in this study, because an action event has similar recognizable features regardless of whether it is caused by an animate agent (cf., "man falls" vs. "rock falls").

Therefore, the operational definition of action used in this study included the happenings or performances of both agents and

objects. This is consistent with Bloom and Lahey's (1978) definition of action which did not restrict action events to those having animate agents. Action could be voluntary or involuntary.

While voluntary and involuntary action was incorporated into this operational definition, Bloom and Lahey's (1978) concept of movement being necessary for action was not. The rationale for this decision was that many verbs not involving movement still refer to happenings that are different from state events. For example, "to stand", "to halt", "to hold", do not necessarily involve movement, but require volitional control over their performance. See further discussion on pp. 16-17.

Procedures for Assigning Subcategories of Action Utterances

In applying the operational definition to the identification of action verbs, the situational context of each utterance was considered to determine appropriate meaning. Specifically noted was who or what the child was referring to, if a movement occurred, and if any change of state occurred, or was possible to occur as a result of the child's actions.

The literature (Chafe, 1970; Edwards, 1974; Miller & Johnson-Laird, 1975; Gentner, 1978; Huttenlocher, Smiley, & Charney, 1983) suggested that the framework summarized in Table 1 offered a useful starting point for the subcategorization of action utterances. This framework consisting of 8 subcategories of action verbs, reflected movement and change features of action. Each of these features is described below.

Movement/Nonmovement Features

Action Verbs Coding Movement. The action utterances in this category involved an overt or observable movement event. That is, some type of movement was necessary in order for the action to occur. The utterances included verbs that coded varying degrees of movement which ranged from movement of the entire body, as in "I am running home," movement of an extremity, as in "She is cutting the cake," to small movements of the head or facial features, as in "look at the dog."

Action Verbs Coding Nonmovement. The action utterances in this category did not involve any overt or observable movement events. That is, the action was able to occur without any movement at all. "She is sleeping" would be an example of a nonmovement verb because no observable movement is involved in the act of "sleeping." Although some movement may occur throughout the act of "sleeping," this movement is not necessary to, and does not characterize, the act of "sleeping" itself.

Within these two broad categories, action utterances were differentiated further in terms of whether or not the action resulted in a change of object state.

Change of State/Nonchange of State Features

Action Verbs Coding a Change of State. The action utterances within this category involved actions that caused a change of an object's state. This change may have been in the object's physical or attributive appearance (e.g., "Close the door"), existence (e.g.,

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"Stop that"), internal state (e.g.,"I learned that at school"), location (e.g., "I am driving the car"), or possession (e.g., "Give me the ball").

In those instances in which the verb did not take an object (e.g., "He is walking"), the agent was affected as a result of the action. These cases could be identified because the reflexive pronoun of the subject was able to occupy the position of the object of the verb, and it could be determined that a change in the subject's state occurred as a result of the action. For example, "He is walking" would become "He is walking himself," in which "himself" would change location as a result of the "walking."

Those action utterances which coded movement and resulted in a change of an object's state, were further subdivided with regard to the type of change that occurred. The change may have been in an object's attributive state, locative state, or possessive state.

Movement Verbs Coding a Change in Attribute State. The action coded by utterances in this category caused either internal or external changes in the state of affairs of their objects. In the example "The boy is eating the cookies," the "eating" results in an external change in the attributive state of the "cookies," whereas "He is teasing his sister" changes the internal state of the sister. Utterances of this nature were consistent with the statement "Subject is Verbing SOMETHING."

Movement Verbs Coding a Change in Locative State. The action coded by the verbs within this category caused a change in the location or position of their objects (or subjects if no objects

were required). In the example "Put the ball down," the "ball" changes location as a result of the "putting." In the example "The girl is swimming," the act of "swimming" results in a change in the location of the "girl." These utterances were consistent with the statement "Subject is Verbing {Object/ Reflective Pronoun of the Subject} SOMEWHERE."

Movement Verbs Coding a Change in Possessive State. The action coded by the verbs in this category caused a change in the temporary ownership or possession of an object. The change may have occurred from one person to another, as in the example "Give me the candy," or from a location to a person, as in the example "I bought the dress." These utterances were consistent with the statement "Subject is Verbing Object {to/for} SOMEONE."

The actions in this category were distinguished from actions resulting in a locative change by the fact that these actions specifically result in the object becoming newly located into the hands of a person or animate being, rather than becoming located to a new position in space.

Action Verbs Coding Nonchange of State. The action verbs in this category did not specify a change of an object's state and could occur within both movement and nonmovement contexts. In the movement example "She is playing house" and the nonmovement example "She is holding the ball," the "playing" and "holding" do not result in any inherent changes in the state of an object. Although various changes may occur as these actions are carried out, specific changes were not identified by the verb itself.

Those action verbs which coded nonmovement, and did not result in a specified change of an object's state, were further classified according to the type of unchanging object state which they described. For verbs which did not require an object, the action described an unchanging state of the subject. The unchanging state of affairs may have been in the external state, positional state, or possessive state of the object.

Nonmovement Verbs Coding a Nonchange in External State. The verbs in this category referred to internal or mental processes. For example, "The boy is thinking" describes a conscious mental activity that the "boy" does.

Nonmovement Verbs Coding a Nonchange in Positional State. The action verbs in this category described the maintenance of the positions or locations of objects. For example, "sitting" within the utterance, "The boy is sitting on the floor," describes the position of the "boy."

Nonmovement Verbs Coding a Nonchange in Possessive State. The action verbs in this category described the maintenance of a temporary ownership or possession of an object. For example, "holding" in the utterance, "I am holding the doll," describes the placement of an object in the hands of a person or animate being.

Summary of Subcategory Framework

The combination of each of these aspects of movement and change resulted in the differentiation of action into eight subcategories, as outlined in Figure 1. Thus, each action utterance was assigned

to one of the following subcategories, on the basis of its movement and change characteristics:

1) Movement-Change of Attributive State

2) Movement-Change of Locative State

3) Movement-Change of Possessive State

4) Movement-Nonchange of State

5) Nonmovement-Change of State

6) Nonmovement-Nonchange of External State

7) Nonmovement-Nonchange of Positional State

8) Nonmovement-Nonchange of Possessive State

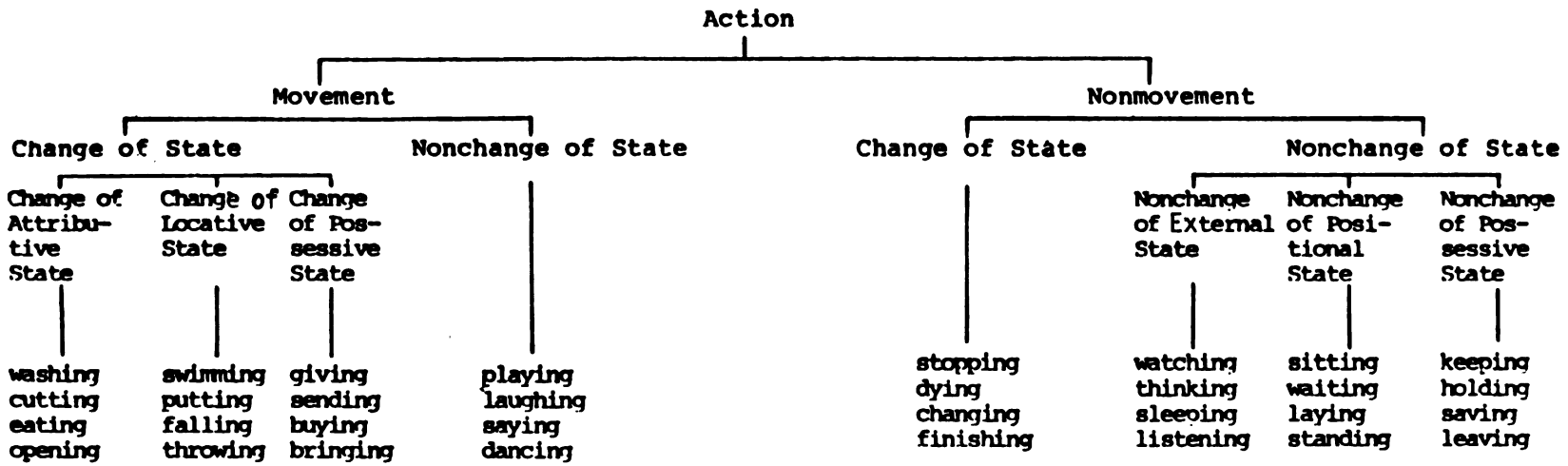

Figure 1. Subcategories of Action Based Upon the Interaction of Movement and Change.

A formal procedure was developed to determine (1) the extent to which this investigator's assignment of categories concurred with others and (2) the extent to which the observers independently agreed in their assignment outcomes.

Observer Agreement With the Subcategorization of Action Verbs

Three graduate students were asked to participate as judges in the determination of observer agreement in subcategorizing action verbs. Each student was provided with instructions regarding subcategorization procedures (Appendix B), a copy of the utterances to be categorized (Appendix C), and a copy of the contextual notes for each utterance.

Preparation of Task for Observer Judgment

Fifty-four verbs were randomly selected from the set of 1,627 action utterances coded. The number of action verbs chosen from each of the eight categories varied as shown below.

Movement-Change in Attributive State:	10
Movement-Change in Locative State:	10
Movement-Change in Possessive State:	5
Movement-Nonchange of State:	10
Nonmovement-Change of State:	5
Nonmovement-Nonchange of External State:	5
Nonmovement-Nonchange of Positional State:	5
Nonmovement-Nonchange of Possessive State:	4

Ten utterances were chosen from those subcategories that had a greater number of action verbs represented, and five utterances were selected from those subcategories with fewer action utterances. Only four action verbs were taken from the category Nonmovement-Nonchange of Possessive State because there were only four verbs represented by the subjects in this category. The total of 54 utterances was judged to be a reasonable amount for the time allocated to the task.

Each action verb was randomly selected across all verbs within each category until the quota for that category was met. To ensure the selection of a variety of action verbs, no verb was selected twice within one category. Once the verbs were chosen, the specific utterances within which the verbs occurred, were randomly selected across all subjects.

The utterances were then transcribed in their original form onto a separate reliability form, in random order. The original transcription forms were photocopied so that the assigned semantic subcategories could be deleted. The original utterances and context notes were clearly numbered to correspond to each action utterance on the reliability forms. In this way, the judges had access to the situational context to aid their designation of action subcategories.

Description of Judges

The three graduate students who participated as judges were potential professionals in the field of speech and language

pathology. The judges were blind observers, and they individually received oral and written instructions of the categorization task. All judgments took place in the Language Sciences Laboratory within one week's time period.

Presentation of the Utterances to Judges

In order to reduce the number of instructions the judges needed to attend to at one time, the categorization of utterances was introduced in four phases presented in the same sitting. The judges were first required to distinguish between those action verbs that referred to movement and those that did not. Following these judgments, they reviewed the same utterances to determine those action verbs that code a change in object state and those that do not. In the third phase, the judges were presented with movement verbs coding a change of object state. They were required to determine whether the action resulted in an attributive, locative, or possessive change in the object's state. In the final phase of the observer agreement study, the judges were required to differentiate among nonmovement action verbs that referred to a nonchange of object state. They were required to determine whether the action described a nonchange of external, positional, or possessive state.

Percentage of Observer Agreement

The percentage of those utterances which were subcategorized in agreement with this investigator was calculated for the judgments

between Movement and Nonmovement categories, Change and Nonchange categories, type of Change -- Locative, Attributive, and Possessive categories, and type of Nonchange -- Positional, External, and Possessive categories. As Table 1 indicates, the average inter-judge agreement for each of these characteristics ranged from 94-100%, with an overall average of 95%. It was concluded, therefore, that this investigator's subcategory assignments had some measure of concurrent validity. Table 1 also shows that there was very little variation among the subjects for any single set of categories judge. Note that the largest observed difference occurred within the Movement/Nonmovement judgments, which ranged from 91-98%. It was therefore concluded that there was also some measure of inter-observer reliability in the assignment of subcategories.

Table 1. Results of Inter-judge Reliability Measures.

Reliability Judgments	Subjects			Average
	S_1	S_2	S_3	
Movement/Nonmovement	91%	93%	98%	94%
Change/Nonchange	91%	93%	93%	92%
Change-Locative/Attributive/Possessive	92%	92%	96%	93%
Nonchange-Positional/External/Possessive	100%	100%	100%	100%

Compilation of Results

The data were tabulated to determine:

1. The percentage of action utterances subcategorized -- calculated by dividing the number of action utterances which were subcategorized by the total number of action utterances.

