

AN INVESTIGATION OF THE RELATIONSHIP BETWEEN
CHILDREN'S KEY VOCABULARY RESPONSES AND
CERTAIN PIAGETIAN CONCEPTS

by

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ABSTRACT

Sylvia Ashton-Warner's (1963, 1972) reading instruction strategies and Jean Piaget's (1955, 1966, 1974, 1976) theory of cognition have attracted the attention of many educators, but their works have seldom been considered under the same rubric (Veatch, 1972; Wadsworth, 1978). Ashton-Warner's recent claim that there exist emergent, sequential levels in Key Vocabulary responses (Wasserman, 1972, 1976b) suggested that the Key Vocabulary method of instruction could be examined from a developmental perspective using selected Piagetian concepts.

The study was designed to explore and describe levels of Key Vocabulary response and to examine the relationship between levels of response and cognition. Stages of preoperational, transitional, and concrete thought were determined using the Piagetian measures of simple classification, simple seriation, conservation of number, and class inclusion. A gamma coefficient was used to analyze the nature of the relationship between levels of Key Vocabulary response and stages of cognitive development.

Teachers in nine kindergarten programs were trained to elicit Key Vocabulary responses from a sample of 120 children. The teachers elicited responses from the children during a six week period in the Spring of the year. During the same six week period the researcher and a trained assistant administered the Piagetian measures.

Individual profiles were developed indicating the child's responses to the Key Vocabulary elicitation. Each response was dated and notations were made by the teacher regarding the child's comments about the response. Based on the recent claims of Ashton-Warner (Wasserman 1972, 1970) and Veatch (1973, 1976), the responses were categorized according to levels of response.

A significant gamma coefficient ($p < .01$) indicated that the lower level responses were associated with preoperational and transitional thought processes while higher levels were characteristic of children who were transitional or concrete in their thinking. The study further indicated that the young child does not always conceive of the concept of "a word" from an adult perspective.

More than one level of response often appeared on individual response profiles. In addition, finer distinctions could be made in terms of levels of response. Because of these observations, a post hoc analysis was conducted to take a closer look at the nature of the responses. The profiles were re-scored using an alternative system which took into account these variations. The analysis revealed that there were 15 patterns of responding to the Key Vocabulary elicitations.

The relationship between levels of Key Vocabulary response and stages of cognitive development suggests that further research related to the Key Vocabulary strategy can

be based on a developmental construct. The identification of differing patterns of response indicates that there is a need for such research. The present study considered only the oral forms of response. Future examinations of the Key Vocabulary method should include written forms of response.

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CHAPTER 1

THE PROBLEM

Young children in North America are expected to learn to read shortly after entering elementary school. This expectation exists for children in some kindergarten settings and in almost all grade one programs in Canada and the United States. Many of the "games" which are used by teachers in pre-primary and grade one classrooms are designed to teach letter names, sight words, or phonetic analysis. Several of the commercially published reading programs are advertised as being suitable for kindergarten settings. In Canada and the United States there are government approved reading textbooks for first grade as well as for some kindergartens. The nature and number of such commercially published reading materials are an indication of the expectations many adults hold for the young child beginning school at approximately five to six years of age.

Some educators maintain that learning to read is a thinking process which is developmental in nature and, therefore, "beginning school age" is not the most accurate indicator of when a child should "learn to read". Some recent research suggests that the young child entering school may not understand such terms as "letters", "words", and "sentences" which are used in reading instruction (Downing, 1970, 1971, 1973; Francis, 1973; Reid, 1966).

There are further indications that the child's understanding of the concept of "a word" is developmental in nature and is related to specific cognitive structures as conceived by Piaget (Papandropoulou and Sinclair, 1974).

Language may be defined as a facilitator of thought in the sense that it liberates mental images from the bounds of time and space, and allows the user to relate past experiences with present and future events and to describe various environments. From a Piagetian perspective, action is said to be basic to the development of both language and thought. The social milieu influences the kinds of actions and interactions the child experiences within his environment. Experience provides information that, when assimilated, alters the child's view of the world. This alteration simultaneously leads to further change in cognitive structures, termed "accommodation", and to an extension of verbal understandings. In turn, verbal understandings influence the child's comprehension of print material. This developmental view is held by those who advise a "language experience" strategy for teaching reading. The teaching-learning process is simplified and made more meaningful for children if the material to be read is written in their own words and is based on events they have experienced.

Sylvia Ashton-Warner (1963, 1972) introduced a "language experience" strategy of instruction based on the elicitation of single word responses from the child. The

strategy, which she named Key Vocabulary, was originally developed in New Zealand. Her work has been of interest to educators in North America since Teacher was published in 1963. To date, the number of research studies based on Ashton-Warner's writings has been extremely limited (Barnette, 1970; Duquette, 1970; Olson & Pau, 1966; Packer, 1970; Wasserman, 1974).

KEY VOCABULARY STRATEGY

Ashton-Warner (1963) developed the Key Vocabulary strategy using the child's own language as the core component in reading instruction. A teacher using this strategy is expected to have a daily, individual conversation with each child in the classroom. Following the conversation, the teacher elicits "a word" from the child which is printed on a large card. The child then "does something" with the word; for example, the word may be written on a chalkboard or a picture can be painted about the word. These single word responses are the bases of what Ashton-Warner refers to as Key Vocabulary. She later identified what she termed "movements" (Wasserman, 1972, 1976b) in the Key Vocabulary responses which reflect qualitatively different forms of response made by the pupils over a period of time. Further, she proposed that these movements are developmental in nature and hierarchical in order (Wasserman, 1972, 1976b):

- (1) single word responses;

- (2) two word responses;
- (3) composition of phrases or simple sentences; and finally,
- (4) independent endeavors to express related ideas in a written form.

Veatch (1968) introduced the Key Vocabulary strategy to a group of grade one and grade two teachers. They became interested in using selected aspects of the Key Vocabulary strategy in their reading programs. The majority of the teachers involved in the project were teaching in public schools in Chandler, Arizona. As there were no State supported kindergartens in Arizona at the time, most of the children entering grade one had had no prior exposure to a formal program of reading instruction.

The teachers working in the Chandler project reported that some children responded to the Key Vocabulary elicitation with sentences or phrases instead of the expected single word. Veatch encouraged the teachers to record these responses on large cards and to note the children's comments about the phrases or sentences. The chronological record kept by the teachers indicated that children responding in this manner believed their response to be "a word". It was further noted that the children eventually changed the form of response to a single word. The sequence of this change convinced Veatch that these responses were developmental in nature. Because of earlier observations reported by Bereiter & Engelmann (1966) and the

children's tendency to refer to their sentences as "giant words", this phenomenon was referred to as the Giant Word Syndrome. The Giant Word Syndrome is believed by Veatch to be a readiness period which may appear prior to the first movement identified by Ashton-Warner as a single word response. Veatch (1972b, 1976) hypothesized that the varying forms of Key Vocabulary responses are related to stages of cognitive development.

STAGES OF COGNITIVE DEVELOPMENT

Piaget (1974, 1976) identified four stages of cognitive development reflected in qualitative changes in mental structures. The sensory motor stage (birth to approximately two years) is the period when the child develops ways of physically organizing objects and actions and ways of dealing with events as they occur in the environment. The preoperational stage (approximately two to seven years of age) is representational in nature. The child requires external objects or symbols as part of the thinking process. Concrete thought (approximately seven to eleven years) is a period in which the child mentally uses class and relational logic to organize the physical properties of the world. Formal operations (approximately eleven years onward) is a period in which abstract reasoning is used to view and organize the real world and the realm of possibility.

Children begin school in Canada at an age characterized, in Piagetian terms, by emerging concrete

processes. The preoperational child is intuitive in terms of thought and reacts to situations in an egocentric manner. As new experiences are assimilated, changes in cognitive structure take place which are then reflected in attempts to use logical strategies for solving problems. Examples of behavior associated with the transition from preoperational to early concrete processes are the ability to classify materials according to one attribute, or to order objects along one dimension. The ability to coordinate the concepts of classification and seriation is indicated when the child is able mentally to reverse actions. Piaget found these processes to be indicative of the emergence of concrete thought. The concrete stage of cognitive development spans a number of years and includes a hierarchy of conceptualizations. For example, the concept of conservation of number is an indicator of early concrete thought while the concepts of class inclusion and conservation of length, weight, and volume reflect more advanced cognitive processes which lead to the formal stage of reasoning.

RATIONALE FOR THE STUDY

"Language experience" is the title given to a strategy for teaching reading. It may also be used as a pre-reading activity. When using the language experience strategy to prepare for reading the teacher prints a story dictated by a child (or group of children). This print material is said to have special meaning for the child because it is a record of

a personal experience and uses the child's own vocabulary. The teacher may develop other activities for the child using words found in the story. Language experience activities are recommended as preparation for reading commercially printed materials. For example, Stauffer (1970) claims that children will make a smooth transition from reading material which they have personally dictated or written to reading stories written by others.

On the other hand, some educators (Veatch, Sawicki, Elliott, Barnette, Blakey, 1973) contend that it is difficult during the early stages of learning to read for children to read the stories they have dictated. While Veatch and her colleagues support the language experience strategy in general, they believe that Ashton-Warner's (1963) strategy of eliciting key words (or Key Vocabulary responses) is an alternative pre-reading activity which should occur prior to, or in conjunction with, recording the child's own stories. They claim that the Key Vocabulary strategy helps children: (1) identify letters, (2) recognize words, (3) make letter name and sound associations, and (4) develop the motor skills necessary for writing stories. They see Key Vocabulary as a bridge to fuller utilization of the language experience strategy.

Ashton-Warner's identification of "movements" in Key Vocabulary response (Wasserman, 1972, 1976b) and the observation of the Giant Word Syndrome (Veatch et al., 1973) added another dimension to understanding the nature of this

pre-reading activity. Furthermore, the hypothesis that varying forms of children's response are related to stages in cognitive development could have implications for instructional decision making.

Thus, the major contributions of the present study lie in the analysis of the nature of children's responses to the Key Vocabulary strategy of instruction and the identification of relationships between the levels of Key Vocabulary response and specific cognitive structures. Such relationships, if they exist, suggest a conceptual framework for matching a strategy of reading instruction appropriate to the cognitive abilities of the child. Such flexibility would permit the teacher to make more precise instructional decisions in terms of selection of materials, provision of activities, and the introduction of concepts. By refining instruction in these terms a teacher should be able to increase the probability of success in developing beginning reading capabilities. In addition, practice has demonstrated that the incorporation of children's own experiences and expressive language strongly motivates interest in reading and the expression of thoughts and personal feelings in writing (Ashton-Warner, 1958, 1963, 1972; Barnette, 1970; Bullock, 1975; Veatch et al., 1973; Wasserman, 1972, 1974, 1976, 1978).

Thus the present study has both practical and theoretical implications for future research and instructional innovation.

PURPOSE OF THE STUDY

The study was intended to explore the differences in the ways five year old children understand the basic term "word" as it is used in teaching beginning reading. It was designed to discover whether developmental levels in children's ability to understand the term "word" could be identified. Further, if such levels of understanding were found, would there be a relationship to stages of cognition as defined by Piaget.

The Key Vocabulary strategy was used to collect information on different ways children understand the concept "word". Stages of cognitive development, as measured by Piagetian concepts, were analyzed in relation to the various types of Key Vocabulary responses elicited by teachers.

Scope of the Study

A pilot study was conducted to discover how five year old children respond to Key Vocabulary elicitations. In addition, it was used to gather material to train teachers in the use of the Key Vocabulary strategy and to train an assistant to administer Piagetian tasks. On the basis of the findings of the pilot study, further investigation into various forms of responses seemed warranted.

The main study focused on identifying and categorizing the range of responses of 5 year old children to the

elicitation of "a word". These categories of response were examined to discover whether or not a sequential development occurred and if a relationship existed between the levels of response and stages of cognitive development.

Responses were collected and described to discover whether the proposed levels of response did indeed exist. The verification of levels of Key Vocabulary response was prerequisite to any further examination of the data. This procedure was followed by an examination of the sequential development of the responses and the match between these levels of Key Vocabulary and the child's stage of cognitive development as measured by selected Piagetian tasks.

The study was designed to: (1) describe the varying levels of Key Vocabulary response; and (2) examine the match between levels of Key Vocabulary response and developmental stages in cognitive processes. Because of the exploratory nature of this study, only the oral forms of response were examined.

DEFINITION OF TERMS

In order to examine the nature of the levels of Key Vocabulary response and to examine the possible relationship between such levels and cognition, it was necessary to define the terms operationally. The terms defined below were used to identify variations in Key Vocabulary responses and cognitive structures.

Terms Related to Key Vocabulary Response

Six terms relating to Key Vocabulary were identified for this study. These terms were used to describe the nature of the responses.

Key Vocabulary responses. The child's verbal or written response following teacher elicitation. The elicitation of responses usually follows a private conversation between the child and the teacher.

Level 1 response. An entire sentence or phrase which the child believes to be a single word (that is, the Giant Word Syndrome).

Level 2 response. A single word.

Level 3 response. Two or three words or the child's spontaneous combination of two word cards which create a new image.

Level 4 response. Forms of oral response to the elicitation of a word which could not be defined as a level 1, level 2, or level 3 response.

Pre-reading activity. An activity used for beginning reading instruction to introduce the child to printed symbols (letters, words, phrases, and sentences).

Terms Related to Cognitive Processes

Piaget defined four stages of cognitive development. Two of these, preoperational and concrete thought, are relevant to the study. Operational definitions of the two stages used in this study and selected Piagetian measures

associated with these periods of cognitive development are defined below.

Preoperational thought. The inability to group objects according to one or more attributes (simple classification), order material along one dimension (simple seriation), and mentally reverse actions (conservation).

Transitional thought. The ability to perform either the classification tasks or the seriation tasks, but not both, and an inability to conserve number.

Concrete operations. The ability to classify objects, order materials along one dimension, and conserve number.

Simple classifications. The ability to sort objects into two or more groups with each group of objects having one common attribute.

Simple seriation. The ability to order objects along one dimension.

Conservation of number. The ability to recognize that the number of objects remains constant in spite of the transformations or displacements which take place.

Class inclusion. The ability to include sub-classes of objects within an overall general class.

QUESTIONS AND SUB-QUESTIONS

The study was designed to investigate the following questions and sub-questions:

- 1.0 Are there qualitative differences in the responses children give when teachers use the Key Vocabulary

strategy as a pre-reading activity?

1.1 Do some children typically respond to the elicitation of a word with an entire sentence or phrase which they believe to be a single word?

1.2 Do some children respond to the Key Vocabulary elicitation with a single word?

1.3 Do some children respond to the Key Vocabulary elicitation with two or three words?

1.4 Are there other forms of verbal response which may appear?

2.0 If distinct levels of response exist, do they appear in a sequence?

2.1 Is the Giant Word Syndrome pre-requisite to the single word response?

2.2 Is the single word response pre-requisite to the two or three word response?

2.3 Are there other persistent forms of Key Vocabulary response which succeed the two or three word response?

3.0 Can Piagetian stages of cognitive development be associated with the emergence of specific levels of Key Vocabulary response?

3.1 Is the first level in Key Vocabulary response (see 1.1) associated with preoperational thought as defined by

inability to classify objects according to one attribute, seriate along one dimension, conserve number, and include sub-classes within an overall general class?

- 3.2 Is the second level in Key Vocabulary response (see 1.2) associated with transitional thought (the ability to classify objects according to one attribute or seriate along one dimension)?
- 3.3 Is the third level in Key Vocabulary response (see 1.3) associated with concrete thought?

These questions were designed to probe the existence of variations in Key Vocabulary response and the possibility of relationships between Key Vocabulary responses and stages of cognitive development as described by Piaget.

ASSUMPTIONS

It was assumed that there are differences among children evident in their use of language. While the social and cultural backgrounds of the children may be reflected in the particular words elicited when using this Key Vocabulary strategy, it is assumed that such variations are not relevant because responses can be categorized according to the level of responses defined for this study.

Children's personal experiences were believed to influence both the nature of the words requested and

cognitive skills. These experiences, which could not be controlled by the experimenter, might be assumed to have influenced the results of the study. Experiences were believed also to be reflected in the power or the emotional impact of the child's word (Ashton-Warner, 1963, 1972; Wasserman, 1974). It was assumed that some words would be more meaningful or powerful for the child than others and would thus influence the nature of the Key Vocabulary response.

OVERVIEW OF THE STUDY

A review of selected literature appears in Chapter 2 while Chapter 3 provides a conceptual framework for the research questions. The design of the study is in Chapter 4 and the findings are presented in Chapter 5. Chapter 6 contains a summary of the study as well as a discussion of the conclusions, and recommendations.

CHAPTER 2

REVIEW OF SELECTED LITERATURE

Several bodies of literature contributed to the conceptualization of the study. These relate to: (1) the Key Vocabulary strategy of reading instruction; (2) certain aspects of Piaget's theory of cognition; (3) language and cognitive development; (4) selected studies relating reading and language development; and (5) studies indicating the possible relationship between Piaget's theory and reading acquisition. Each topic will be examined briefly in this chapter followed by the presentation of an integrating conceptual framework in Chapter 3.

