ASSESSING SEMANTIC DEVELOPMENT THROUGH AN OBJECT DESCRIPTION TASK

By

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ABSTRACT

For the purpose of assessing semantic development in kindergarten-age children, an object description task utilizing specific probe questions was constructed. Test administration procedures included both a spontaneous format and a probe format for each child. Subjects consisted of 28 children between the ages of 5-4 and 6-5, with a mean age of 5-10. Responses were recorded utilizing a fifteen unit categorical system. Data analyses revealed the presence of statistically significant differences among the frequencies with which responses were given for each of the fifteen categories. Differences in the number of responses given for each of the six test objects were also significantly different. A comparison of descriptions given for a novel object with those given for familiar objects also yielded statistically significant differences. Interpretations of these findings and their clinical implications are discussed.

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CHAPTER I

INTRODUCTION

The analysis of a child's semantic development is a diagnostic procedure that needs to be included in any comprehensive speech and language evaluation. Receptively, the development of the lexicon is often analyzed by using a vocabulary test such as the Peabody Picture Vocabulary Test (Dunn, 1965). To obtain a measure of the child's expressive semantic abilities, the diagnostician frequently asks him to spontaneously talk about a series of common objects. The Verbal Expression Subtest of the Illinois Test of Psycholinguistic Abilities (Kirk, McCarthy, and Kirk, 1968) provides the format most often used in making this type of investigation. However, sensitive diagnosticians have found themselves being dissatisfied with the information they obtain from that subtest. It was this dissatisfaction that prompted the following research.

The Problem

Obtaining an accurate measure of a child's semantic development is a highly complex task. Individual variations in the rate and manner of word meaning acquisition (E. Clark, 1973, 1974; Bowerman, 1974) coupled with an environment-based variation in lexical entries (Cazden,

1972) require that the Examiner present the child with a task that will allow him to display his entire range of semantic abilities. Because the lexicon includes entries for every word the child knows (McNeill, 1970), a complete assessment of his semantic development must provide that child with the opportunity to report on a great variety of these entries (e.g., physical attributes, actions, emotions, names, and associations). In addition, evidence from longitudinal studies (Leopold, 1949; Greenfield, 1967; Bowerman, 1974) indicates that when a child initially enters a word in his lexicon, the meaning which he associates with that word is incomplete. New features are continually added to the entry until its meaning matches that of the adult (Clark, 1974). Therefore, in assessing semantics, not only does the diagnostician need to determine the presence of a word in the lexicon, but he also must measure the completeness of the child's understanding of that word.

The Verbal Expression Subtest of the Illinois Test of Psycholinguistic Abilities is an example of one test that attempts to measure some aspects of semantic development. It does this by presenting the child with a series of small objects (a ball, a block, an envelope, and a button, in sequence) and giving him the directive, "Tell me everything you can about this!" The child is then encouraged to relate his knowledge about the object while the Examiner records the responses. Scoring is done "by means of a

category system incorporating ten basic dimensions" (McCarthy and Olson, 1964, p.37). These dimensions -- Label and Class, Color, Shape, Composition, Function or Action, Major Parts, Numerosity, Other Physical Characteristics, Comparison, and Person, Place, or Thing -- indicate the types of lexical entries that this task is most successful in calling forth from the child. For each "discrete, relevant, and approximately factual concept" that is reported, the child receives a numerical score of one (1) point (Paraskevopoulos and Kirk, 1969, p.19). For example, if a child states that the ball is red, round, can bounce, can roll, and can be thrown, he would receive one point for color, one for shape, and three for function -- for a total score of five (5) points. Thus, the child who can think of the greatest number of "unique and meaningful ways in which to characterize a given test object" will receive the highest numerical score (McCarthy and Olson, 1964, p.34).

An important aspect of using this type of categorical scoring system is that it provides the Examiner with the opportunity to evaluate the child's responses in terms of their diversity as well as their quantity. A "diversity" score would represent the number of different categories that the child reported in his description of the object. A "quantity" score would represent the total number of scoreable responses that were offered across all categories,

regardless of how frequently the child referred to the same category. In reference to the example given above, that child would have received a "diversity" score of three since he reported on color, shape, and function. His "quantity" score would have been five because he offered a total of five scoreable responses.

It had been the original intent of those who designed the Verbal Expression Subtest to utilize both types of scores in describing the response patterns of the children who comprised the standardization population. However, their dual effort was "deemed impractical at the time and the present scoring system (as a result) reflects only quantity of concepts in expression (Paraskevopoulos and Kirk, 1969, p.38)."

Although the scores used for deriving norms for the Verbal Expression Subtest (see Appendix A) reflect only the quantitative aspects of the children's responses, the data on the diversity of responses (see Appendix B) has been made available (Paraskevopoulos and Kirk, 1969, p.156). These data indicate the mean number of responses per child in each category by age level. The figures "represent a detailed analysis of the verbal responses and could be used to further describe a child's verbal behavior by specifying breadth as well as quantity of concepts used" (p.158).

However, even if this additional data on performance diversity were routinely applied, there would still be a serious limitation in the Subtest's ability to assess the ten lexical areas previously described. This limitation is inherent in the fact that test administration procedures specify that the Examiner must obtain all responses by using a "spontaneous" format. He can only probe the child with very "general" questions such as, "What else can you think of?" or "Tell me more." Only in the initial demonstration item is the Examiner allowed to indicate to the child the various categories that he could report in his dialogue.

It is the contention of this paper that the spontaneous format yields an inadequate measure of the child's semantic knowledge. By using this procedure, the Examiner cannot determine how extensive, or how limited, the child's lexical development truly is. He does not know if the child has failed to report on an attribute, such as color, because he is unaware of this dimension of the object, or because he has merely forgotten to include it in his dialogue. Also, it is possible that he has not referred to an attribute because he considers that bit of information to be insignificant (Rees, 1974).

All of this evidence clearly indicates that a more effective means of examining the child's ability to express his semantic knowledge is needed.

The Purpose of the Study

This study was based on the belief that: (1) semantic development is an important aspect of total linguistic development and, therefore, needs to be assessed in a comprehensive speech and language evaluation; (2) a viable procedure for making this type of assessment is an object description task. Although such a task could not investigate all aspects of semantic development, it does allow the Examiner to obtain information that has a perceptual basis (color, shape, etc.) and also information that must be derived from more conceptual operations (classification, association, etc.); (3) the spontaneous format yields an inadequate measure of the child's ability to relate his knowledge about the objects; and (4) a more complete procedure would utilize a series of specific questions that would probe the child's entire store of information regarding the diverse categories that he could refer to in describing the objects.

Therefore, the purpose of this project was to construct an object description task that incorporated probe questions, administer it to a group of kindergarten age children, and analyze their responses in order to identify trends in semantic acquisition and language usage.

The test was designed so that initially the child was given the opportunity to spontaneously report on descriptive aspects of each object, as is done in the Verbal

Expression Subtest. This portion of the test was called the Spontaneous Condition. The test then required that the Examiner ask specific questions in order to probe for those features that the child did not report spontaneously (the Probe Condition).

By following this procedure, the Examiner obtained information that allowed her to identify trends relative to the verbal ability of kindergarten children for describing the characteristics of objects. That is to say, the Examiner obtained an indication of the richness of their semantic development relative to object concepts. The Examiner also gained a comparison between the amount of concept description the children offered spontaneously and that which they were able to offer in the context of a question format.

The Research Questions

This study was concerned with answering several major questions regarding the level of semantic development that would be displayed by a kindergarten-age child. The first of these was: 1. Is there a "characteristic" type of performance that is exhibited by kindergarten-age children on this form (question--answer) of an object description task? A definition of "characteristic" performance was arrived at by answering the following series of questions:

(a.) In their <u>spontaneous</u> dialogues, are there certain categories (areas of related lexical entries) that

the children discuss more frequently than others?

(b.) When both spontaneous and probed responses are analyzed (the Total Condition), will any variation in the frequency of responses among the categories be evident?

(c.) What is the correlation between the frequency of category response in the spontaneous condition as compared to the total condition?

(d.) What is the average number of categories a child spontaneously talks about?

(e.) What is the average number of categories a child talks about when both spontaneous and probed (total) responses are considered?

The second major question focused on improvement in performance during testing: 2. Is there a progressive increase in the number of categories that each child spontaneously discusses as he works through the objects in the test battery? That is to say, if the child reports on three categories for the first object, will he then report on a greater number for each succeeding object? Also, would a similar trend be found for the total condition?

The third major question concerned the stated necessity of the child being able to "decode" the objects (McCarthy and Olson, 1964, p.34): 3. How would a child describe an unknown object, as compared to the way in which he describes a known object?

The final question involved a comparison with the Illinois Test of Psycholinguistic Abilities: 4. How does the data from this project compare with the normative data for the Verbal Expression Subtest for this particular age group?

In summary, the research effort involved delineating the characteristic performance of a kindergarten-age child on this object description task, determining improvement in performance during testing, considering the importance of the "decoding" requirement, and comparing the data from this probe test with that of the spontaneous Verbal Expression Subtest of the Illinois Test of Psycholinguistic Abilities.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

In order for a child to be able to perform successfully on an object description task, such as the one used in this project, he must have established certain cognitive, perceptual, and linguistic skills. He needs to have had a substantial amount of experience with objects -- looking at them, manipulating them, learning their physical properties, and determining their use. He also needs to have developed his linguistic abilities to a level that allows him to relate this information to the Examiner. The following review traces the acquisition of these skills.

Early Sensorimotor and Perceptual Development

Early in infancy, the child begins to acquire the cognitive skills that allow him to associate a certain identity with a specific object. According to Wapner (1964), this knowledge is first acquired through sensorimotor operations, followed by perceptual operations, and finally by conceptual operations. Piaget (1954, cited by Flavell, 1963, p.130) states that when a child enters the sensorimotor stage, he conceives of objects as being "primarily sensations." What he sees is an "image" that has no

identity or permanence. Gradually, through his active interaction with the object, the child develops an "action pattern" that is associated with that particular object. At this point, the action, not the object has acquired "an incipient permanence" (p.131). Piaget further states that the development of the "object concept" is not complete until the object is:

> . . . seen as an entity in its own right which exists and moves in a space common both to it and to the subject who observes it. (Also,) the continued existence of the object must be construed as separate from and independent of the activity which the subject intermittently applies to it. . . . And finally, . . . (the child must recognize) that the self is also one object among others, which, like others, has its own space-filling properties and its own movements in the common spatial field (p.129).

While the child is establishing his "object concept," he is also acquiring information about the physical properties of items as well. According to Sinclair-de Zwart (1973), the child's manipulations of objects teach him that different items have different and unique physical characteristics. In addition, he discovers that this variation in properties requires that he handle each object in a different way. For example, he learns that "he cannot grasp the corner of his blanket in the same way as he grasps his mother's finger" (p.22). Each object is thus associated with a specific "action pattern." Piaget describes this as the child's "tactile-motor recognition" of those items that are familiar to him (1954, in Flavell, 1963, p.99).

Sinclair-de Zwart (1973) states that these individual "action patterns" are later to be coordinated in such a way that the child's knowledge of object properties will be extended further:

> The child discovers, for example, that certain objects and things when shaken produce a noise, and links this action both to listening and to looking. New objects, looked at, listened to, and acted upon, can then be put into two categories: those that make a noise and those that do not. New discoveries will be made when the baby intentionally starts shaking objects to see whether they make a noise (p.22).

Soon the child establishes even more complex action patterns such as assembling, taking apart, putting on top of, and putting into. As a result, he not only increases his knowledge of the properties of objects, but also introduces organization into his reality (p.22).

While the child is learning about objects through his tactual and motoric explorations, he is simultaneously acquiring perceptual information about them. E. Clark (1974) cites studies which indicate that initially the child attends primarily to the form or shape of an object, examines its texture, and notices whether or not it is moving. Later, he also attends to color and begins to notice differences in size. Clark contends that it is this perceptual information, when combined with auditory input, that provides the basis for the acquisition of the child's first words and their "overextended" usage -- a topic to be discussed in a later section.

Bernard (1973) states that the information that is acquired through the various sense modalities is continually being integrated by the child. He learns that "hearing, touch, taste, sight, and proprioception are related -- that they yield various impressions of a stimulus situation" (p.127). The sensorimotor-stage child's explorations of all types of sensations and his responses to them, allow this child to learn about the characteristics of objects in his environment and to establish the cognitive and perceptual skills that must be present for linguistic acquisition to occur.

Aspects of Early Semantic Development

As a group, preschoolers gradually advance toward a kindergarten level of ability to use words to describe object concepts. In a somewhat idiosyncratic style, each child gains cognitive support, discerns word meaning(s) in comprehension, assigns word meaning(s) in expression, and organizes an understanding of the semantic component of grammar. The following sub-sections review these aspects of cognitive-linguistic development.