2. The number and type of subcategories of action utterances represented -- determined by scanning the data collection forms for each child and noting which subcategories have been represented at least once by the child.

3. The diversity of the verb forms within each subcategory of action - determined by calculating the percentage of different verb forms within each category.

The Wilcoxan matched-pairs signed-ranks test and the Friedman Two-Way ANOVA by Ranks were applied to the data, as appropriate.

Outcomes Which Would Support the Existence of Subcategories of Action Utterances in Normally Developing Children

It was expected that at least 90% of the children's action utterances would be represented by the subcategories of action outlined in Figure 1. It was also expected that, while the categories of verb forms would be similar across the children, there would be individual variation with respect to the inventory of specific verb forms used within the subcategories.

Part 2 - Action Subcategories in Clinical and Normal Samples

The following section outlines the procedures designed to answer the second research question: Can the application of identified action subcategories reveal differences between normal and language-impaired children's action utterances?

The subjects were selected from an existing data base that included clinical and normally developing children between the ages of 3;0 to 8;0 years of age, and provided audio-visual records of spoken language samples. Unlike the data base used in Part 1, these samples were collected in a University Laboratory setting, rather than in the home.

Description of Subject Characteristics

The subjects consisted of two language-impaired and two non-language-impaired children matched on the basis of age, sex, ethnicity, and socio-economic background. All four children were white males from working-class families.

The first of the language-impaired subjects (M.W.) was 4;5 years of age with normal nonverbal cognitive abilities based on a Leiter age equivalency of at least 5;6 years of age. His MLU of 3.44 placed him in Brown's Early Stage IV with a predicted age of approximately 3;2 years. M.W.'s scores on the NSST placed his receptive performance at the 25th percentile and his expressive performance less than the 10th percentile. These results suggested that M.W. exhibited a significant expressive language delay of approximately one year compared to his chronological age. M.W. had

been receiving speech and language therapy for approximately one year through his preschool program. He was very cooperative and talkative throughout the testing procedures.

A normally developing child (D.B.), 4;6 years of age, was selected as a match to M.W.. He was also very outgoing, and animated throughout the testing procedures. D.B. demonstrated normal nonverbal cognitive skills based on a Leiter age equivalency of at least 5;6 years of age. His MLU of 5.37 placed him in Brown's Stage V with a predicted age equivalency of approximately 4;6 years of age. The results of the NSST revealed that D.B. was performing receptively at the 75th percentile and expressively between the 50th and 75th percentile. These results suggested that D.B.'s receptive and expressive language skills were within normal limits for his age. D.B. was attending a preschool at the time of this study, but had never received speech and language therapy.

The second of the language-impaired children (J.K.) was 3;10 years of age. He also demonstrated normal nonverbal cognitive abilities based on a Leiter age equivalency of at least 3;10 years of age. His MLU of 3.76 placed him within Brown's Late Stage IV-Early Stage V, with a predicted age equivalency of 3;4 years. Administration of the NSST was attempted, but J.K. would not cooperate with the testing procedures. While these results did not provide strong support for the diagnosis of language-impaired, J.K. was identified as language-impaired, based on a December 5, 1986 assessment, by the speech pathologist at the preschool he attended. At that time his spontaneous speech consisted primarily of one-word

throughout the language sample collected in the Language Sciences Laboratory.

A summary of the subject characteristics is outlined in Table 2. Subjects selected to participate in this study were free of frank neurological insult and physical, sensory, or motor disability, as determined by clinical records and parental reports. In addition, the children were included if they received a normal range Leiter IQ score. The Leiter International Performance Scale (LIPS) was chosen to test for intelligence because it was assumed that language-impairment would not penalize the child's performance. In addition, it enabled the subjects of this study to be more comparable with the other research. The LIPS required children to match one set of blocks to another on the basis of perceptual and conceptual information. No verbal instructions were provided to the children. The scoring procedures involved basal and ceiling levels with each level corresponding to an age-equivalency score.

The language-impaired subjects were selected on the basis of percentile scores of 10 or lower, relative to the child's age group on one or both of the Northwestern Syntax Screening Test (NSST) subtests. The nonimpaired group at the same age were included if they received percentile scores of 50 or higher for both NSST subtests relative to the child's age. The NSST has a receptive and an expressive subtest consisting of eleven items each. The receptive portion required the child to point to one of four pictures representing the utterance spoken by the examiner. The child was required to provide a delayed imitative response in the

Table 2. Subject Characteristics

Characteristics	Subjects			
	M.W.	D.B.	J.K.	A.D.
Classification	Language-Impaired	Normal	Language-Impaired	Normal
Age	4;5	4;6	3;10	3;11
Leiter Age Equivalency	≥5;6	≥5;6	≥3;10	≥4;8
MLU Score	3.44	5.37	3.76	7.37
Brown's Stage	Ear.St.IV	Pst.St.V	Late St.IV	Pst.St.V
Predicted Age	3;2	4;6	3;4	>4;10
NSST				
Receptive Percentile	25	75	--	<10
Expressive Percentile	<10	50-75	--	>90
Testing Behavior	animated	animated	uncooperative	shy

expressive portion of the NSST. Each correct response received a score of one point, and the total score was tabulated for each subtest and compared to statistical norms to calculate a percentile ranking.

In addition, the language-impaired children had been previously diagnosed, and were receiving therapy. On the other hand, the normally developing children were not receiving therapy and had never been suspected of having language problems.

Effort was made to select children from a common socio-economic background, as indexed by parental occupation and predictions about co-occurring incomes. They were chosen from the Head Start Program and elementary school populations of Lansing, Michigan. This plan was approved for use by human subjects by the Michigan State University Committee on Human Subjects (See Appendix D).

Subject Selection Procedures

Screening Procedures

The subjects were selected in two phases of screening activity. The first phase identified the clinical and nonclinical children who potentially met subject selection criteria. The second screening phase verified whether the subject selection criteria had been met.

Phase 1 of Screening Activity. The first phase of the screening activity involved the classroom teachers and speech-language pathologists in the school programs. They completed brief questionnaires on every child in the age ranges of interest (see

Appendix E). The teachers provided information about children who had never been referred to speech therapy or special education classes whereas the speech pathologist provided information about the language-impaired children.

The questionnaires required yes/no responses to questions regarding demographic features (e.g., age, sex, educational placement, health, history, and socio-economic status), professional judgments, and access to the child's school records. In addition, it was determined whether scores were available for the NSST and the LIPS. Further screening of those children who potentially met subject selection criteria was completed as the questionnaires were returned. The children's identity remained anonymous until they were selected as potential subjects.

Phase 2 of Screening Activity. The second phase of screening involved the administration of the NSST and LIPS to determine if the potential subjects met criteria for selection. In addition, a fifty utterance language sample was collected for the calculation of a mean length of utterance. Informal observations of the oral peripheral structure and functioning, and verbal and nonverbal behavior such as speech intelligibility, vocal attributes, and response to verbal commands were noted to ascertain body integrity. A standard checklist was used for the purpose of applying the same observations to each child screened (see Appendix F). Those children who did not meet subject selection criteria were not observed further.

The testing during this phase was conducted in the child's home environment after written parental consent was obtained (see Appendix G).

The language-impaired children were selected first, and then normal children of comparable age, sex, ethnicity, and socio-economic background, were sought.

Procedures Used to Obtain Language Samples

The children's spoken language was recorded using audio-visual equipment that consisted of a portable color camera (Sony BMC-660) equipped with view finder and automatic light control and self-contained video-cassette recorder supplemented by a microphone (Sony ECM-Z200). The sample also was audio-recorded using a cassette recorder (Sony TC-205) with a tie-tack microphone (EMC-150T) attached to the child's clothing at the collar.

All observations took place in the Language Sciences Laboratory at Michigan State University during the hours of 10:00 to 4:00. Prior to the language sample, the subjects had participated in a structured locative task designed for another study. Following this structured task which lasted 30-40 minutes, the children were given a short break and then engaged in a play activity with the investigator, so that a 50-60 minute language sample could be collected. At this point, the children were usually eager to play and were familiar with the investigator who also had administered the structured task.

A core set of toys was used consistently across all subjects, and centered around four themes, each being the focus of a 10-15 minute play interaction. The first theme introduced objects for a picnic scene. The child played with objects that included a mommy, a daddy, a son, a daughter, a dog, a picnic table, a picnic blanket, flowers, plates, knives, napkins, raisins, and crackers. The second theme revolved around modes of transportation. The objects included a jeep, a helicopter, a plane, boats, and horses. The third theme centered around animals such as monkeys, horses, cows, sheep, roosters, pigs, and a barn. The final theme centered around machinery that included a dump truck, tractor and wagons that were handled in relation to rocks, stones, and lichens. The first two activities took place on a landscape set depicting a hill with a tunnel through it, a river with a bridge over it, and a grassy field. The third and fourth activities took place on a green mat depicting grass and placed on the floor.

These toys were selected because they allowed the children to perform a wide variety of actions and appeared to be of high interest value to children. The play activity involved the child and the investigator, with the investigator imposing a minimum amount of structure except for controlling the type and sequence of toys that were available for the child's play.

All the toys were kept out of the child's sight, in separate boxes according to the theme with which the toy was associated. The investigator generally constructed each activity for the child and then allowed the child to position the toys on the set and talk

about what they were doing. The themes were introduced, one-at-a-time, in a consistent order as previously described. As the child appeared to lose interest in an activity or reduced the amount of verbal output, a new toy was introduced, and the other toys removed. The child was allowed to play with toys in whatever manner he wished. The investigator attempted to keep the language-sample as child-oriented as possible by engaging in parallel play and asking open-ended questions. In instances when the child was not very talkative, or was very repetitious in his/her play, the investigator became more directive.

Form of the Data

The data were available in audio-visual form on color Beta video cassettes. The audio-visual record provided the situational and linguistic context in which the child's action utterances were produced. This was helpful in interpreting the underlying meanings of the child's utterances.

The audio-visual recording was viewed and all utterances were transcribed orthographically on the standard forms used in Part 1 of this study. Subject identification, utterance numbers, counter numbers, and general context were also noted on these forms.

Procedures for Identifying Action Utterances

The utterances coding action were identified in the same manner as in Part 1 of this study. The audio-visual tape was reviewed in conjunction with the written form. The investigator looked

primarily at the verb in each utterance to identify those coding actions on the basis of the operational definition. It was also noted whether the verb was used correctly within the situational and communicative context.

Procedures for Assigning Subcategories of Action Utterances

The contexts were considered in order to infer the specific meanings encoded within each action utterance. The utterances were then assigned to the subcategories developed in Part 1 of this study, based upon the movement and change characteristics of the action.

Tabulation of the Data

The same analyses performed on the original norming group, were performed on the data collected from the normal and language-impaired children in Part 2 of this study. The Rank Sums test was applied to the data, as appropriate, to determine if significant differences existed between groups.

Outcomes Which Would Support the Argument of Differences in Semantic Relations Used by Normal and Clinical Groups

It was expected that all of the children would be coding action in some form. However, it was also expected that differences would exist in any one of the three aspects of data tabulated. The clinical children were expected to code fewer of the action subcategories than the normal children. In those subcategories of action which the clinical and normal children had in common, it was

expected that the clinical children would represent less diversity in their verb forms. For example, the clinical child might use only two verb forms to code a particular subcategory of action, whereas the normal child might use five different forms within the same subcategory.

RESULTS

Part 1 - Action Subcategories in a Normative Sample

The purpose of this section is to describe the distribution of action verb subcategories in the normative sample. Ninety-six percent of the action utterances produced by the children in this study were accounted for by the following eight subcategories:

Movement-Change of Attributive State

Movement-Change of Locative State

Movement-Change of Possessive State

Movement-Nonchange of State

Nonmovement-Change of State

Nonmovement-Nonchange of External State

Nonmovement-Nonchange of Positional State

Nonmovement-Nonchange of Possessive State

Although all categories were represented in the language samples of one or more subjects, they did not occur with equal frequency, nor did they include the same number of verb types. In the following sections, 1) the relative frequency distribution of subcategories and 2) the lexical composition of each category are described for each subject.

The Relative Frequency Distribution of Verb Subcategories

The proportion of different action verbs represented in each of eight verb categories was calculated for each subject. These proportions are displayed in Table 3 and the mean proportions are graphically summarized in Figure 2 for visual inspection (see Appendix H for complete data record).

Inspection of Table 3 and Figure 2 reveals that by far the greatest number of action utterances were represented by the movement categories which accounted for more than 3/4 of the data. The Movement-Change of State categories alone accounted for approximately 2/3 of the different action verbs in this study.