KEY VOCABULARY

Key Vocabulary was first introduced as a teaching strategy by Sylvia Ashton-Warner in her book Teacher (1963). The limited selection of publications relating specifically to the Key Vocabulary methodology which have appeared since the strategy was first introduced (Ashton-Warner, 1972; Barnette, 1970; Duquette, 1970; Kales & Nizolek, 1973; Olsen & Pau, 1966; Packer, 1970; Veatch, et al., 1973; Wadsworth, 1978; Wasserman, 1972, 1974, 1976a, 1978) may be indicative of the nebulous theoretical conceptualization of Ashton-Warner's writings. Ashton-Warner more recently has identified the emergence of four sequential movements (Wasserman, 1972, 1976b) or variations in children's Key

Vocabulary responses which appear to clarify the basic elements of the strategy. Ashton-Warner has no published material to date clearly describing the observed characteristics of the four movements. The descriptions used in this study are based on the work of Wasserman (1972, 1974, 1976b).¹

Key Vocabulary is the term used to describe an instructional strategy in which the teacher elicits from each child a single word which reflects, for the child, a meaningful image. Ashton-Warner considers each word to be a "key" to the inner feelings, thoughts, and ideas of the child. As each "key word" is elicited, it is recorded on a large card. The child's personal collection of word cards becomes the content of his first reading material. The words are reviewed daily and any words which are not recognized by the child are discarded under the assumption that they lack "power" (Ashton-Warner, 1963, 1972). Words which have power are those having intrinsic meaning. They are words which, for the child, relate strong emotions or are captions for meaningful events.

The nature of the conversation the teacher has with the child seems to influence the power of the elicited response. The teacher's supportive interactions and empathic understanding will encourage the child to relate experiences

¹ The movements as described here have been observed by Ashton-Warner as well as by the teachers working with Wasserman in the Vancouver Project. The possible significance of the identification of these movements was not touched on in Wasserman's (1974) Vancouver Project Report.

and feelings. Ashton-Warner (1963, 1972) contends that those words which reflect the feelings and personal thoughts of the child are powerful words. If a response has meaning or power, the child will consistently recognize the word in the printed form. If the child does not recognize the word, she insists that it must be discarded as it is not "the right word" for the child.

Movements or Levels of Response

Ashton-Warner claims that when children are taught to read using Key Vocabulary elicitations, they go through four distinct movements or levels of response (Wasserman, 1972, 1976b). She has claimed that these movements are developmental in nature in that they appear without specific instruction from the teacher and emerge in a set sequence. The strategies used by the teacher need to be modified to match the nature of each emerging movement. For example, some of the more advanced movements may no longer require motivation by the teacher.

The first Key Vocabulary movement, according to Ashton-Warner, is one in which the child responds with a single word as an expression of an entire idea or image. The child, who may use a number of words to describe an image when talking to the teacher, will ask for a single word as a caption of the image. For example, the child may ask for the word "grandpa" to relate that grandpa is in town for a visit. Ashton-Warner (1963) says that this single word

response is a "caption" of the entire conversation. The teacher writes the child's single word on a large card. The child is instructed to trace the letters of the word. It is at times such as this that the teacher can give individual guidance relating to printing skills and letter identification.

In the second movement, the child seems to be able to combine two words to describe an image. At this level a child might ask for the words "my grandpa". The two words still relate to the image described previously, but a child at this stage uses two words to describe the image.

Ashton-Warner (Wasserman, 1972, 1976b) states that when these two word responses emerge, the child has made a transition to the second movement. The cards used for recording these two word responses are longer and narrower than those used with children in the first movement. The child is encouraged to write the words on a small chalkboard. In addition, the child is given small teacher-made books which relate stories made from the collection of Key Vocabulary word cards.

The third movement is one in which the child will request, or write, a phrase or simple sentence. Such a response may be, "my funny grandpa" or "I love my funny grandpa". The child's response describes the image in more precise detail. Children who have acquired the necessary writing skills will usually attempt to record their thoughts independently. Children at this level are aware that their

responses contains more than one word. Ashton-Warner sequentially introduces three kinds of booklets to children who have exhibited this movement (Wasserman, 1972, 1976b). The first booklet contains a few unlined, blank sheets of paper. As the childrens' phrases or sentences become longer, they are introduced to a second booklet which contains more pages and the paper is lined. When children combine two short sentences they are given a third booklet. This booklet is larger and contains more lined sheets of paper than the previous booklet.

The final movement involves combining several sentences into a series of related thoughts and ideas. The stories are written independently and the elicitation of a word may no longer be a necessary stimulus for the child. The child might write, "Grandpa is here for a visit. He lives in Toronto. He walks me to school every morning. At night he tells me stories before I go to sleep."

The Key Vocabulary movements observed by Ashton-Warner consist of forms of response which she claims are emergent in nature and hierarchical in order (Wasserman, 1976b). The first movement is the single spoken word followed by the combination of words and moving on through to the independent composition of stories. These movements have been observed by Ashton-Warner in her work with children in New Zealand, the United States, and Canada.

The Giant Word Syndrome

Veatch (1973, 1976) has identified a form of response which she claims is apparent prior to Ashton-Warner's first movement. A child at this level of response will request a sentence or a phrase which is believed to be a single word. She first observed this phenomenon, which she termed the Giant Word Syndrome, while training ten volunteer grade one and grade two teachers to use the Key Vocabulary strategy. The teachers informed Veatch that several children would respond to the Key Vocabulary elicitations with sentences or phrases. Veatch encouraged the teachers to note the children's comments regarding their sentences and phrases. Conferences with the teachers indicated that the children seemed to focus on the amount of space the word covered on the word card or the number of letters involved. They appeared to be unaware of the spaces between words and would continue to disregard these spaces when they were pointed out by the teacher. Although this phenomenon, as it relates to Key Vocabulary, had been noted (Veatch et al., 1973), it had not been verified empirically.

To summarize, the basis of the Key Vocabulary instructional strategy is the use of the child's verbal response through the elicitation of key words. Ashton-Warner's observations of children's responses led to her identification of four levels of response. Veatch identified a form of response made by some children prior to Ashton-Warner's first level response.

PIAGET'S THEORY OF COGNITIVE DEVELOPMENT

Aspects of Piaget's theory of development seemed especially appropriate for the investigation of a possible relationship between levels of Key Vocabulary response and cognition. Those elements of Piaget's theory with special significances for this study will be examined.

Piaget has identified four stages of development in the acquisition of the ability to think logically. The transition from one stage to the next is said to be invariant in order but not strictly tied to age (Piaget, 1966, 1974, 1976).

According to Piaget (1955, 1967, 1976), the origins of intelligence are rooted in the sensorimotor stage of development (birth to two years of age). The six sub-stages within the sensorimotor stage begin at birth in the form of reflexes and progress through the scheme of object permanence.

The concept of the object is the knowledge that objects continue to exist outside the infant's perceptual field. Toward the end of the first year of life, the infant will search out an object which has been hidden. This search will later be guided by the infant's observation of the displacements (that is, the sequence of hiding places) and thus the child will eventually develop a system of practical actions relating to the immediate space. This system enables the infant to take into account successive displacements, to

order them and then to reverse them (Piaget, 1974, 1976).

The preoperational stage (approximate ages two to seven) is a period in which symbols, especially language, are very important. Through the use of language and symbols the child can reconstruct past actions, make reference to far away spaces or events outside the perceptual field, and anticipate future actions. The three personal symbols used at this stage are: (1) symbolic or imaginative play; (2) imitation or deferred imitation; and (3) mental imagery. Personal symbols are derived from motor imitation and Piaget believes this imitation serves as one of the possible links between sensorimotor behavior and representational thought. This link is independent of language, but it aids in the acquisition of language.

The function of symbols is broader than language and includes both verbal signs and personal symbols. Piaget maintains that this "symbolic function" can be explained by the formation of representations. Furthermore, the essence of the symbolic function is the differentiation of the signs/symbols (the signifiers) from the objects or events (the signified). The ability to differentiate the signifiers from the signified permits the evocation of the appropriate sign or symbol to represent the object or event. The child can now make a connection between the symbols and the objects or events which they represent. Representational thought and language can therefore be considered as interactive.

Although the child at the preoperational stage is now capable of representational thought, he is not yet capable of logical thought. Instead of logic, he uses what Piaget (1967) terms "intuition". The child depends on the internalization of percepts and movement in the form of representational images and "mental experiences".

The child's abilities to conserve number, to group and seriate objects along one dimension, and to classify objects relative to one or more attributes are indicative that the transition from preoperational to concrete operational thinking has occurred. The stage of concrete operations (approximately ages seven to twelve) is characterized by the formation of the logic of classes and the logic of relations. The child's actions upon concrete objects result in the assimilation, accommodation, and interiorization of actions and subsequent reactions. As these actions and reactions are interiorized, the child reorganizes earlier conceptualizations and applies them anew leading to the emergences of more complex concepts (that is, class inclusion and multiplicative classification; double seriation and placement; conservation of substance, length, weight, area, and volume). The coordination of these conceptualizations (or second order operations) are characteristic of what Piaget considers the formal and final stage of cognitive development.

The four stages of cognitive development identified by Piaget are sensorimotor, preoperational, concrete

operational, and formal operations. The cognitive behaviors characteristic of children at the preoperational and concrete operational stages were the ones of interest in this study.

LANGUAGE AND COGNITIVE DEVELOPMENT

Language development, although not the focus of this study, will be treated briefly because of the relationship between language and cognition and language and the reading process.

Recent studies indicate that the general nature and sequence of language acquisition for English speaking children is universal (Fishbein & Emans, 1972; Menyuk, 1971; Moskowitz, 1978). This sequence will be described first followed by the examination of two selected theoretical views of the nature of the relationship between language and cognition: (1) that language precedes thought; and (2) that thought precedes language. These theoretical positions will be reviewed separately followed by a discussion of their commonalities.

Sequence of Language Acquisition

The first type of vocalization infants make include sounds related to crying followed by cooing noises. These begin to emerge around six to eight weeks of age. When infants are about six months of age they enter a babbling stage. These babblings will include intonation patterns

similar to those used by adults (Fishbein & Emans, 1972; Menyuk, 1971).

When children are approximately one year old, they enter what is termed a "one word stage". These early one word utterances are basically concrete nouns and verbs. It has been noted that newly acquired words are used first for naming and only later will children use them as a means of asking for something (Moskowitz, 1978). It is believed that each word serves as a "sentence". Furthermore, the intonation used will vary depending on the situation or individual needs. The children's developing syntactic abilities are reflected in both the nature of the one word utterances and the accurate perception of the multiword sentences they hear.

The one word stage is followed by the two word stage and then followed by what Moskowitz (1978) cites as telegraphic speech. This latter form of speech is characterized by short, simple sentences or phrases. Telegraphic speech lacks "function words". That is, the speech lacks tense endings on verbs, plural endings on nouns, prepositions, conjunctions and so forth. Gradually children begin to add function words to their sentences. The basic language process is complete by about age five and only subtle refinements are added thereafter.

Relationship Between Language and Cognition

There are several different theories proposed to

account for the nature of the relationship between language and cognition. Two different views which have won wide attention are those put forward by Vygotsky and Piaget.

Vygotsky (1962) viewed language as the major stimulant of cognitive growth. He hypothesized that the beginnings of language and thought are found in the models provided by adults and that the strategies used in learning a language are of major importance in the development of the thought process. Luria (1961), a colleague of Vygotsky's concluded that the directive role of words progresses in a series of stages. Although Luria and Vygotsky held that language precedes thought, they alleged that cognition and language are dependent on the child's experiences and interactions with objects in the environment. When reviewing some of his own research findings, Luria (1976) extended his position by stating that cognition is influenced markedly by past events. He contended that some forms of cognitive processes (perception, generalization, deduction, reasoning, imagination, and self-examination) vary as the conditions of social life change and as rudiments of knowledge are mastered.

From a Piagetian perspective (Duckworth, 1976a, 1976b; Piaget, 1964, 1967 Sinclair-de Zwart, 1974), the origins of thought are in the sensorimotor, pre-verbal actions experienced by the child in the first two years of life. The starting point of any kind of understanding is to be found in the actions performed by the child. As new information is

assimilated, language structures are modified and the child incorporates into existing speech patterns those language structures which correspond to cognitive development. This assimilation-accommodation process allows the child to organize and generalize past experiences and apply them anew. Thus language interacts with thought, but it is not considered to be the origin of intelligence. Rather, thinking is considered to be the basis of language.

Commonalities in Theories

The relationship between language and thought is a complex one and has given rise to a variety of theoretical perspectives. However, no single theoretical position provides a comprehensive explanation of this complex process. Although each of the two theoretical perspectives described above emphasizes a different kind of relationship between language and thought, there are points at which they converge. It is agreed that experience, thought, and language development are interactive variables. Language acquisition and usage are seen as being dependent upon the development of perceptual strategies. Finally, language has structure, and words can be viewed as representations of thought.

READING AND LANGUAGE

Some of the similarities in theory relating to language and thought are applicable to the literature about language and the reading process. An examination of theory relating language and reading should assist in clarifying the links among reading and language and cognitive development. The following is a brief summary of selected views explaining how the child acquires the ability to read. These views will be related to appropriate research studies and to the Key Vocabulary method of reading instruction.

Spache and Spache (1973) take the position that when the child's own language is not comparable to that found in the beginning reading material, reading comprehension will be severely limited. They emphasize the fact that reading is a multifaceted process that changes in nature as the child moves from one developmental stage to the next. Auditory discrimination, cognition, language development, and social-cultural influences are some of the factors said to influence the reading process. However, these authors do not describe the characteristics of these "developmental stages" or the relationship between such stages and the factors believed to influence the reading process. On the other hand, Durkin (1974) states that the difference between the recognition of symbols and their meanings and the ability to read reflects a difference in the ability to think.

Smith, Brooks, Goodman, Meredith (1976), and Goodman (1969, 1970, 1972) regard the reader as a decoder who

attempts to reconstruct a printed message. They outline three cue systems involved in reading which aid the reader in decoding print language: (1) cues within words; (2) cues in the flow of language; and (3) cues within the reader. Proficiency in the use of these cue systems is said to be influenced by the child's experiential and conceptual background.

Stauffer (1975) stresses that reading is a thinking process. He contends that it is a process which is closely related to experience and language development. Stauffer (1969) further states that a child's oral language facility is the necessary foundation for the transition from oral to printed language. The extensive research which he has reported (Stauffer, 1976) supports these claims.

Language Experience Strategies

While it appears there is support for the contention that there is a relationship between language development and reading acquisition, Groff's (1977) review of research studies suggest that the nature of this relationship is not clearly defined. He reports that the research seems to fall into two categories; (1) research focusing on oral language fluency and reading; and (2) studies dealing with measures of oral syntax and reading. Based on his review of the literature, Groff concludes that the question of the relationship between language and reading achievement has not been resolved because of the nature of the research

itself. He contends that research needs to focus more specifically on beginning reading material which utilizes the child's own language. Groff states that there are empirical data to support the contention that reading achievement is enhanced if the reading materials match the child's experiential and conceptual background.

The experiential and conceptual background of the reader is the major thrust in the language experience approach to reading instruction (Allen & Allen, 1969; Allen, 1976, 1977, 1978; Stauffer, 1970, 1976; Veatch et al., 1973; Wasserman, 1972, 1974, 1976a). The supporters of this strategy contend that effective instruction incorporates those concepts, experiences, and expressive vocabulary which are a part of the child's own repertoire. Allen (1978) points out that there are three kinds of activities which he has observed related to successful beginning reading instruction. The activities are: (1) self-expression activities (for example, art, drama, rhythm, role-playing, and personal writing) which promote language usage; (2) storytelling sessions in which the teacher reads with the children so as to encourage the repetition of words, phrases, and language patterns; and (3) alphabet activities which are based on individual beginning reading skills (for example, spelling out words as the child dictates a story). He further states that the child needs real and vicarious experiences that can be verbalized and captured in writing.

David and Muria (1979) concluded from their review of

research that experience will aid children in forming a "theory" about their world. This "theory" enables children to predict events regarding the world as they see it. The experiences further aid children in formulating general rules that assist them in the prediction of future events. These rules are the forerunners of the language rules which children have to make when learning to read the printed symbol. The Bullock Report (1975), based on a survey of classroom practices in England, supports this view in part. The researchers found that one of the values of using children's spoken and written language as reading material was that it aided in organizing and generalizing the experiences children shared with others. This organization and generalization process requires the use of complex rules which govern the combination of elements used in speaking and writing.