I. The Prerequisite Need for Cognitive Skills

Several authorities agree that the development of certain cognitive skills is a necessary prerequisite for the emergence of linguistic abilities. Sinclair (1971) states that because of his sensorimotor experiences, the

child is able to make "mental representations" of his world -- a skill that must be present for linguistic development to occur. Morehead and Morehead (1974), also dealing with this emerging cognitive ability, indicate that when the young child has learned to symbolize, it will be displayed through activities such as deferred imitation, symbolic play, drawings, gestures, and mental imagery, as well as through his initial linguistic output. E. Clark (1974) indicates that because linguistic structures are used to talk about objects, events, and other forms of input from the outside world, a child's linguistic abilities cannot exceed the limits of his "cognitive interpretive system." H. Clark (1973, p.28), referring to those words which designate concepts dealing with space and time, states that "the acquisition of these terms is built onto prior cognitive development." Slobin (1973) also writes about the necessity of a child having acquired a cognitive understanding of an event before he is able to map it linguistically. He cites Cromer (1968) who theorizes that once a child has developed certain cognitive abilities, he then begins to search for linguistic forms to express them. Slobin further contends that the linguistic forms merely provide representations for the child's cognitive relations (in press, cited by Ervin-Tripp, 1973). Likewise, Olson (1970, p.26) states that before a child can begin to attach meaning to spoken words, he must have adequate knowledge of their "intended referents."

II. The Acquisition of Word Meaning

Assuming that a child does have an adequate understanding of the objects within his environment and is able to form "mental representations" of them, how does he learn to understand and use the words that name and describe these objects?

Anglin (1970) proposes three means by which meaning may be associated with a word:

1.) Through an analysis of the contextual utterance,

2.) Through an ostensive definition (i.e., "defining by pointing"),

3.) Through a dictionary definition.

Obviously, using a dictionary is a process much too sophisticated for the beginning language learner. Therefore, the ostensive definition and the contextual utterance appear to be the primary sources of word meaning for the young child.

By using an ostensive definition, the adult is able to immediately pair the spoken word with an exemplar of the class of objects to which that word refers. Several problems, however, are going to result from the use of this type of definition. Vygotsky (1962, p.5) writes that "a word does not refer to a single object but (rather) to a group or class of objects." Ogden and Richards (1953, cited by Boyle, 1971) also contend that a word symbolizes an entire concept. Because of this "conceptual" quality of words, it is obvious that pointing out one example of a

particular class of objects and naming it for a child leaves him with an incomplete understanding of the range of meaning embodied in the word. Pointing to a cat, for example, and saying, "That's a kitty!" does not tell the child that there are other animals besides that particular one that are also "kittys." Until the adult applies the label "kitty" to other felines, the child may consider the term to be a proper name. Schlesinger (1974) refers to this as an "over-restricted" understanding of the meaning of a word.

E. Clark (1974) discusses another problem that is inherent in the ostensive definition. She argues that pointing out and naming an exemplar of a category will not dictate to the child those criterial attributes of the object that he should attend to in forming his concept for a word. He will not know whether "kitty" indicates a color, an action, a shape, or some other attribute rather than a four-legged animal that says "meow." She contends that the child will associate the spoken word with the feature of the object that is most "perceptually salient" (see Rosch, 1973) and will "overextend" its meaning to all other objects that share this perceptual feature. For example, if the child recognizes the word "kitty" as indicating an object covered with fur, he could extend his understanding of this word to include dogs, fur coats, and shag carpets, as well as to other cats.

Luria and Yudovich (1959) suggest that this problem of ostensive definitions can be overcome by providing the child with additional verbal information. They contend that by connecting a word (e.g., "glass") with the direct perception of the object, and by adding its functional role, ("for drinking"), the adult makes explicit to the child those features that are necessary for "glassness" and inhibits the less essential properties, such as weight, color, and size.

E. Clark (1974), however, points out that words that are relative, such as big, wide, tall, etc., which have no tangible referents cannot be given ostensive definitions. Anglin (1970) concurs with this statement and further demonstrates that other intangibles (e.g., idea, because, some, during, and if) also need a different type of definition.

This evidence indicates that the ostensive definition alone is inadequate as a means for assigning appropriate meanings to words. The child must have additional sources of information. Rommetveit (1962, p.124) indicates that a very important source of this information would be the context in which the utterance is heard -- that is, the combination of the environmental and the syntactic contexts. He states that the "mere occurrence" of a word, ("cup"), during a set of particular, recurrent, environmental events (drinking, washing, and pouring), does not provide the

child with an appropriate basis for "singling out the word's referent" from other perceptually similar objects (such as glasses, pitchers, and bowls). In addition, he writes, the situations provide no cues to prevent the child from associating the word with the activities (drinking or pouring), rather than with the object. It is his contention, therefore, that it becomes necessary to examine the syntactic contexts in which "cup" is used in order to determine a "basis for distinction":

> Both "drink" and "cup" occur in slots like "I want a _____." or "The _____ fell down." Only "cup" though, will appear in contexts like, "My _____ broke." and "I shall wash your _____." And only "drink" will appear in contexts like "Father wants to _____ his coffee." (p.125).

By utilizing this contextual information, the child learns to recognize cups as objects and drinking, pouring, and washing as actions.

Ervin-Tripp (1973) supports this hypothesis by stating that a word must be heard in different syntactic environments before its meaning will be fully understood. Menyuk (1969), also concurring with this opinion, writes that the child must learn to extract the various meanings of a single word from the sentences in which it occurs. Anglin (1970), too, indicates that much meaning can be derived from a word's syntactic context and provides the following example:

> Suppose that one is introduced to a novel word (X) in the sentence: "The (X) bought a hat yesterday." Given an acquaintance with other words in the sentence, one can easily infer that (X) designates a human since non-humans do not usually buy hats. Other features of the novel word can be inferred from other sentences (p.4).

Anglin's final sentence in this paragraph illustrates an important concept of semantic acquisition: All of the features of a word are not acquired simultaneously. On the contrary, the child's lexical entry for a word is continually being modified. (A more complete discussion of this aspect of semantic development is included in Section IV.)

III. The Emergence of Verbal Expression

The child, at this point in time, has assigned some type of meanings to certain words that he has heard. It is likely that these meanings are either "overextensions" or "overrestrictions" of the adult's lexical entries. Therefore, when the child begins speaking these words, he will use them in ways that are highly idiosyncratic. As a result, the meaning of his speech must be interpreted in terms of the situational context in which it occurs (McNeill, 1970). Brown (1973) refers to this as a "rich" interpretation of the child's speech.

Greenfield (1967, cited in McNeill, 1970) identified the following series of words and meanings in the early utterances of a child.

WORD	AGE	MEANING
"dada"	11 mos.	caretaker: a) Mother b) Father c) Third person in the house
"ha"	12 mos. 13 mos.	a) hot substance b) empty coffee cup c) turned-off stove
"nana"	15 mos.	a) Location where bananas were kept (no bananas in sight)

Major (1906, cited by E. Clark, 1974) found that his son, at age two years referred to all four-legged animals as "mum", called a monkey "baby", and referred to birds' eggs and snail shells as "balls".

Piaget (1949, cited by Sinclair-de Zwart, 1973) contends that if a 1½ year-old child says:

> . . . vaou when she sees a dog from the balcony, this vaou will be extended (not only) to animals that resemble dogs, but also to everything she can see from the same viewpoint: a horse, a baby in a pram, when seen from the balcony are called vaou. Panama (from Grandpapa) is said whenever she wants somebody--not necessarily her grandfather--to do something that her grandfather used to do with her (p.22).

De Laguna (1927, cited by McNeill, 1970) states that when a child uses a word, he is not indicating an object or a property or an act; rather he is signifying all of these attributes together. The listener needs to consider the context in which the child spoke in order to determine

which aspect was receiving the primary emphasis in that situation. The recording of a child's uses of "bow-wow" (Werner, 1926) illustrates de Laguna's hypothesis:

DAY		USE
251	1.)	China figurine of a girl
307	2.)	Dog in the yard
	3.)	Pictures of grandparents
	4.)	Toy dog
	5.)	Clock
331	6.)	Glass eyes in animal's head on a furpiece
	7.)	Another fur stole without a head
334	8.)	Rubber squeak doll
396	9.)	Father's cuff links
433	10.)	Pearl buttons on dress
	11.)	Bath thermometer

For this child, Werner stated, the criterial attribute for designating an object as a "bow-wow" was an oblong shape or a shiny surface resembling eyes.

Vygotsky (1962) lists a child's early uses of the word "quah": 1.) a duck in a pond, 2.) any liquid, 3.) a coin with an eagle on it, and 4.) any round, coin-like object.

Bowerman (1974) reports data that she had collected on the overextended and idiosyncratic uses of the words open and hi by each of her two children. "Hi", as used by one child, referred to any object that covered a hand or fist. Her other child, however, never associated this

meaning with the word. Her data, like that of Greenfield, Werner, and Vygotsky, indicate that these early word meanings are highly individual and change readily.

Leopold (1949, cited in Schlesinger, 1974) states that there are cases, though infrequent, of overrestricted uses of words. For example, in one child's speech, "hot" was used for hot objects but not for hot weather, and the German word weiss indicated snow but not other white things (p.138). Werner and Kaplan (1967, p.160) present the example of a child who had two words for milk -- one for milk in a cup and another for milk in a bottle.

IV. The Semantic Component of Grammar

The refinement of the child's ability to accurately label and verbally describe the attributes of objects will be the result of a more complete development of the semantic component of his grammar. Menyuk (1971) writes that this semantic component is composed of two parts: 1.) the Lexicon or mental dictionary and 2.) the set of Projection Rules.

The Lexicon:

The child's mental dictionary includes an entry for every word that he is able to comprehend. This entry consists of a syntactic feature and a collection of semantic features (McNeill, 1970, p.116). The lexical entry for the word girl would include:

Syntactic Feature	=	common noun
Semantic Features	=	a) + animate b) + human c) + female d) + young e) - abstract f) other features

McNeill indicates that additional semantic features are incorporated into the lexical entry as the child increases in age and experience. He refers to this as "horizontal" development of the lexicon. McNeill also describes "vertical" development in which new, completely formed entries are added to the lexicon.

E. Clark (1973, 1974) also describes "horizontal" lexical development when she states that the child's first usage of a word will be based on only one or two of its perceptual features. Then he continues his "acquisition of semantic knowledge . . . (by) adding more features of meaning to the lexical entry of the word until his combination of features corresponds with the adult's" (1973, p.72).

Bloom (1970, p.222) refers to this part of semantics as the "substantive" aspect of the word. She states that while these factors provide much information about a word, the child's understanding of that word will be incomplete until he also learns its "relational" aspects. These "relational" aspects are more frequently referred to as the projection rules.

The Projection Rules:

These rules, according to Menyuk (1971) serve a dual purpose:

1.) They interpret the meanings of the individual items of a sentence in terms of the underlying syntactic structure of the sentence, and

2.) They impose restrictions on the co-occurrence of items in a string. As McNeill states, "they keep the word in the right semantic environment" (1970, p.116).

Thus, these rules are responsible for enabling the language user to distinguish grammatical sentences from nongrammatical sentences and to recognize anomalous sentences (Menyuk, 1971).

Summary:

In summary, Katz and Foder (1963) state that the role of the semantic component of a grammar is that it describes and explains how speakers interpret sentences. Semantics is important in:

> . . . accounting for a speaker's performance in determining the number and content of the readings of a sentence; by detecting semantic anomalies; by deciding upon paraphrase relations between sentences; and by marking every other semantic property or relation that plays a role in this ability (p.178).

According to this statement, inadequate semantic development would seriously limit the individual's ability to understand and construct sentences.

The Semantics of the Kindergarten-age Child

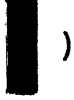
Because semantic acquisition begins at such an early age and continues indefinitely, it became important in designing this study to determine what semantic abilities -- with regard to object description -- would constitute a "normal" expectancy for the kindergarten child. Few studies have been conducted which attempt to determine how well children of a particular age group can understand and/or use descriptive terms. However, the literature does reveal the following information:

H. Clark (1973) in examining the concepts of <u>length</u> (long-short), <u>height</u> (tall-short), and <u>width</u> (wide-narrow) determined that of the three pairs of adjectives, long-short was the most "elementary" because it presupposes only a one-dimensional object, and the "extent of any one-dimensional object is called its length." The tall-short pair was judged to be more complex because it "presupposes three-dimensional objects and requires that the dimensions are applied to the vertical." Wide-narrow was identified as the most difficult pair because "width is a term applied to objects <u>after</u> tallness or length has applied to the maximal dimension" (p.38, 39). Clark cites a study by Tashiro (1971) which confirmed his expectations about these adjectives. Her results indicated that primary adjectives (long-short; tall-short) elicited fewer errors than secondary (wide-narrow) and tertiary (thick-thin)

adjectives for three to five year-old children. Because these data indicate that this group of concepts is relatively difficult to master, it can probably be assumed that secondary and tertiary adjectives would seldom appear in the spontaneous description of an object as given by a kindergarten-age child. The data also indicate that when a child is asked about each of these dimensions, the least number of errors should occur when referring to long-short, more for tall-short, and the most for wide-narrow.

The Boehm Test of Basic Concepts (Boehm, 1971) indicates that by mid-year, 83% of the population of middle-class kindergarten children should be able to respond correctly to the task, "Mark the door that is the widest."

Ervin and Foster (1960, cited by Palermo and Molfese, 1972) found that for a large number of first graders, the meanings for the words big, strong, and heavy were synonomous. Additional semantic development, they concluded, would be required before each word could acquire a differentiated meaning.