In an attempt to make the relationships between categories more apparent, the information presented in Table 4 has been subdivided into smaller tables which show percentage values for selected sets of categories, as will be described in the following sections.

Comparison of Movement/Nonmovement Categories

The data in Table 4 collapses the categories into Movement and Nonmovement, making it apparent that a greater diversity of action verbs are characterized by movement rather than nonmovement. The Wilcoxan matched-pairs signed ranks test (Orkin and Drogin, 1974) was applied to these data and revealed a significant difference ($W = 36$, $P(W \geq 20) = .098$) between the categories of Movement and Nonmovement.

Table 3. The Percentage of Different Action Verbs In Each Category For Each Child in Normative Sample.

Subcategories		Subjects								$\bar{X}$	Sd
		KM	ST	DW	DD	MW	LA	CW	EC		
N		(177)	(109)	(274)	(205)	(224)	(199)	(256)	(120)		
Movement-Change of State	Locative	26.3	21.9	27.8	32.0	23.2	27.8	41.0	36.8	29.6	2.5
	Attrib.	23.7	25.0	24.1	28.0	32.1	24.1	21.3	21.1	24.9	1.4
	Possess.	10.5	15.6	11.1	6.0	5.4	13.0	9.8	10.5	9.5	1.3
	Subtotal	60.5	62.5	63.0	66.0	60.7	64.9	72.1	68.4	64.8	1.5
Movement-Nonchange of State		31.6	15.6	18.5	14.0	25.0	14.8	9.8	21.1	18.8	2.6
Nonmovement-Change of State		2.6	9.4	5.6	10.0	7.1	9.3	1.6	7.9	6.7	1.2
Nonmovement-Nonchange of State	Position	2.6	6.3	5.6	6.0	1.8	5.6	6.6	2.6	4.6	.7
	Internal	0	6.3	1.9	4.0	1.8	3.7	8.2	0	3.2	1.1
	Possess.	2.6	0	5.6	0	3.6	1.9	1.6	0	1.9	.8
	Subtotal	5.2	12.6	13.1	10.0	7.2	11.2	16.4	2.6	9.8	1.7

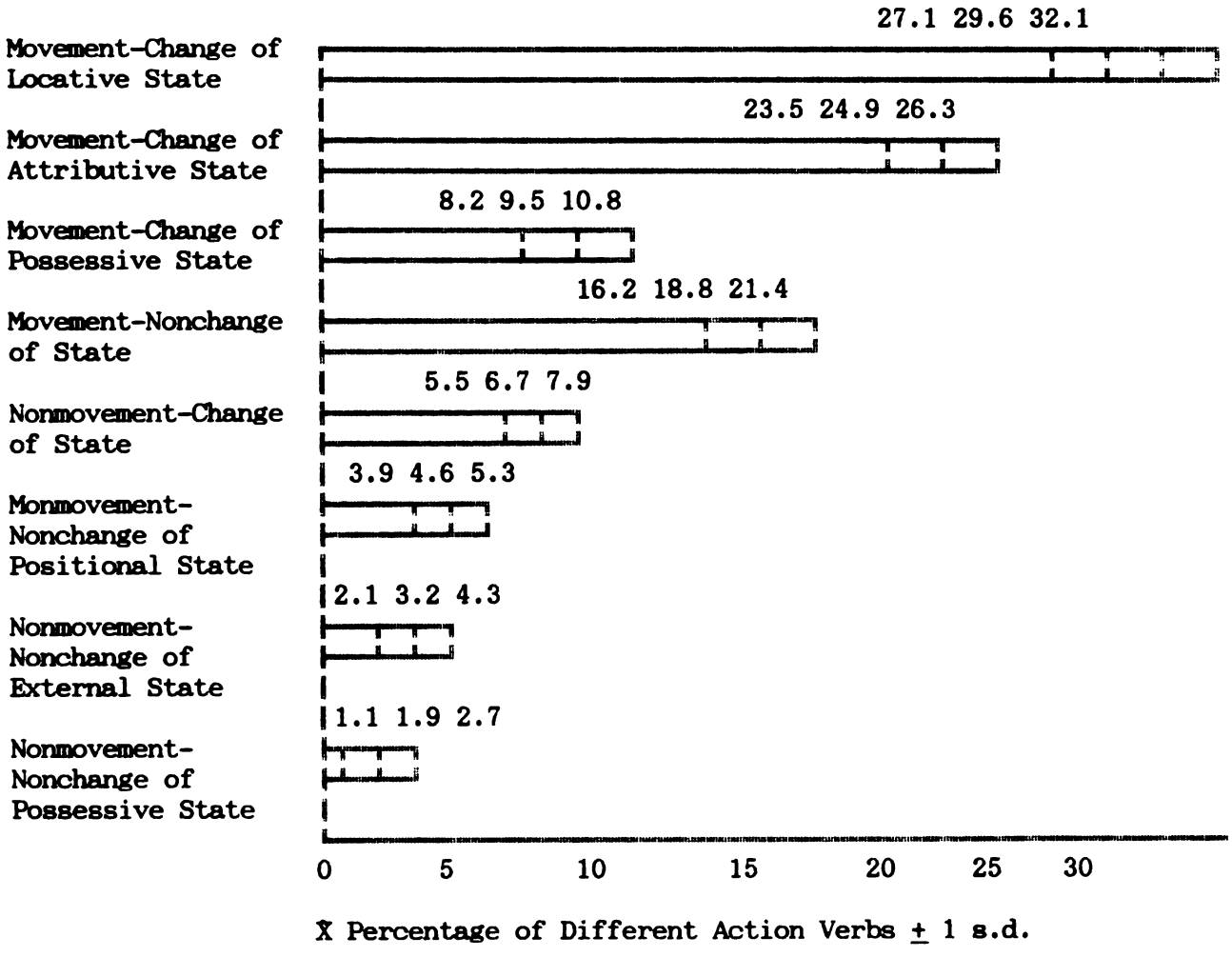

Figure 2. The Mean Percentage of Different Action Verbs ± 1 Standard Deviation Within Each Category.

Table 4. The Percentage of Different Action Verbs In the Movement and Nonmovement Categories.

Subcategories	Subjects								$\bar{X}$	Sd
	KM	ST	DW	DD	MW	LA	CW	EC		
Movement	92.1	78.1	81.5	80.0	85.7	79.7	81.9	89.5	83.6	1.9
Nonmovement	7.8	22.0	18.7	20.0	14.3	20.5	18.0	10.5	16.5	1.9

Comparison of Change/Nonchange Categories

Table 5 summarizes the diversity of action utterances within the subcategories involving a Change of State and Nonchange of State revealing a substantial advantage of the Change of State categories over the Nonchange of State categories in representing the action verbs used by subjects. Application of the Wilcoxan matched-pairs signed-ranks test indicated that this difference was statistically significant ($W = 36$, $P(W \geq 20) = .098$).

However, close inspection of Table 5 reveals that the interaction of movement with change contributed greatly to this difference. When the Wilcoxan matched-pairs sign-ranks test was applied to the subcategories of Change of State and Nonchange of State separately for the Movement and Nonmovement subcategories, as in Table 6 and Table 7, it becomes apparent that the dominance of Change of State over Nonchange of State is characteristic only within the Movement categories ($W = 36$, $P(W > 20) = .098$). Within the Nonmovement category, the opposite difference was noted, with the Nonmovement-

Table 5. The Percentage of Different Action Verbs In the Change of State and Nonchange of State Categories Irrespective of Movement or Nonmovement Classification.

Subcategories	Subject								$\bar{X}$	Sd
	KM	ST	DW	DD	MW	LA	CW	EC		
Change of State	63.1	71.9	68.6	76.0	67.8	74.2	73.7	76.3	71.5	1.7
Nonchange of State	36.8	28.2	31.6	24.0	32.2	26.0	26.2	23.7	28.6	1.7

Table 6. The Percentage of Different Movement Action Verbs In the Change of State and Nonchange of State Categories.

Subcategories	Subjects								$\bar{X}$	Sd
	KM	ST	DW	DD	MW	LA	CW	EC		
Movement-Change of State	60.5	62.5	63.0	66.0	60.7	64.9	72.1	68.4	64.8	1.5
Movement-Nonchange of State	31.6	15.6	18.5	14.0	25.0	14.8	9.8	21.1	18.8	2.6

Table 7. The Percentage of Different Nonmovement Action Verbs In the Change of State and Nonchange of State Categories.

Subcategories	Subjects								X	Sd
	KM	ST	DW	DD	MW	LA	CW	EC		
Nonmovement-Change of State	2.6	9.4	5.6	10.0	7.1	9.3	1.6	7.9	6.7	1.2
Nonmovement-Nonchange of State	5.2	12.6	13.1	10.0	7.2	11.2	16.4	2.6	9.8	1.7

Nonchange of State category representing a significantly greater percentage of action verbs than the Change of State category ($W = -23$, $P(W \geq 20) = .098$).

Comparison of Change of Locative/Attributive/Possessive State Categories

The subdivision of the Movement-Change of State category into the type of change -- Locative, Attributive and Possessive -- is represented in Table 8. The Friedman Two-Way ANOVA by Ranks (Orkin & Drogin, 1974) revealed a significant difference among the categories Movement-Change of Attributive, Locative, and Possessive States ($X_r^2 (2) = 13$, $p < .005$). The Wilcoxan matched-pairs signed-ranks test was then applied to compare each pair of categories. The results indicated that Movement-Change of Locative State represented a significantly larger percentage of action verbs than did the Movement-Change of Attributive State ($W = 20$, $P(W \geq 20) = .098$) or the Movement-Change of

Table 8. The Percentage of Different Movement Action Verbs In the Change of Locative, Attributive and Possessive State Categories.

Subcategories	Subject								X	Sd
	KM	ST	DW	DD	MW	LA	CW	EC		
Change of Locative State	26.3	21.9	27.8	32.0	23.2	27.8	41.0	36.8	29.6	2.5
Change of Attributive State	23.7	25.0	24.1	28.0	32.1	24.1	21.3	21.1	24.9	1.4
Change of Possessive State	10.5	15.6	11.1	6.0	5.4	13.0	9.8	10.5	9.5	1.3

Possessive State ($W = 36$, $P(W \geq 20) = .098$). The Movement-Change of Attributive State represented a significantly larger percentage of action verbs than did the Movement-Change of Possessive State category ($W = 36$, $P(W \geq 20) = .098$).

Comparison of Nonchange of Positional/External/Possessive State Categories

The Friedman Two-Way ANOVA by Ranks was applied to the Nonmovement-Nonchange of State categories, represented in Table 9, significant differences were not revealed between the categories of Nonchange of Positional, External, or Possessive State (Xr^2 (2) = 3.1, $p \geq .05$).

Table 9. The Percentage of Different Nonmovement Action Verbs In The Nonchange of Positional, External and Possessive State Categories.

Subcategories	Subjects								X	Sd
	KW	ST	DW	DD	MW	LA	CW	EC		
Nonchange of Positional State	2.6	6.3	5.6	6.0	1.8	5.6	6.6	2.6	4.6	.7
Nonchange of External State	0	6.3	1.9	4.0	1.8	3.7	8.2	0	3.2	1.1
Nonchange of Possessive State	2.6	0	5.6	0	3.6	1.9	1.6	0	1.9	.8

The Diversity of Verb Forms Within Each Subcategory

The total population of action verbs within each category varied considerably across subjects. The verbs in Tables 10 through 17 are arranged in order from those represented by all subjects to those represented by only one subject. Lines have been drawn to highlight those verbs used by all subjects and those used by only one subject. Inspection of these tables reveals that some verbs were produced by a larger group of children than other verbs. Approximately 50% of the verbs within each category were used by only one subject. For any one category, no more than four verbs were used by all subjects. No verb within the nonmovement categories was produced by all subjects. The total number of verbs used by all subjects ranged from 4 to 51, across categories.

Table 10. The Diversity of Action Verbs In the Movement-Change of Locative State Category.

Verbs	Subjects							
	KM	ST	DW	DD	MW	LA	CW	EC
put	+	+	+	+	+	+	+	+
go	+	+	+	+	+	+	+	+
come	+	+	+	+	+	+	+	+
get	+	+	+	+	+	+	+	+
take	+	+	+		+	+	+	+
fall		+	+	+	+	+	+	
move	+		+	+		+	+	
knock (down)	+		+	+	+		+	
turn			+		+	+	+	+
run			+	+			+	+
sit	+		+			+		
push			+		+			+
stand		+	+				+	
pick				+		+	+	
pull				+		+	+	
jump			+				+	
bring					+		+	
throw						+		+
walk					+		+	
drop			+				+	
stick	+						+	
lay						+	+	
pop (up)	+							
swing							+	
spit					+			
ride							+	
drive				+				
backing up				+				
set (back)							+	
carry								+
follow							+	
scoot							+	
hit (ball)				+				
spill				+				
race					+			
flip						+		
land							+	
leave							+	
fly								+
swim								+
roll								+
park				+				
call (back)				+				
chase						+		

Table 11. The Diversity of Action Verbs In the Movement-Change of Attributive State Category.