Understanding the Term "Word"

Proponents of the language experience strategy for teaching reading argue that the meaning attached to the printed symbols will vary depending on the child's experiential background and the developmental factors of language and cognition. Papandropoulou and Sinclair (1974), in a study involving 121 children age four to ten, found that these developmental factors may also influence the child's understanding of the concept of "a word". Their study, which did not include the variable of reading

acquisition, revealed that there are four sequential levels involved in the child's conceptualization of "a word". The first level (ages four to five) is characterized by the inability to differentiate between a word and the reality to which it referred. At the second level (ages five to seven), the child no longer confuses words with reality and now understands that words are what is said about something or are used to name something. The following two sub-stages are found within the second level: (1) a word is seen as a global topic and thus a complete sentence is said to be "a word"; and (2) a single unit (or word) is given as an example of a word. By the third level (ages six to eight), words are still viewed as "things that tell something" but can now be detached from the reality which they represent and placed into a meaningful context. The fourth level (ages eight to ten) is achieved when words are seen as meaningful units which can be integrated into a system of relationships. In addition, words are seen as units, comprised of letters, and can be heard, spoken, or written.

On the basis of their findings, Papandropoulou and Sinclair (1974) proposed that there is a developmental sequence in the metalinguistic competence of children which develops along with the general cognitive structures identified by Piaget. Further, this sequence is similar to the universal one found in the early periods of language development (Fishbein & Emans, 1972; Hoskinson, 1975; Menyuk, 1971; Moskowitz, 1978; Pflaum, 1974).

Reid (1966), Downing (1968, 1970, 1971, 1973-74), and Francis (1973) examined the understanding children five to seven years of age ascribed to the meaning of "a word" as it relates to reading. Their studies focused on the following technical terms: (1) words, (2) letters, (3) numbers, (4) sounds, (5) writing, and (6) reading. The results indicate that a child's concept of "a word" (as well as the other technical terms) changes over time. Reid and Downing both concluded that the child's understanding of "a word" is related to cognitive and linguistic abilities. They argued that as the child's cognitive skills and linguistic abilities increase, the understanding of technical vocabulary relating to reading changes. It is not clear whether the changes observed were related to maturation or were a result of learned behavior since all of the children in these studies were receiving reading instruction at the time of the investigations.

Holden (1977) used 7 categories of word awareness to analyze the responses of 26 kindergarten and 24 grade one children. The analysis was based on the responses children gave to 10 individually administered items on the Homophones Test. The data were collected in a public school which had open classroom areas.

Holden found that the kindergarten children made twice as many errors as the grade one children. The author concluded from the analysis that utterances proceed from the global to the discrete.

Nixon (1975) explored the nature of word meanings (that is, the verbal description of the inherent properties of a group of objects) as expressed orally by 48 Canadian children ages six, seven, and eleven. The data were examined in terms of the number of properties; the categories of meanings; and the quality of word meanings expressed in words, phrases, or sentences. It was found that as the age of the children increased, the verbal responses became more complex, detailed, and precise. All children scored between 100 and 115 on an intelligence test (the Canadian Cognitive Abilities Test Primary 1 or 2; or the Canadian Longe-Thorndike Intelligence Test Level B or D).

The sequence of metalinguistic competency identified by Papandropoulou and Sinclair (1974) and supported by Reid (1966), Downing (1968, 1970, 1971, 1973-74), Francis (1973), Nixon (1975), and Holden (1977) may in some way influence the formation of word boundaries as applied to print symbols. Smith's (1973) summary of research related to beginning reading indicates that there are five steps in the formation of word boundaries. These steps are: (1) individual letters seen as words; (2) words seen as units made up of more than one letter; (3) a space seen as a boundary between words unless the words are short and then they are combined; (4) long words divided and seen as several words; and (5) spaces used to indicate boundaries. Smith's interpretation of the research suggests that certain cognitive structures are necessary before the child can

perceive that printed language is comprised of parts (letters) that are combined to form classes (words) which in turn form a whole (thought).

It is not certain how the child makes a connection between printed symbols and the thoughts they represent, but it appears from the research that this ability is influenced by linguistic and cognitive competencies. The evidence supports a language experience conceptualization as a basis for pre-reading activity relating to the concepts of "word", "word boundaries", and "Key Vocabulary responses". The starting point for this linkage is the developmental change which takes place in the child's language and cognition.

Key Vocabulary Responses and Cognition

The Key Vocabulary strategy uses the child's language as the major focus for pre-reading activity and thus takes into account any linguistic or cognitive changes which may occur. In fact, Veatch's (1973, 1976) identification of the Giant Word Syndrome does support the idea of identifiable levels found in the sequence of children's responses, over time, to teachers' requests for "a word". Further support is evident in Papandropoulou and Sinclair's (1974) identification of the first sub-stage, second level, of metalinguistic competency. The observation that children are unable to see that their "giant words" are composed of several words separated by spaces is consistent with the word boundary findings reported by Smith (1973). The Giant

Word Syndrome and Ashton-Warner's four movements appear to be indicative of transitions in metalinguistic knowledge and parallel aspects of Papandropoulou and Sinclair's (1974) findings as illustrated in Table 1.

It seems plausible that the nature of change in a child's Key Vocabulary responses over time may be dependent upon the developmental changes in cognitive structures as identified by Piaget. These changes are said to influence the child's understanding of the printed symbol. The literature relating to aspects of Piaget's theory of cognition and reading acquisition will be examined next for possible relationships.

PIAGET'S THEORY AND READING ACQUISITION

Waller (1977) contends that, from a Piagetian perspective, teaching by telling or reading is inadequate. He further states that this is especially true if the child does not have the linguistic referents necessary to understand the material being read or orally communicated. He supports the Piagetian position that learning results from the child's own activity. He states that the acquisition of reading should be viewed from a Piagetian perspective for the following reasons: (1) it provides a theoretical base which is comprehensive in scope and developmental in nature; and (2) inferences and testable hypotheses can be derived relating to developmental changes and reading acquisition.

Table 1
Key Vocabulary Responses
and
Levels of Metalinguistic Competency

Forms of Key Vocabulary Responses (Ashton-Warner)	Metalinguistic Competency (Papandropoulou and Sinclair)
	<u>Level 1</u>
	A word is seen as reality (that is, the real object) rather than a representation of reality.
<u>Level 1</u>	<u>Level 2, Sub-Stage 1</u>
An entire sentence or phrase is given which the child believes to be a single word.	A word is seen as a global topic and a sentence is said to be a word.
<u>Level 2</u>	<u>Level 2, Sub-Stage 2</u>
A single word response to the elicitation of a key word.	A single word unit is given as an example of a word.
<u>Level 3</u>	<u>Level 3</u>
A two word response which relates more information about the image.	A word can be detached from the reality and placed into a meaningful context.
<u>Level 4</u>	<u>Level 4</u>
Responds with phrases and sentences as well as attempts to write phrases and sentences independently.	Words are seen and meaningful units which can form a system of relationships. Words are units which can be spoken or written.
<u>Level 5</u>	
Composition of stories	

There are research findings indicating that the concepts of conservation, classification, and seriation relate to reading acquisition and reading comprehension (Brekke, Williams, & Harlow, 1973; Briggs & Elkind, 1973; Kretschmer, 1972, 1975; Roberts, 1976). Although the thought processes relating to these concepts are believed to be similar to those used in the reading process, the nature of that similarity is never fully described.

Brekke, Williams, and Harlow (1973) tested 81 grade one children on selected factors of reading readiness using the Gates-MacGinitie: Readiness Skills Test and intellectual abilities using the grade K-1 form of the Primary Mental Abilities Test. Five Piagetian tasks were used to measure the concepts of conservation of number and conservation of substance. The findings indicated a moderate, positive correlation between conservation of number and substance and reading readiness; a slight correlation between reading readiness and intelligence as measured by the Primary Mental Abilities Test; and a moderate, but positive, correlation between conservation and intelligence. The authors concluded that concept of conservation is worthy of attention as an additional predictor of the child's readiness for beginning reading instruction.

Dimitrovsky and Almy (1975) tested 120 kindergarten children to determine ability to conserve number. Two and a half years later they administered a reading achievement test to the same children. It was found that children who

could not conserve number in kindergarten tended to score lower on reading achievement tests at the end of grade two than did the children who conserved number. The researchers believe the study indicates that in general there is some association between learning to read and cognitive abilities rather than a specific relationship between conservation and reading. The study did not attempt to find out if the nonconservers would have been as successful in reading as the conservers had experiences been provided to enhance conservation skills prior to the onset of instruction in reading.

Roberts (1976) reviewed a number of studies relating to conservation skills and reading readiness. The findings from these studies support Dimitrovsky and Almy's (1975) hypothesis that the concept of conservation and reading are related. Other studies reviewed by Roberts (1976) involved training children in the use of strategies that could be applied to the concept of conservation. It was found that success in conservation training tasks relates positively to reading readiness. Unfortunately, none of the studies reviewed indicated what thought processes are involved in conservation tasks and how these processes are similar to the ones utilized in the reading process.

Briggs and Elkind (1973) administered a battery of perceptual, motor, cognitive, and personality tests to 16 matched pairs of five and one-half year olds. The 32 children were categorized as readers or non-readers. All of

the parents were interviewed regarding a number of issues related to reading. The results of the study indicated that certain logical abilities characteristic of concrete operations facilitate children's acquisition of beginning reading skills.

Kretschmer (1975) was interested in children's ability to comprehend written directions involving the concepts of classification and seriation. He described a study in which he presented 60 grade three and 60 grade six students with stories, written on a second grade reading level, which included the concepts of grouping and ordering. Each story was followed by eight multiple choice questions. Only 45 per cent of the grade three children and 65 per cent of the grade six children could correctly answer the questions. The majority of the incorrect responses followed a pattern which indicated an inability on the child's part to consider a whole thought composed of two distinct ideas. There was a tendency to focus on the first idea presented and disregard the second thought.

Kretschmer (1975) also reported a second study in which he examined children's responses to questions on the Gates-MacGinitie Reading Test. He found that children again made errors of a consistent nature if the questions required the operations of negation and reciprocity. He concluded that material written for children under 12 years of age often requires a certain degree of abstraction in order to comprehend the meaning. Such abstraction may not emerge

until the stage of formal operations.

Based on her past research and experience, Kamii (1971) postulated a similarity between the processes involved in reading and those used in doing conservation and classification tasks. She further proposed that the child must be able to discriminate among letters, which requires a "well structured space", and conservation of left to right directionality. A classificatory scheme is needed to group letters into words or sentences and to understand sentence structure. Kamii speculates that comprehension requires the evocation of mental images or representation, mobility of thought, and the coordination of relationships among objects in terms of space, time, and logic.

Elkind (1974) supports Kamii's (1971) ideas based on his investigations. He found that the concept of "letters" presents many of the same cognitive problems for a young child as the concepts of number, space, and time. Letters have the following properties: (1) an ordinal property, meaning their position in the alphabet; (2) a cardinal property, which is the name (A B C); and (3) phonic and contextual properties. The classification and coordination of these properties require the use of cognitive processes which do not appear until the child reaches the concrete stage of cognition.

Freeman and Wolfgang (1978) theorized that children who score poorly on reading readiness tests are usually functioning at a preoperational level of thought in

Piagetian terms. They state that such children are not ready for formal basal reading instruction. The kinds of pre-reading activities Freeman and Wolfgang advocate are those which involve role playing, expressive arts, and language usage.

Based on her review of research, Kirkland (1978) contends that reading requires cognitive skills which would enable the child to deal with a variety of rules, abstractions, and classifications. She found that learning to read includes the following abilities:

- (1) directionality; (2) ability to perceive the distinguishing features of letters, words, and pictures; (3) ability to classify and reorganize common characteristics of things such as words, letters, or numbers; (4) ability to understand concepts presented in a text; (5) ability to focus on hearing and repeating phonemic sounds in words; and (6) ability to attend to the teacher's verbal instructions.

She suggests that in order to deal with transformed letters and hold relational rules in mind while synthesizing the meaning of printed material, the child must be at a concrete stage of cognitive development. She further contends that the young child who is "dominated by egocentrism" (ages five to seven), may not be very interested in learning to read other people's thoughts and words. For this reason, she believes that beginning reading material should be the child's own words written by the teacher or significant adult.

Cannon (1973) theorized that the child's first reading material should be an outgrowth of spoken language. He adopted a Piagetian perspective and stressed that cognitive and conceptual growth is influenced by the child's interaction with the environment. Spoken language is seen as reflecting the child's understanding of his environment and, because of its intrinsic meaning, is said to be an appropriate source of beginning reading material.

Veatch (1972) hypothesized a relationship between the Key Vocabulary words requested by the child and the Piagetian concept of conservation. She concluded that each word the child asks for is already internalized and therefore is conserved, as it is a part of the child's experiences. Although it seems to be true that the words learned in Key Vocabulary programs are quickly internalized and seldom forgotten (Ashton-Warner, 1963, 1972; Veatch et al., 1973; Wasserman, 1974), Veatch is not clear as to the theoretical link between the internalization of Key Vocabulary responses and the concept of conservation as described by Piaget.

Wadsworth (1978) observed that Ashton-Warner's Key Vocabulary method of reading instruction is conceptually consistent with Piagetian principles of learning in that: (1) it ensures that the content (the words used for instruction) has meaning for the child; (2) the child is encouraged to read via personal motivation; (3) the strategy is individualized enabling advancement at the child's own

rate; and (4) the strategy avoids negative reinforcement. Wadsworth's experience demonstrated that the Key Vocabulary strategy provides the child with the time and opportunity necessary to develop an understanding of the technical aspects of the reading process. As the child explores and works with the words printed by the teacher, there is the opportunity and motivation to combine words to form phrases, sentences, and then stories which are meaningful to the child. Wadsworth concluded that there is a need for research based on the work of Ashton-Warner and Piaget.

RELATIONSHIP BETWEEN KEY VOCABULARY AND PIAGETIAN CONCEPTS

The literature suggests a commonality in the thought processes used by children when solving certain Piagetian tasks (more specifically; simple classification, simple seriation, and conservation of number) and those they use when first learning to read (Brekke, Williams, & Harlow, 1973; Briggs & Elkind, 1973; Dimitrovsky & Almy, 1975; Elkind, 1974; Kamii, 1971; Kretschmer, 1972, 1975; Roberts, 1976). Veatch (1972) and Wadsworth (1978) contend that the Key Vocabulary strategy is conceptually consistent with Piagetian principles of learning. They suggest that this consistency provides a sound basis for examining a possible relationship between the child's ability to solve Piagetian tasks and learning to read.

In brief, recent identification of varying forms of Key Vocabulary response (Veatch et al., 1973; Wasserman, 1972,

1976b) seems to provide sufficient basis for exploring the relationship between cognition and Key Vocabulary responses. A description of the thought processes used to solve selected Piagetian tasks and those related to each level of Key Vocabulary response are outlined in Chapter 3.

SUMMARY

Recent studies (Downing, 1968, 1970, 1971, 1973-74; Francis, 1973; Reid, 1966) indicate that the child five or six years of age does not have a clear understanding of such terms as "word" used frequently by teachers during reading instruction. Papandropoulou and Sinclair (1974), found that there are four levels and two sub-stages in the child's understanding of the concept of "a word". They found also that these levels of metalinguistic competency were related to Piagetian measures of cognition.

Piagetian measures have been used to examine the relationship between reading and cognitive development (Brekke, Williams & Harlow, 1973; Briggs & Elkind, 1973; De Vries, 1974; Dimitrovsky & Almy, 1975; Kretschmer, 1973, 1975; Roberts, 1976). These studies support the view that reading is a developmental process that can be directly related to the emergence of certain cognitive structures (Durkin, 1974; Spache & Spache, 1973; Stauffer, 1969, 1975).

Some theorists posit the existence of a relationship between language development and cognition (Luria, 1961, 1976; Piaget, 1964, 1976; Sinclair-de Zwart, 1974; Vygotsky,

1962). Others have suggested that there is an interrelationship among the variables of cognition, language development, personal experiences, and reading acquisition (Allen, 1976, 1977; Stauffer, 1975; Veatch, 1972; Veatch et al., 1973). Key Vocabulary is a particular teaching strategy which is believed to take into account all of these interrelated variables (Veatch, 1972; Veatch et al., 1973; Wadsworth, 1978; Wasserman, 1976a).

The identification recently of emergent levels in response to the Key Vocabulary method of introducing the child to the reading process (Veatch et al., 1973; Wasserman, 1972, 1976b) has opened the possibility of investigating Key Vocabulary responses from a developmental perspective. The transition from one level to another in Key Vocabulary responses may be dependent upon developmental changes in the child's cognitive structures.

Certain aspects of Piaget's theory of cognition are believed to be especially pertinent to an understanding of reading acquisition and thus may be a useful means of examining whether a relationship exists between the levels of Key Vocabulary response and stages of cognitive development.

CHAPTER 3

CONCEPTUAL FRAMEWORK

The conceptual framework that follows was developed to provide a synthesis of the literature related to Key Vocabulary responses and to establish a theoretical position relating levels of Key Vocabulary response and cognitive structures as identified by Piaget. This framework was used first to test for the confirmation and identification of various levels of Key Vocabulary response. Secondly, it provided criteria necessary for the examination of the proposed relationship between the nature of Key Vocabulary responses and stages of cognitive development.