Lumsden and Poteat (1968, also in Palermo and Molese, 1972) collected data which revealed that when five and six year-old children were shown two rectangular-shaped objects of equal area, but which varied in the vertical dimension (e.g., a 6" by 6" square  and a 12" by 3" rectangle ), in 72% to 97% of the pairs, the children would select the object with the greatest vertical dimension as being "bigger."

It was also found that even when "the area of the alternate object was four times as great as the object with the greater vertical dimension, 85% of the children still selected the smaller object with the greater vertical dimension" (p.425). These data, they concluded, indicate that the semantic marker on the lexical entry bigger was not yet completely formed for five and six year-old children.

The Test for Auditory Comprehension of Language (Carrow, 1973) indicates that the colors red, black, and yellow are receptively acquired by 75% of children by age 3 years, 6 months and by 90% by age 5 years. Big and little should be mastered by age 4 years, 6 months; tall and taller by 5 years; and soft by 6 years of age. The number concept two should be understood by 4 years, and the concept four at age 5 years, 6 months.

The Preschool Language Manual (Zimmerman, Steiner, and Evatt, 1969) states that a 4 year, 6 month old child should be able to recognize all primary colors. The authors also cite Gesell (1940) whose data show that 41% of the children in this age group are able to name two colors. Regarding number concepts, at age 4-6 the child should be able to respond correctly to the statement, "Give me just three," when twelve blocks are present. By age 6, he should also respond correctly to "Can you put nine (five, seven) blocks here?" The five year old child should be able to point to the "heavier" object when two pictures are shown to him

(e.g., a bird and cow; a bed and a chair). At age 6, he should be able to identify animals on the basis of descriptive adjectives: "Which one has the longest nose?" or "Which one has a long, thin tail?"

Goldman and Levine (1963, cited by Smart and Smart, 1973, p.74) conducted a study in which children were asked to sort objects into groups. Their results showed that children in kindergarten primarily used color (a perceptual feature) as the basis for their groupings. The second most frequent groupings were based on "situational" factors (e.g., "You buy them all in a food store.") Classifications based on abstract concepts, such as "fruits," seldom occurred. This evidence could be interpreted as an indication that -- assuming verbal abilities follow a pattern similar to those demonstrated in the grouping task -- when describing objects, the most frequent descriptions given by kindergarten-age children should be of a perceptual nature, such as color, shape, or parts.

Cazden (1972) cites a study by Berlin and Kay (1969) which analyzed the color terms in twenty different languages. Their results indicated that the development of labels for colors proceeds in a predictable sequence. If a language had names for only two colors, they claim, these would be white and black; if they had three, the third would be red and so on:

Number of Color Terms		Names of Colors
2	terms	White and Black
3	terms	Red
4 & 5	terms	Green and Yellow (order = optional)
6	terms	Blue
7	terms	Brown
8 to 12	terms	Purple, Orange, Pink, and Gray in any order or combination.

These authors speculate that perhaps children learn colors in this same sequence. Cazden, however, indicates that in her experience as a first grade teacher, she found no evidence of this order of acquisition. She further cites Heider (1971) whose research on color and color names failed to reveal the "evolutionary sequence" proposed by Berlin and Kay.

Data from the Verbal Expression Subtest of the Illinois Test of Psycholinguistic Abilities (Kirk, McCarthy and Kirk, 1968) indicate that for the age group 5 years, 7 months to 6 years, 1 month, children are able to provide responses in each of the ten descriptive areas that were discussed in Chapter I (Label and Class, Color, Shape, Composition, Function or Action, Major Parts, Numerosity, Other Physical Characteristics, Comparison, and Person, Place, or Thing). The greatest frequency of responses occurred for the category Function or Action. (This was a consistent trend through all eight age groupings tested.) Responses for the categories Numerosity and Other Physical Characteristics occurred with the least frequency.

Thus, the research findings to date describe the child of kindergarten age as one who has acquired a certain amount of information about the meaning and use of the words that map attributive properties. The research also reveals that their knowledge about descriptive words may remain incomplete from an adult standpoint.

Summary

The process of acquiring descriptive words and their meanings is the result of the interaction of several cognitive operations. According to Wapner (1969, p.40), these processes include:

1.) Sensorimotor operations because they "involve direct, external, motoric manipulation of objects,"

2.) Perceptual operations because they "involve directiveness towards properties of objects," and

3.) Conceptual-symbolic operations because they "involve the manipulation of symbols representative of objects."

Each operation serves as a means for obtaining information about the world. They provide the basis on which linguistic abilities are built, elaborated, and refined.

Throughout this review, the complexity of the acquisition of word meaning has been demonstrated. Rommetveit (1962) reiterated this fact when he wrote:

> Even common nouns like "apple" and "cup" are from the very beginning of language acquisition encountered in contexts of composite utterances applied to complex events and in a framework of social interaction. . . . (Also,) the potential referent of any word has to be investigated within the perspective of intellectual growth on the part of the child (p.126).

It remained for this study to identify the level of semantic development that kindergarten children demonstrate in their descriptions of objects. Realizing the fact that these children have had to contend with complex aspects of perceptual and cognitive-linguistic development, and that their appreciations may be incomplete for many of the descriptive words of their language, this research focused upon identifying how such children perform linguistically on a specific object describing task.

CHAPTER III

PROCEDURES

Subjects

Subjects consisted of 28 children between the ages of 5 years, 4 months and 6 years, 5 months, with a mean age of 5 years, 10 months. All were students in either the morning or afternoon kindergarten class of the Schofield Elementary School in Schofield, Wisconsin. The group included 15 boys and 13 girls.

All children in each of the classes were administered the Columbia Mental Maturity Scale (Burgemeister, Blum, and Lorge, 1972) in order to determine normalcy in "general reasoning ability" on a task that required no verbal response. Reasoning is a cognitive skill and as indicated in the Review of the Literature, normal cognitive development is a necessary prerequisite for the establishment of normal linguistic skills. The 28 children who were selected as subjects achieved Age Deviation Scores on the Columbia Mental Maturity Scale within the range designated by its authors as being an "average" performance (i.e., the range in which 68% of the standardization population scored).

The Objects

The test objects consisted of one cup, two pair of scissors, five socks, three apples, one miniature table, and one tire valve stem, presented in sequence. A more complete description of the objects is given in Appendix C.

The first five sets of objects were selected on the basis of the following criteria:

1. The objects must be selected from the child's life-space (i.e., things he has seen and used).
2. The objects must provide a large number of contrasting characteristics both within and across category groupings. This requirement is illustrated in Figure 1.
3. The objects must be relatively the same size as those that the child would be using in his environment.
4. The objects must hold the child's interest and attention for the entire test session.
5. The objects must be durable, or replaceable.

The sixth item, the tire valve stem, was included because it was believed that this would be an object that most, if not all, of the children would be unfamiliar with. Its inclusion allowed the Third Research Question -- "How would a child describe an unknown object, as compared to the way in which he describes a known object?" -- to be answered.

Figure 1. Characteristics of the Five Test Objects in Terms of the Fifteen Descriptive Categories.

Name	Color	Parts	Shape	Texture	Size L-H-W Weight
CUP	White	Various Parts for Each Object	Round	Smooth	Various Comparisons with Known Objects for Each
SCISSORS	Silver		Straight	Hard	
SOCK	Blue		Flat	Soft	
APPLE	Red		Round	Hard	
TABLE	Brown		Square	Rough	

Name	Composition	Function	Relationship	Numerosity	Classification
CUP	Glass	Drinking	Various Persons, Places, and Things for Each Object	One	Container
SCISSORS	Metal	Cutting		Two	Tools
SOCK	Cloth	Wearing		Five	Clothing
APPLE	Plastic	Eating		Three	Fruit
TABLE	Wood	Write On		Four Legs	Furniture

Test Administration

All subjects were tested individually in relatively quiet areas adjacent to the classroom. To assure that all testing would be completed in one day, three Examiners were used. Testing was done simultaneously in three separate sites. This factor minimized the possibility of the children discussing the task among themselves, thereby invalidating the data. The Examiners consisted of the Researcher and two trained assistants. Responses were tape recorded to allow for both inter- and intra-examiner reliability tests.

Testing was conducted in the following manner. An Examiner accompanied a child from the classroom to the test site. Once at the site, both the child and the Examiner were seated at a small table. The child sat facing the wall, thereby minimizing visual distractions. Located on the table were a closed box containing the test objects and a tape recorder.

Initially, the Examiner established rapport with the child (i.e., made him feel at ease). This was done so that the child's performance would not be detrimentally affected by negative emotional factors. Then the Examiner gave the instructions:

> "In this box I have a lot of things that I want you to talk about. I'll give you one of them and you think as hard as you can. Then tell me everything that you can about it."

The box was then opened in such a way that the child could not see its contents. The Examiner took out the cup and handed it to the child saying:

> "Here's the first one. Hold it. Look at it. Feel it. Now, tell me everything you can about it."

The child's responses were recorded on individual score sheets (see Appendix D). From time to time, general statements such as, "Tell me more." were used to encourage the child to think harder and offer more information.

When the child could no longer provide spontaneous responses, the Examiner began asking the designated probe questions for those categories that the child failed to discuss. In addition, for the features Composition, Function or Action, and Classification, if the child were unable to accurately answer the probe, the Examiner asked the multiple choice question that was provided. This final question was asked even though the child's response to the probe question might have been incorrect. (The Score Sheet -- Appendix D -- provides further clarification.) Multiple choice items were included because, according to Nelson (1972) a child can recognize a category name when spoken by another before he is able to generate the word himself. This type of questioning provided another means to test the child's level of concept development.

Scoring was done in the following manner:

1.) All responses were recorded on the score sheet.

2.) Spontaneous responses were scored by underlining or writing in the answer given by the child under the appropriate category heading. An (X), if correct, or a (O), if incorrect, was placed on the first blank in front of the category name.

3.) Probed responses were scored using the same procedure, except that the (X) or (O) was placed in the second blank under the category name rather than in the first blank.

4.) Responses to multiple choice questions were underlined and their accuracy was indicated by an (X) or an (O) in the third blank.

5.) For any questionable responses, a question mark (?) was placed in the appropriate blank, and the response was written out on the score sheet. The probe question and/or multiple choice question for that category were also asked in order to clarify the child's understanding of that concept. In addition, for the categories Size, Length-Height-Width, and Weight, spontaneous comments such as, "It's big." were immediately followed up with the question, "Bigger than what?" If the child reported an accurate comparison (e.g., "The table is bigger than a pencil."), his response was scored as a spontaneous, accurate description.

If the child began to give spontaneous responses after "probing" had begun, those responses were scored the same as his initial spontaneous responses provided that the Examiner had not yet probed for responses in those categories.

When all fifteen categories had been dealt with, either spontaneously or in response to probe questions, the cup was replaced in the box and the Examiner verbally reinforced the child for doing a fine job and for working so hard.

Identical procedures were followed for the remaining objects. The only exception to this rule involved the probe questions assigned to the category Numerosity for the objects scissors, apple, and sock. When this item was reached, the Examiner opened the box and removed the specified number of additional objects (described in Appendix C). The Examiner then asked, "How many of them do you have now?" In this way, number concepts from one to five could be assessed. (Appendix C also distinguishes between the object that was presented for the child to spontaneously describe in each group and those that were introduced for the Numerosity question.) These additional objects were not replaced in the box until all of the remaining questions were completed. All of the objects were then put away.

A pilot study was conducted to determine the most effective probe questions for eliciting information about the fifteen categories. Those features that were found to be most problematic were Size, Length-Height-Width, and Weight. This was due to the fact that questions such as, "How big is it?" elicited answers that could not be scored due to their ambiguity. Therefore, it was determined that probe questions requiring a comparison with a known referent object (e.g., "Is it bigger or smaller than a penny?") should be used.

Analysis of the Data

Data gathered in this study were submitted to the following statistical analyses.

A one-way analysis of variance (subjects by treatments design) (Edwards, 1967) was conducted, and repeated, in order to answer the questions:

1.) Is there a significant difference in frequency of usage among the fifteen descriptive categories in the spontaneous condition?

2.) Is there a significant difference in frequency of usage among the fifteen descriptive categories in the total (i.e., spontaneous plus probe) condition?

3.) Is there a significant difference in response to the six objects in the spontaneous condition?

4.) Is there a significant difference in response to the six objects in the total condition?

Because each of these questions was answered in the affirmative, post hoc analyses utilizing the Scheffe' multiple comparison technique (Edwards, 1967) were performed. By employing this technique, the Researcher was able to locate precisely where the significant differences lay within each of the four areas of interest indicated in the above questions.

To determine the difficulty level of each of the fifteen categories, a scale of item difficulty was

constructed. This was done by dividing the number of correct responses by the total number of possible responses to a given category (Nelson, Denny, & Coladarci, 1956). These computations yielded percent correct figures which were then rank-ordered. Difficulty scales were constructed for both the spontaneous and the probe conditions.

Using Spearman's rho, the rank-orderings of the frequency of use of the fifteen categories in the spontaneous condition were compared with their rankings for the total condition. A scattergram was drawn to provide a visual illustration of this relationship. Spearman's rho was also used to determine the correlation between the frequency of category response for the unknown object (valve stem) as compared to the known objects.