Verbs	Subjects							
	KM	ST	DW	DD	MW	LA	CW	EC
eat	+	+	+	+	+	+	+	+
make		+	+	+	+	+		+
open	+	+	+	+	+	+		+
bite		+	+	+		+	+	+
cook		+	+	+	+			
break	+			+	+		+	
shake			+		+	+		+
fight	+		+				+	+
mess	+		+		+			
paint			+					+
close					+	+		
wash			+	+				
scare				+			+	
pop (popcorn)	+						+	
fix				+			+	
turn (light on)				+				+
stir					+	+		
hit		+			+			
kill							+	
cut				+				
clean					+			
wrap							+	
take (a bath)				+				
bust				+				
drink						+		
whip					+			
waste					+			
choke	+							
feed					+			
put (together)					+			
polish						+		
beat							+	
pop (your hand with elastic)						+		
tease	+							
get (ready)					+			
scratch		+						
tear			+					
cover			+					
wipe					+			
fill					+			
smoke						+		
tie						+		

Table 11, contd.

Verbs	Subjects							
	KM	ST	DW	DD	MW	LA	CW	EC
crack							+	
fall (apart)							+	
mix			+					
bathe				+				
knock (you out)	+							
lock								+
mock (tease)		+						
teach						+		
hurt							+	

Table 12. The Diversity of Action Verbs In the Movement-Change of Possessive State Category.

Verbs	Subjects							
	KM	ST	DW	DD	MW	LA	CW	EC
get	+	+	+	+	+	+	+	+
give	+	+	+	+	+	+	+	+
take	+		+		+	+		
find		+	+				+	
buy			+			+		+
lose			+			+	+	
catch						+		+
roll						+		
bring		+						
see (give it)		+						
leave							+	
pay							+	
pick	+							
steal				+				

Table 13. The Diversity of Action Verbs In the Movement-Nonchange of State Category.

Verbs	Subjects							
	KM	ST	DW	DD	MW	LA	CW	EC
play	+	+	+	+	+	+	+	+
say	+	+	+	+	+	+	+	+
look	+		+	+	+	+	+	+
tell	+		+	+	+	+	+	+
show		+	+	+	+	+		
help	+		+	+				
call	+		+	+				
laugh	+			+	+			
cry					+		+	
messing (fooling)		+			+			
talk			+					+
read			+					+
holler	+							+
knock (on door)					+			
cheat					+			
check (heartbeat)	+							
rub						+		
dance	+							
take (a picture)	+							
ask						+		
pee			+					
sing	+							
feel		+						
peep					+			
taste					+			
reach							+	
use			+					
work					+			
kiss								+

Table 14. The Diversity of Action Verbs In the Nonmovement-Change of State Category.

Verbs	Subjects							
	KM	ST	DW	DD	MW	LA	CW	EC
stop	+	+		+	+	+	+	
get (cold)			+		+			+
die				+	+			
go to sleep				+	+			
finish		+	+					
burn			+	+				
learn						+		
freeze				+				
make (me sick)				+				
(school) open						+		
come (on TV)						+		
coming (badly)								+
win								+
boil						+		

Table 15. The Diversity of Action Verbs In the Nonmovement-Nonchange of Positional State Category.

Verbs	Subjects							
	KM	ST	DW	DD	MW	LA	CW	EC
wait		+	+	+			+	
stay		+	+	+			+	
sit			+			+		+
lay					+			
hold still	+							
stand				+				
hold (on)						+		
step						+		
hide							+	

Table 16. The Diversity of Action Verbs In the Nonmovement-Nonchange of External State Category

Verbs	Subjects							
	KM	ST	DW	DD	MW	LA	CW	EC
watch			+	+		+	+	
dream		+				+		
think					+		+	
bet				+			+	
ignore							+	
sleeping		+						
remember							+	

Table 17. The Diversity of Action Verbs In the Nonmovement-Nonchange of Possessive State Category.

Verbs	Subjects							
	KM	ST	DW	DD	MW	LA	CW	EC
hold			+		+		+	
get (i.e. keep)			+		+			
save	+					+		
keep			+					

The overall distribution of verbs reveals that all subjects used at least one verb in each of the categories except the Nonmovement-Nonchange of Internal State and Nonmovement-Nonchange of Possessive State categories. This distribution suggests that some categories (Movement-Change of Locative State, Movement-Change of Attributive State, Movement-Change of Possessive State, Movement-Nonchange of State) are more dominant than other categories (Nonmovement-Nonchange of Internal State, Nonmovement-Nonchange of Possessive State).

Part 2 - Action Subcategories in Clinical and Normal Samples

The purpose of this section is to compare the distribution of subcategories in the normal and language-impaired groups. Based on the results presented in Part 1 of this study, it would be expected that the normally developing subjects in Part 2 of this study would demonstrate the following trends in the distribution of their action verbs within the subcategories:

1. The Movement categories would represent a larger percentage of action verbs than the Nonmovement categories.

2. Within the Movement category, the Change of State categories would represent a larger percentage of action verbs than the Nonchange of State categories.

3. Change of Locative State would represent a larger percentage of action verbs than Change of Attributive State which would represent a larger percentage of action verbs than Change of Possessive State.

4. Little difference would exist between the percentage of action verbs represented by the Nonchange of Positional, Internal or Possessive State categories.

As with the normative sample, all categories were represented in the language samples of at least one of the two language-impaired and nonimpaired children. However, the categories did not occur with equal frequency, nor did they include the same number of verb types. The following sections describe for each group 1) the distribution of verb subcategories and 2) the lexical composition of each category.

The Relative Frequency Distribution of Verb Subcategories for Normal and Language-Impaired Groups

The percentage of different action verbs represented by each category was calculated for both the normally developing and language-impaired subjects. These results are displayed in Table 18 and the mean proportions are graphically summarized in Figure 3 for visual inspection (see Appendix I for complete record of this data). The rank order of the subcategories was compared between the normal and language-impaired groups, using the Rank-Sums test (Senders, 1958). No significant difference was found between the groups ($T_1 = 70$, $T_2 = 66$, $p(T \leq 49) = .05$). The normal and language-impaired subjects demonstrated similar patterns in the distribution of action verbs across the eight subcategories.

The information presented in Table 18 has been subdivided into smaller tables in an effort to determine whether the trends observed in

Table 18. A Comparison of the Percentage of Different Action Verbs Within Each Category Between Normal and Language-Impaired Subjects.

Subcategories		Normal Subjects		$\bar{X}$	Rank	Language Impaired Subjects		$\bar{X}$	Rank
N		DB (238)	AD (42)			MW (182)	JK (93)		
Movement-Change of State	Locative	42.3	57.1	49.7	1	42.6	46.9	44.8	2
	Attrib.	26.9	19.0	23.0	4	21.3	25.0	23.2	3
	Possess.	3.8	4.8	4.3	10.5	4.3	9.4	6.9	7
	Subtotal	73.0	80.9	77.0		68.2	81.3	74.9	
Movement-Nonchange of State		11.5	9.5	10.5	6	17.0	9.4	13.2	5
Nonmovement-Change of State		1.9	0	1.0	15	0	0	0	16
Movement-Nonchange of State	Position.	3.8	4.8	4.3	10.5	12.8	0	6.4	8
	External	3.8	0	1.9	14	2.1	3.1	2.6	13
	Possess.	5.8	4.8	5.3	9	0	6.3	3.2	12
	Subtotal	13.4	9.6	11.5		14.9	9.4	12.2	
					$T_1 = 70$				$T_2 = 66$

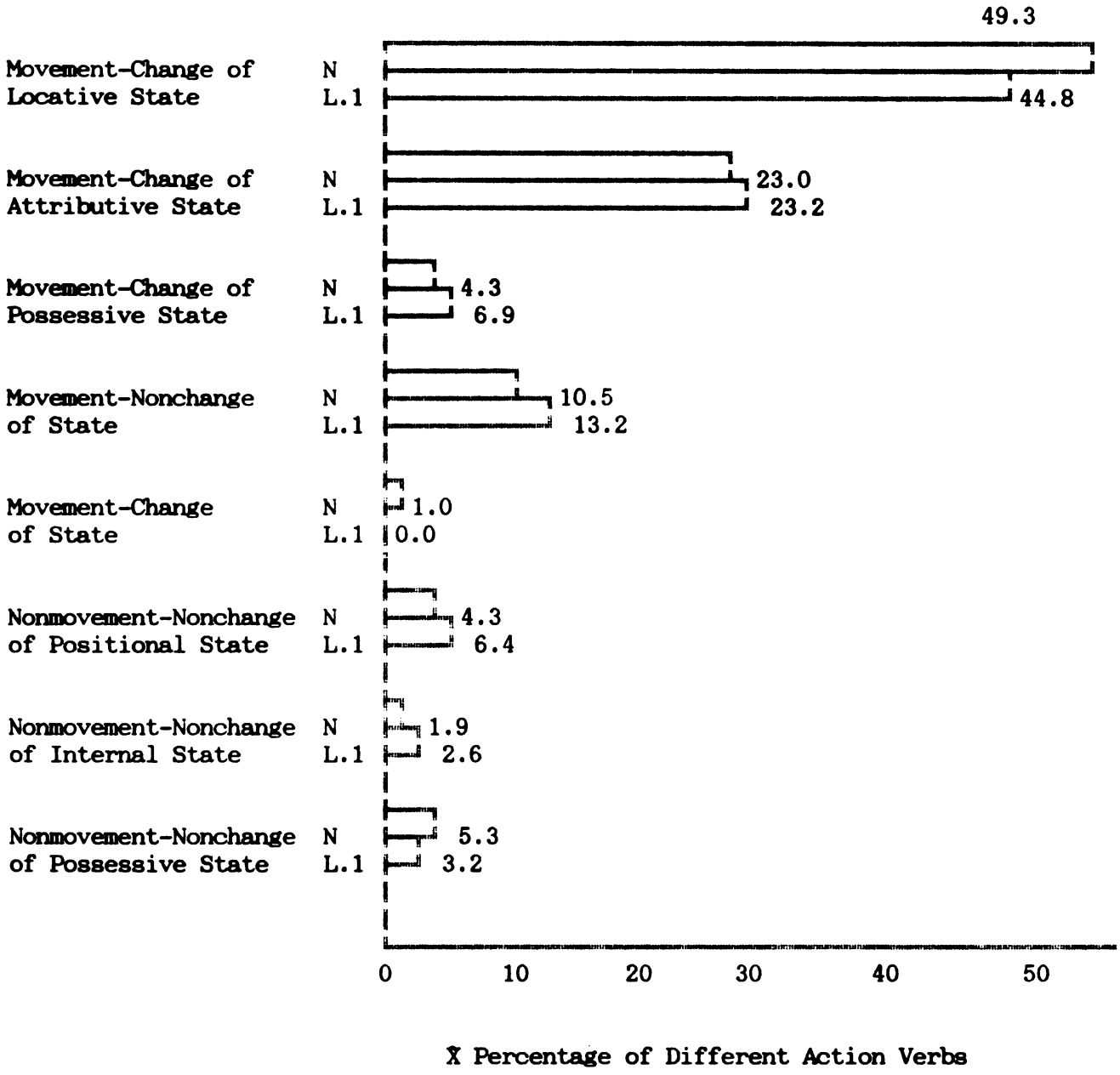

Figure 3. A Comparison of the Mean Percentage of Different Action Verbs Within Each Category, Between Normal and Language-Impaired Children.

Part 1 of this study are also apparent in the data of our age-matched normal and language-impaired subjects.

When the categories are collapsed into Movement and Nonmovement, as presented in Table 19, it becomes apparent that no substantial differences exist between the normal and language-impaired children. For both groups, the same tendency as observed in Part 1 of this study was noted. The Movement categories represented a much larger percentage of action verbs than did the Nonmovement categories.

The tendency for the Change of State categories to account for a greater percentage of action verbs than the Nonchange of State Categories, was also demonstrated by both the normal and language-impaired subjects, as indicated in Table 20. No substantial differences are noted between the normal and language-impaired children.