The review of the literature in the preceding chapter illustrated the research findings in support of an interrelationship among the variables of language, thought, and experience. These findings were then related to the Key Vocabulary teaching strategy and stage of cognitive development. This review of literature was the bases for the conceptual framework outlined in this chapter.

LANGUAGE, THOUGHT, AND EXPERIENCE

Papandropoulou and Sinclair (1974) were able to identify four levels and two sub-stages in the development of the young child's understanding of the concept of "a word". The levels of understanding, in turn, were related to stages of cognition as identified using Piagetian measures. These

findings support studies (Downing, 1968, 1970, 1971, 1973-74; Frances, 1973; Reid, 1966) which suggest that five and six year olds do not understand much of the basic terminology such as "word" used in the teaching of reading. Thus there are indications that the child's understanding of the concept of "word" and the other basic terminology used in reading instruction is related to cognition. Cognitive development, language, and experience are said to be interrelated.

Language experience strategies of reading instruction assume this interrelationship among language, experience, thought, and reading are interrelated. Key Vocabulary is an instructional strategy for the teaching of reading based on the child's language and experience. The levels of Key Vocabulary response identified by Ashton-Warner (Wasserman, 1972, 1976b) and Veatch (1973, 1976) reflect levels of metalinguistic competency which are believed to be related to particular cognitive structures (Papandropoulou & Sinclair, 1974). A relationship between the sequence of Key Vocabulary responses and the development of specific cognitive concepts was hypothesized.

Hypothesized Sequence in Key Vocabulary Response

Ashton-Warner (Wasserman, 1972, 1976b) contends that different forms of Key Vocabulary response emerge in sequential order and are developmental in nature. Veatch's (1973, 1976) observations led her to propose that a Giant

Word Syndrome precedes Ashton Warner's single word response giving further support to the suggestion that there is an hierarchical order in responses. Based on these claims is it reasonable to propose that a hierarchy exists?

Resnick (1973) outlined three ways in which to define hierarchies in stages of learning. The first is the transfer definition which suggests that when two tasks are hierarchically related, learning of one task produces a positive transfer to the other task. The second, a psychometric definition, states that someone who can perform a complex task can reliably be expected to perform a simpler task within the hierarchy. The third definition relates to developmental hierarchies. These hierarchies are based on stage theories of development which imply that an individual passes through a fixed series of stages in an orderly sequence.

The proposed levels of Key Vocabulary response may best be defined in terms of the developmental definition of hierarchies. Because of the lack of criteria for identifying a stage, the varying forms of response could not be viewed as stages. The order proposed was based on the preliminary observation of Veatch (1973, 1976) and subsequent work of Ashton-Warner (Wasserman, 1972, 1976b) that changes in linguistic understanding and structural complexity can be observed in children's responses over time.

Level 1. Responses at the first level, while complex in terms of linguistic structure, reflect the child's lack of

understanding of the concept of "a word". These responses express an entire thought that is global in structure and yet is perceived by the child to be a single word. For example the child might respond with "I love my mommy" rather than the single word "love" or "mommy". The nature of this form of response suggests that the child cannot yet identify the meaning of a single word as a representation of a thought. More specifically, the child cannot express a thought "in a word".

Level 2. At the second level of response, the child selects a single word to represent something of importance which has personal meaning. After talking about "mother", a child at this level might respond with the single word "love" or "mommy". This form of response reflects an understanding of the concept of "a word". Level 1 and 2 responses mirror an understanding of the concept of "a word" similar to the levels identified by Papandropoulou and Sinclair (1974).

Level 3. At the third level of response the child provides two or three words which are combined consciously to describe an image (or thought) in a detailed, concise manner.

Level 4. A fourth level of response was included to aid in the identification of other forms of oral response. This level would include responses which could not be defined as level 1, 2, or 3 responses.

These changes in levels of Key Vocabulary response

reflect aspects of the findings of Papandropoulou and Sinclair (1974). Their research indicated that the understandings related to the concept of "a word" were associated with changes in cognition. Therefore, it was proposed that varying levels of Key Vocabulary response would be related to stages of cognitive development.

STAGES OF COGNITION

The way in which young children cognitively perceives their world is reflected in the way they relate their experiences, beliefs, and perceptions orally. As children experience the world about them, their cognitive structures are altered. From a Piagetian perspective (Inhelder & Piaget, 1964; Inhelder, Sinclair & Bovet, 1974; Piaget, 1966, 1974, 1976; Gray, 1978), the way one organizes and incorporates new information into existing processes is indicative of the function of assimilation. The modification of existing processes and/or the creation of new processes which adapt to the incoming information is termed accommodation. Assimilation and accommodation lead to the modification of existing structures and the creation of new mental processes. These new processes and structures provide a basis or framework for viewing one's world. As the child's cognitive processes are altered, metalinguistic competency becomes more complex.

Theories of development. Overton and Reese (1973) contend that psychological theories of development can be

categorized according to a mechanistic model or an organismic model. These authors state that theories falling within one of the basic categories form a family of theories. These families may contain theories that differ in terms of content, but they are compatible as they are representative of the same developmental model. They argue that theories which are based on different models are not compatible.

The mechanistic model views the phenomena of psychology as being controlled by basic laws. This model is a "reactive model" of humans. That is, the organism is inherently at rest and is active only as a result of external factors or forces. The resulting behaviors, in principle, make complete prediction possible. That is, knowledge of a specific behavior at one point allows for inferences at the next state given a knowledge of the forces present. Overton and Reese (1973) point out that in this model cognitive activities are viewed as complex phenomena which can be reduced to simple phenomena. The emergence of a qualitative change can be reduced to a quantitative change.

The organismic model of psychology is reflected in an "active organism model" of humans (Overton & Reese 1973). Individuals are seen as inherently and spontaneously active. They are viewed as being the source of acts rather than being activated by external forces. The emergence of new properties or concepts cannot be reduced to lower levels and therefore are viewed as being qualitatively different from

earlier concepts.

Ashton-Warner has described the classroom setting for the Key Vocabulary teaching strategy as an "organic" environment, and her proposed movements from one level of response to another seem to reflect an organismic model of development. Based on the Overton and Reese (1973) argument that theories should be compatible, the developmental theory used to examine Key Vocabulary responses should adhere to the organismic model.

All stage theories of development meet the criteria of an organismic model (Lerner, 1976; Lipsitt and Reese, 1979). Stages are viewed as being multiplicative and interactive in nature. An emerging stage is said to be qualitatively different from the preceding stage. The transition from one stage to the next is a gradual process. Lerner (1976) outlines the following types of transitions: (1) the characteristics of an earlier stage are totally displaced and new organizations take place; (2) the behaviors of an earlier stage are still seen, but characteristics of a more advanced stage are dominant; and (3) when the new stage has fully emerged, the characteristics of the earlier stage become latent but in special circumstances may come into play.

THE RELATION BETWEEN KEY VOCABULARY AND COGNITIVE DEVELOPMENT

The levels of Key Vocabulary response were viewed as transitions from one level of understanding to another. These transitions, in turn, were said to be related to cognitive development. The developmental model for examining the nature of the Key Vocabulary transitions suggests that a stage theory would be appropriate. Piaget's theory of cognition, a stage theory reflecting the organismic model, was selected for its appropriateness to the task of examining the relationship between stages of cognitive development and levels of Key Vocabulary response.

Simple classification, simple seriation, conservation of number, and class inclusion are Piagetian concepts that have been shown to be related to the reading process (Brekke, Williams & Harlow, 1973; Briggs & Elkind, 1973; DeVries, 1974; Dimitrovsky & Almy, 1975; Kretschmer, 1973, 1975; Roberts, 1976). It is possible that the emergence of these specific concepts may also be related to the transition from one level of Key Vocabulary response to the next. The proposed relationship between levels of Key Vocabulary response and stage of cognition are presented in Table 2. The following description outlines the similarity between the logical processes involved in solving selected Piagetian tasks and those relating to levels of response.

When children are asked to group objects according to one attribute, they must be able to hold an attribute (for

Table 2
Possible Relationships Between Levels of
Key Vocabulary Response and Stages
of Cognitive Development

Key Vocabulary	Preoperational Stage	Transitional Stage	Concrete Stage
Level 1 - A whole sentence "word"	x		
Level 2 - A single word response		x	
Level 3 - A two or three word response			x
Level 4 - Extended oral responses			x

example, the color red) constant mentally while sorting through an array of objects. They must then identify all of those objects which possess the selected attribute and eliminate those which do not. Simple seriation (ordering objects along one dimension) also requires the selection of a relevant attribute (for example, height) which must mentally be held constant and coordinated so as to order all objects in relation to the relevant attribute.

Similar mental processes are necessary in the early stages of learning to read. Children must select the relevant attribute of a whole word and hold it constant while ordering the letters and letter sound relationships within a word. It can be hypothesized that the inability to use the logic of class and relations would be reflected in the first level of Key Vocabulary response. That is, children who are at a preoperational stage of cognitive development cannot select a single word response. They would respond to the Key Vocabulary elicitation with a sentence. Furthermore, they would believe their whole sentence response to be "a word". As children interact with their environment, new experiences are assimilated and adaptations and modifications occur. This assimilation-accommodation process leads to new mental structures. As children begin to utilize the logic of classes or relations, a transition in thought processes takes place. These processes operate at the second level of Key Vocabulary response. Children at this level must be able to select a single word to represent

a thought and recognize that word as distinct from all other words which may have been requested. The selection of relevant graphic attributes aids children in the identification of their word.

Conservation of number requires that the child mentally conserve or hold constant the number of objects in a collection regardless of the displacements or transformations which may take place. That is, no matter how a group of objects is arranged, the child knows the number remains the same because nothing has been added to or taken away from the group. Furthermore, the actions can be reversed and the objects can be returned to the original position.

When reading, the child must mentally hold the image of the word constant in spite of the transformations which might take place. A word will remain the same word whether it appears alone or in combination with other words. The other words may change the meaning and must be viewed in relation to the words surrounding it. At the third level of Key Vocabulary response, the child is beginning to combine words. These combinations may change the overall meaning, but they do not necessarily change the individual word or words.

The conceptual framework presented in this Chapter has suggested a way of exploring whether order is characteristic of the levels of Key Vocabulary response. The theoretical views regarding the cognitive processes associated with

certain Piagetian concepts, learning to read, and levels of Key Vocabulary response formed the bases for the hypothesized relationship.

CHAPTER 4

DESIGN OF THE STUDY

Introduction

This exploratory study was designed (1) to identify oral levels of response using the Key Vocabulary strategy of instruction; and (2) to determine whether a relationship exists between children's levels of Key Vocabulary response and ability to use selected cognitive concepts. In order to explore the questions related to the study, 150 kindergarten children were randomly selected from the classes taught by nine volunteer teachers. The researcher and a trained assistant were responsible for the administration of the selected Piagetian tasks measuring cognitive processes. The teachers elicited Key Vocabulary responses from the children in their classrooms.

There was a four week pilot study followed by the main study. The sequence of the main study is outlined below.

1. All teachers collected Key Vocabulary responses from the children for a period of two and a half weeks.
2. The Key Vocabulary data were examined for the identification of levels of response.
3. As varying levels were identified, the teachers continued to elicit responses from the children. During this same period Piagetian tasks were administered to all children in the study.

4. The data were examined to identify whether there was a relationship between Key Vocabulary responses and cognitive structures.

The Variables

Four levels of the response variable and three stages of the cognitive variable were investigated in the present study. The response variable was defined as the following levels of Key Vocabulary response: (1) a phrase or an entire sentence response which the child believed to be a single word; (2) a single word response; (3) a two or three word response; and (4) forms of response that could not be classified as level 1, 2, or 3. The cognitive variable was defined as preoperational, transitional, and concrete stages of thought. The scoring procedures for both of these variables are outlined in a later section of this chapter.

PILOT STUDY

The following is a presentation of the purposes of the pilot study, the subjects, and the procedures used.

Purposes

The first purpose of the pilot study was to refine the method of Key Vocabulary elicitation for use with children of kindergarten age. Secondly, the pilot study served as a means of training an assistant to administer the Piagetian measures. Finally, the pilot study was used to gather

material (for example, video tapes) which could be used in the training of teachers taking part in the main study.

The method of eliciting Key Vocabulary responses and the related activities used in the pilot study were adopted from Key words to reading (Veatch et al., 1973). These procedures and activities are outlined below.

1. Engage the child in a conversation.
2. Ask the child what to write that will best describe the conversation. For example, "Of the things we've talked about, what word would you like me to write?".
3. Print the response on an oak tag card (approximately 10 cm. x 30 cm. or 4 in. x 12 in.) using a black felt pen. Name the letters as you print the word.
4. Have the child trace each letter with the index finger. Check for left to right progression and top to bottom direction.
5. Suggest that the child select an activity to do with the "word".

The following activities were suggested to the child:

- a. Write the word on a chalkboard.
- b. Write the word in a salt tray.
- c. Write the word with magnetic letters.
- d. Draw a picture about the word.
- e. Use clay to write the word.
- f. Write the word in a "word booklet".

Audio tapes were made of all Key Vocabulary conversations elicited during the pilot study. In addition,

a video tape was made of conversations with four children. The video tape and a transcript of one of the audio tapes were used to train the teachers taking part in the main study.

Subjects

The subjects for the pilot study were randomly selected from one kindergarten class of 29 children. Twenty children (ten boys and ten girls) were selected for the Piagetian testing. Ten of the twenty children (five boys and five girls) took part in the Key Vocabulary elicitation sessions.

Procedures for the Pilot Study

After arrangements were made to use one kindergarten class it was discovered that the teacher had been using the Key Vocabulary strategy of instruction with some of the children in the classroom. Six of the children selected for the Key Vocabulary elicitations had already experienced the activity. As prior Key Vocabulary experience would not negate the purposes outlined for the pilot study, it was decided to continue to use the kindergarten class.

Key Vocabulary responses. All the children selected responded to the elicitation techniques and three forms of Key Vocabulary response were recorded. One boy usually responded to the elicitation of "a word" with an entire sentence. He would say that he wanted "one word" written on his card. All other children in the pilot study would

request one word and occasionally ask for two words (for example, "birthday party").

Reliability of method of elicitation. An educational psychologist was asked to assess the transcripts of nine conversations recorded during the first two weeks of the pilot study. It was his judgement that the strategies used to elicit conversations and words from the children were appropriate for children of this age. He suggested the occasional use of questions such as, "If you had three wishes, what would they be?" as an additional way of opening a conversation with young children.

Material for training teachers. A twenty minute video tape was made using four children in the pilot study. The tape was designed to train the teachers who were to take part in the main study. In addition, transcripts of portions of the audio tapes recorded during the pilot study were used in the training sessions (see Appendix A).

Training an assistant. A graduate student in Early Childhood Education was trained by the investigator to administer the Piagetian measures during the pilot study. The investigator administered tests to three children while the assistant observed the procedures. In between each testing session, the procedures were discussed and questions were answered. The assistant then did the testing with three children while the investigator observed the interactions. These observations were reviewed after each testing session and suggestions were given when needed. The assistant worked

with seven more children and the researcher spot checked these sessions. After working with ten children, the assistant demonstrated that she could administer the tests accurately and expressed confidence about using the procedures.

THE MAIN STUDY

The teachers and children in the study were selected from a suburban community in central Alberta. The cooperation of both the Separate and Public School Boards ensured that all of the kindergarten teachers in the community were invited to participate in the study.

The community from which the children were selected had a population of 25,000. Over eighty-eight percent of the population was under forty-five years of age; birth to fourteen, and twenty-five to forty-five age ranges were the predominant age groups. The majority of adults were employed in a nearby metropolitan area but elected to live in this community characterized by low density, single family housing. A few private schools were in operation in the area, but they provided services only for children under five years of age (City of St. Albert, 1977).

Five teachers who participated in this study worked for the Separate (non-Catholic) district. The kindergarten classes were located throughout the community representing the whole range of the school population in the city. Some of the children were bused to the schools, but many of the

children lived within walking distance. Although these kindergarten programs all had a Local Advisory Committee of parents, the programs were administered centrally by the Separate school system.

Four of the teachers taking part in the study were in programs operated in conjunction with the Public system (Roman Catholic system). These programs were basically parent operated programs in that parents decided how to spend the budget and had part in the hiring of teachers. The kindergarten programs were housed in buildings belonging to the Public school district. All the buildings were located on a single site near the center of the community. The buildings consisted of one older structure with two kindergarten classrooms, a gym, washroom facilities, a staff lounge, and two office areas. Four portable classrooms were located next to the central building. All children attending the program were bused to and from school.

Teacher Sample

Nine kindergarten teachers in the Separate and Public systems were included in the study. Five teachers from the two school districts were excluded for the following reasons: (1) one teacher taught in a French immersion kindergarten; (2) one worked with "special needs" children; and (3) three teachers were teaching in kindergartens for the first time. All teachers who took part in the study had special training in the area of Early Childhood Education.