Using the tape recordings that were made during test administration, both inter- and intra-examiner reliability were examined. Inter-examiner comparisons (i.e., comparisons of scoring done by the Researcher while listening to the recordings versus the live scoring done by the two trained Examiners) resulted in reliability levels of 94.2% and 95.5% for each Examiner. Intra-examiner comparisons (i.e., the Researcher's live scoring as compared to her own re-scoring using the tape recordings) yielded a 96% reliability level.

CHAPTER IV

RESULTS AND DISCUSSION

Characteristic Test Performance

Spontaneous Responses:

To determine whether or not there was a statistically significant difference among the fifteen descriptive categories in the spontaneous condition, a one-way analysis of variance was performed. This analysis compared the frequency with which the children of this study spontaneously reported on each of the categories Color, Parts, Shape, Texture, Size, Length-Height-Width, Weight, Composition, Function, Relationship, Numerosity, Classification, Name, and Other Characteristics. Results of the computation are listed in Table 1.

Table 1. Analysis of Variance Due to Frequency of Category Report in the Spontaneous Condition.

Source of Variation	d.f.	Sums of Squares	Mean Squares	F-Ratios
Subjects	27.	77.0562	2.8539	
Between Categories	14.	519.4614	37.1043	34.2190**
Within Categories	378.	409.8729	1.0843	
Total	419.	1006.3906		

**significant beyond the .01 level; F = 2.12

Data from this analysis of variance indicate that, in terms of the frequency with which each of the fifteen categories occurred in the children's spontaneous dialogues, at least one of the fifteen was significantly different from the others. To determine where this significance lay, a *post hoc* analysis employing the Scheffé multiple comparison technique was performed. This technique provides a procedure for testing "any and all possible comparisons on a set of *k* treatment means" (Edwards, 1967, p.267). The set of mean scores that were utilized in this multiple comparison are listed in Table 2. Results of the Scheffé analysis are provided in Table 3.

Table 2. Mean Scores for Frequency of Category Report in the Spontaneous Condition.

Category Number	Category Name	Abbreviation	Mean
(1)	Function or Action	(F or A)	3.67
(2)	Parts	(Parts)	3.14
(3)	Name	(Name)	2.78
(4)	Relationship (a)	(R - a)	2.00
(5)	Relationship (b)	(R - b)	2.00
(6)	Shape	(Shape)	1.67
(7)	Color	(Color)	1.39
(8)	Composition	(Compo.)	1.28
(9)	Texture	(Tex.)	1.17
(10)	Numerosity	(Num.)	.64
(11)	Size	(Size)	.42
(12)	Other Characteristics	(O. Ch.)	.32
(13)	Length-Height-Width	(L-H-W)	.25
(14)	Weight	(Wt.)	.14
(15)	Classification	(Class.)	.00

Table 3. Scheffe' Test of Multiple Comparisons for Frequency of Report According to the Fifteen Categories (Spontaneous Condition).

Source of Variation					F-Ratios
Category Number	Abbre-viation	versus	Category Number	Abbre-viation	
(1)	(F or A)	vs	(4)	(R - a)	1.67*
			(5)	(R - b)	1.67*
			(6)	(Shape)	2.00*
			(7)	(Color)	2.28*
			(8)	(Compo)	2.39*
			(9)	(Text.)	2.50*
			(10)	(Num.)	3.03*
			(11)	(Size)	3.25*
			(12)	(O. Ch)	3.35*
			(13)	(L-H-W)	3.42*
			(14)	(Wt.)	3.53*
			(15)	(Class)	3.67*
(2)	(Parts)	vs	(7)	(Color)	1.75*
			(8)	(Compo)	1.86*
			(9)	(Text.)	1.97*
			(10)	(Num.)	2.50*
			(11)	(Size)	2.72*
			(12)	(O. Ch)	2.82*
			(13)	(L-H-W)	2.89*
			(14)	(Wt.)	3.00*
			(15)	(Class)	3.14*
(3)	(Name)	vs	(9)	(Text.)	1.61*
			(10)	(Num.)	2.14*
			(11)	(Size)	2.36*
			(12)	(O. Ch)	2.46*
			(13)	(L-H-W)	2.53*
			(14)	(Wt.)	2.64*
			(15)	(Class)	2.78*
(4) and (5)	(R - a) and (R - b)	vs	(11)	(Size)	1.58*
			(12)	(O. Ch)	1.68*
			(13)	(L-H-W)	1.75*
			(14)	(Wt.)	1.86*
			(15)	(Class)	2.00*
(6)	(Shape)	vs	(15)	(Class)	1.67*

*significant at the .05 level.

Note: All other comparisons were not significant.

The statistically significant differences among the categories, which were identified through the use of the Scheffé, indicate the variation in the frequency of responses that occurred across the fifteen categories in the spontaneous condition. This variation, it was concluded, suggested the possibility that some categories, (those reported less frequently), were more "difficult" than the others.

To further demonstrate this variation in complexity among the fifteen categories, a scale of item difficulty was devised. ("Difficulty" was considered as being inversely related to frequency of category report.) The scale was constructed by dividing the number of correct responses by the total number of possible responses to a given category, yielding a percent correct figure. The rank-ordering of the fifteen categories thus established is presented in Table 4.

Table 4. Scale of Item Difficulty -- Spontaneous Condition.

Rank	Category	Percent Correct
1.0	Function or Action	73.6
2.0	Parts	62.8
3.0	Name	55.6
4.5	Relationship (a)	40.0
4.5	Relationship (b)	40.0
6.0	Shape	33.6
7.0	Color	27.8
8.0	Composition	25.7
9.0	Texture	23.6
10.0	Numerosity	12.9
11.0	Size	8.6
12.0	Other Characteristics	6.4
13.0	Length-Height-Width	5.0
14.0	Weight	2.5
15.0	Classification	0.0

An extrapolation of E. Clark's (1974) discussion of the attributes of objects that are most "perceptually salient" to the sensorimotor stage child would have predicted that the more frequently occurring categories would be Shape, Movement (Action), Texture, Color, and Size. The data presented in Table 4 indicate that only one of Clark's five categories -- Action -- was among those reported more frequently by kindergarten-age children in the spontaneous condition. The remaining four categories occupied "middle" positions in the difficulty scale. These data, according to the Researcher's interpretation, suggest that there is some relationship between the acquisition of word meanings and the frequency of word usage when compared

to the sequence of perceptual explorations of the very young child. The relationship, however, is far from being a one-to-one correspondence.

The prediction that the children's most frequent responses would be reporting perceptual features (derived from the Goldman and Levine sorting study, 1963, cited by Smart and Smart, 1973) was not supported by the data of the present study. Results of this study suggest that kindergarten-age children more readily report characteristics of objects that are not "visible" (Function, Name, Relationship) as compared to more perceptually oriented features (Shape, Color, Texture, etc.).

The data did support another prediction that was based on the Goldman and Levine study. This prediction suggested that responses dealing with Classification would seldom occur in the spontaneous condition. In the present study, no Classification responses spontaneously occurred.

Also, the data from this study support the conclusion derived from H. Clark's (1973) examination of spatial concepts. That conclusion stated that because these concepts are difficult to master, their frequency of occurrence in the spontaneous dialogues of kindergarteners would be expected to be low. In this study, spatial concepts (Size, Length-Height-Width) were among the five categories offered with the least frequency.

Total Responses:

Evaluation of responses in the total condition was conducted by means that were identical to those used for the spontaneous condition. Initially, a one-way analysis of variance was performed. The purpose of this analysis was to determine whether the variation in the frequency of responses across the fifteen categories would be evident for the total condition as it had been for the spontaneous condition. Results are listed in Table 5.

Table 5. Analysis of Variance Due to Frequency of Category Report in the Total Condition.

Source of Variation	d.f.	Sums of Squares	Mean Squares	F-Ratios
Subjects	27.	42.0390	1.5570	
Between Categories	14.	507.0303	36.2164	50.0280**
Within Categories	378.	273.6426	0.7239	
Total	419.	822.7120		

**significant beyond the .01 level; F = 2.12

Data from this analysis of variance indicate that, in terms of the frequency with which accurate responses were given for each of the fifteen categories, at least one of the fifteen was significantly different from the others.

Again, by using the Scheffe' technique to compare the mean scores for each of the categories (Table 6), a post hoc analysis of the data was performed. Results of this analysis are presented in Table 7.

Table 6. Mean Scores for Frequency of Category Report in the Total Condition.

Category Number	Category Name	Abbreviation	Mean
(1)	Function or Action	(F or A)	4.96
(2)	Numerosity	(Num.)	4.85
(3)	Name	(Name)	4.82
(4)	Size	(Size)	4.82
(5)	Relationship (a)	(R - a)	4.69
(6)	Relationship (b)	(R - b)	4.69
(7)	Color	(Color)	4.46
(8)	Shape	(Shape)	4.39
(9)	Composition	(Compo.)	4.39
(10)	Length-Height-Width	(L-H-W)	4.39
(11)	Weight	(Wt.)	4.21
(12)	Parts	(Parts)	3.85
(13)	Classification	(Class.)	3.67
(14)	Texture	(Tex.)	3.32
(15)	Other Characteristics	(Other)	0.32

Table 7. Scheffe Test of Multiple Comparisons for Frequency of Report According to the Fifteen Categories (Total Condition).

Source of Variation					F-Ratios
Category Number	Abbre-viation	versus	Category Number	Abbre-viation	
(1)	(F or A)	vs	(13)	(Class.)	1.29*
			(14)	(Tex.)	1.64*
			(15)	(Other)	4.64*
(2)	(Num.)	vs	(14)	(Tex.)	1.53*
			(15)	(Other)	4.53*
(3)	(Name)	vs	(14)	(Tex.)	1.50*
			(15)	(Other)	4.50*
(4)	(Size)	vs	(14)	(Tex.)	1.50*
			(15)	(Other)	4.50*
(5)	(R - a)	vs	(14)	(Tex.)	1.37*
			(15)	(Other)	4.37*
(6)	(R - b)	vs	(14)	(Tex.)	1.37*
			(15)	(Other)	4.37*
(7)	(Color)	vs	(15)	(Other)	4.14*
(8)	(Shape)	vs	(15)	(Other)	4.07*
(9)	(Compo.)	vs	(15)	(Other)	4.07*
(10)	(L-H-W)	vs	(15)	(Other)	4.07*
(11)	(Weight)	vs	(15)	(Other)	3.89*
(12)	(Parts)	vs	(15)	(Other)	3.53*
(13)	(Class.)	vs	(15)	(Other)	3.35*
(14)	(Tex.)	vs	(15)	(Other)	3.00*

*significant at the .05 level.
Note: All other comparisons were not significant.

The Scheffé analysis thus indicated that, in the total condition, statistically significant differences in response accuracy existed between those pairs of categories listed in Table 7. These differences were again interpreted as suggesting that some categories were more "difficult" than others.

To further illustrate this variation in difficulty, a scale of item difficulty was constructed. The rank-ordering of the fifteen categories in the total condition is given in Table 8.

Table 8. Scale of Item Difficulty -- Total Condition.

Rank	Category	Percent Correct
1.0	Function or Action	99.3
2.0	Numerosity	97.1
3.5	Name	96.4
3.5	Size	96.4
5.5	Relationship (a)	93.9
5.5	Relationship (b)	93.9
7.0	Color	89.3
9.0	Shape	87.9
9.0	Composition	87.9
9.0	Length-Height-Width	87.9
11.0	Weight	84.3
12.0	Parts	77.1
13.0	Classification	73.6
14.0	Texture	66.4
15.0	Other Characteristics	6.4

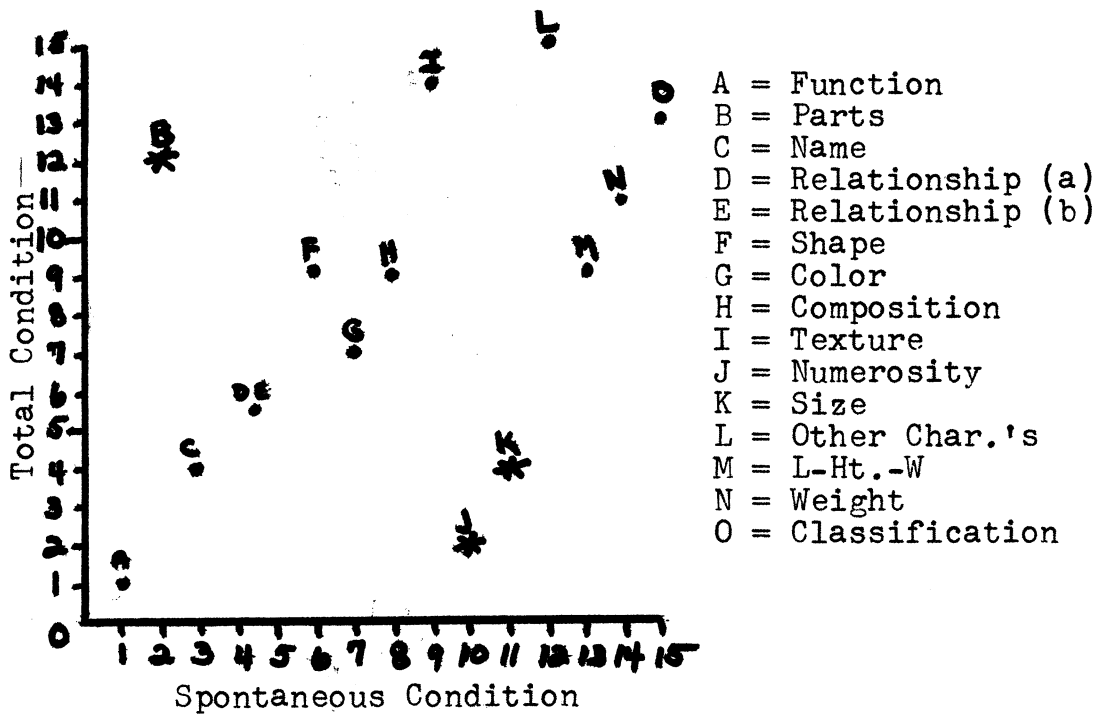
An examination of the rank-orderings in the Total Condition (listed above) as compared to the Spontaneous

Condition (Table 4), reveals discrepancies that need to be analyzed more thoroughly. This analysis is completed in the following section.