As noted in Part 1 of this study, the dominance of Change of State hold true only within the Movement categories, as revealed in Table 21. In fact, this trend seems to be reversed within Nonmovement categories. Inspection of Table 22 indicates that, among nonmovement verbs, Nonchange of State represents a considerably larger percentage of action verbs than Change of State.

Table 23 summarizes the subdivision of the Movement-Change of State category into the type of change--Locative, Attributive, and Possessive. Once again, substantial differences between the normal and language-impaired subjects are not apparent. The rank ordering of these categories from largest to smallest is Change of Locative State, Change of Attributive State, and Change of Possessive State,

Table 19. The Percentage of Different Action Verbs In the Movement and Nonmovement Categories for Normal and Language-Impaired Subjects.

Subcategories	Normal Subjects		$\bar{X}$	Language-Impaired Subjects		$\bar{X}$
	DB	AD		MW	JK	
Movement	84.5	90.4	87.5	85.2	90.7	88.0
Nonmovement	15.3	9.6	12.5	14.9	9.4	12.1

Table 20. The Percentage of Different Action Verbs In the Change of State and Nonchange of State Categories for Normal and Language-Impaired Subjects, Irrespective of Movement or Nonmovement Classification.

Subcategories	Normal Subjects		$\bar{X}$	Language-Impaired Subjects		$\bar{X}$
	DB	AD		MW	JK	
Change of State	74.9	80.9	77.9	68.2	81.3	74.8
Nonchange of State	24.9	19.1	22.0	18.3	25.4	31.9

Table 21. The Percentage of Different Movement Action Verbs In the Change of State and Nonchange of State Categories for Normal and Language-Impaired Subjects.

Subcategories	Normal Subjects		$\bar{X}$	Language-Impaired Subjects		$\bar{X}$
	DB	AD		MW	JK	
Movement-Change of State	73.0	80.9	77.0	68.2	81.3	74.9
Movement-Nonchange of State	11.5	9.5	10.5	17.0	9.4	13.2

Table 22. The Percentage of Different Nonmovement Action Verbs In the Change of State and Nonchange of State Categories for Normal and Language-Impaired Subjects.

Subcategories	Normal Subjects		$\bar{X}$	Language-Impaired Subjects		$\bar{X}$
	DB	AD		MW	JK	
Nonmovement-Change of State	1.9	0	1.0	0	0	0
Nonmovement-Nonchange of State	13.4	9.6	11.5	14.9	9.4	12.2

Table 23. The Percentage of Different Movement Action Verbs In the Change of Locative, Attributive, and Possessive States Categories for Normal and Language-Impaired Subjects.

Subcategories	Normal Subjects		$\bar{X}$	Language-Impaired Subjects		$\bar{X}$
	DB	AD		MW	JK	
Locative	42.3	57.1	49.7	42.6	46.9	44.8
Attributive	26.9	19.0	23.0	21.3	25.0	23.2
Possessive	3.8	4.8	4.3	4.3	9.4	6.9

respectively. This ordering is the same as that observed in Part 1 of this study, but with much larger differences noted between Change of Locative State and Change of Attributive State. The Change of Locative State category, for both the normal and language-impaired subjects, represented approximately twice as many different action verbs than did the Change of Attributive State category. As observed in Part 1 of this study, the Change of Possessive State Category accounted for a considerably smaller percentage of action verbs than the preceding two categories.

The fourth trend observed in the data of Part 1 of this study was also upheld by both the normal and language-impaired subjects, as demonstrated in Table 24. Substantial differences between the Nonmovement-Nonchange of Positional, Internal, and Possessive states were not apparent.

In summary, it appears that the general trends in the subcategorization of action data, found in Part 1 of this study, have

Table 24. The Percentage of Different Nonmovement Action Verbs In the Nonchange of Positional, External, and Possessive States Categories for Normal and Language-Impaired Subjects.

Subcategories	Normal Subjects		$\bar{X}$	Language-Impaired Subjects		$\bar{X}$
	DB	AD		MW	JK	
Positional	3.8	4.8	4.3	12.8	0	6.4
External	3.8	0	1.9	2.1	3.1	2.6
Possessive	5.8	4.8	5.3	0	6.3	3.2

been upheld in Part 2 of this study by both the normal and language-impaired subjects. The only exception noted in Part 2 was the greater percentage of action verbs within the Movement-Change of Locative State category as compared with the Movement-Change of Attributive State category.

The Diversity of Verb Forms Within Each Subcategory

As in Part 1 of this study, the total population of verbs in each category varied considerably between the normal and language-impaired groups. Tables 25 through 32 document the variety of verbs produced by each group within each subcategory. The verbs are arranged in order from those represented by both groups to those represented by only one group. Lines have been drawn to highlight those verbs used by both groups and those used by only one group. Inspection of these tables reveals that while there is a different inventory of verbs between the

Table 25. The Diversity of Action Verbs In the Movement-Change of Locative State Category.

Verbs	Group	
	N	LI
put	+	+
go	+	+
get	+	+
take	+	+
come	+	+
jump	+	+
knock	+	+
drive	+	+
fall	+	+
throw	+	+
fly	+	+
bring	+	+
pick	+	+
drop	+	+
sit	+	+
run	+	+
dump	+	+
walk	+	
swim	+	
leave	+	
stick	+	
bump	+	
tip	+	
limb	+	
crawl	+	
push		+
turn		+
move		+
stand		+
pull		+
park		+
pop		+
backing		+
race		+
land		+
tramp		+
bang		+

Table 26. The Diversity of Action Verbs In the Movement-Change of Attributive State Category.

Verbs	Group	
	N	LI
get	+	+
take	+	+
leave	+	
give		+
pass		+

Table 27. The Diversity of Action Verbs In the Movement-Change of Attributive State Category.

Verbs	Group	
	N	LI
eat	+	+
open	+	+
cut	+	+
crash	+	
put	+	
clean	+	
seal	+	
break	+	
close	+	
bust	+	
fill	+	
roll	+	
slam	+	
hook	+	
make	+	
hit	+	
fire		+
paint		+
get		+
tickle		+
turn (on)		+
explode		+
spread		+
set (table)		+
fit		+
lock		+
poke		+
wake		+

Table 28. The Diversity of Action Verbs In the Movement-Nonchange of State Category.

Verbs	Group	
	N	LI
play	+	+
say	+	+
look	+	+
cry	+	+
sing	+	
use	+	
help		+
tell		+
talk		+
wave		+
reach		+

Table 29. The Diversity of Action Verbs In the Nonmovement-Change of State Category.

Verbs	Group	
	N	LI
go to sleep	+	

Table 30. The Diversity of Action Verbs In the Nonmovement-Nonchange of Positional State Category.

Verbs	Group	
	N	LI
stay	+	+
sit	+	
wait		+
stand		+
hang		+
lay		+
hold		+

Table 31. The Diversity of Action Verbs In the Nonmovement-Nonchange of External State Category.

Verbs	Group	
	N	LI
sleep	+	
pretend	+	
watch		+

Table 32. The Diversity of Action Verbs In the Nonmovement-Nonchange of Possessive State Category

Verbs	Subject	
	N	LI
keep	+	+
hold	+	+
save	+	

normal and language-impaired groups, it is not clear how these words differ, if at all.

The overall distribution of verbs across categories reveals that both groups used at least one verb in each of the categories except the Nonmovement-Change of State category.

DISCUSSION

Summary and Conclusions

This study was conducted for two purposes. The first was to develop subcategories of the global category action which could account for the majority of action utterances produced by normally developing children. The second purpose was to apply this system of subcategories to compare the action utterances produced by language-impaired children to those produced by their normally developing peers. The results were expected to expand semantic descriptions of child language and provide insight into the nature of language impairment.

The action utterances produced by eight normally developing children between the ages 4;3 and 4;6 years were extracted from spoken language samples approximately one hour in length. These utterances were assigned to one of the following eight subcategories on the basis of the movement and change characteristics coded by the action verb:

Movement-Change of Locative State

Movement-Change of Attributive State

Movement-Change of Possessive State

Movement-Nonchange of State

Nonmovement-Change of State

Nonmovement-Nonchange of Positional State

Nonmovement-Nonchange of External State

Nonmovement-Nonchange of Possessive State

These eight subcategories accounted for 96% of the action utterances produced by the subjects. Those utterances that could not be classified included figurative expressions for which the specific movement and change aspects of action meaning were not readily apparent. The relative distribution frequency of action verbs within these categories revealed four general observations:

1) Movement categories represented a larger percentage of action verbs than Nonmovement categories.

2) Within the Movement categories, Change of State represented a larger percentage of action verbs than Nonchange of State. Contrastively, within the Nonmovement categories, Nonchange of State represented a larger percentage of action verbs than Change of State.

3) Among Movement-Change of State verbs, Change of Locative State represented a larger percentage of action verbs than Change of Attributive State, which represented a larger percentage of action verbs than Change of Possessive State.

4) Among Nonmovement-Nonchange Change of State verbs, distributions among the Nonchange of Positional, External, and Possessive States were not significantly different from each other.

When this system of subcategories was applied to the action utterances produced by normal and language-impaired subjects of

comparable ages, the four general observations were upheld regardless of the grouping. The rank ordering of the eight subcategories was very similar for the normal and language-impaired groups.

The population of action verbs comprising each category varied considerably for both the normal subjects in Part 1 of this study, and the normal and language-impaired subjects in Part 2 of this study. While the normal children used verbs that the language-impaired children did not, and conversely, the language-impaired children used verbs that the normal children did not, it was not clear how these words differed, if at all.

Comparison of the Results with Other Studies

It appears that only one other study (Huttenlocher et al., 1983) has systematically investigated the action utterances of normally developing children on the basis of movement and change characteristics. However, it is difficult to compare the Huttenlocher et al. results with those reported in this study because the definitions of the action subcategories were different. Huttenlocher et al. (1983) classified verbs of movement in terms of characteristic movements (e.g., walk, wave), and separated these from verbs of change (e.g., get, open). They also analyzed both comprehension and production data. Results of their study suggested

that, while children comprehend verbs of movement earlier than verbs of change, they rarely produced verbs of movement to describe their own actions, although they did use verbs of change.

Contrastively, this study dealt with only production data and, the subcategories of action were defined in a different way. Verbs were defined by the interaction of movement and change characteristics. They were classified as movement if any observable movement was necessary to carry out the action, irrespective of whether or not they were characteristic movements. Because each action verb was defined on the basis of both movement and change features, the verbs of change in the Huttenlocher et al. (1983) study would have been classified in this study as verbs coding Movement-Change of State. The characteristic movement category of Huttenlocher et al. contains verbs that would be classified as either Movement-Change of Locative State (e.g., walk), or Movement-Nonchange of State (e.g., wave).

Irrespective of the differences between this study and that of Huttenlocher et al. (1983), both studies suggest that the characteristics of movement and change dominate the early acquisition of action verbs.

While trends in the distribution of action verbs revealed in this study were somewhat similar to the results of Huttenlocher et al. (1983), it is not clear why these trends existed. The possible explanations for the fact that some categories represented a greater variety of action verbs than others, must be explored.

Interpretation of the Distribution of Action Verbs

In accounting for the four general trends in the distribution of action verbs, one may look to two sources. The first source of explanation may be related to the method of language sampling, employed in this investigation. The second source may be found in theoretical explanations of language development.

Although the method has been used frequently within the past ten years, limitations of language sampling are being recognized. One such limitation is that language is situation specific. Consequently, the verbs found to be dominant in this study may have been so because the situation encouraged their use. For example, the dominance of the movement verb categories over the nonmovement verb categories may have resulted from the play situations used to collect the language samples. The majority of these situations involved activities requiring the child's movement of himself and objects. It is possible that, within other contexts, a different distribution of action verbs across categories would be revealed.

Interpretation of the Results Within Theories of Language Development

The literature suggests that many variables have an impact on children's language development. These include perceptual, semantic, conceptual, and pragmatic factors, as well as language input factors. Before proceeding with a discussion of these variables, two notes of caution are warranted. The first is that language development is extremely complex and may be accounted for

by an interaction of a number of variables. The second note of caution is that theories of lexical acquisition have dealt primarily with the acquisition of object words. Therefore, they may not be equally applicable to action verbs, particularly in light of Huttenlocher and Lui's (1979) claim that action concepts are structurally different from object concepts.

While recognizing these two problems, the following sections will attempt to identify briefly the perceptual, semantic, and conceptual factors involved in language acquisition, and tentatively draw interesting parallels between these positions and the results of this study.