The number of years of teaching experience ranged from 1 to 12 years with the average being 5 years. The nine teachers were teaching a total of fifteen half day kindergarten classes.

Pupil Sample

Using numbers generated by a computer, five boys and five girls were randomly selected from each of the fifteen classes. A second set of random numbers was generated to replace those children who were excluded from the study on the bases that they were learning English as a second language, that they had identifiable speech defects, or that they were absent due to an extended holiday. The planned sample size was 150.

The Nature of the Learning Environments

The learning environments in the classrooms where this study was conducted were designed to encourage children to make choices and decisions regarding their own activities. There were times during the day when children could select activities to do independently or with friends. Such activities included: (1) construction activities (such as blocks or Lego); (2) use of pliable materials (for example, play dough or clay); (3) sensory activities (for example, the exploration of water or sand); (4) expressive activities (such as painting and creative dance); (5) receptive activities (for example, listening to stories or records);

and (6) thematic play opportunities.

Key Vocabulary was introduced as an optional activity which the children might select during the day. Each teacher designated an area where she could have a private conversation with a child. This conversation was intended to elicit a Key Vocabulary response which would be recorded for the child. Each child participated in at least one such session.

PROCEDURES FOR COLLECTING DATA

The procedures described below include information about the training of personnel required for the collection of data. All training sessions took place prior to the collection of the data.

During the training period the researcher and teachers agreed that children should not be forced to leave an activity of their choice to become involved in the Key Vocabulary activity. Thus no attempt was made to control the number of times words were elicited from each child or the day on which the words were elicited. An equal number of Key Vocabulary responses from each child would have provided a more reliable measure for the overall Key Vocabulary score. Had each elicitation taken place on the same day for all children, it would have provided a clearer picture of changes in levels of response across short periods of time. However, forcing children to take part in the Key Vocabulary activity would have possibly provided invalid responses.

Training of Teachers

Based on the outcome of the pilot study, a half day workshop to train the teachers was provided by the researcher. The video tape made during the pilot study provided a visual image of ways of eliciting conversations, children's Key Vocabulary responses, and the method of recording responses by the teacher. Typed transcripts of nine conversations recorded during the pilot study were distributed and discussed in small groups (Appendix A). These transcripts further illustrated ways of initiating conversations based on interests or recent events in the child's life. The video tape illustrated conversations initiated by the child and conversations initiated by the teacher.

Each teacher was given a copy of Ashton-Warner's Teacher (1963) and Spearpoint (1972) as a basis for understanding the Key Vocabulary strategy. The teachers were instructed to read at least one of the books before eliciting responses from the children. The teachers were told that they could introduce the Key Vocabulary activity to small groups of five children or do the introduction on a one-to-one basis. Following the introduction, however, all elicitations were to be done individually. The individual elicitations and activities adhered to the procedure outlined in the pilot study.

Both the guidelines for eliciting responses and the suggested activities were adopted from Key words to reading

(Veatch et al., 1973). The guidelines and a list of activities were distributed at the workshop. The video tapes used in the workshop followed these guidelines and illustrated a child writing the word on a chalkboard, a child drawing a picture of the word, and children writing their word in a salt tray.

Monitoring the Data Collection

Audio tapes were given to the teachers so they could record the conversations they had with the children. These tapes were checked by the researcher to ensure that the method used was consistent across teachers. The two essential behaviors checked for on the tapes were engaging the child in a conversation and asking what "word" the child would like written on the card. The teachers were asked to record at least three conversations throughout the six week period. Two of the sessions recorded were to be during the first two weeks and one during the last four weeks of the study.

In addition to the audio tapes, five teachers were observed as they elicited Key Vocabulary responses from the children. These observations were informal and were scheduled for two teachers upon their request. The observations of the other three teachers occurred because the researcher was in the classroom when the Key Vocabulary activity was taking place.

Obtaining Key Vocabulary Responses

The nine volunteer teachers trained by the researcher agreed to try to elicit conversations and Key Vocabulary responses from the children twice a week during April and May (this was a six week period). The teachers chose to elicit words from the children on days that parent volunteers were working in the classroom. It was discovered early in the study that some children requested words on days when Key Vocabulary was not specified as an activity and that the children did not all elect to become involved in the activity on the specified days. As a result, each teacher arranged for the activity to be available whenever the child selected it, but the majority of responses were collected on the days parents were present.

Obtaining Piagetian Measures

The researcher and trained assistant administered the Piagetian tasks selected to measure each child's stage of cognitive development. The concepts selected as measures of cognitive processes were: (1) simple classification, (2) simple seriation, (3) conservation of number, and (4) class inclusion. Five year olds were not expected to understand the concept of class inclusion as it is a measure of advanced concrete thought. The concept was considered a "ceiling measure". Three tasks measuring each of the four concepts were based on Piagetian research (Inhelder and Piaget, 1964; Inhelder, Sinclair and Bovet, 1974; Piaget,

1952).

Two kits of materials were put together by the researcher and contained the concrete materials necessary for the twelve tasks. The kits, which were used by the researcher and assistant, each contained materials that were identical for ten of the twelve tasks. The two items which differed (the flowers and the color tablets) varied only in color. A full description of the materials and directions used for administering the tasks are located in Appendix E.

The Piagetian tasks were all administered in areas outside the classroom. The spaces were quiet and free from outside interference.

Scoring Procedure and Reliability of Key Vocabulary Responses

The teacher printed each child's Key Vocabulary response on an oak tag card approximately 10 cm. x 30 cm. (4 in. x 12 in.). She also recorded the date and any relevant comments on the back of the cards. The teachers were specifically asked to question children who responded with sentences to find out the number of words they thought were included in their response. The child's collection of responses, relevant comments, and the dates of elicitation were transferred onto sheets of paper (referred to as "profiles") by the investigator. If no comment was noted regarding any of the multiple word responses, the level of response could not be scored accurately. Profiles with

incomplete data of this nature were not included in the study. The individual responses within each profile were then scored by the researcher using the criteria outlined in Appendix B.

The responses on the profiles were scored by the investigator and transferred to a coding sheet. A graduate student in Educational Psychology checked 75 percent of the information and then the data were professionally keypunched and verified. The first two responses on each profile were not included in the analysis as these responses were considered practice sessions. It was during this period that the teachers developed the comfort and rapport necessary to elicit responses from young children.

An examination of the Key Vocabulary data revealed that some children requested words reflecting more than one level of response. It was necessary, therefore, to devise a system of scoring that would take into account these varying forms of response and provide an overall Key Vocabulary score for each child. The most frequent form of response, or the mode, was considered the overall Key Vocabulary score. If the levels of response were bimodal, then only the most recent three responses were considered for children who had only four responses. For all other children who had bimodal scores, their five most recent responses were used to determine their modal response.

Scoring Procedures for Piagetian Measures

Each of the following concepts was measured using three Piagetian tasks per concept. The investigator scored the Piagetian tasks by applying the following criteria to the responses recorded earlier on individual record sheets (see Appendix F) by the investigator or assistant:

Simple Classification

- a. A score of 0 was assigned to a classification task if: (1) the child arranged the material in pairs or (2) used the materials to form a graphic arrangement (for example, a picture or design).
- b. A score of 1 was assigned to a classification task if the child sorted materials according to one attribute (for example, if the child could find only one way to group the objects).
- c. A score of 2 was assigned to a classification task if the child sorted the materials using two attributes.
- d. A score of 3 was assigned to a classification task if the child sorted the materials using three attributes.
- e. A score of 4 was assigned to a classification task if the child sorted the materials according to four or more attributes.

Simple Seriation

- a. A score of 0 was assigned to a seriation task if the child formed subgroups with the objects or used the materials to form a graphic arrangement or design.
- b. A score of 1 was to be assigned to a seriation task if the child ordered the materials by trial and error.
- c. A score of 2 was assigned to a seriation task if the child ordered the material correctly.

Conservation of Number

- a. A score of 0 was assigned to a conservation of number task if the child did not realize that the two rows contain the same number of objects despite the displacement of objects.
- b. A score of 0 was assigned to a conservation of number task if the child realized the two rows of objects were the same, but could not give a reason for the answer.
- c. A score of 1 was assigned to a conservation of number task if the child knew there were the same number of objects in both rows in spite of the displacement of objects in one row. Furthermore, the child could explain why the two rows still had the same number of objects.

Class Inclusion

- a. A score of 0 was assigned to a class inclusion task if one or more responses were incorrect on a class inclusion task.
- b. A score of 1 was assigned to a class inclusion task only if all the child's responses were correct on a class inclusion task.

Scoring Stages of Cognitive Development

- a. A score of 1, indicating a preoperational level of thought, was assigned if a child; (1) received a score of 0 on both the classification tasks and the seriation tasks, or (2) scored on only the classification tasks or the seriation tasks but not on both tasks.
- b. A score of 2, corresponding to the transitional period of thought was assumed if the child scored at least 1 on the classification tasks, 1 on the seriation tasks, and less than 2 on the conservation of number tasks.
- c. A score of 3 was assigned to subjects operating at the concrete stage of cognitive development. This score was assigned if the child scored on two or more of the simple seriation, simple classification, and conservation of number tasks. The child did not have to score on the class inclusion measures to be considered in the early period of concrete thought.

As pointed out earlier, class inclusion is an advanced concept appearing in the latter period of concrete operations.

Scores for each child were summarized on a profile sheet (see Appendix G). The total score for concepts summarized on the profile sheets served as the guide for determining the stage of cognitive development (preoperational thought, transitional thought, or concrete operations) for each child.

A random selection of twenty-five profiles were scored by a graduate student at the University of British Columbia. Analysis of the data using the Pearson product moment correlation revealed that the inter-rater reliability on the four Piagetian measures ranged from .96 to 1.00.

Relationship Between Key Vocabulary and Cognitive Development

The possible relationships between levels of Key Vocabulary response and cognitive structures were determined using a gamma coefficient. The analysis was run on the AMDAHL computer at the University of Alberta which operates under the Michigan Terminal System. The Statistical package for the social sciences (Nic, Hull, Jenkins, Steinbrenner, Brent, 1975) Version H, Release 8.0 was used to perform the actual calculations.

Gamma coefficient. This statistic is often used in sociological studies in which both variables are ordinal.

The statistic measures all possible pairs and is interpreted as probability. Thus if one knows the stage of cognition for a pair of students, can the level of Key Vocabulary response be predicted for the same pair?

The formula used is:

$$\text{gamma} = \frac{P-Q}{P+Q}$$

where:

P = concordant or same order pairs

Q = discordant or reverse order pairs

An example may serve to clarify the calculation of gamma.

Suppose a group of children rated high, medium, and low on the variables social-economic class and reading ability. The classification relative to these two variables is as follows:

(Example)

		Social-Economic Class		
		Low	Medium	High
Reading Ability	Low	20	20	20
	Medium	10	10	10
	High	5	5	30

Using the formula above, P would equal those pairs in agreement which are located in a diagonal increasing to the right. In this example, focus on each cell in turn and multiply the frequency in each cell by the total number of cases below and to the right of the cell. Q equals all pairs in disagreement. Thus examine each cell in turn and multiply the frequency in each cell by the total number of cases above and to the right of the cell. This calculation is as follows:

$$P = 20(10+10+5+30)+10(5+30)+20(10+30)+10(30)=2550$$

$$Q = 5(10+10+20+20)+10(20+20)+5(10+20)+10(20)=1050$$

$$\frac{P-Q}{P+Q} = \frac{2550-1050}{2550+1050} = \frac{1500}{3600} = .42$$

When using the gamma coefficient, all ties are ignored. Hayes (1963) contends that this exclusion of ties permits a simpler interpretation in a predictive sense.

The test of the null hypothesis of no relation was performed following the inferential procedures described by Marachuiilo and McSweeney (1977, pp. 469-470). This procedure, based on the earlier work of Goodman and Kruskal (1954, 1963) provides a conservative test of the hypothesis (since the formula for the standard error of gamma provides an upper bound). The test statistic is:

$$Z = \frac{G-0}{SE}$$

where:

G = gamma coefficient

$$SE = \sqrt{\frac{2n(1-G^2)}{n^2-N}}$$

CHAPTER 5

RESULTS OF THE STUDY

This chapter focuses on the findings of the study and presents additional information resulting from the examination of data. The first section provides a summary of results regarding Key Vocabulary responses. This is followed by a discussion of scoring of the stages of cognitive development and the analysis of the relationship between levels of response and cognitive structure. Finally, results from a post hoc analysis suggested by the initial analysis are presented and discussed.

Data were analyzed using a sample of 120 children ranging in age from sixty-two months to seventy-seven months as of May 1, 1978 (Table 3 outlines the number of children in each of the age groups). Fifty-eight of the children were in a kindergarten program operating in conjunction with the Public school system and sixty-two were attending a program which was part of the Separate system. Thirty children were excluded from the original sample of 150 because they had fewer than four scorable responses.

THE NATURE OF KEY VOCABULARY RESPONSES

The nature of the Key Vocabulary responses is described in relation to the questions and sub-questions outlined earlier in Chapter 1. This description includes the

Table 3
Number of Children in Each Age Group

Ages in Months (as of May 1, 1978)	Number of Children (N=120)
62	2
63	4
64	9
65	17
66	8
67	7
68	11
69	10
70	12
71	13
72	12
73	8
74	3
75	2
76	0
77	2

variability of levels of response and the sequence of these levels.

Variability in Key Vocabulary Responses

The first set of questions relates to the variability in Key Vocabulary responses. The main question and the four sub-questions were designed to identify the nature of the proposed levels of response.

Question 1.0. Are there qualitative differences in the responses children give when teachers use the Key Vocabulary strategy as a pre-reading activity?

This was the preliminary question asked to confirm the existence of varying levels in Key Vocabulary response. An examination of individual profiles revealed that several forms of response were given by the children in the sample. Furthermore, 81 profiles contained responses that varied over time. Some of the forms of response did adhere to the definitions of the three levels of response initially expected. In addition to responses which were classified as: (1) a whole sentence or phrase which the child believed to be "a word"; (2) a single word response; and (3) a two or three word response, a level 4 response was identified in which the children provided sentences which they recognized as being composed of several words. Table 4 presents these levels (or overall Key Vocabulary response scores) as they relate to the questions put forth in the study. Further, within some of the major response levels, sub-classes were

Table 4
Frequency Distribution for
Levels of Key Vocabulary Response
and
Stages of Cognitive Development

Stages of Cognitive Development	Levels of Key Vocabulary Response				Total
	Level 1	Level 2	Level 3	Level 4	
Preoperational Stage	6	10	0	0	16
Transitional Stage	11	39	0	1	51
Concrete Stage	<u>0</u>	<u>45</u>	<u>0</u>	<u>8</u>	<u>53</u>
Total	17	94	0	9	120

observed (these forms of response will be discussed in detail in a later section). As distinct levels of response did appear, the findings can be related to the four sub-questions posed at the beginning of the study.

Question 1.1. Do some children typically respond to the elicitation of a word with an entire sentence or phrase which they believe to be a single word?

It was found that seventeen children had a modal response to the elicitation indicative of the Giant Word Syndrome. An additional observation in relation to the first sub-question was that three of these children attempted to count the letters in their sentences apparently in an effort to determine the number of words they had requested. As Veatch and her colleagues (1973) considered this type of response behavior to be characteristic of the Giant Word Syndrome, responses of this nature were scored at the first level.

Question 1.2. Do some children respond to the Key Vocabulary elicitation with a single word?

Ninety-four children received an overall score of level 2, indicating single words were their most frequent responses. Even though these children had an overall Key Vocabulary score at level 2, over half of the profiles include responses at other levels. Thus again it was found that some children consistently request words at one level of response while others move back and forth across levels.

Question 1.3. Do some children respond to the Key Vocabulary elicitation with two or three words?

Although some children responded occasionally with two or three words, there were no children who had an overall Key Vocabulary score at level 3. Furthermore, these responses appeared in two forms. Some of the responses could be defined as compound words as they reflected a single image (see Appendix C). An example of such a response would be "ice cream" or "strawberry ice cream". Other responses were requests for two or three words that could not be defined as a compound word response. An examination of the profiles indicated that there were single word responses on all of the profiles containing compound and/or two and three word responses. This level of response will be discussed more fully later in this chapter.

Key Vocabulary Sequence

The second question raised in the study focused on the sequence of Key Vocabulary responses.

Question 2.0. If distinct levels of response exist, do they appear in a sequence?

Varying forms of response were identified but the data relating to the proposed sequence were not clear. Thus this question could not be answered within the scope of the present study.

Key Vocabulary and Cognitive Development

As shown in Table 4, sixteen children were at a preoperational stage of cognitive development. There were fifty-one children identified as being transitional in thought while fifty-three children possessed understandings indicative of the emergence of concrete operations. More specific findings as they relate to the question and sub-questions are discuss below.

Question 3.0. Can Piagetian stages of cognitive development be associated with the emergence of specific levels of Key Vocabulary response?