Spontaneous Condition versus Total Condition -- Correlational Data:

Using the rank-orderings of the fifteen categories in the spontaneous condition and in the total condition, (Tables 4 and 8, respectively), a correlation scattergram was constructed. This graph is shown in Figure 2.

Figure 2. Scattergram of the Rank-Ordering of the Fifteen Categories in the Spontaneous Condition versus the Total Condition.



Analysis of these data using Spearman's rho (Williams, 1968) revealed the presence of a rank-difference correlation of 0.474 between the spontaneous condition and the total condition. Considering the situation being examined (i.e., a comparison of two related conditions, both of which are attempting to elicit the same response), it was expected that a correlation much closer to the 1.00 level would be found. Therefore, ρ = 0.474 was interpreted as being a low correlation.

An interesting event that appeared to have been responsible for this low correlation, (and which needs to be more thoroughly examined in future studies), is the fact that the rankings of the three categories Parts, Numerosity, and Size, data points B, J, and K, were nearly "reversed" between the two conditions. That is, in one condition, the category was near the top of the rank-ordering list, (indicating a high frequency of accurate response occurrence), while in the other condition it was near the bottom.

In contrast to the other twelve categories, which achieved similar rank-order positions in both the spontaneous and the total conditions (suggesting an equivalent level of difficulty under each condition) Size and Numerosity demonstrated low spontaneous rankings and high total rankings. This "ranking reversal" was attributed to the fact that the stimulus items were not of a nature which would elicit these types of responses in a spontaneous

condition (i.e., the objects were "life-like" in size -- neither notably large nor small -- and none of them, with the exception of the table and possibly the scissors, had parts that a child would be likely to count). Therefore, although the children did understand these concepts, as evidenced by their accurate performance in the total condition, their appearance in the spontaneous dialogues was quite infrequent.

The other "deviant" category, Parts, displayed an opposite type of rank reversal. Here, references to the category did occur very frequently in the children's spontaneous descriptions, but when the probe question, "What are some of its parts?" was asked, the children could not provide accurate responses. This differential factor was attributed to the fact that although the children were able to spontaneously label such things as the handle of the cup or the legs of the table, they responded poorly to the probe because they did not completely understand the meaning of the word "parts" as it was used in the question. Error responses to this probe frequently involved references to the shape of the object. Also, many children offered no response to the item. Both of these factors indicate inadequate comprehension of and perhaps some degree of lexical confusion for the concept.

A similar, though not as dramatic, a reversal occurred for the category Texture. The difference between the conditions as displayed here, also appeared to be the result of incomplete lexical development. Because of the wide range of meanings that are included in this category (e.g., hard, soft, picky, slippery, cold, sharp, furry, feels like glass, feels like wood, etc.) nearly all of the children -- 20 of 28 -- made some reference to texture in their spontaneous dialogues. However, when this spontaneous reference was not made and the question, "How does it feel when you rub it?" was asked, it became apparent that the children did not completely understand the concept. Insufficient responses, such as "Good," "Nice," or "Funny," and incorrect responses were noted often. The most frequently recurring error involved confusion between hard and soft.

Spontaneous Condition versus Total Condition - Descriptive Comparison:

The mean number of correct responses that were offered in the spontaneous condition was 4.19 per object for the five "known" objects (i.e., those objects that were selected from the child's life-space). The mean number of correct responses that were elicited in the total condition was 12.38 per object for the same five items. This difference (although not tested for statistical significance) indicated that, on the average, kindergarten

age children were able to provide the Examiner with nearly three times the information when probe and multiple choice questions were utilized. This tripling of information indicates a substantial increase in the accuracy of the Examiner's assessment of the child's semantic abilities. It strongly supports the contention that the probe technique provides a more adequate means for examining a child's knowledge of object concepts.

In addition, an examination of the percent correct figures for the spontaneous condition (Table 4), reveals that only three of the fifteen categories achieved scores above the 50% level. By contrast, in the total condition (Table 8), eleven of the fifteen categories were beyond the 80% level. Data from the spontaneous condition thus failed to show this group's high level of concept knowledge. This fact further indicates the superiority of the probing technique.

Improvement During Testing

Spontaneous Condition:

Mean number of responses for each of the objects during the spontaneous condition was calculated. These data are included in Table 9. The objects are listed according to the order of presentation during the test.

Table 9. Mean Number of Responses and Standard Deviations for the Six Objects in the Spontaneous Condition.

Object	Mean	S.D.
1. Cup	3.17	1.22
2. Scissors	4.14	1.95
3. Apple	4.28	1.96
4. Sock	4.39	1.49
5. Table	4.96	1.61
6. Valve Stem	3.53	1.84

Using these data, a one-way analysis of variance was performed to determine whether or not there was a statistically significant difference among the means for each of the six objects. The results of this analysis are listed in Table 10.

Table 10. Analysis of Variance Due to the Frequency of Categorical Responses for the Six Objects in the Spontaneous Condition.

Source of Variation	d.f.	Sums of Squares	Mean Squares	F-Ratios
Subjects	27.	284.1646	10.5246	
Between Objects	5.	56.9755	11.3951	7.5522**
Within Objects	135.	203.6988	1.5088	
Total	167	544.8336		

**significant beyond the .01 level; F = 3.17

These results indicate that in terms of the frequency with which information was offered for each of the six objects in the spontaneous condition, at least one of the six was significantly different from the others.

A post hoc analysis of the data was performed, once again utilizing the Scheffé multiple comparison technique. Results of this analysis indicate the presence of a statistically significant difference ($p < .05$) between the mean scores for the objects Cup and Table (means = 3.17 and 4.96, respectively) and between Valve Stem and Table (mean scores = 3.53 and 4.96). All other differences among the objects were not statistically significant.

The Researcher contends that the difference between the objects Cup and Table was due to the children "cueing into" the features that were being questioned in the probes. As more and more questions were presented, the

children began to learn the various descriptive elements that could be included in their spontaneous dialogues. For example, responses like, "The table is lighter than a car" or "The sock is longer than a banana" occurred only for the objects that were located in the latter half of the test. Also, as indicated in Table 9, there was a progressive increase in the mean number of spontaneous responses that were given for each of the five known objects. This factor is viewed as additional support for the contention that the children were learning the various types of categorical responses that could be made.

The difference between the objects Valve Stem and Table may be attributed to the fact that the Valve Stem was an unknown item. (This factor will be discussed more thoroughly in a later section.)

Total Condition:

Evaluation of the responses given in the total condition was accomplished by employing procedures that were identical to those used for the spontaneous condition. Mean number of responses for each of the objects was calculated. These data are listed in Table 11.

Table 11. Mean Number of Responses and Standard Deviations for the Six Objects in the Total Condition.

Object	Mean	S.D.
1. Cup	12.10	1.08
2. Scissors	12.17	1.44
3. Apple	12.10	1.17
4. Sock	13.00	1.06
5. Table	12.50	1.50
6. Valve Stem	9.96	1.89

An inspection of this table indicates that the mean number of responses for the five known objects were very similar with relatively small standard deviations. To determine if there were any significant differences among the mean scores for each of the six objects, an analysis of variance was performed. Results of the one-way ANOVA are presented in Table 12.

Table 12. Analysis of Variance Due to Frequency of Categorical Responses for the Six Objects in the Total Condition.

Source of Variation	d.f.	Sums of Squares	Mean Squares	F-Ratios
Subjects	27.	136.8828	5.0697	
Between Objects	5.	152.4726	30.4945	22.677**
Within Objects	135.	186.5508	1.3818	
Total	167.	475.9063		

**significant beyond the .01 level; F = 3.17

Data from this table indicate the presence of at least one statistically significant difference among the six objects in the total condition. By employing the Scheffe' multiple comparison technique, it was found that the unknown object (Valve Stem) was significantly different from each of the other five objects ($p < .05$). No statistically significant differences were revealed in the comparisons that were made among the other five objects. These results, combined with the minimal differences in mean scores, indicate that performance in the total condition did not improve as a result of exposure to additional test items. By contrast, improvement during testing had been the case in the spontaneous condition. This finding suggests that while the children appeared to have been "cueing into" the types of responses that they could offer (as evidenced by the data from the spontaneous condition), they did not seem be to learning new concepts (as shown by the small differences among the objects in the total condition).

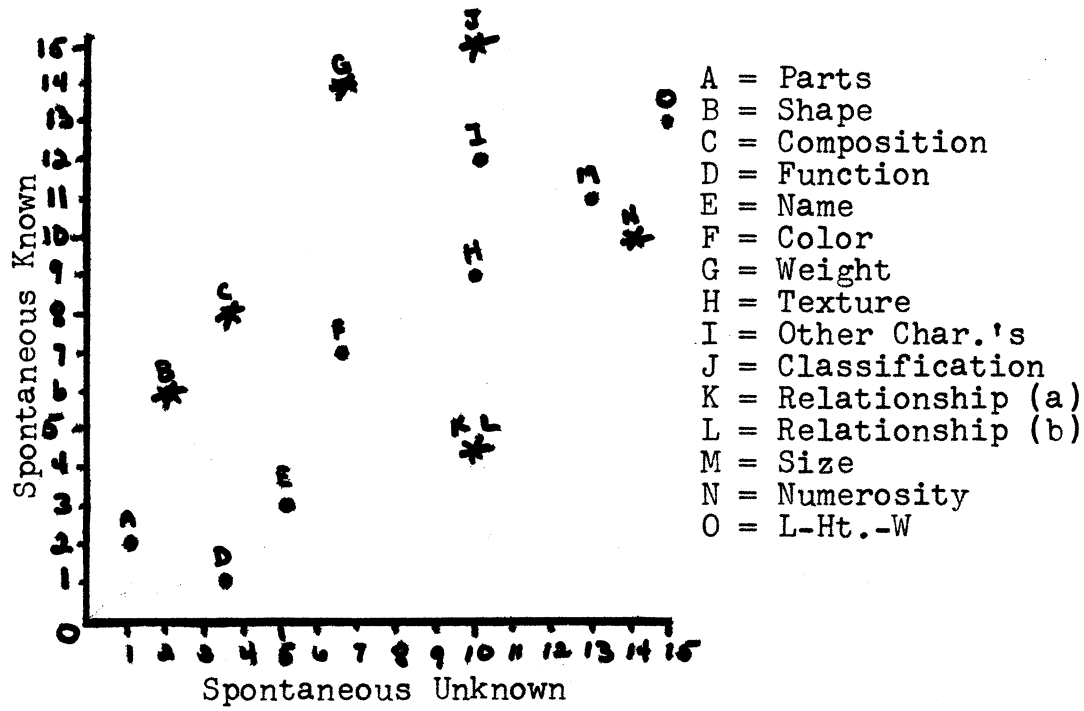
In addition, the similarity in mean scores for the five known objects in the total condition indicates that these test items were equal in difficulty.

The Decoding Requirement

As indicated in the preceding sections, the kindergarten-age children in this study described an unknown object (Valve Stem) by giving a reduced mean number of responses. This mean was described as being significantly different from those obtained for the five known objects ($p < .05$). The mean number of responses per object for the five known items in the total condition was found to be 12.38; mean number of responses per object for the unknown item in the total condition was 9.96.

To analyze the relationship between the frequency with which the children referred to each of the fifteen categories for the known objects as compared to the unknown object, Spearman's rho was employed. In the spontaneous condition, $\rho = .612$; for the total condition, $\rho = .241$. Scattergrams (figures 3 and 4) were constructed to further illustrate this relationship.

Figure 3. Scattergram of the Rank-Ordering of the Fifteen Categories in the Spontaneous Condition for Known Objects versus an Unknown Object.



As is evident in the scattergram, those categories demonstrating the largest degree of variation between the "known" versus the "novel" condition were Shape, Composition, Weight, Classification, Relationship (a) and (b), and Numerosity (data points B, C, G, J, K, L, and N). Shape, Composition, Weight, and Classification were offered more frequently for the Valve Stem than for the known objects, while Relationship and Numerosity were offered less frequently.