Perceptual Factors. Clark (1974) suggested that, in learning language meanings, children extract the most salient perceptual characteristics of situational examples named, and assume that is what the word refers to. They will then use these characteristics to identify new referents for the same label. The child using this strategy will often misuse newly acquired words in a manner which Clark refers to as "overextensions." For example, a child who has determined that the word "dog" means a "furry, four-legged animal" on the basis of perceptual features, many overextend the term "dog" to include a cat, horse, cow, etc.

Clark (1974) provided evidence for this position primarily through the analysis of children's overextension terms in early lexical development. She analyzed the observations made in various diary studies of early meanings children seemed to have for certain words. She discovered that the majority of overextensions used by

children seemed to be directly derived from the perceptual features of the object named.

The suggestion that the children derive word meaning from the perceptual features of their referents may help to explain children's acquisition of words referring to objects or static relational terms. However, as Nelson (1985) pointed out, Clark's (1974) position does not account for children's acquisition of words that do not have clear, real-world referents. For example, abstract terms, such as "justice," or relational terms, such as "all gone," do not have observable characteristic features which the child can identify for meaning.

Thus, perceptual factors do not appear adequate to explain children's acquisition of the Movement and Change subcategories of action presented in this study. However, Clark's (1974) position may explain children's acquisition of the Nonmovement-Nonchange of Positional State subcategory of action. The verbs in the category may be acquired through children's perception of characteristic positions (e.g., sitting, standing) that remain static. The fact that this category comprises such a small percentage of the action verbs used by the children in this study suggests that static actions are not the dominant action features that children talk about.

Semantic Features. Clark (1973) also proposed a semantic feature model to help explain children's lexical acquisition. She suggested that abstract semantic features are derived from the common dimensions among terms within a semantic domain. These

dimensions may include size, movement, or time. The semantic features were defined in terms of contrasts along perceptual dimensions, and could be expressed ± pairs. However, Clark (1973) did not address the issue of how semantic domains were established in the first place.

Because this position is based along perceptual contrasts, it is unable to account for those contrasts within a semantic domain that are not perceptually based. As Nelson (1985) pointed out, the contrast between wild and domestic animals cannot be made on the basis of perceptual characteristics. Nelson (1985) suggested that Clark's (1973) semantic feature model does not provide the basis on which lexicons are initially acquired. This model may be more relevant to later language development and the distinctions children make among objects within semantic domains or categories.

Clark's (1973) semantic feature model may have some application to the subcategories of action presented in this study. The action verbs produced by children were characterized by contrasts between ± movement and ± change. Thus semantic features of the action domain may be regarded as movement and change. While the framework of subcategories of action presented in this study appears to be consistent with Clark's (1973) semantic feature model, the question as to how these semantic features were established remains unanswered. Perceptual explanations do not seem able to account for the interaction of movement and change characteristics within action, because these features are not static or observable.

Conceptual Factors. While the theories based on perceptual and semantic variables may account for some aspects of language learning, they appear to be inadequate to explain all the facets of word use and interpretation. Nelson (1985) suggested that children must also know about the uses of objects as well as their appearance.

Nelson (1985, 1982) and Bloom and Lahey (1978) are among several writers who have called attention to the conceptual factors influencing language acquisition. This section will briefly discuss each of their proposals and suggest ways in which conceptual factors may help to explain the acquisition of action verbs.

In Nelson's (1985, 1982) functional core model, she proposed that children construct concepts about familiar things in their world before learning words. It is to these concepts, rather than to perceptual features, that early words are attached.

Nelson (1985) maintained that the concepts that children constructed had a functional basis in their own experience. The child's concepts are formed on the basis of experience with objects in functional situations, and they include information about actions and reactions of objects in relation to people, especially including the child himself.

Nelson's (1985, 1982) functional core model viewed the child's knowledge of the world, as functionally organized around what he can do and what things can do. Thus, when the child begins to learn language, the concepts attached to the new word would be concepts reflecting this functional organization. Children would match their

concepts to the adult's use of a word within a particular context and then extend the use of this word to other items that matched the previous context. In this way, words are mapped directly onto concepts rather than perceptual characteristics.

Nelson (1985) provided as evidence for her functional core model the observation that children tend to name things that did interesting actions such as "ball," or "dog," rather than static things such as "tree" or "kitchen."

The functional core model and other conceptual models specify more than how to identify an example by reference to a perceptual form and, therefore, can be used to interpret utterances that do not refer to static real-world objects, as well as utterances that do refer to easily observable objects. While the functional core model may be used to account for relational terms such as action, Nelson (1985, 1982) has only accounted for the acquisition of object words within this model.

The recent work of Nelson (1985, 1982) is strongly allied with Bloom and Lahey's earlier writings of the acquisition of semantic relations. Bloom and Lahey (1978) discussed the basis of language acquisition in relation to Piaget's theory of cognitive development. A fundamental premise of Piaget's theory is that children form mental schemes for acting through actions and patterns of activity with objects. The result of this action is that children are able to learn about things in relation to one another and in relation to their own actions.

While Bloom and Lahey (1978) account for children's acquisition of each of their defined semantic relations using Piaget's model, it is their explanation of the development of action relations that is of most interest. They proposed that action relations develop from the concepts the child acquires in acting on his environment. Specifically, it was suggested that,

> when objects move, there is a source of movement, some actor, and an effect of the movement which could be some change in location or other change in the mover or in some other object or person (p. 83).

They called attention to the regularities in infant activities that permit them to generalize about certain movements. There are also specific effects of specific movements which the child must detect and mentally represent. Bloom and Lahey (1978) suggested that relational concepts develop from the conceptualization of the regularities among movement, the origin of movement, and the effect of movement.

It would appear that conceptual factors may be useful in explaining children's acquisition of relational terms, and in accounting for the general trends in the distribution of action verbs noted in this investigation. In light of the positions of Nelson (1985; 1982) and Bloom and Lahey (1978) one may hypothesize that, as children conceptualize the regularities in various movements and their effects on objects, they may begin to categorize these actions according to the type of effect they have on objects (i.e., change of locative, attribute, or possessive state). If the child is actively manipulating objects and observing movement patterns and their resulting effects on objects, then it would seem

probable that the child would initially acquire a large number of action words to map onto their movement and change of state concepts. It is possible that the features of movement and change of state may be particularly salient to young children, which would account for the large percentage of action verbs coded within the Movement-Change of State categories. In fact, one would expect the Movement-Change of State categories to develop earlier than Nonmovement-Nonchange of State categories.

This review of prominent positions in accounting for lexical acquisition is very superficial and only touches the surface observations made within each position. For additional information regarding language acquisition, it is suggested that the original sources documented in the previous discussion be referred to.

Interpretation of the Results of the Comparison of Normal and Language-Impaired Children

No significant differences were noted in the number and type of subcategories of action represented in the utterances of normal and language-impaired children. For both groups, the pattern of distribution of action utterances among the categories was similar to that noted by the eight subjects in the normative group, with the majority of utterances occurring in the Movement categories. Thus, like previous studies that used global definitions of semantic relations (Freedman & Carpenter, 1976; Fokes & Konefal, 1981; Leonard, Bolders, & Miller, 1976; Coggins, 1979; and Duchan & Erickson, 1976), this study also revealed no significant differences

between normal and language-impaired children, even though a more differentiated description of a semantic category was applied.

These results are contrary to what might be hypothesized within the framework of the cognitive/representational hypothesis. If a cognitive deficit is at the base of language-impairment, these deficits should be reflected in the semantic system because of the assumed linkage between cognition and semantics. The fact that significant semantic differences were not found between the language-impaired and normally developing children may be a reflection of two possibilities. One possibility is that semantic deficits are not a characteristic of language impairment. The second possibility is that semantic deficits do exist in language-impaired children, but due to methodological problems, they were not revealed in this study. Before accepting the first possibility, the second must be further considered.

Methodological Problems of Small Sample Size Which May Account for the Nonsignificant Results

In this study, the major emphasis was on the development of subcategories of action verbs, with the comparison between clinical and normal children pilot work to point to future areas of research. Therefore, due to time restrictions placed on the completion of this study, additional children meeting the requirements for participation could not be found. It was decided to continue with the study with only two children per group. While it wasn't feasible to get more than two subjects per group, it was recognized that this was a problem.

Any population would be expected to vary along a continuum for a given measure. Therefore, there is expected overlap between populations of normal and language-impaired children. As a result of the small sample size, the subjects may have been representative of the area of overlap between normal and language-impaired children. In fact, when one considers the subject characteristics, it appears that this may have been the case.

The language-impaired children used in this study may not have demonstrated a severe enough language impairment to distinguish them significantly from the normal children. Although J.K. was reported to have started developing language six months prior to this investigation, his expressive language skills were delayed only six months based on his MLU score.

A follow-up interview with his speech and language pathologist indicated that, as of September 1987 (3 months following this study), A.D. had passed all language levels on the Zimmerman Preschool Language Scale and was in the process of being dismissed from therapy. Therefore, J.K.'s classification as language-impaired may not have been valid.

M.W. was also classified as language-impaired and had been receiving speech and language therapy for one year at the time of the study. Based on M.W.'s MLU and NSST scores he demonstrated an expressive language delay of 15 months. While this classification appeared valid, M.W.'s therapy program may have confounded the results of this study. A follow-up interview with M.W.'s speech and language pathologist revealed that the primary emphasis in M.W.'s

therapy sessions was the verb system. It was interesting to note that the reasoning was because verbs are more difficult for language-impaired children to learn because they are less concrete than objects, suggesting from her observation that language-impaired children demonstrate weaknesses in their development of action verbs. Because of the treatment focus on verbs, M.W. may have developed a greater number and variety of action utterances than a language-impaired child who had never received therapy.

One of the normally developing children, A.D., also presented characteristics which may have confounded the results. He was an extremely shy child and had never attended pre-school. During the collection of the language sample in the Language Sciences Lab, A.D. produced very limited output. As a result, it is unlikely that a representative sample of his action utterances was obtained.

The confounding factors indicate that it may be premature to conclude that no differences exist between normal and language-impaired children in their action utterances. Further research using a larger sample size and more definitive criteria for judging language-impaired status is warranted.

Implications for Future Research

This study resulted in the development of a reliable framework for subcategorizing action utterances which can describe the majority of action utterances produced by normally developing children, 4;3 to 4;6 years of age. This system can now be used in developmental research to identify trends in the acquisition of

action, and to conduct further research comparing language-impaired and normally developing children in the type of action utterances produce.

Because in-depth studies of negation and location have been successful in identifying developmental trends, it is probable that trends in children's development of action will also be revealed when a more discriminating system of subcategories is applied. The distribution of verbs observed in this study predicts the following developmental trends which should be empirically tested:

1) Movement categories will be acquired before Nonmovement categories.

2) Within Movement categories, Change of State categories will be acquired before Nonchange of State categories.

3) Developmental differences may also be noted among the Movement-Change of Locative State, Attributive State, and Possessive State categories. However, it is difficult to hypothesize, at this point, which of these categories would dominate early lexical acquisition. While the data in this study would suggest that Change in Locative State would be acquired before Change in Attributive State which, in turn, might be acquired before Change in Possessive State, this distribution may shift throughout the course of language development. Early in development, the category of Movement-Change in Possessive State may represent a larger percentage of action verbs than later in development. For example, a large frequency of utterances containing "gimme" are often observed in the spontaneous speech of young children. Investigation of the distribution of

action verbs within the Movement-Change of Locative, Attributive, and Possessive States, may yield interesting developmental trends.

4) Categories of Nonmovement-Nonchange of Positional, External, and Possessive State would account for very few of the action verbs in early language development. These categories are likely to be a characteristic of later language development, even beyond 4;6 years of age. It may be possible that trends in the distribution of action verbs within these three categories may be revealed in research with school-aged children when a greater number of these verbs have been acquired.

Once developmental research has identified trends in the acquisition of action subcategories, it would be useful to conduct further research into the action utterances of language-impaired children. It is hypothesized that language-impaired children will lag behind normal children in their acquisition of later-developing categories and might exhibit more restricted lexical composition in each category.

The system for the subcategorization of action which was developed in this study appears to be a viable tool to be applied in additional research into both normal language development and the nature of language-impairment.

APPENDIX A

SAMPLE TRANSCRIPT FORM

APPENDIX A

SAMPLE TRANSCRIPT FORM

TRANSCRIPT FORM

NAME OF CHILD: D D
AGE OF CHILD: 3;1

SAMPLE NUMBER: IV B

OBSERVER: Sharon

PAGE: 6

DATE: 6/11/87

UTTERANCE #	CONTEXT	CHILD'S UTTERANCES	TAPE COUNTER NO.	SEMANTIC CATEGORY
	I was telling C "I just put some shoes			
	on your feet" - referring to playdoh figure			
	- C leans over & is pointing to the shoes	Shoes on feet!	376	State
	on the play-doh figure			
	Betty was showing C a figure she			
	made with her play doh			
	- C is reaching out his hand toward	Give it here!	388	M CPoss
	the play doh			
	Betty didn't give it to C.			