A gamma analysis was performed to identify the nature of the relationship between the levels of response and stages of cognitive development. Table 5 illustrates a statistically significant relationship between cognition and levels of Key Vocabulary response as measured by a two tailed gamma coefficient (Hays, 1963; Hildebrand, Laing, & Rosenthal, 1977; Kohout, 1974; Mueller et al., 1970).

Consistent Observations

As shown in Table 5, there were six children in cell A. These children were preoperational in thought and also responded to the Key Vocabulary elicitations with a sentence or phrase which they believed to be "a word". The six children in cell A scored lower in terms of cognition than those who were in cells E, F, H, and I. There were ninety-three children (see cells E, F, H, and I in Table 5)

Table 5
A Gamma Coefficient Analysis
of
Cognitive Development and Key Vocabulary Response

Stages of Cognitive Development	Levels of Key Vocabulary Response			Total
	Level 1 6 cell A	Level 2 10 cell B	Level 4 0 cell C	
Preoperational Stage				16
Transitional Stage	11 cell D	39 cell E	1 cell F	51
Concrete Stage	0 cell G	45 cell H	8 cell I	53
Total	17	94	9	120

Gamma=.817*

*Significant (two-tailed) $p < .01$

who were higher in terms of cognition and Key Vocabulary response than the six children in cell A. The data indicate that in these observations the predictions were consistent.

There were eleven children in cell D. These children were transitional in thought and responded to the Key Vocabulary elicitations with sentences or phrases which they believed to be "a word". They scored lower on both of the variables than the children in cells H and I. Thus in these observations the predictions were consistent.

The children in cell B scored lower on both cognitive development and Key Vocabulary response than did the children in cells F and I. The analysis indicated that these predictions were consistent.

Cell E indicates that thirty-nine children were lower in terms of cognition and levels of response than children in cell I. Thus in this observation the prediction was consistent.

An occurrence of particular interest was that there were no observations recorded in cells C and G indicating a strong relationship between levels of response and cognition. The children who were preoperational in thought did not respond to the Key Vocabulary elicitations in a manner characteristic of level 4. Similarly, children who were concrete in their thinking did not have responses indicative of the Giant Word Syndrome (level 1 response).

Inconsistent Observations

The eleven children in cell D scored higher than the children in cells B and C. This indicates that in these instances the observations were inconsistent. The second inconsistency was found in cell H where forty-five children scored higher than the child in cell F.

Question 3.1. Is the first level in Key Vocabulary response (see 1.1) associated with preoperational thought as defined by the inability to classify objects according to one attribute, seriate along one dimension, conserve number, and include sub-classes of objects within an overall general class?

Seventeen children responded to the Key Vocabulary elicitation with a whole sentence or phrase which they believed to be "a word" (see p. 88). Six of the children were at a preoperational stage of cognitive development. That is, they could not classify objects, seriate along one dimension or conserve number. Eleven of the children were transitional in thought in that they could classify objects or order material along one dimension but could not do both. In addition, these children could not conceive number. None of the children responding at this level were at a concrete stage of cognitive development.

Question 3.2. Is the second level in Key Vocabulary response (see 1.2) associated with transitional thought (the ability to classify objects according to one attribute and/or seriate along one dimension)?

Ninety-four children responded to the Key Vocabulary elicitations with single words. Ten of the children scored

at a preoperational stage, that is, they could not classify, seriate, or conserve number. Thirty-nine of the children were transitional in their thinking because they used either the logic of classes or the logic of relations. The remaining forty-four children attained a score indicative of the concrete stage of cognitive development based on their ability to do simple classification and seriation tasks as well as to conserve number.

Question 3.3. Is the third level in Key Vocabulary response (see 1.3) associated with concrete thought.

As pointed out earlier, there were no children who received an overall Key Vocabulary response score at this level. Therefore, this question could not be answered within the framework of this study.

Level 4 Responses

An additional question asked if there would be forms of response other than those defined in the study. Nine children responded to the Key Vocabulary elicitations with sentences realizing that their responses contained more than one word. Eight of these children were able to conserve number. The other child was in a transitional period of cognitive development and thus was still unable to perform the conservation of number tasks.

Summary

The gamma measure was used to examine the data. A level 4 response was identified and included in the analysis. The findings indicated a strong relationship between levels of Key Vocabulary response and stages of cognitive development.

POST HOC ANALYSIS

While the modal score for the Key Vocabulary data provided the necessary information for answering the preceding questions, the majority of the response profiles did not conform to expectations. The variations included: (1) more than one level of response in some profiles, (2) the counting of letters to determine how many words were in a sentence, and (3) two or three word responses that were compound words. Because these variations were not predicted, it was deemed important to examine them more closely.

Alternative Scoring for Key Vocabulary

Some children counted the number of letters in their whole sentence or phrase responses in an attempt to determine the number of words in the response. As this behavior was said to be characteristic of the Giant Word Syndrome (Veatch, 1976), it was scored as a level 1.1 response (see Table 6).

It was further observed that the majority of two or three word responses could be defined as compound words (Webster, 1965). While such responses reflect a single image

Table 6
Alternative Scoring for
Key Vocabulary Responses

Relationship to Earlier Categories	Alternative Key Vocabulary Score	Nature of Response
Giant Word Syndrome	1.0	A whole sentence which the child believes to be a word.
	1.1	A whole sentence in which the child counts the letters to determine the number of words.
Single words	2.0	A single word response.
Two word response	3.0	A two word response.
	3.1	A compound word response.
Other than levels 1,2, or 3	4.0	A whole sentence or phrase response realized to be more than one word.

(for example "ice cream") and could be scored as a single word, Ashton-Warner (Wasserman 1972) classifies them as two or three word responses. Based on Ashton-Warner's original definition, responses of this nature were scored as level 3.1 indicating that such responses are compound words (see Table 6).

Patterns of Response

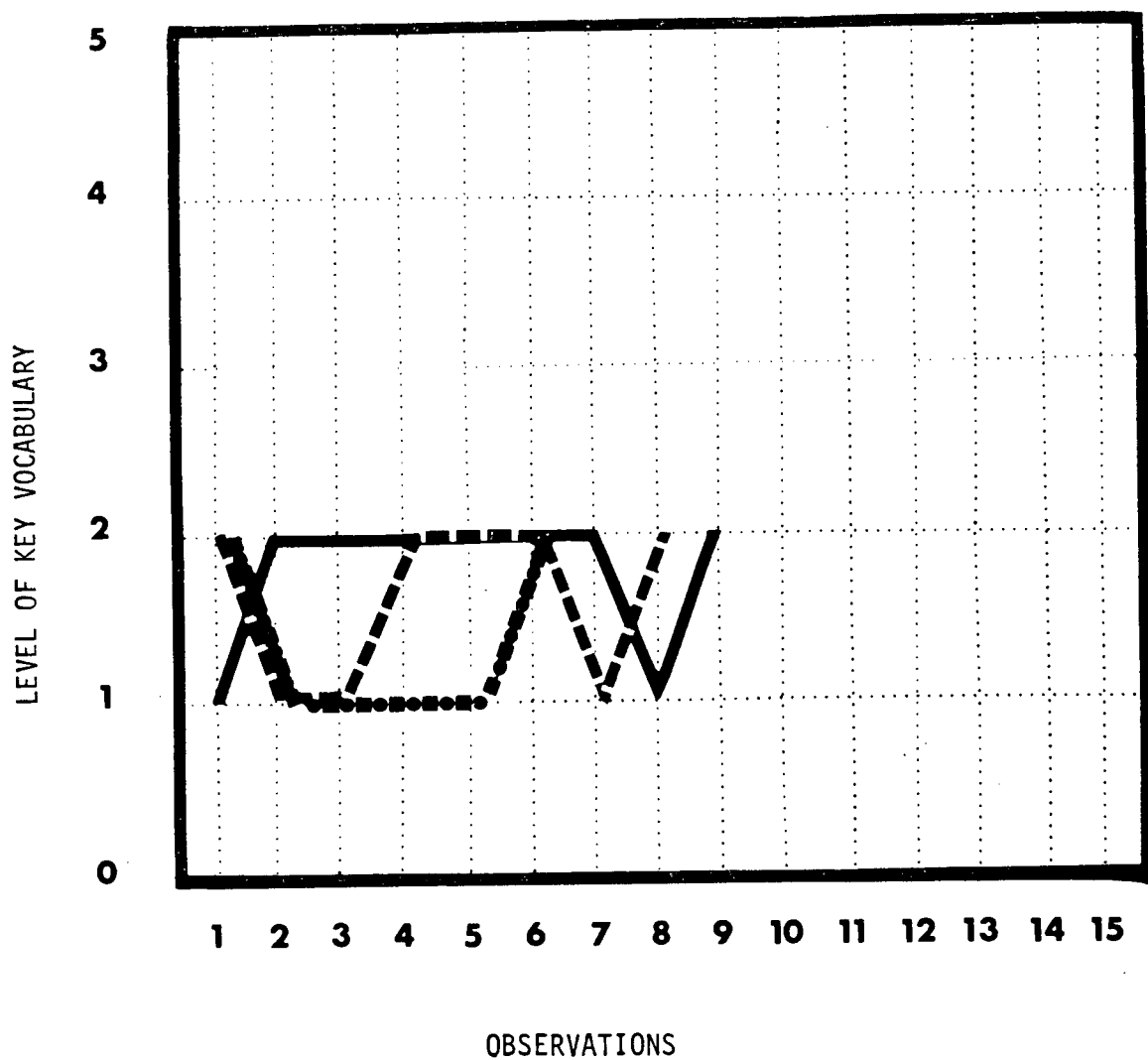
An examination of the Key Vocabulary profiles indicated that some children responded to the elicitations with more than one level of response. Using the alternative scoring system presented in Table 6, the profiles were grouped according to the various levels of response within each profile. The overall Key Vocabulary score was not considered in this categorization.

The grouping of profiles based on the varying nature of responses within revealed a series of fifteen patterns (see Table 7). Within each of the patterns, there were individual differences in terms of the sequence of responses. Graphs were made of each profile so as to examine these individual variations more closely. Graphs for the three children in pattern C and the two children in pattern M are presented in Figures 1 and 2 as examples of the differences observed. The patterns of response identified in the study are described more fully in Appendix D.

Table 7
Patterns of Key Vocabulary Response

Patterns	N	Levels of Response
Pattern A	8	1.0
Pattern B	1	1.0, 1.1
Pattern C	3	1.0, 2.0
Pattern D	1	1.0, 1.1, 2.0
Pattern E	7	1.1, 2.0
Pattern F	8	1.0, 2.0, 3.1
Pattern G	2	1.1, 2.0, 3.1
Pattern H	24	2.0
Pattern I	35	2.0, 3.1
Pattern J	3	2.0, 3.0, 3.1
Pattern K	10	2.0, 3.1, 4.0
Pattern L	4	2.0, 3.0, 3.1, 4.0
Pattern M	2	2.0, 3.0, 4.0
Pattern N	5	2.0, 4.0
Pattern O	7	4.0

Figure 1

PROFILES OF STUDENTS SCORING
IN PATTERN C

CODE

Student

1 = ———

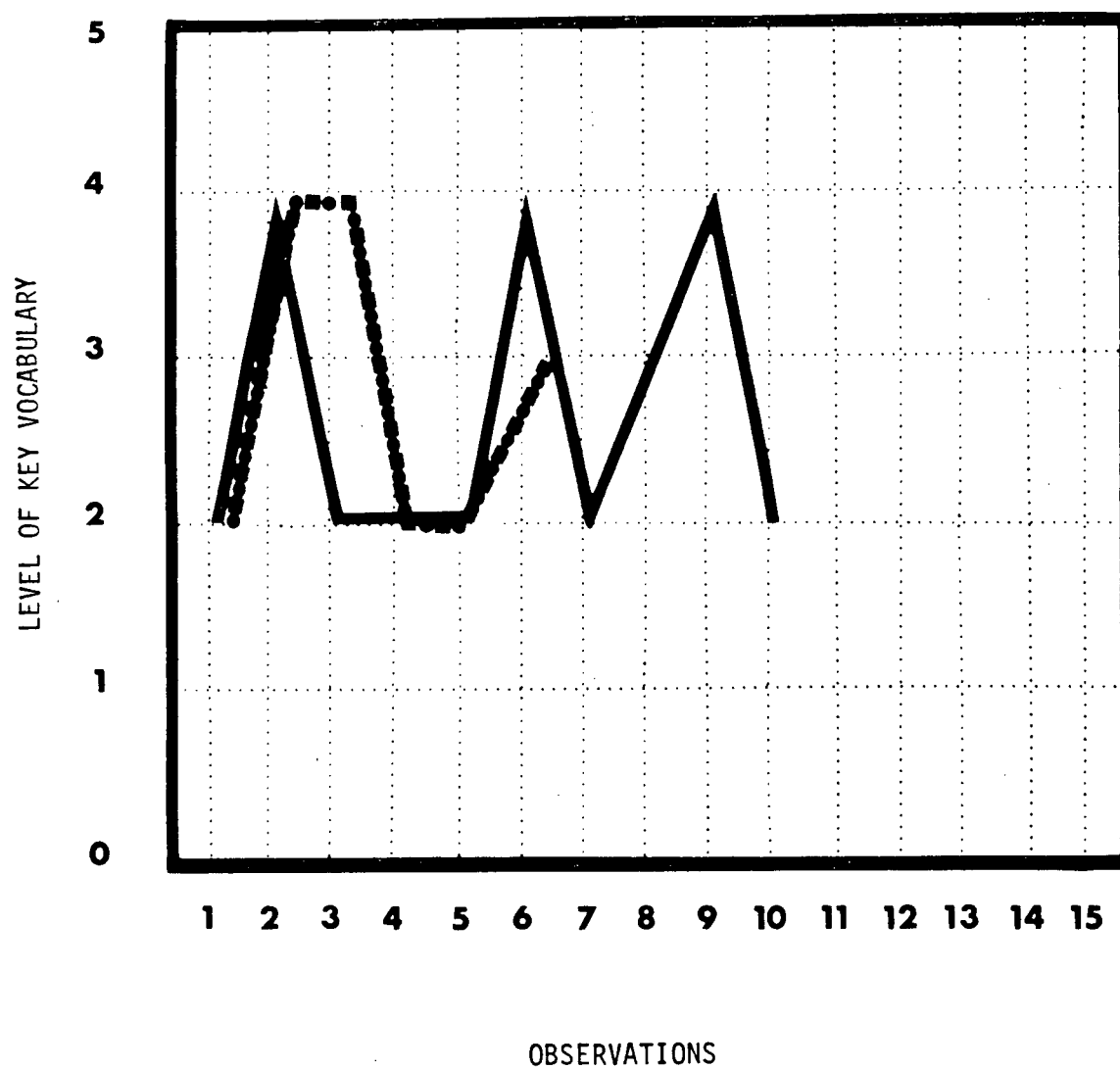
2 =
.....

3 = - - - - -

Figure 2

PROFILES OF STUDENTS SCORING

IN PATTERN M



CODE

Student

1 = ———

2 =
.....

3 = - - - - -

A Child With Unique Responses

One boy responded to the elicitation of Key Vocabulary in a manner which was not observed in any of the other children. In addition, his performance on the Piagetian tasks indicated his understanding were characteristic of a child in a later period of concrete thought.

During the Piagetian task tests, this child classified objects according to four to six attributes when using the blocks and the plastic animals. He identified three attributes using the picture cards from Attribute Games and Problems.

In terms of seriation, he quickly and accurately ordered all the materials. Tasks of double seriation and placement were not used in the study so it is not known whether he could perform these tasks.

The three measures for conservation of number were done quickly and the explanations were appropriate. Again, the tester did not administer the more complex conservation tasks.

The emergence of these specific concepts was observed in other children in the study. However, none of the other children scored as high on the classification tasks. In addition to the understanding of simple classification, simple seriation, and conservation of number; this child was able to do all three of the class inclusion tasks accurately and he could fully explain each of his responses.

This child responded to the Key Vocabulary elicitations

by telling the teacher that he needed more than one word to describe his conversation. He would then predict the number of words needed and request that the teacher write his sentence containing the predicted number of words.

The ability to predict the number of words he was going to request was a complex task. He had to be able to select the relevant idea he wanted to relate, mentally identify the number of words needed to express that idea, hold the idea constant while predicting the number of words needed, and then express the idea. His logical processes enabled him to respond in this manner, unusual for children 5 1/2 years of age. It is not clear whether the nature of this boy's response is indicative of another level of Key Vocabulary response or if it is unique to this child.

SUMMARY STATEMENT

An examination of the data provided support for the existence of varying levels of Key Vocabulary response. A gamma coefficient analysis indicated a strong relationship between these levels of response and stages of cognitive development. The post hoc analysis led to the identification of fifteen patterns of response. These patterns suggest individual differences in the ways children respond across time to the Key Vocabulary elicitations. Finally, the results of one child's unique responses and cognitive understandings were reported.

CHAPTER 6

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter presents a summary of the study, the conclusions reached, and the recommendations for teaching and for future research.