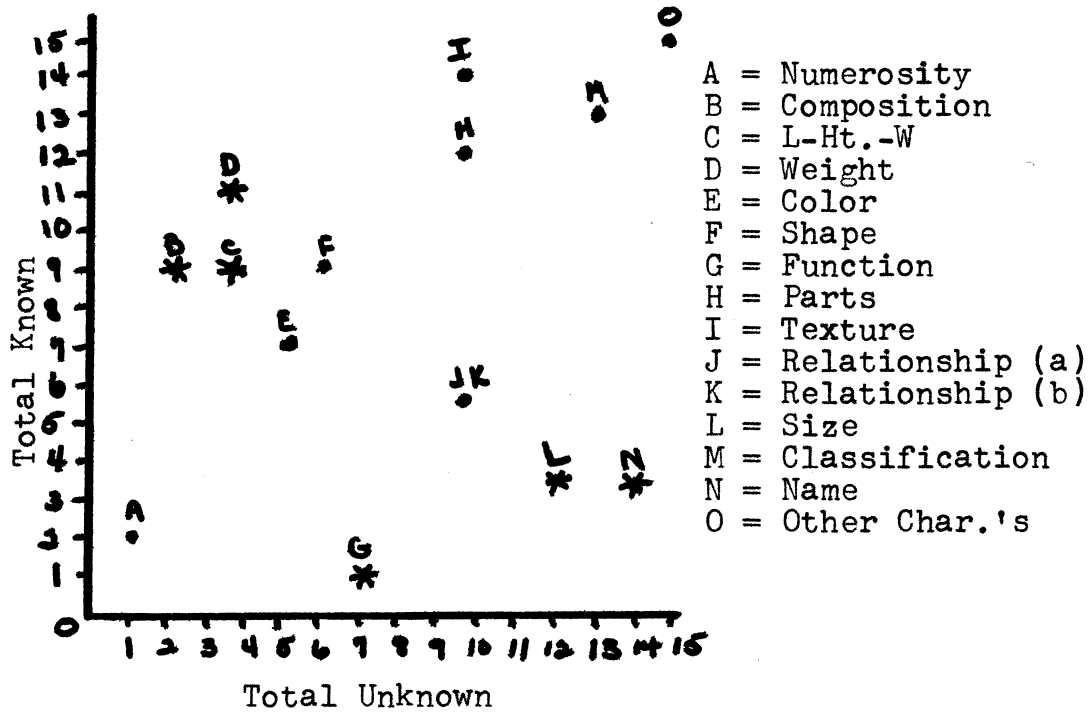
It is believed that the children discussed Weight more often because in comparison to the other five items in the task, the Valve Stem alone was relatively "heavy" for its size. Thus, the increase in response frequency could be attributed to a physical property of this item rather than to the fact that it was a novel object.

For the remaining six categories, the increase or decrease in response frequency was attributed to the unfamiliarity of the object. Because the children did not recognize the Valve Stem, they could not relate it to other things, persons, places, or events. Nor were they able to associate the object with a conceptual grouping. Thus, the number of references made to the Relationship and Classification categories decreased. However, for the categories Shape, Composition, and Numerosity, the variation in response frequency could not be given a similar type of explanation. Thus, the contention made by McCarthy and Olson (1964) -- that the presentation of an unfamiliar object would elicit responses that were "different" from those obtained for a known object -- was supported by the data of the present study.

A possible explanation for this variation in responses was drawn from the results of the "tip of the tongue" study that was done by Brown and McNeill (1966). In applying their findings to the present research, it was concluded that because the children had no lexical entry for the

Valve Stem, asking them to describe the object forced them to use a different technique for drawing information from the lexicon. Brown and McNeill termed this process "entering the lexicon backwards." As a result of using this alternate technique, changes occurred in the frequency with which the children reported on each of the fifteen categories. As stated above, this was especially evident for the categories Shape, Composition, and Numerosity. Implications of this finding will be discussed in the following chapter.

Figure 4. Scattergram of the Rank-Ordering of the Fifteen Categories in the Total Condition for Known Objects versus an Unknown Object.



The scattergram in Figure 4 indicates that when Total responses were analyzed, those categories demonstrating the greatest amount of variation between the "known" object condition versus the "unknown" object condition include Composition, Length-Height-Width, Weight, Function, Size, and Name (data points B, C, D, G, L, and N). The graph also indicates that the children were able to respond to the questions provided for the categories Composition, Length-Height-Width, and Weight more accurately for the Valve Stem than for the five known objects. Correct responses for the categories Function, Size, and Name, however, occurred less frequently.

The decrease in the frequency of correct responses for the category Size was caused by an error in test construction. As stated in Chapter III, probe questions for this category were designed in a manner which allowed the child to compare the test object with a known object. In this instance, the probe --- "Is it bigger or smaller than a tack?" --- violated the known object requirement. This was evident from the spontaneous comments that were made by some of the children when the probe question was asked (e.g., "What's a tack?").

For the remaining five categories, the increase or decrease in response frequency was believed to be the result of the children's unfamiliarity with the Valve Stem. Because most of them had never encountered this

object prior to receiving this test, the children's inability to assign a Function or a Name to the Valve Stem was to be expected. For the categories Composition, Length-Height-Width, and Weight, however, the variation in response frequency could not be accounted for by so obvious a factor. Here, as in the spontaneous condition, it is believed that this variation was the result of utilizing a different technique for drawing information from the lexicon.

In summary, the data indicate that when kindergarten-age children are presented with a novel object, they will provide a significantly less amount of information about that object than they would for a known object. In addition, they will report on the various descriptive categories in a pattern that is somewhat different from that which they characteristically display in reports for known objects.

Comparison with the ITPA

Spontaneous Responses:

Data from the Verbal Expression Subtest of the Illinois Test of Psycholinguistic Abilities (ITPA) indicate that the mean number of responses for children in the age group 5-7 to 6-1 is 19.7 responses for four objects with a standard deviation of 6.73. This would yield a mean score of 4.90 responses per object. As indicated in Chapter I,

this mean of 4.90 represents "quantity" of responses and not "diversity." ("Quantity" score = total number of scoreable responses across all categories including repetitions within categories; "Diversity" score = number of different categories reported with repetitions within category groupings being disregarded.) Data from this project for spontaneous responses reveals a mean "diversity" score of 20.96 for the five known objects with a standard deviation of 6.38 for the age range 5-4 to 6-5. This would yield a mean score of 4.19 responses per object. Thus, the difference between the mean scores for the two tests is 0.71 responses per object. Taking into account the fact that different scoring procedures were used, this difference in mean scores between the tests is considered minimal. Therefore, the spontaneous portion of the present task is believed to be equivalent to the Verbal Expression Subtest of the ITPA.

Because different scoring methods were applied, this equivalence in results was not anticipated. A possible explanation for this finding is the "cueing in" factor that was believed to be occurring as the children were continually exposed to the probe and multiple choice questions. In addition, the children in the present study were asked to hold the object, to look at it, and to feel it. These directives could have been providing the children

with some additional information regarding possible aspects of the objects to focus on and report to the Examiner.

Although data for the ITPA Subtest are derived from "quantity" scores, and the data from the present study relied on "diversity" scores, it was interesting to find that a rank-ordering of the frequency of responses for the various categories corresponds quite closely for the two tasks. This is illustrated in Table 13.

Table 13. A Comparison of Frequency of Response Across Categories for the Verbal Expression Subtest and the Spontaneous Condition.

Verbal Expression Subtest	Spontaneous Condition
1. Function	1.0 Function
2. Relationship	2.0 Parts
3. Shape	3.0 Name
4. Name	4.5 Relationship (a)
5. Parts	4.5 Relationship (b)
6. Color	6.0 Shape
7. Composition	7.0 Color
8. Other Physical Characteristics	8.0 Composition
9. Comparisons	9.0 Texture
10. Numerosity	10.0 Numerosity
	11.0 Size
	12.0 Other Characteristics
	13.0 Length-Height-Width
	14.0 Weight
	15.0 Classification

Total Responses:

Data from the total condition of this project show a mean diversity score of 61.92 with a standard deviation of 4.51. This yields a mean score of 12.38 responses per object. This indicates that under the total condition, children were providing nearly three times the amount of information than they would be expected to relate in the Verbal Expression Subtest. In addition, the smaller standard deviation in the total condition shows that the amount of overall dispersion about the mean was decreased in this population when the probe and multiple choice questions were included. These two factors lead the Researcher to conclude that the probe technique provides a more effective and efficient means for analyzing semantic abilities relative to object concepts in kindergarten-age children.

CHAPTER V

SUMMARY AND CONCLUSIONS

This study was undertaken to assess the viability of using an object description task that incorporated a series of specific probe questions as a means of measuring semantic development. Four questions regarding the semantic abilities of the kindergarten-age child and the effectiveness of the testing instrument itself were asked. On the basis of the data obtained in this study, several conclusions can be made regarding those questions.

The Research Questions

The first research question asked whether a "characteristic" type of performance would be exhibited by kindergarten-age children on this task. Results indicated that the children did perform in a characteristic manner for both the spontaneous condition and the total condition of the task.

Spontaneous Condition:

In their spontaneous dialogues, the frequencies with which the children referred to each of the fifteen categories were shown to be significantly different ($p < .01$). Those categories, (i.e., areas of related lexical entries)

included most often in the spontaneous descriptions were Function or Action, Parts, Name, and Relationship. Responses involving these lexical entries occurred in at least 40% of the descriptions. Categories referred to with the lowest frequencies (i.e., occurring in less than 10% of the descriptions) were Size, Other Characteristics, Length-Height-Width, Weight, and Classification.

Total Condition:

In the total condition, (i.e., spontaneous plus probe responses), it was shown that significant differences in frequency of responses among the fifteen categories were still present ($p < .01$). Parts, Texture, and Classification were the only probed categories whose percent correct ratings were below the 80% level.

Spontaneous Condition versus Total Condition:

A comparison of the frequency of correct category responses in the spontaneous condition with those in the total condition revealed the presence of a low correlation ($\rho = .474$). In view of the fact that both conditions involved responses dealing with the same descriptive categories, it was expected that a much higher correlation would be obtained. The low correlation was interpreted as indicating that the ability of a kindergarten-age child to relate descriptive information relative to common objects will vary as a function of the type of format used

to obtain that information. It was found that certain categories which appeared to be well understood in the spontaneous condition were found to be incompletely comprehended when the probe questions were asked. Also, categories that seemed to be poorly understood in the spontaneous condition were shown to be more completely comprehended under the probe format. Because the responses obtained in the probe situation were believed to be more representative of each child's semantic abilities than those displayed in the spontaneous condition, it was concluded that the probing technique provided a more accurate means for assessing knowledge of object concepts.

This finding was also indicated in the differences in mean scores obtained in the spontaneous condition (4.19 per object) as compared to the total condition (12.38 per object).

Summary:

The spontaneous component of a "characteristic" response for each object can thus be described (for this kindergarten population) as including approximately four category remarks. There is a high probability that these remarks will involve the categories Function or Action, Parts, Name, and Relationship. The probe component will add approximately eight more categories. Those that

would most likely be added include Numerosity, Size, Color, Shape, Composition, Length-Height-Width, Weight, and Classification. An examination of the results obtained in the two conditions indicated that the probe technique provided a more accurate and efficient means for assessing semantic development for object concepts.

The second major question asked: Is there a progressive increase in the number of categories that each child spontaneously discusses as he works through the objects in the test battery? Results indicated that such a progressive increase was indeed apparent for the five known objects. A significant difference ($p < .05$) was shown to exist between the first object, cup, and the fifth object, table. The Examiner contends that this difference occurred because the children were "cueing into" those aspects which could be included in their spontaneous dialogues. This factor was believed to be the result of the children's continual exposure to the probe questions as they worked through the test objects.

Although the order of object presentation was not counterbalanced, it is believed that the differences in mean number of responses among the objects in the spontaneous condition was not due to different difficulty levels among the objects themselves. Using the Scheffé multiple comparison technique, it was shown that in the

total condition, difficulty levels for all five objects were not significantly different. Therefore, any differences that occurred in the spontaneous condition were attributed to the "cueing in" factor discussed in the preceding paragraph.

The third major research question dealt with the stated necessity that the objects be familiar to the child. It was found that when presented with a novel object, kindergarteners would provide the Examiner with significantly less information than they would offer for a known object ($p < .01$). The proportion of responses given in each descriptive category was also different than that which was characteristically given for a known object. These results were interpreted as an indication that when kindergarten-age children are asked to describe a novel object, they will do so by drawing information from the lexicon in a manner that is different from that which is used for a familiar object.

The final research question asked how closely the data from the present project compared with the normative data for the spontaneous Verbal Expression Subtest of the Illinois Test of Psycholinguistic Abilities. The mean scores per object for Verbal Expression and for the spontaneous condition of this project differed by only 0.71 points (4.90 and 4.19, respectively). The total condition,

however, yielded a mean score of 12.38 responses per object. This score is nearly three times as large as the age expectancy score for Verbal Expression, indicating that the latter Subtest fails to tap many of the characteristics of common objects that a kindergartener has within his lexicon. The larger mean score for the total condition of the present object description task demonstrated that, for this population, the question-answer format was a highly effective and efficient means for measuring a child's ability to talk about the descriptive aspects of common objects.

Limitations of the Study

A major limitation of this study was the fact than an object description task does not allow the Examiner to assess the entire range of a child's semantic abilities. Responses are limited to descriptive features, comparisons, relationships, and classifications. Aspects such as humor, emotions, and imagination cannot be investigated.

In addition, if the child responds with single-word utterances or short phrases, the Examiner cannot determine how well that child has acquired the projection rules (McNeill, 1970; Menyuk, 1971) for his lexical entries. Indeed, an examination of semantics using a corpus of contextual utterances would be far superior.