APPENDIX B

INSTRUCTIONS FOR SUBCATEGORIZATION OF ACTION VERBS

APPENDIX B

INSTRUCTIONS FOR SUBCATEGORIZATION OF ACTION VERBS

RELIABILITY TESTING

Thank you for agreeing to participate in this reliability study of the assignment of action verbs to various subcategories. You will be provided with a list of the utterances to be classified as well as a copy of the utterance and the situational context that was recorded at the time the utterance was produced. The contexts will be clearly numbered in red, to correspond to each utterance number. It is very important that the context be considered in each classification you make.

Please attempt to classify all of the utterances into the categories provided.

MOVEMENT/NONMOVEMENT

The first set of utterances will be categorized according to whether or not the action involves an overt or observable movement event. Specific instructions for inclusion within either the movement or nonmovement category are provided on index cards for your convenience.

It is very important that you refer to the context of each utterance, even though you feel you can make the judgment on the basis of the verb alone. The use of some verbs may or may not denote movement, depending upon the contexts in which they are used. For example, "I am sitting," within the context of the child moving from a standing position to a sitting position involves movement. However, within the context of the child remaining in a sitting position, "I am sitting" does not involve any movement.

Therefore, consider the contexts carefully to determine if movement actually occurs or was possible to occur within the context of the utterance.

Once you have conceptualized the action that the child is referring to within the context, ask yourself, "Is some type of movement necessary for this action to occur, or can the action occur with no movement at all?" Disregard the tense of the verb, and concentrate on the action itself. Place an M in the classification column if the action verb involves movement, and a NM if the utterance does not involve movement.

MOVEMENT CATEGORY

The action verbs within this category involve an overt or observable movement event. Movement includes a wide range of degrees, from verbs such as "I am running home," which require movement of the entire body, verbs such as "She is cutting the cake," which require movement of an extremity, to verbs such as "Look at the dog" which require smaller movement of the head or facial features.

Ask yourself, "Can somebody or something _____ without moving?" If the answer is no, then the act is considered a Movement verb.

NONMOVEMENT CATEGORY

The action verbs within this category do not involve any overt or observable movement events. "She is sleeping" would be an example of a nonmovement verb, because no observable movement is involved in the act of "sleeping." Although some movement may occur throuighout the act of "sleeping," this movement is not necessary to, and does not characterize, the act of "sleeping" itself.

Ask yourself, "Can somebody or something _____ withouth moving?" If the answer is yes, then the act is considered a Nonmovement verb.

CHANGE/NONCHANGE

You will now be provided with the same set of utterances which will be categorized according to whether or not the action causes any change of an object's state. Occasionally, the object may be omitted in a child's utterance, as in the example, "I am eating the ...." In such cases, one can fill in a number of objects such as "food," " pizza," "cookies," etc., to determine if the action would result in a change in the object. If it were included in those instances in which the verb does not take an object, the subject becomes affected as a result of the action. In these cases, the reflexive pronoun of the subject is able to occupy the position of object of the verb. For example, "He is walking" becomes "He is walking himself," in which "he" changes location as a result of the "walking."

Specific instructions for inclusion within either the change or nonchange category are provided on index cards for your convenience.

Once again, the use of some verbs may or may not denote a change of state in the object involved, depending upon the contexts in which they are used. For example, "I get the candy" denotes a change in ownership of the candy within the context of the child reaching for and taking some candy (i.e., the candy is affected because it is transferred from one owner to another). However, within the context of the child holding some candy in his hand, "I get the candy" does not involve a change in the ownership of the candy, but instead is an announcement of his ownership, much in the same way as "I keep the candy" or "I have the candy." Therefore, it

is extremely important to consider the context of the utterance to determine whether a change in the state of the object actually occurs or was possible to occur within the context. For example, if the child says "I get the candy," and he doesn't actually end up with the candy in his hand, even though there is a bowl of candy in the room, the intention within the child's utterance was a change in the possession of the candy (i.e., into his hands) even though this change didn't actually occur. Within this context, it was possible for a change in the ownership of the candy to take place. In other instances, the child may be looking at a picture or pretending to be in a different situation. In these cases, it is necessary to infer whether a change in an object's state is possible to occur depending upon the context of the child's utterance and the response of others to the utterance.

Once you have conceptualized the action that the child is referring to within the context, ask yourself, "Is the primary purpose of this action to cause a specific change in the state of an object?" Disregard the tense of the verb, and concentrate on the action itself.

Place a C in the classification column if the action verb in the utterance involves a change of state of the object (or subject if no object is required) and a NC if the utterance does not involve a change of state.

CHANGE CATEGORY

The verbs within this category involve actions which cause any change of an object's state. This change may be in the object's physical or attributive appearance (e.g. Close the door), existence (e.g. Stop that.), internal state (e.g. I learned that at school), location (e.g. I am driving the car), or ownership (e.g. Give me the game).

Ask yourself, "Is the primary purpose of _____ to cause a specific change in the physical appearance, internal state, location, or ownership of an object?"

If the answer is yes, then the act is considered a Change word.

Place a C in the classification column if the action verb in the utterance causes a change of an object's state.

NONCHANGE CATEGORY

The action verbs within this category do not cause any change of an object's state. In the example, "She is playing house," the "playing" does not involve any inherent change in the state of an object. Although various changes may occur as these actions are carried out, specific changes are not identified by the verb itself.

Ask yourself, "Is the primary purpose of _____ to cause a specific change in the physical appearance, internal state, location, or ownership of an object?"

If the answer is no, then the act is considered a Nonchange verb.

Place an NC in the classification column if the action verb in the utterance does not cause a specified change of an object's state.

CHANGE

ATTRIBUTIVE--LOCATIVE--POSSESSIVE

The utterances that will now be presented all involve actions which result in the current change of the object's state. In those cases in which the verb does not take an object, the subject undergoes a change of state as a result of the action. In these instances, the reflexive pronoun of the subject is able to occupy the object position in the utterance. For example, "he is driving to town" becomes "he is driving himself to town." It can be seen that in this utterance, it is "himself" that undergoes a change in location as a result of the "driving."

Your task will be to consider the following utterances within their situational contexts, to determine whether the object affected by the action undergoes a change in attributive, locative, or possessive state. Specific instructions for inclusion within each category are provided on index cards.

Once again, I urge you to carefully consider the situational context in order to place each action verb within its rightful category. For example, the verb "get" can be placed within each of these categories depending upon the context. For example, "get" results in an attributive change in the utterance, "I am getting messy," a locative change in the utterance "I am getting out of here," and a possessive change in the utterance "I am getting the ball."

CHANGE

CHANGE IN ATTRIBUTIVE STATE

The action verbs within this category result in either internal or external changes in the state of affairs of their objects. In the example, "the boy is eating the cookies," the "eating" results in an external change in the attributive state of the cookies, whereas "he is hurting the dog" results in a change in the internal state of the dog. Utterances of this nature are consistent with the statement, "Subject is Verbing SOMETHING.

CHANGE IN LOCATIVE STATE

The action verbs within this category result in a change in the location or position of their objects (or reflexive pronoun of the subject, if no object is required). In the example, "the girl is swimming," the act of "swimming" results in a change in the location of the girl. These utterances are consistent with the statement, "Subject is Verbing {Object/Reflexive Pronoun} SOMEWHERE."

CHANGE IN POSSESSIVE STATE

The action verbs within this category result in a change of an object from one person to another (e.g. Give me the candy), or from a location to a person (e.g. I bought the dress). These utterances are consistent with the statement, "Subject is Verbing Object {to/for} SOMEONE."

The verbs within this category can be distinguished from verbs which result in a locative change, by the fact that these actions specifically result in the object becoming newly located into the hands of a person or animate being, rather than becoming located to a new position in space.

NONCHANGE

EXTERNAL--POSITIONAL--POSSESSIVE

The following utterances involve actions which do not result in the current change of an object's state. Instead, they describe an unchanging state of an object. In cases in which the verb does not take an object, the action describes an unchanging state of the subject. In these instances, the reflexive pronoun of the subject is able to occupy the object position in the utterance. For example, "he is thinking" becomes "he is thinking himself," and it becomes evident that "he" does not undergo a change in state as a result of the "thinking." Rather, the action "thinking" is simply describing a conscious mental activity that "he" is doing.

Your test will be to consider these utterances within their situational contexts to determine whether the action verb is describing a nonchange of external state, positional state, or possessive state of affairs. Specific instructions for inclusion within each category are provided on index cards.

NONCHANGE OF EXTERNAL STATE

The action verbs within this category describe ongoing mental activities, and are often thought of as mental processes. For example, "sleeping" in the utterance, "The girl is sleeping," describes a mental process in the state of the girl.

NONCHANGE OF POSITIONAL STATE

The action verbs within this category describe the position or location of objects. For example, "sitting" in the utterance, "the boy is sitting on the floor," describes the position of the boy.

NONCHANGE OF POSSESSIVE STATE

The action verbs within this category describe the temporary or permanent ownership of an object. For example, "holding," in the utterance "I am holding the doll" describes the placement of an object in the hands of a person or animate being.

APPENDIX C

UTTERANCES USED IN THE SUBCATEGORIZATION OF ACTION UTTERANCES

APPENDIX C

UTTERANCES USED IN THE SUBCATEGORIZATION OF ACTION UTTERANCES

MOVEMENT/NON-MOVEMENT

I'm not chasing you.

Watch this.

Move his hand.

I get all of these.

Come and drink some.

I always dream Santa Claus house.

He dump this in here.

Stop mocking mama.

Hold it.

Wow, see I flip down.

Kermit, um, Melissa try to tease me.

Set 'em up all on their cages.

She laying back.

We was dancing.

The dog knocked the man off and bumped him up in the air and slammed him, boom.

I'll save you one.

Hold still. I can't --.

Don't tear the bag and you buy this batch?

He hanging around.

I bets you house fell.

Climbing up here.

Now, clean up this house daughter.

A balloon flying up in the air.

You take this one.

Take this off and sing with it.

Yep, I remember how to do it.

I goin' take these crackers home too.

He's standing up.

I'm gonna keep these, take 'em home.

Sitting down in chair.

No. When we pay her back, she don't even give us nothing.

Y'all kids better go to sleep 'cause that's Santa Claus right now.

--my little brother's gonna take ours next weekend.

He said, Antoine said, bust --.

Not 'til it open up.

Let me see it.

Mom, bring me my cupcake.

I said, in a cup.

Waving.

I tickling her.

They ignoring him.

Monkey's walking in the water.

I feel inside it.

I'm a tell her, give me something.

Waving.

I tickling her.

They ignoring him.

Monkey's walking in the water.

I feel inside it.

I'm a tell her, give me something.

Crashed up.

You suppose to stop peepin' Nita.

And cover it up 'cause might get cold.

Oh, this got dirty.

Crashed up.

You suppose to stop peepin' Nita.

And cover it up 'cause might get cold.

Oh, this got dirty.

CHANGE

ATTRIBUTIVE--LOCATIVE--POSSESSIVE

Kermit, um, Melissa try to tease me.

Climbing up here.

I tickling her.

No, when we pay her back, she don't even give us nothing.

Move his hand.

And cover it up 'cause night get cold.

Don't tear the bag and you buy this batch?

I'm not chasing you.

Set 'em up all on their cages.

The dog knocked the man off and bumped him up in the air and slammed him, boom.

Come and drink some.

I goin' take these crackers home too.

Now, clean up this house daughter.

Oh, this got dirty.

A balloon flying up in the air.

He said, Antoine said, bust --.

Monkey's walking in the water.

You take this one.

Tie that for me.

Let me see it.

Wow, see I, I flip down.

Crashed up.

Now Nita go and get me a napkin.

He dump this in here.

NONCHANGE

EXTERNAL--POSITIONAL--POSSESSIVE

I get all of these.

Hold still, I can't --.

Yep. I remember how to do it.

She laying back.

Standing around.

He hanging around.

I always dream Santa Claus house.

I'll save you one.

I can keep 'em.

They ignoring him.

Watch this.

Sitting down in chair.

Hold it.

I bets your house fell.