The Problem

Ashton-Warner (1963) introduced a strategy of reading instruction in which the teacher engages a child in a conversation followed by the elicitation of a single word response. These responses are recorded by the teacher on large cards and are reviewed daily with the child. Any words which the child does not recognize are discarded and those which the child knows immediately become the bases of the beginning reading instruction.

Based on her observations of children's responses across time, Ashton-Warner (Wasserman, 1972, 1976b) identified varying forms of response associated with the Key Vocabulary strategy. She noted four forms of oral and written response which she termed movements and which include: (1) single word responses; (2) two or three word responses; (3) written phrases or sentences; and (4) the composition of stories. She observed that these movements emerge in a sequential order.

In 1968, Veatch initiated a research project incorporating the Key Vocabulary strategy. She subsequently

reported (Veatch et al., 1973, Veatch, 1976) a form of Key Vocabulary response which she claimed appeared prior to the emergence of the single word response. It was observed that certain children responded to the Key Vocabulary elicitation with a sentence or phrase which they believed to be "a word". Some children referred to these sentences as "giant words"; thus Veatch labeled this phenomenon the Giant Word Syndrome.

The Giant Word Syndrome and the four movements in Key Vocabulary, when combined, reflect aspects of Papandropoulou and Sinclair's (1974) findings of four levels and two sub-stages associated with the child's understanding of the concept of "a word". Their study further indicated that these levels and sub-stages of metalinguistic competency were related to changing cognitive structures as measured by Piagetian tasks. It was conceived, therefore, that emerging cognitive processes would influence the nature of the child's response to the elicitation of a word as used in the Key Vocabulary strategy.

Thus the first focus of the study was the identification of levels of oral response obtained using the Key Vocabulary strategy as described by Ashton-Warner (1963), Wasserman (1972, 1976b), and Veatch (1973, 1976).

The second focus was the exploration of any possible relationships between levels of Key Vocabulary response and emerging stages of cognitive development as identified by Piaget (1955, 1966, 1974, 1976). It was proposed that there

would be a relationship between Key Vocabulary level and cognitive stage, with the Giant Word Syndrome corresponding to preoperational thought; the single word level of response to transitional thought; and between the two or three word level and concrete thought processes. A fourth level, consisting of advanced Key Vocabulary responses which could not be classified in the other three categories, was postulated to correspond to the concrete stage of cognitive development.

Research Procedures

Nine kindergarten teachers, working in fifteen half-day programs, volunteered to be trained to conduct the elicitation of conversations and Key Vocabulary responses with selected children in their classrooms. Five boys and five girls were randomly selected from each program providing an initial sample of 150 children. Thirty children were later excluded because they had fewer than four scorable responses; thus the analysis of the main study was based on a sample of 120 children.

The teachers elicited conversations and Key Vocabulary responses from each child on an individual basis twice a week during a six week period in April and May. These responses were recorded on large cards and were dated. On the back of each card the teacher noted information about the child's comments regarding multiple word responses. Using this information and the Key Vocabulary responses, a

response profile was developed for each child.

During the same six week period, the researcher and trained assistant administered the cognitive measures. Selected Piagetian tasks were used to determine preoperational, transitional, and concrete stages of thought. The tasks used were selected from studies reported by Piaget and his colleagues (Inhelder and Piaget, 1964; Inhelder, Sinclair, and Bovet, 1974; Piaget, 1952). Three measures of each of the following concepts were administered: (1) simple classification, (2) simple seriation, (3) conservation of number, and (4) class inclusion. Children who could not accurately do two out of three tasks related to any one concept were considered to be preoperational in thought. Those children who could do two out of three of the classification or seriation tasks were categorized as being in a transitional period. Children who could do two out of three of the conservation, seriation, and classification tasks were said to be entering the concrete stage of cognition. If the children could do two out of three class inclusion tasks, in addition to the seriation; classification; and conservation of number tasks, they were said to be in a more advanced period of concrete thought.

Findings

The findings, as they relate to each of the research questions, are reported below.

Key Vocabulary responses. The findings support the observation that some children respond consistently to Key Vocabulary elicitations. However, the data in this study, collected within a six week period, indicated that 81 of the 120 children moved back and forth between levels when responding to the elicitations. This within-child variation of level of response had to be considered when scoring the profiles. For the purposes of this study a modal score was chosen to determine an overall Key Vocabulary score for each child.

Seventeen children responded to the Key Vocabulary elicitations with a sentence which they believed to be "a word" (level 1 response). Ninety-four children responded with single word responses (level 2). No child consistently responded by giving two or three words (level 3). Nine children responded using sentences or phrases which they knew to be more than one word (level 4).

Key Vocabulary and cognitive development. A significant relationship ($\gamma=.82$; $p<.01$) was found between the four levels of response and the three stages of cognition. Of the 17 children who responded to the Key Vocabulary elicitations with a sentence which they believed to be "a word", 6 were preoperational in their thinking and 11 were in a transitional stage. There were no children scoring at this level who were at a concrete stage of cognitive development. Thus the Giant Word Syndrome was a phenomenon which did not appear in children who used logical thought processes.

Of the 94 children who had an overall Key Vocabulary score indicative of the single word, 10 were in a preoperational stage of thought, 39 were transitional in their thinking, and 45 were at a concrete stage of cognitive development. While some children who were preoperational in thought did respond to the Key Vocabulary elicitations with single words, the majority (84 out of 120 children) were no longer representational in their thinking but rather were able to use some processes characteristic of logical thought.

Nine children responded to the teacher's elicitations with a sentence understood to be more than one word (or a level 4 response). One child was transitional in terms of thought processes and 8 children were at a concrete stage of cognitive development.

Post hoc analysis. The nature of the Key Vocabulary responses varied in three ways from the predicted responses. First, some of the children attempted to count the letters in their whole sentence response so as to determine the number of words. Secondly, while no child had an overall Key Vocabulary score defined as a two or three word response, most of the multiple word responses recorded were compound words. Finally, the majority of individual profiles contained more than one level of response.

A post hoc analysis was conducted to examine these variations more closely. An alternative scoring system was developed to take into account a child's perception that

letters represented words and to separate compound words from two or three word responses. Following Veatch (1976), who contended that counting letters in a whole sentence response is a behavior sometimes observed in relation to the Giant Word Syndrome, a response of this nature was re-scored at level 1.1. Compound word responses were re-scored as level 3.1 responses.

The children's profiles were grouped according to the varying levels of response observed across time. These variations in levels of response formed patterns which included two, three, and occasionally four kinds of response. Fifteen patterns of response were identified in the study.

CONCLUSIONS

Levels of Key Vocabulary Response

The levels of response identified in this study indicate that there are differences in the ways children respond to the Key Vocabulary strategy. Some children respond to the Key Vocabulary elicitations with a whole sentence which they believe to be "a word". Thus it may be concluded that the Giant Word Syndrome described by Veatch (1973, 1976) does exist relative to the Key Vocabulary strategy. Furthermore, these data confirm aspects of Papandropoula and Sinclair's (1974) findings providing evidence for a period of understanding during which the child believes a sentence to be "a word".

A second form of response revealed in this study was the single word. Data of this nature confirm Ashton-Warner's (1963, 1972) contention that children respond to the Key Vocabulary elicitation with a single word as a caption of the conversation they have had with the teacher.

The two or three word response reported by Ashton-Warner (Wasserman, 1972) did not appear as an overall Key Vocabulary score in this study. Some children did, on occasion, respond to the elicitations with two or three words. However, the majority of responses of this nature could be defined as compound words. Given these data, it was concluded that not all children five and one half years of age respond to the Key Vocabulary elicitations with two or three words.

Some children responded to the Key Vocabulary elicitations with sentences they knew to be more than "a word". Most teachers, when recording a response of this nature, noted only that the child knew the response to be more than one word. Therefore, the data available were not sufficient to support any firm conclusions regarding this form of response.

Sequence of Key Vocabulary Response

It was proposed that levels of Key Vocabulary response would be found to emerge in a sequence. This sequence was hypothesized to vary in complexity moving from the Giant Word Syndrome (whole sentences believed to be "a word"), to

single word responses, to two or three word responses, and then to more complex forms of response. It was found that only some children in this study did move back and forth between levels of response. The Key Vocabulary data collected in this study alone are not sufficient to support the idea of a sequential development.

Key Vocabulary and Stages of Cognition

A high relationship ($\gamma = .82$; $p < .01$) was found to exist between levels of response and Piagetian stages of cognitive development. Because the gamma coefficient is one of the less conservative measures, it must be interpreted with caution. The level of significance does support Papandropoulou and Sinclair's (1974) earlier findings that the concept of "a word" is related to cognitive processes. Reid (1966) and Downing's (1968, 1970, 1971, 1973-74) research indicated that the terminology used in reading instruction is not always understood by the child. The present study supports their conclusions that the child's ability to understand the term "word" is indeed related to stages of cognitive development.

Sequence of response and cognition. The Piagetian stages of cognitive development have been shown to emerge in hierarchical order. The levels of response also appeared in a sequence which was related to ordered stages of cognition. Because of the relationship identified in this study, it can be concluded that there is a developmental sequence in the

forms of oral responses to Key Vocabulary elicitations. Thus, these levels of response are indicators of children's developmental stages of cognition.

Post Hoc Analysis

A post hoc analysis conducted to examine within-child variation led to the identification of patterns of responses to Key Vocabulary elicitations. These patterns indicated that the nature of children's responses to the elicitation of "a word" changed over a six week period. However, this change did not clearly indicate a transition from one level of response to another. It did reveal that not all children five and one half years of age consistently respond to the Key Vocabulary strategy with one form of response within a six week period. It was not possible to draw any conclusions about the significance of this variation of response.

Ashton-Warner's Observations

Ashton-Warner's (Wasserman, 1972) identification of "movements" or sequential forms of Key Vocabulary response, were basic to the conceptualization of this study. Concurrently, the presence of a Giant Word Syndrome identified by Veatch et al. (1973) suggested that there was a form of response which had not been acknowledged by Ashton-Warner. The data from this study revealed additional forms of response which had not been described previously. It can be concluded that levels of children's responses to

Key Vocabulary are more complex in nature than was thought previously.

IMPLICATIONS AND RECOMMENDATIONS

Implications drawn from this study are appropriate for practical application as well as for further investigation. The practical applications will be considered in terms of the classroom milieu and the experimental aspects will appear under the rubric of research.

Implications for Teaching

The study confirmed that children's responses to Key Vocabulary elicitations do vary according to several general types. These responses deserve the teacher's careful observation and anecdotal notation. Profiles of responses and notations about conversations should provide four kinds of information which would help the teacher match teaching-learning experiences to each child.

First, a child's level of understanding relative to reading and reading terminology can be indicated by the Key Vocabulary records. For example, a child's perception of the term "word" would be evident in the nature of the Key Vocabulary response. Other understandings, such as letters and spaces between words, would be reflected in a child's conversation about elicited response. This information could then be used in the selection of pre-reading and reading activities which are most appropriate for each individual

child.

Second, a child's interests will be indicated in the records the teacher keeps regarding the topics discussed during the individual sessions. These topics can be incorporated into the development of an integrated curriculum that is meaningful for each individual.

Third, a child's social/emotional needs and understandings will appear during his conversations with the teacher. The teacher's sensitivity to, and understanding of, a child's needs in this area of development have ramifications for all aspects of life within a classroom setting.

Fourth, a child's cognitive understandings are reflected in the way the environment is described and related to self. Information of this nature is indicated by the level of response elicited during the Key Vocabulary sessions. A record of such information is of value to the classroom teacher in terms of planning activities, selecting materials, and evaluating teaching strategies in every part of the teaching program.

Recommendations for Further Research

The identification of various levels of Key Vocabulary response suggests that continued research into the usage of this strategy of instruction would be worthwhile. The relationship indicated between levels of response and thought processes as measured by Piagetian concepts further

suggests that the research can be based on a developmental construct.

Sequence of response and cognitive development. One area for future investigation is the question of the developmental sequence of levels of Key Vocabulary response. The relationship found in this study between levels of response and stages of cognition provides some evidence of the existence of such a sequence. This order, as it is related to Key Vocabulary response, provides support for a sequential nature in levels of response. Further investigation is needed to clarify the sequence of responses to Key Vocabulary elicitations.

Thus the first recommendation for future research is that a longitudinal study be conducted which would trace the sequence of responses across time. It is recommended that pre and post Piagetian measures be administered. The intent of longer term investigations would be: (1) to define levels of Key Vocabulary response clearly; (2) to determine the exact sequence of response; and (3) to explore further the relationship between emerging cognitive structures and levels of Key Vocabulary response. When conducting such an investigation, the problems of scoring, as identified in this study, should be considered.

Level 4 response. While a level of response was identified which seemed to be more advanced than those described by earlier studies, the characteristic of this form of response requires more detailed examination. There

were not enough data available from this study to provide an understanding of this particular type of response. It is therefore recommended that future research collect data from teachers to provide more extensive information about the children's understanding of their Key Vocabulary responses.

Two word response. The existence of a two word response was not confirmed using the rules adopted for this study. Whether such responses should be explored by observing children's oral and written responses across time or whether they are the product of arbitrary scoring procedures, is yet to be determined.

It is recommended, therefore, that future studies include the two word response in order to test for its existence. It is also recommended that compound words be scored as a separate category from two unit or two word responses. Consideration should also be given to the search for this form of response in early stages of written response.

Written forms of response. The study examined children's oral responses only. Ashton-Warner (Wasserman, 1972, 1976b) claims that there are levels of Key Vocabulary response given in written forms which are also identifiable. There is a need for a long term study which would examine both the oral and written forms of Key Vocabulary response.

Impact of personal contact. The teachers participating in the study reported that the Key Vocabulary strategy encouraged them to talk to children on a more personal

level. They stated that this personal communication helped them better understand individual behaviors. Wasserman (1976) contends that this intimate adult-child interaction is a model for child-child interactions. It is possible that this personal contact influences the success children experience when the Key Vocabulary strategy is used.

It is recommended that future studies be designed comparing programs using: (1) the Key Vocabulary strategy; (2) a language experience method in which the instruction is on an individual basis; and (3) a language experience program where the major part of the instruction is on a group basis. An important feature of such a study would be to isolate the effects of the one-to-one relationship and the child's ability to respond. A second purpose would be to investigate the effects on children's behaviors towards one another as a result of the model of interaction they have experienced with the teacher. Finally, such a study could explore changes in teacher behaviors; that is, as the teachers become more aware of the needs and interests of individual children, do they alter behavior to meet those needs?

Possible limitations imposed by the elicitation method.

While the study confirms that there are differing levels of Key Vocabulary response, the method of elicitation raises some interesting questions. By asking children to respond with "a word" does the teacher unconsciously impose a limit on the number of words the child feels free to offer? Do

some children interpret this to mean they may not respond with two or more words? What other instructions should be investigated to test the various effects of teacher instruction. It is recommended that future studies consider the possible relationship between teacher instructions and the nature of children's responses.

These recommendations could provide directions for more extensive research relating to teaching styles and to the choice of the Key Vocabulary strategy for pre-reading and beginning reading activity.

CONCLUDING STATEMENT

This study has shown that although there is a need for continued research relating to the use of the Key Vocabulary method of instruction, the strategy itself has promise as a means of providing teachers with diagnostic information about individual pupils. The present study was limited to oral forms of response even though the Key Vocabulary teaching strategy can be used to elicit written forms of response when appropriate. The evidence suggests that cognitive processes related to other levels of response might be later identified using written responses. Finally, the affective impact of this particular teaching strategy has not been studied. Since elicitation of Key Vocabulary responses is a process which encourages children to express personal feelings and experiences, its use as a teaching strategy deserves attention.

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APPENDICES

APPENDIX A

Sample Conversations and Key Vocabulary Elicitation

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Sample Conversation and Key Vocabulary Elicitation

R. = Researcher and C. = The child

Sample 1

R. I saw you the last time I was out here, didn't I? It was Brian's birthday. it was a fun day, wasn't it?

C. Yup--It's my birthday the day after tomorrow. March the 2nd. That's my birthday.

R. How old will you be?

C. Six! Brian's already six. He beat me.

R. (laughs) Yes, but not by very many days. Are you going to do something special for your birthday?

C. M-m-m-m-m. Just we're going bowling--I think. If it's O.K. with my Dad and my Mom.

R. Who's going bowling with you?

C. Charlie, Les--that's my sister, Andrea who's in the afternoon class and that's all. Oh, my other sister and my baby sitter.

R. You have two sister's?

C. U-mmmm and me.

R. Do you go bowling very often?

C. No!

R. You've been before though?

C. Yes--once.

R. Do your Mom or Dad bowl?

C. U-mmmm. (nods "yes")

R. Do they go often?

C. Not often.

R. I find that the bowling ball is pretty heavy.

C. We don't do ten pin. We do five pin.

R. Ah-ha!

C. But the bowling ball is still pretty heavy for me.

R. Do you know how much it weighs? (Shakes her head "no").
It's just pretty heavy, isn't it? I'm always afraid I'm
going to drop it on my toe.