Only one age level was tested in this study. This factor ruled out the possibility of forming any conclusions regarding trends in the acquisition of the concepts included in the various response categories.

Another limitation was the time factor involved in test administration. Total time ranged from twenty to thirty-five minutes per child. This element made the testing instrument inefficient for screening purposes.

The fact that order of object presentation was not counterbalanced resulted in an additional limitation. Although the Researcher believes that the differences in mean scores among the objects that were demonstrated in the spontaneous condition were not the result of differences in difficulty levels of the objects, a counterbalancing design would have eliminated the possibility of this form of bias.

Also, the fact that the "known object rule" (as discussed in Chapter IV) was violated for the category Size for the object Valve Stem resulted in a further limitation.

A final limitation was the need for the Examiners to receive a sufficient amount of training and practice prior to administering the test. This training was particularly essential for maintaining accuracy and consistency in scoring standards.

Implications for Clinical Procedures

The rank-ordering of the difficulty level for the fifteen categories in the total condition indicates an arrangement that could be utilized in forming an appropriate sequence for teaching these concepts. Because the categories Parts, Classification, and Texture received very low rankings, it is concluded that, for the kindergarten-age child, these are lexical items whose entries are incomplete, even for the "normal" child. These are items which are still in the process of being refined to the adult level of understanding. Therefore, they probably should not be included in a therapy program for a language delayed child in this age group.

The data from this study indicate that children respond to an unknown object in a manner that is different from the way they handle a known object. This finding supports the contention that an adequate measure of a child's capabilities can only be obtained by using materials that are familiar to him. This factor needs to be accounted for in all diagnostic evaluations. Failure to do so could bias the results that are obtained.

Multiple choice questions were utilized in three of the categories when the probes failed to elicit the appropriate responses. This allowed the Researcher to assess the effectiveness of this type of questioning procedure. For the category Composition, 24 of 115 correct

responses were obtained through multiple choice questions; for Function, 7 of 139; and for Classification, 102 of 103 correct responses resulted from the use of multiple choice questions. These data indicate that the presentation of multiple choice questions provided the children with a means through which they could demonstrate their categorization abilities. In addition, the results support Nelson's (1972) contention that children are able to recognize a category name when spoken by another before they are able to generate the words themselves. Because the multiple choice question format facilitates the child's ability to respond, its utilization in therapy situations could be very beneficial.

In using this task for diagnostic purposes, the administration procedures could be modified so that the spontaneous condition would be used for only two of the five objects. This would serve to reduce the total testing time. The Examiner would explain to the child that he is going to be given some objects to talk about. He would be told that for the first three, he only needs to answer questions about the objects, but for the last two, he has to say as much about the objects as he can without any help from the Examiner.

Another possible procedure modification would be to order the conditions: One Spontaneous -- Three Probe --

One Spontaneous. By comparing the child's two spontaneous dialogues, the Examiner would be able to assess how well the child "cued into" the categories being examined by the probe questions. This information could be useful in evaluating a child's learning style or learning rate. In addition, total test time would again be reduced by employing this procedure.

This task could also be used for screening purposes if certain changes were made in its content. By presenting only one or two of the five known objects, and by using only the probe condition, a child's semantic abilities relative to this type of task could readily be estimated.

Implications for Further Research

This object description task should be administered to children of different age levels in order to identify trends in the acquisition of the various concepts. Also, the category Length-Height-Width should be divided into three separate categories. This would allow the Researcher to examine H. Clark's (1973) contentions regarding these spatial concepts.

In addition, when recording responses in the spontaneous condition, repetitions within the various categories should not be ignored. Rather, the Examiner should note these offerings and utilize them in a more "in depth"

analysis of the child's semantic capabilities. Also, a more accurate comparison of this task with the Verbal Expression Subtest of the ITPA could then be done.

In order to explain more completely why the "different" types of responses were obtained with familiar objects as opposed to novel objects, more research is needed in the area of describing the organization of the lexicon.

Additional research also needs to be carried out for the purpose of constructing an expressive task that is able to examine those semantic features that could not be included in an object description task.

APPENDICES

APPENDIX A

Means of Number of Responses per Child in Each Category of Verbal Expression by Age Level

Age Group	Label and Class (1)	Color (2)	Shape (3)	Composition (4)	Function or Action (5)
2-7/3-1	2.7	.4	.0	.1	.9
3-7/4-1	2.7	.5	.1	.4	3.2
4-7/5-1	2.5	.4	.5	.5	5.5
5-7/6-1	1.9	1.1	2.0	.9	7.5
6-7/7-1	2.1	1.8	2.8	1.2	8.7
7-7/8-1	2.0	2.5	3.7	1.3	9.0
8-7/9-1	2.4	3.0	4.0	2.1	10.2
9-7/10-1	2.5	3.2	4.2	2.2	10.0

Age Group	Major Parts (6)	Numerosity (7)	Other Physical Char's (8)	Comparisons (9)	Person Place or Thing (10)
2-7/3-1	.1	.0	.2	.0	.6
3-7/4-1	.1	.0	.3	.1	1.8
4-7/5-1	.3	.1	.4	.2	2.5
5-7/6-1	1.2	.5	.8	.6	3.3
6-7/7-1	2.4	.9	1.6	.7	4.0
7-7/8-1	3.1	1.3	2.5	.9	4.0
8-7/9-1	3.6	2.1	3.2	1.0	4.6
9-7/10-1	4.3	2.2	3.4	1.1	4.8

APPENDIX B

Means and Standard Deviations of Raw Scores for the Verbal Expression Subtest of the ITPA by Age Group

Age Group	Verbal Expression	
	Mean	SD
2-7/3-1	4.9	2.22
3-7/4-1	9.3	3.67
4-7/5-1	12.9	4.74
5-7/6-1	19.7	6.73
6-7/7-1	26.2	7.58
7-7/8-1	30.4	8.52
8-7/9-1	36.3	9.12
9-7/10-1	38.0	9.81

APPENDIX C

The Objects

CUP #1 -- bone or white in color; one handle; round shape; smooth texture; made of glass or ceramics; four inches in height; three inches in diameter.

SCISSORS #1 -- silver in color; pointed tips; round handles; made of metal; four inches total length.

SCISSORS #2 -- silver; rounded tips; blue plastic handles; blades made of metal; three inches in length.

APPLE #1 -- deep red color; has a stem; round in shape; made of plastic; hard texture, but also smooth; three inches in height.

APPLE #2 and #3 -- red-orange in color; have stems; round; made of plastic; hard, but smooth in texture; three inches high.

SOCK #1 -- light blue in color; child's size knee sock; cable-stitch pattern; made of nylon blend cloth; elasticized top; twelve inches long.

SOCK #2, #3, #4, and #5 -- dark brown in color; nine inches long; all other characteristics like Sock Number 1 above.

TABLE #1 -- natural wood color; four round legs, each five inches long and $\frac{1}{4}$ inch in diameter; rectangualr shape (5" by 4" by $\frac{1}{4}$"); made of wood; four nail heads show on table top.

TIRE VALVE STEM #1 -- made by the Dill Company; VS-911-R TR 417 tubeless chrome valve stem; silver color with a black rubber washer.

(Note: For any item where more than one object is specified, the object that is listed as #1 is the object that was given to the child to spontaneously describe. The remaining objects were presented for the category Numerosity when the probe question needed to be asked.)

APPENDIX D

The Test Record Form

Name of Child: _____

Date of Birth: _____

Age: _____

CUP:

Physical Features

_____Color: white, bone, beige.
_____ What color is it?

_____Parts: handle, bowl, top, bottom, rim, base, inside, outside.
_____ What are some of its parts?

_____Shape: round, like a circle; straight sides.
_____ What shape is it?

_____Texture: smooth, rough at the bottom; hard; slippery; like glass; cold.
_____ How does it feel when you rub it?

_____Size: bigger than_____. smaller than_____.
_____ Is it bigger or smaller than a penny?

_____Length-Ht.-Width: taller than_____. shorter than_____.
_____ Is it taller or shorter than a coffee pot?

_____Weight: heavier than_____. lighter than_____.
_____ Is it heavier or lighter than a spoon?

_____Others: (shiny) (sturdy) (plain)

Composition

_____glass, clay, pottery, ceramics, (cement)
_____ What is it made of?
_____ Is it made of wood, glass, or paper?

Function or Action

_____drinking, eating, holding things; breaks.
_____ What is it used for?
_____ Is it used for drinking, sewing, or writing?

CUP:

Relationship (a) and (b) -- obtain two responses

_____coffee, milk, soup, money; hand or finger in
_____ handle; cupboard, closet.

_____ What could you put in it?

_____ Where would you put it away?

Numerosity

_____one cup; three inches high; one handle

_____ How many are you holding?

Classification

_____container

_____ Do you know what group of objects it belongs to?

_____ Is it furniture, a tool, or a container?

Nomination

_____cup

_____ What do you call it?

SCISSORS:

Physical Features

_____Color: silver, gray
_____ What color is it?

_____Parts: handles, circles, or holes; blades; tips, points, or peaks; screw.
_____ What are some of its parts?

_____Shape: round handles; straight blades; pointed tips; flat; makes an X.
_____ (point to blade) -- What shape is this part? -- straight, triangle.

_____Texture: smooth, sharp, hard, cold, rough edges, like metal or steel.
_____ How does it feel when you rub it?

_____Size: bigger than_____. smaller than_____.
_____ Is it bigger or smaller than a hammer?

_____Length, Height, Width: longer than_____. shorter than_____.
_____ Is it longer or shorter than a pin?

_____Weight: heavier than_____. lighter than_____.
_____ Is it heavier or lighter than a shoe?

_____Others: (skinny) (shiny)

Composition

_____metal, steel, tim, iron.
_____ What is it made of?
_____ Is it made of metal, plastic, or wood?

Function or Action

_____cutting, piercing, stabbing; opens, closes.
_____ What is it used for?
_____ Is it for eating, cutting, or wearing?

Relationship (a) and (b) -- obtain two responses.

_____sewing, paper, cloth, hair; finger or hand;
_____ looks like a knife.
_____ What do you cut with it?
_____ Where do you use it?

SCISSORS:

Numerosity

_____one pair; two handles; two blades; four inches long; two points

_____ (bring one one more pair of scissors): How many do you have now?

Classification

_____tool

_____ What group of objects do they belong to?

_____ Are they furniture, containers, or tools?

Nomination

_____scissors (pair of scissors)

_____ What do you call them?

APPLE:

Physical Features

_____Color: red
_____ What color is it?

_____Parts: stem, peel, seeds, core, pulp, juice, lines, hole.
_____ What are some of its parts?

_____Shape: round, oval, circle.
_____ What shape is it?

_____Texture: smooth, hard, waxy, like plastic, slippery.
_____ How does it feel when you rub it?

_____Size: bigger than_____. smaller than_____.
_____ Is it bigger or smaller than a basketball?

_____Length, Height, Width: wider than_____. narrower than_____.
_____ Is it wider or narrower than a banana?

_____Weight: heavier than_____. lighter than_____.
_____ Is it heavier or lighter than a grape?

_____Others: (artificial)

Composition

_____plastic
_____ What is it made of?
_____ Is it made of wood, cloth, or plastic?

Function

_____eating, cutting, peeling, baking, making fruit salads, making pies; decorations.
_____ What is it used for?
_____ Is it used for eating, wearing, or writing?

Relationship (a) and (b) -- obtain two responses.

_____ other fruits, snacks, apple pies, salads,
_____ trees, garbage for the core, orchards, gardens,
_____ apple blossoms, "an apple a day..."
_____ Where do they grow?
_____ What can you make with them?

APPLE:

Numerosity

_____one apple, three inches high, can cut it in half.
_____ (Bring out two more apples): How many do you have now?

Classification

_____fruit, food.
_____ What group of objects do they belong to?
_____ Are they fruits, fools, or furniture?

Nomination

_____apple(s)
_____ What do you call them?

SOCK:

Physical Features

_____Color: blue
_____ What color is it?

_____Parts: toe, heel, ankle, top, sole, inside, outside, elastic, designs.
_____ What are some of its parts?

_____Shape: flat, straight; round at toe, heel, and ankle.
_____ (Point to heel): What shape is this part?

_____Texture: soft, smooth, stretchy, knit, like cloth.
_____ How does it feel when you rub it?

_____Size: bigger than_____. smaller than_____.
_____ Is it bigger or smaller than a pencil?

_____Length, Height, Width: longer than_____. shorter than_____.
_____ Is it longer or shorter than a pair of pants?

_____Weight: heavier than_____. lighter than_____.
_____ Is it heavier or lighter than a boot?

_____Others: (new) (warm)

Composition

_____cloth, nylon, material, cotton, threads, yarn, string.
_____ What is it made of?
_____ Is it made of cloth, wood, or metal?

Function or Action

_____wear, keep legs and feet warm, wash, stretches.
_____ What do you use it for?
_____ Is it used for writing, eating, or wearing?

Relationship (a) and (b)

_____shoe, foot, washing machine, hamper, skating or Christmas socks, skiing socks, darning needle
_____and thread, drawer.