APPENDIX D

APPROVAL FOR USE BY HUMAN SUBJECTS

APPENDIX D

APPROVAL FOR USE BY HUMAN SUBJECTS

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 E

QUESTIONNAIRES COMPLETED FOR LANGUAGE-IMPAIRED SUBJECTS

APPENDIX E

QUESTIONAIRES COMPLETED FOR LANGUAGE-IMPAIRED SUBJECTS

Language impaired Children

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 last name initial only. All information provided by you will be kept confidential. Thank you for your cooperation.

acher

hool Maple Hill Hd St

ate 4/17/87

NAME	Birthdate	Sex M	Sex F	English Spoken yes	English Spoken no	Bilingual Home	Bilingual Home no	Expressive Prbl. yes	Expressive Prbl. no	Receptive Prbl. yes	Receptive Prbl. no	Spch Hard to Understand yes	Spch Hard to Understand no	First Born yes	First Born no	Only Child yes	Only Child no	Slow Learner yes	Slow Learner no	Evidence of Brain Damaged yes	Evidence of Brain Damaged no	Hyperactive yes	Hyperactive no	Learning Disabled yes	Learning Disabled no	Hearing Aid or Crutches yes	Hearing Aid or Crutches no	Mouth Deformity yes	Mouth Deformity no	Emotional Prbl. yes	Emotional Prbl. no	Seizures yes	Seizures no
A Blk	9/12/62	✓		✓			✓	✓		✓			✓		✓		✓				✓		✓		✓		✓		✓		✓		
B white	4/23/63	✓		✓			✓	✓			✓	✓		✓		✓			✓		✓		✓		✓		✓		✓		✓		✓
C white	10/15/62	✓		✓			✓	✓		✓		✓			✓		✓		✓		✓		✓		✓		✓		✓		✓		✓

Teacher ____________

School ____________

Date ____________

NAME	Language Age	Socially Shy yes	Socially Shy no	Other Disability yes	Other Disability no	NA Below Grade Reading/Writing yes	NA Below Grade Reading/Writing no	Health Probl. yes	Health Probl. no	On Medication yes	On Medication no	#Yrs Speech Ther.	Severity of Impr 1-5 most severe	Therapy on locative Terms yes	Therapy on locative Terms no	Responds to Formal Testing yes	Responds to Formal Testing no	NA Leiter Scores yes	NA Leiter Scores no	NA NSST Scores yes	NA NSST Scores no	Mother's Occupat.	Father's Occupat.	Comments
A	3-3		✓		✓				✓		✓	3mths	4	✓		✓						[illegible]	[illegible]	
B	3-5		✓		✓							3mths	3	✓		✓						[illegible]	[illegible]	
C	3-6		✓		✓				✓		✓	3mths	4	✓		✓						[illegible]	[illegible]	

APPENDIX F

OBSERVATION CHECKLIST

APPENDIX F

OBSERVATION CHECKLIST

1. Ability to formulate and produce the CV syllable /pʌ /, /tʌ /, and /kʌ /.
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.

APPENDIX G

SUBJECT CONSENT FORM FOR PARTICIPATION IN THE STUDY

APPENDIX G

SUBJECT CONSENT FORM FOR PARTICIPATION IN THE STUDY

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

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 observe 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 cents per mile for the use of my car or reimbursed for the entire cost 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.

I can be contacted at the following telephone number to set up the appointments: _____

APPENDIX H

ACTION VERBS PRODUCED BY THE NORMATIVE GROUP

APPENDIX H

ACTION VERBS PRODUCED BY THE NORMATIVE GROUP

MOVEMENT-CHANGE IN LOCATIVE STATE

Verbs	KM	ST	DW	DD	MW	LA	CW	EC	Total
*put	13	11	30	10	41	21	15	7	148
*go	6	19	19	14	20	11	16	28	133
*come	4	4	4	4	22	6	10	9	53
*get	2	1	15	7	4	1	7	5	42
take	3	1	6		3	8	1	1	23
fall		2	4	3	2	1	8		20
move	5		1	7		2	3		18
pop (up)	18								18
sit (down)	9		4			3			16
push			1		8			4	13
stand (up)		1	1				7		9
knock (down)	1		3	2	1		1		8
turn			3		1	2	1	1	8
run			1	1			4	1	7
pick				2		2	3		7
jump			2				5		7
bring					2		4		6
swing							6		6
throw						2		2	4
spit					4				4
ride								4	4
pull				1		1	1		3
walk				1		2			3
drop			2				1		3
drive				3					3
backing up				3					3
set (back)							3		3
carry								3	3
stick	1						1		2
lay (down)						1	1		2
follow							2		2
scoot							2		2
hit (ball)				1					1
spill				1					1
race					1				1
flip						1			1
land							1		1
leave							1		1
fly								1	1
swim								1	1
roll								1	1
park				1					1
call (back)				1					1
chase						1			1
Total	62	39	96	61	100	63	106	68	

MOVEMENT-CHANGE IN ATTRIBUTIVE STATE

Verbs	KM	ST	DW	DD	MW	LA	CW	EC	Total
*eat	1	4	17	4	17	1	1	4	49
make		10	15	8	1	4		1	39
cook		1	6	8	1				16
open	1	1	1	1	6	3			13
kill							12		12
break	3			1	1		6		11
shake			5		2	2		1	10
fight	1		1				6	2	10
paint			9					1	10
mess	2		4		3				9
bite		1	2	2		1	1	1	8
close					4	3			7
cut				6					6
wash			4	2					6
clean					6				6
scare				4			2		6
pop (popcorn)	3						1		4
fix				1			3		4
wrap							4		4
take (a bath)				3					3
bust				3					3
drink						3			3
whip					3				3
waste					3				3
choke	3								3
turn (light on)				1				1	2
stir					1	1			2
hit		1			1				2
feed					2				2
put (together)					2				2
polish						2			2
beat							2		2
pop (your hand with elastic)						2			2
tease	2								2
get (ready)					1				1
scratch		1							1
tear			1						1
cover			1						1
wipe					1				1
fill					1				1
smoke						1			1
tie						1			1
crack							1		1
fall (apart)							1		1
mix			1						1
bathe				1					1
knock (you out)	1								1
lock								1	1
mock (i.e., tease)		1							1
teach						1			1
hurt									11
Total	17	20	67	45	56	25	41	12	

MOVEMENT-CHANGE IN POSSESSIVE STATE

Verbs	KM	ST	DW	DD	MW	LA	CW	EC	Total
*get	11	20	17	8	5	6	3	3	73
*give	8	2	8	10	12	3	4	3	50
find		2	3				15		20
roll						9			9
buy			3			3		2	8
take	1		1		1	3			6
bring		5							5
catch						1		3	4
see (give it)		4							4
lose			1			1	1		3
leave							2		2
pay							2		2
pick	1								1
steal				1					1
Total	21	33	33	19	18	26	27	11	

MOVEMENT-NONCHANGE OF STATE

Verbs	KM	ST	DW	DD	MW	LA	CW	EC	Total
look	14		15	18	3	25	10	15	100
*play	30	3	14	2	2	17	10	3	81
*say	10	3	4	12	2	2	23	2	58
tell	2		10	6	6	6	5	1	36
help	2		2	5					9
show		1	2	1	1	3			8
knock (on door)					7				7
call	3			1	1				5
cry					1		4		5
cheat					5				5
laugh	1				2	1			4
check (heart beat)	4								4
messing (fooling)	1				3				4
rub						4			4
dance	3								3
talk			1					1	2
read			1					1	2
take (a picture)	2								2
ask						2			2
holler	1							1	2
pee			2						2
sing	1								1
feel		1							1
peep					1				1
taste					1				1
reach							1		1
use			1						1
work					1				1
kiss								1	1
Total	73	9	52	45	36	60	53	25	

NONMOVEMENT-CHANGE OF STATE

Verbs	KM	ST	DW	DD	MW	LA	CW	EC	Total
stop	2	1		3	1	4	3		14
get (cold)			3		1			1	5
die		1			4				5
go to sleep				3	1				4
learn						3			3
finish		1	1						2
freeze				2					2
burn			3	1					4
make (me sick)				1					1
(school) open						1			1
come (on TV)						1			1
coming (badly)								1	1
win								1	1
boil						1			1
Total	2	3	7	10	7	10	3	3	

NONMOVEMENT-NONCHANGE POSITIONAL STATE

Verbs	KM	ST	DW	DD	MW	LA	CW	EC	Total
wait		1	4	7			1		13
stay		1	2	4			5		12
lay					4				4
sit			1			1		1	3
hold still	1								1
stand				1					1
hold						1			1
step						1			1
hide							1		1
Total	1	2	7	22	4	3	7	1	

NONMOVEMENT-NONCHANGE EXTERNAL STATE

Verbs	KM	ST	DW	DD	MW	LA	CW	EC	Total
watch			5	2		4	2		13
dream		1				7			8
think					1		6		7
ignore							6		6
bet				2			1		2
sleeping		2							2
remember							2		2
Total	0	3	5	3	1	11	17	0	

NONMOVEMENT-NONCHANGE POSSESSIVE STATE

Verbs	KM	ST	DW	DD	MW	LA	CW	EC	Total
get (i.e., keep)			3		1				4
hold			1		1		1		3
keep			3						3
save	1					1			2
Total	1	0	7	0	2	1	1	0	

APPENDIX I

ACTION VERBS PRODUCED BY THE NORMAL AND LANGUAGE-IMPAIRED GROUPS

APPENDIX I

ACTION VERBS PRODUCED BY THE NORMAL AND LANGUAGE-IMPAIRED GROUPS

MOVEMENT-CHANGE IN LOCATIVE STATE

Verbs	DB	AD	MW	JK	Total
*put	45	6	29	5	75
*go	11	5	17	11	44
*get	21	1	14	5	41
take	24		2	6	32
come	4	2	7	3	16
jump	2	5	8		15
knock	12		2		14
drive	4	1	5		10
fall	1	1	7		9
push			4	5	9
throw	4		4		8
fly	2	3		1	6
bring	1			3	4
pick	1	1		1	3
drop	1		2		3
turn			3		3
walk		3			3
sit (down)	1		1		2
run	1		1		2
dump	1			1	2
move				2	2
stand (up)			2		2
pull			2		2
swim	2				2
park			1		1
leave	1				1
stick	1				1
pop (up)				1	1
backing up				1	1
race				1	1
land				1	1
bump	1				1
tip	1				1
tramp			1		1
hang (up)			1		1
climb		1			1
crawl		1			1
Total	142	30	103	47	

MOVEMENT-CHANGE IN ATTRIBUTIVE STATE

Verbs	DB	AD	MW	JK	Total
eat	20		9	9	38
*open	3	4	3	4	14
*cut	5	1	2	2	10
fire (a gun)			7		7
crash	4				4
paint				3	3
put (a hole in it)	3				3
clean	2				2
seal	2				2
get (dirty)				2	2
tickle			2		2
break	2				2
close	2				2
bust	1				1
turn (on)				1	1
fill		1			1
roll	1				1
slam	1				1
explode			1		1
spread			1		1
set (a table)			1		1
hook (together)		1			1
fit				1	1
make	1				1
lock			1		1
hit	1				1
poke				1	1
wake			1		1
Total	48	7	28	23	

MOVEMENT-CHANGE IN POSSESSIVE STATE

Verbs	DB	AD	MW	JK	Total
*get	17	1	10	3	31
take	1			1	2
give			2		2
pass				2	2
leave	2				2
Total	20	1	12	6	

MOVEMENT-NONCHANGE OF STATE

Verbs	DB	AD	MW	JK	Total
*play	3	1	7	12	23
say	5		5	1	11
help			6		6
look	1	1	1		3
cry	1		1		2
sing	2				2
tell			1		1
talk			1		1
wave				1	1
reach			1		1
use	1				1
Total	13	2	23	14	

NONMOVEMENT-CHANGE OF STATE

Verbs	DB	AD	MW	JK	Total
go to sleep	3				3
Total	3	0	0	0	

NONMOVEMENT-NONCHANGE POSITIONAL STATE

Verbs		DB	AD	MW	JK	Total
wait				4		4
sit		2	1			3
stand				3		3
hang				3		3
stay		1		1		2
lay				1		1
hold				1		1
	Total	3	1	13	0	

NONMOVEMENT-NONCHANGE EXTERNAL STATE

Verbs		DB	AD	MW	JK	Total
watch				3	1	4
sleep		1				1
pretend		1				1
	Total	2	0	3	1	

NONMOVEMENT-NONCHANGE POSSESSIVE STATE

Verbs		DB	AD	MW	JK	Total
keep		5			1	6
hold			1		1	2
save		2				2
	Total	7	1	0	2	

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