_____ Where do you wear it on your body?
_____ Where do you put it when it gets dirty?

SOCK:

Numerosity

_____one sock; about a foot long; three inches wide, "I wear two of them."

_____ (Bring out four more socks): How many do you have now?

Classification

_____clothing

_____ What group of objects do they belong to?

_____ Are they tools, clothing, or food?

Nomination

_____sock(s)

_____ What do you call them?

TABLE:

Physical Features

_____Color: tan, brown, beige; wooden color; gray or silver nails.
_____ What color is it?

_____Parts: legs, nail-heads, corners, top, bottom, edges, sides, points.
_____ What are some of its parts?

_____Shape: square, rectangle, flat; round legs.
_____ What shape is it?

_____Texture: hard; rough edges; smooth on top; grainy, picky, feels like wood.
_____ How does it feel when you rub it?

_____Size: bigger than_____. smaller than_____.
_____ Is it bigger or smaller than your bathtub?

_____Length-Height-Width: taller than_____. shorter than_____.
_____ Is it taller or shorter than a refrigerator?

_____Weight: lighter than_____. heavier than_____.
_____ Is it heavier or lighter than a match?

_____Other: (nailed together)

Composition

_____wood
_____ What is it made of?
_____ Is it made of wood, metal, or cloth?

Function

_____eat at, write on, study at, draw on, play on, set for supper, put_____on; stands up.
_____ What do you use it for?
_____ Is it for wearing, eating at, or riding?

Relationship (a) and (b) -- obtain two responses.

_____food, chairs, tablecloth, dishes, plates, glasses,
_____silverware; kitchen; breakfast, dinner, supper. (made from boards, somebody made it)
_____ What do you put on it when it's time to eat?
_____ Where is there one in your house?

TABLE:

Numerosity

_____one table, four legs, five inches high.
_____ How many legs does it have?

Classification

_____furniture
_____ What group of objects does it belong to?
_____ Is it a tool, furniture, or an appliance?

Nomination

_____table
_____ What do you call it?

VALVE STEM:

Physical Features

_____Color: silver, gray; black washer.
_____ What color is it?

_____Parts: cap, nut, bolt, washers, screw, threads, (lines), front, back, hole in the middle.
_____ What are some of its parts?

_____Shape: like a circle, round; shaped like a_____.
_____ What shape is it?

_____Texture: hard, cool, smooth; rubber = soft, waxy; threads = sharp; like metal or iron.
_____ How does it feel when you rub it?

_____Size: bigger than_____. smaller than_____.
_____ Is it bigger or smaller than a pin?

_____Length-Height-Width: wider than_____.
narrower than_____.
_____ Is it wider or narrower than a can of soup?

_____Weight: heavier than_____. lighter than_____.
_____ Is it heavier or lighter than a nickel?

_____Others: (shiny)

Composition

_____aluminum, metal, tin, steel, iron; rubber.
_____ What is it made of?
_____ Is it made of wood, metal, or plastic?

Function

_____putting air in a tire; comes apart;
(count any "likely" function as being correct):
"hold things together," "screws into something."
_____ What is it used for?
_____ Is it used for holding things together, putting air in a tire, or flattening things out?

VALVE STEM:

Relationship (a) and (b) -- obtain two responses.

_____tires, air pump, tire salesman or serviceman, air; looks like a nail, tack, or screw;
_____hardware store, tool store, tire store.

_____ What could you put it into?
_____ Where would you buy one?

Numerosity

_____one valve stem, 1½ inches high; five parts.
_____ How many are you holding?

Classification

_____tool, piece of hardware.
_____ What group of objects does it belong to?
_____ Is it a part of a tire, a piece of furniture, or a fruit?

Nomination

_____valve stem; screw
_____ What is it called?

BIBLIOGRAPHY

Anglin, J., The Growth of Word Meaning. Cambridge, Mass.: The M.I.T. Press (1970).

Berlin, B. and Kay, P., Basic Color Terms and Their Universality and Evolution. Berkley: University of California Press (1969).

Bernard, H.W., Child Development and Learning. Boston: Allyn and Bacon, Inc. (1973).

Bloom, L., Language Development: Form and Function in Emerging Grammars. Cambridge, Mass.: The M.I.T. Press (1970).

Boehm, A., The Boehm Test of Basic Concepts. New York: The Psychological Corporation (1971).

Bowerman, M., Relationship of early cognitive development to a child's early rules for word combination and semantic knowledge. Paper presented at the American Speech and Hearing Association National Convention, Las Vegas (1974).

Boyle, D., Language and Thinking in Human Development. London: Hutchinson Company, L.T.D. (1971).

Brown, R., A First Language. Cambridge, Mass.: Harvard University Press (1973).

Brown, R. and McNeill, D., The 'tip of the tongue' phenomenon, J. Verb. Learn. Verb. Beh., 5, 325-337 (1966).

Bruner, J.S., Eye, hand, and mind. (In) D. Elkind and J. Flavell (eds.) Studies in Cognitive Development. New York: Oxford University Press (1969).

Bruner, J.S., Beyond the Information Given. New York: W.W. Norton and Company, Inc. (1973).

Burgemeister, B., Blum, L., and Lorge, I., Columbia Mental Maturity Scale (third edition). Harcourt, Brace, and Jovanovich, Inc. (1972).

Carrow, E., Test for Auditory Comprehension of English. Austin, Texas: Learning Concepts (1973).

Cazden, C., Child Language and Education. New York: Holt, Rinehart and Winston, Inc. (1972).

Clark, E., What's in a word? On the child's acquisition of semantics in his first language. (In) T. Moore (ed.) Cognitive Development and the Acquisition of Language. New York: Academic Press (1973).

Clark, E., Some aspects of the conceptual basis for first language acquisition. (In) R.L. Schliefelbusch and L. Lloyd (eds.) Language Perspectives -- Acquisition, Retardation, and Intervention. Baltimore: University Park Press (1973).

Clark, H., Space, time, semantics, and the child. (In) T. Moore (ed.) Cognitive Development and the Acquisition of Language. New York: Academic Press (1973).

Cromer, R.F., The development of temporal reference during the acquisition of language. Unpublished doctorial dissertation, Harvard University (1968).

Dunn, L., The Peabody Picture Vocabulary Test. Circle Pines, Minn.: American Guidance Service, Inc. (1965).

Edwards, A.L., Statistical Methods, second edition. New York: Holt, Rinehart, and Winston, Inc. (1967).

Ervin, S.M., and Foster, G., The development of meaning in children's descriptive terms. J. Abnormal and Social Psych., 60, 271-275 (1960).

Ervin-Tripp, S., Some strategies for the first two years. (In) T. Moore (ed.) Cognitive Development and the Acquisition of Language. New York: Academic Press (1973).

Flavell, J., The Developmental Psychology of Jean Piaget. New York: Litton Educational Publishing Company, Inc. (1963).

Gesell, A., The First Five Years of Life. New York: Harper and Row, Publishers (1940).

Goldman, A.E., and Levine, M., A developmental study of object sorting. Child Devel., 34, 649-666 (1963).

Greenfield, P., Who is "DADA"? Unpublished paper, Syracuse University (1967).

Heider, E.R., "Focal" color areas and the development of color names. Developmental Psych., 4, 447-455 (1971).

Katz, J.J., and Foder, J.A., The structure of a semantic theory. Language, 39, 170-210 (1963).

Kirk, S., McCarthy, J., and Kirk, W., Examiner's Manual: Illinois Test of Psycholinguistic Abilities (rev. ed.). Urbana, Illinois: University of Illinois Press (1968).

de Laguna, G.A., Speech: Its Function and Development. New Haven, Conn.: Yale University Press (1927).

Leopold, W.F., Speech Development of a Bilingual Child: A Linguistic Record. Vol. 3, Grammar and General Problems in the First Two Years. Evanston, Ill.: Northwestern University Press (1949).

Lumsden, E.A., and Poteat, B.W.S., The salience of the vertical dimension in the concept of "bigger" in five and six year olds. J. Verb. Learn. Verb. Beh., 7, 404-408 (1968).

Luria, A.R., and Yudovich, F., Speech and the Development of Mental Processes in the Child. Baltimore: Penguin Books, Inc. (1959).

Major, D.R., First Steps in Mental Growth. New York: Macmillan Company (1906).

McCarthy, J. and Olson, J., Validity Studies on the Illinois Test of Psycholinguistic Abilities. Madison, Wisconsin: University of Wisconsin Press (1964).

McNeill, D., The Acquisition of Language: The Study of Developmental Psycholinguistics. New York: Harper and Row, Publishers, Inc. (1970).

Menyuk, P., Sentences Children Use. Cambridge, Mass.: The M.I.T. Press (1969).

Menyuk, P., The Acquisition and Development of Language. Englewood Cliffs, N.J.: Prentice-Hall, Inc. (1971).

Morehead, D., and Morehead, A., From signal to sign: a Piagetian view of thought and language during the first two years. (In) R.L. Schliefelbusch and L. Lloyd (Eds.) Language Perspectives -- Acquisition, Retardation, and Intervention. Baltimore: University Park Press (1973).

Nelson, K., The relation of form recognition to concept development. Child Devel., 43, 67-74 (1972).

Nelson, M.J., Denny, E.C., and Coladarci, A.P., Statistics for Teachers (revised ed.). New York: Holt, Rinehart, and Winston, Inc. (1956).

Ogden, C.K., and Richards, I.A., The Meaning of Meaning: A Study of the Influence of Language Upon Thought and of the Science of Symbolism (eighth ed.). London: (no publishing company listed) (1953).

Olson, D., Language and thought: aspects of a cognitive theory of semantics. Psychol. Rev., 77, 257-273 (1970).

Palermo, D., and Molfese, D., Language acquisition from age five onward. Psychol. Bull., 78, 409-428 (1972).

Paraskevopoulos, J. and Kirk, S., The Development and Psychometric Characteristics of the Revised Illinois Test of Psycholinguistic Abilities. Urbana, Ill.: University of Illinois Press (1969).

Piaget, J., The Construction of Reality in the Child. New York: Basic Books (1954).

Piaget, J., La Formation du Symbole. Neuchatel: Delachaux et Niestle (1949).

Piaget, J., The Mechanisms of Perception. New York: Basic Books, Inc., Publishers (1969).

Rees, N., Issues in language and cognition: implications for clinical practice. Paper presented at the American Speech and Hearing Association National Convention, Las Vegas (1974).

Rommetveit, R., Words, Meanings, and Messages. New York: Academic Press (1962).

Rosch, E.H., On the internal structure of perceptual and semantic categories. (In) T. Moore (Ed.) Cognitive Development and the Acquisition of Language. New York: Academic Press (1973).

Schlesinger, I.M., Production of utterances and language acquisition. (In) D.I. Slobin (Ed.) The Ontogenesis of Grammar. New York: Academic Press (1971).

Schlesinger, I.M., Relational concepts underlying language. (In) R.L. Schliefelbusch and L. Lloyd (Eds.) Language Perspectives: Acquisition, Retardation, and Intervention. Baltimore: University Park Press (1973).

Sinclair, H., Sensorimotor action patterns as a condition for the acquisition of syntax. (In) R. Huxley and E. Ingram (Eds.) Language Acquisition: Models and Methods. Ney York: Academic Press (1971).

Sinclair-de Zwart, H., Developmental psycholinguistics. (In) D. Elkind and J.H. Flavell (Eds.) Studies in Cognitive Development. New York: Oxford University Press (1969).

Sinclair-de Zwart, H., Language acquisition and cognitive development. (In) T. Moore (Ed.) Cognitive Development and the Acquisition of Language. New York: Academic Press (1973).

Slobin, D.I., Cognitive prerequisites for the development of grammar. (In) W.O. Dingwall (Ed.) A Survey of Linguistic Science. Edmonton, Alberta: Linguistic Research, Inc. (in press).

Slobin, D.I., Cognitive prerequisites for the development of grammar. (In) C.A. Ferguson and D.I. Slobin (Eds.) Studies of Child Language Development. New York: Holt, Rinehart, and Winston, Inc. (1973).

Smart, M. and Smart, R., School-Age Children. New York: Macmillan Publishing Company, Inc. (1973).

Tashiro, L., On the acquisition of some non-comparative terms. Senior Honors Thesis, Stanford University (1971).

Vygotsky, L.S., Thought and Language. Cambridge, Mass.: The M.I.T. Press (1962).

Wapner, S., An organismic-developmental approach to the study of perceptual and other cognitive operations. (In) Scheerer, C. (Ed.) Cognition: Theory, Research, Promise. New York: Harper and Row, Publishers (1964).

Wapner, S., Organismic-developmental theory: some applications to cognition. (In) P. Mussen, J. Langer, and M. Covington (Eds.) Trends and Issues in Developmental Psychology. New York: Holt, Rinehart, and Winston, Inc. (1969).

Werner, H., Einfuehrung in die Entwicklungspsychologie. Leipzig: J.A. Barth (1926).

Werner, H. and Kaplan, B., Symbol Formation: An Organismic-Developmental Approach to Language and the Expression of Thought. New York: John Wiley and Sons, Inc. (1967).

Williams, F., Reasoning with Statistics. New York: Holt, Rinehart, and Winston, Inc. (1968).

Zimmerman, I., Steiner, V., and Evatt, R., Preschool Language Manual. Columbus, Ohio: Charles E. Merrill Publishing Company (1969).