C. One time I did!

R. Oh, I bet that hurt! It's like stubbing your toe really
hard, isn't it?
JILL, I THOUGHT THAT WHAT WE MIGHT DO TODAY IS FOR YOU
TO THINK ABOUT ALL THE THINGS WE'VE TALKED ABOUT THEN
YOU TELL ME A WORD THAT TELLS YOU ABOUT SOMETHING
SPECIAL WE TALKED ABOUT AND I'LL WRITE THAT WORD DOWN
FOR YOU ON THIS CARD.

C. BOWLING. I WANT YOU TO WRITE THE WORD BOWLING.

R. (The elicited response "bowling" is recorded on a card.)

Sample 2

R. What we are going to do Paul is think about something you would really like to talk about. I'd like to get to know you better so I'd like to know things that you would like to tell me about yourself. You might tell me about things that you like, or things that you do, --like--you just made something very special over there.

C. A giraffe!

R. Can you tell me how you made that giraffe.

C. You have some legs and you nail it and you have a flat piece of wood, and a long piece of wood for his neck, and another for his head.

R. And how do you get all these pieces together?

C. Hammer 'em.

R. Is it hard to do?

C. Yes.

R. Then after you got all the pieces together, what did you do next?

C. Paint it. Yellow and brown for it's spots.

R. Have you ever seen a giraffe?

C. Yes. In a zoo.

R. What animals did you see in the zoo?

C. A giraffe--in pens--and birds and an elephant! And I seen foxes, chipmunks, and I seen ah-ah-zebras and ah-ah-that's all. And there was another animal, but I forget.

R. What did he look like? Do you remember?

C. He jumps and he has a pocket in front (short pause) a kangaroo!

R. That's right! What does she keep in the pocket?

C. A baby.

R. Sounds like you like animals. Do you have any pets at home?

C. We got two kittens but they run away from home.

R. I have a cat too. I like cats.

C. So do I.

R. Do you have any other pets?

C. No.

R. PAUL, OF ALL THE THINGS WE'VE TALKED ABOUT| WHAT WORD WOULD YOU LIKE ME TO WRITE DOWN. A WORD THAT TELLS YOU ABOUT WHAT WE'VE TALKED ABOUT TODAY. WHAT WOULD YOU LIKE ME TO WRITE DOWN.

C. KANGAROO.

R. ("Kangaroo" is recorded on a card.)

APPENDIX B

Criteria for Scoring Key Vocabulary Responses

APPENDIX B

Criteria for Scoring Key Vocabulary Responses

The data were scored by the investigator using the criteria outline below. A single score was entered along side each response.

Level 1.0

A whole sentence or phrase response which the child believed to be "a word".

Level 2.0

A single word response.

Level 3.0

A two or three word response.

Level 4.0

A sentence or phrase understood by the child to be more than one word.

Overall Key Vocabulary Score

The most frequent level of response on an individual response profile.

APPENDIX C

Alternative Criteria for Scoring Key Vocabulary Responses

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Alternative Criteria for Scoring Key Vocabulary Responses

The following criteria were used as an alternative scoring for responses on individual Key Vocabulary profiles. The appropriate score was entered next to each response.

Level 1.0 Response

A whole sentence or phrase response which the child believed to be 'a word'.

Level 1.1 Response

A whole sentence or phrase response in which the child counted letters to determine the number of words in the response.

Level 2.0 Response

A single word response.

Level 3.0

A two or three word response.

Level 3.1 Response

The combination of two or more words which are defined as "compound words" and which form a single concept of image. Only those responses which fit the Webster's Seventh New Colligate Dictionary (1965) definition of a compound word were considered a level 3.1 response. The following definitions of a compound word (Webster, 1965) served as a guide to determine whether or not a two or three word response could be classified in the level 3.1 response.

1. Independent English words (for example, "like") which are sometimes considered suffixes and joined together to form a single word or joined by a hyphen (such as, "Christlike"/"Christ-like") were considered compound words.
2. A noun plus another noun can be considered a compound word. Words such as "baby sitter", "black bear", "baby calf", or "bunk bed" were considered compound words.
3. Two proper nouns, such as "Bobbie Jean", were scored as compound words.
4. Nouns showing possession plus another noun were considered compound words. For example, "boys club" and "Mother's Day" were viewed as single concept responses.
5. An adjective plus a noun, such as "swimming pool" or "speed buggy" were considered compound words.
6. A verb plus a noun can be viewed as a compound word. An example of such a word would be "cure-all".
7. A verb plus an adverb can sometimes be considered a compound word. An example of such a combination would be "up-rooted".
8. A compound adverb, such as "sight unseen", would be scored as a single concept response.

If there was any question as to how to score a multiple word response, a dictionary definition was used to determine the appropriate level of response.

Level 4.0 Response

A sentence or phrase understood by the child to be more

than one word.

APPENDIX D

Patterns of Key Vocabulary Response

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Patterns of Key Vocabulary Response

Pattern A. Child responds to the Key Vocabulary strategy with a sentence which is believed to be "a word".

Pattern B. Child responds to the Key Vocabulary elicitation with a sentence saying it is "a word" and by counting the letters in a sentence to determine the number of words. Counting letters in a sentence was believed to be related to the belief that a whole sentence response is a word. For the purposes of this analysis, it was deemed necessary to separate this form of response from the other responses.

Pattern C. Whole sentence responses and single word responses.

Pattern D. A combination of whole sentences believed to be a word, attempts to count the letters in the sentences so as to determine the number of words, and responded with single words.

Pattern E. Whole sentence responses in which the child counts the letters so as to determine the number of words and single word responses.

Pattern F. Whole sentence responses which the child believes to be "a word", single word responses, and compound words.

Pattern G. A combination of counting the letters in a whole sentence responses, single word responses, and compound words.

Pattern H. Child responds with only single words.

Pattern I. Child responds with single words and compound words.

Pattern J. Child responds to the Key Vocabulary elicitations with single words, two or three word responses, and compound words.

Pattern K. Child responds to the Key Vocabulary strategy with single word responses, compound words, and whole sentences understood to be more than one word.

Pattern L. Child responds to the Key Vocabulary strategy with single words, two or three word responses, compound words, and sentences which he understands to be more than one word.

Pattern M. A combination of responses that are single words, compound words, and sentences which the child knows to be more than one word.

Pattern N. Single word responses and whole sentences which the child understands to be more than one word.

Pattern O. Child responds to the elicitations with sentences which he knows to be more than one word.

APPENDIX E

Piagetian Tasks

APPENDIX E

Piagetian Tasks

1. Material: Plastic geometrical shapes.
 3 triangles, 3 squares, and 3 circles (1 red, 1 blue, and 1 yellow.)
 There are two different sizes and two different thicknesses of each shape.

Presentation: The experimenter puts all the shapes in a heap on the table and asks the child to describe them: "Tell me what's there."

- A. "Can you put in a pile all the ones that go together. Put those that are very like each other together."

When child has finished, ask: "Why did you put them like that?"

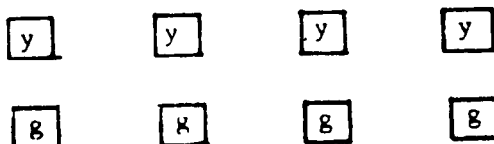
- B. "Can you find another way to put them together?"
 "Why did you put them like that?"

- C. Continue until the child has run out of ways. If he has not sorted into two piles, say, "Now can you put them in just two piles? All the ones that are alike in one way put here and all that are alike in another way put here."
 "Why did you put them like that?"

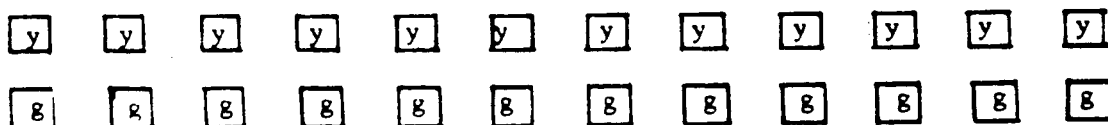
Continue having the child sort into two piles, always asking "Why", until he has exhausted all possible ways he can think of to sort.

2. Material: Colored wooden blocks 1 inch square.
 12 yellow blocks
 12 green blocks

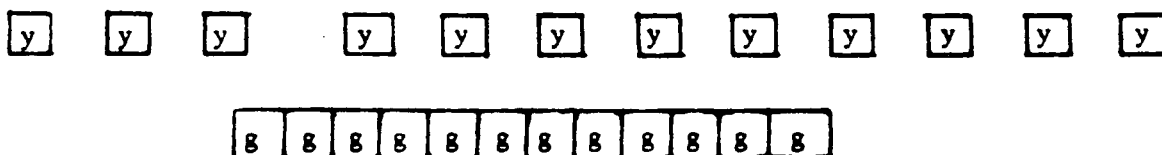
Presentation: Start by lining up 4 yellow blocks opposite 4 green blocks as shown.



- A. "Are there as many blocks in my row as in your row?"
If the child says "no", ask the child to make the rows equal.
- B. Add 2 blocks to just one row. Ask, "Do I still have the same number of blocks as you have?" Make the rows equal and repeat the above question. Continue until you have 12 blocks in each row as shown.



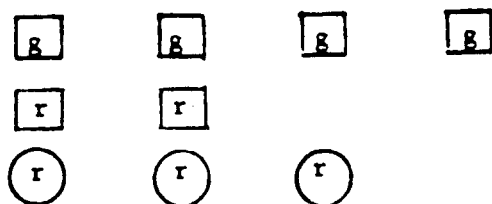
"Now watch what I am going to do." Push the green row together as shown. "Are there still as many green blocks in this row as there are yellow blocks in this row? Or are there more or less green blocks now?"



"Why do you think that?"

3. Material: Plastic nesting toy.
- Presentation: Place pieces of toy on the table in a heap.
- A. "Will you please line these up for me so they go from the largest to the smallest?"
4. Materials: 4 green squares, 2 red squares, and 3 red circles.

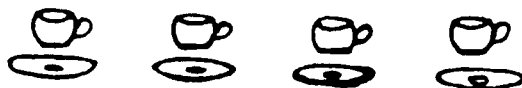
Presentation: Place the shape on the table as shown.



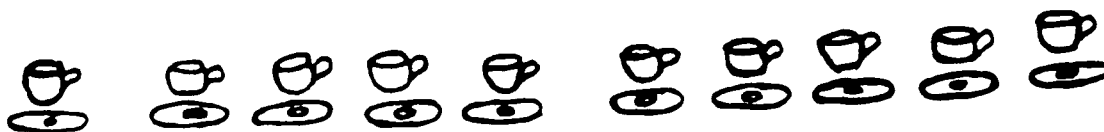
- A. "Are all the red ones circles? Why?"
- B. "Are all the squares green? Why?"
- C. "Are there more circles or more red things? Why?"
- D. "Are there more red things than there are squares, or are they the same or less? Why?"

5. Material: Ten plastic cups and ten plastic saucers.

Presentation: Start by lining up 4 cups opposite 4 saucers as shown.



- A. "Are there as many cups in this row as there are saucers in this row?" If the child says "no", ask that the rows be made equal.
- B. Add two cups to one row. Ask, "Do I still have the same number of cups as I have of saucers?" Make the rows equal and repeat the above question. Continue until you have 10 cups and saucers in each row as shown.



"Now watch what I am going to do." Push the row of cups together. "Are there still as many cups in this row as there are saucers in this row? Or are there more or less cups than saucers now?" (See #2).

"Why do you think that?"

6. Materials: Nine little rods of different lengths.

Presentation: Place the rods on the table in a pile.

- A. "I would like you to line these up for me so they go from the longest to the shortest."

"Why did you line them up that way?"

7. Material: Plastic picture cards of sixteen people. The pictures show people dressed in two colors (blue and red), of two age groups (adults and children), two sizes (fat and thin), and two sexes (male and female). Material taken from Attribute Games and Problems; Elementary Science Study.

- A. "Can you put in a pile all the ones that go together. Put those that are very much like each other together."

- B. "Can you find a different way to put them together?"

"Why did you put them like that?"

Continue in the above manner until the child can think of no more ways to sort.

8. Material: A bunch of ten yellow (or white) daisies and four red roses (artificial flowers).

Presentation: Have the child name the flowers and make sure that he knows the term "flowers".
 "Are the daisies flowers? . . . Are the roses flowers? . . . Do you know the names of some other flowers?"

- A. Are there more yellow (or white) daisies or more flowers in this bunch?
- B. "You and a friend would like to make up bunches with these flowers. You make up a bunch with the daisies. Then you give the daisies back to your friend. She makes up her bunch with the flowers. Which bunch will be bigger?"
- C. If I give you the daisies, what will I have left in the bunch?
- D. If I give you the flowers, what will I have left in the bunch?
- E. "I'm going to make up a bunch with all the daisies, and you are going to make a bunch with all the flowers. Who will have the bigger bunch?"

9. Material: Eight red (or orange) pieces of wood which vary in shade from light pink (or orange) to dark red (or orange).
 Materials are from a Montessori color tablet kit.

- A. "Will you please line up for me all the colors going from the darkest color to the lightest color."

"Why did you line them up that way?"

10. Material: Twelve yellow wooden blocks and 12 yellow cars.

Presentation: Start by lining up 4 yellow cars opposite 4 yellow blocks (garages).
 (Same as task #2 and task #5).

- A. "Are there as many cars in this row as there are garages in this row?" If child says "no", ask that they be made equal.
- B. Add 2 cars to one row. Ask, "Do I still have the same number of cars in this row as garages in this row?" Make the rows equal and repeat the above question. Continue until you have 12 in each row. (See #2 and #5.)
- C. "Now watch what I am going to do." Push the blocks

(garages) together. "Are there still as many cars in this row as there are garages in that row? Or are there more or less cars than garages?" (See task #2).

"Why do you think that?"

11. Material: Ten yellow plastic beads and four green plastic beads.

Presentation: Place the beads in a small box.

"What do I have in this box? (Plastic beads--if the child does not state "plastic beads", ask, "What are these beads made of?").

"What colors are my plastic beads?"

"Now I am going to ask you some questions about these beads."

- A. "Are there more plastic beads or more yellow beads in my box of beads?"
- B. There are two little girls who would like to make necklaces out of these beads. One would like first to make a necklace out of the yellow beads, and then, when she gives the beads back to me, the other girl would like to use the plastic beads to make a necklace. Which of the two necklaces will be longer?"

"Why?"

- C. "If you give me all the yellow beads, what will be left in the box?"
- D. "If you give me all the plastic beads, will there be any beads left in the box? Why? How do you know?"
- E. "In this box, would you say that there are more yellow beads or are there more beads made of plastic? Why? How do you know?"

12. Material: Ten plastic animals.

Presentation: Place the animals in a random order on the table. Have the child name the animals and talk about them for a bit.

- A. "Can you put together all of the animals that go together? Put those together that are alike in some way."

"Tell me why you put them together this way."

B. "Can you find another way to put them together?"

"Why did you put them like that?"

C. Continue until the child has run out of ways. If he has not sorted into two piles, say, "Now can you put them in just two piles? All the ones that are alike in one way put here and all the ones that are alike in another way put here."

"Why did you put them like that?"

Continue in the above manner until the child can find no more ways to sort.

APPENDIX F

Record Sheet For Piagetian Tasks

APPENDIX F

Record Sheet For Piagetian Tasks

Name of Child _____

Date of Birth _____

Today's Date _____

1. Classification

2. Conservation of number

more

less

same

reason:

3. Seriation

4. Class inclusion

A. yes no

reason:

B. yes no

reason:

C. circles red things

reason:

D. red things same less

reason:

5. Conservation of number

more less same

reason:

6. Seriation7. Classification

8. Class Inclusion

- A. daisies flowers
- B. me my friend
- C. daisies roses nothing
- D. daisies roses nothing
- E. you me
- reason:

9. Seriation10. Conservation of number

- more less same
- reason:

11. Class Inclusion

- A. plastic bead yellow beads
- reason:
- B. plastic yellow beads green beads
- C. green beads nothing

D. yes

no

reason:

E. yellow beads

plastic beads

reason:

12. Classification

APPENDIX G

Summary Sheet For Piagetian Tasks

APPENDIX G

Summary Sheet For Piagetian Tasks

Child's Name _____

Date of Birth _____

Teacher's Name _____

Date of Testing _____

	Task 1	Task 2	Task 3						
1 attribute				nesting toy		blocks		shapes	
2 attributes				rods		cups and saucers		flowers	
3 attributes				color tablets		cars and blocks		beads	
more than 3									
CLASSIFICATION				SERIATION		CONSERVATION OF NUMBER		CLASS INCLUSION	

APPENDIX H

Criteria for Scoring Piagetian Tasks

APPENDIX H

Criteria for Scoring Piagetian Tasks

Simple Classification

- (a) A score of 0 was assigned to a classification task if: (1) the child arranged the material in pairs or (2) used the materials to form a graphic arrangement (for example, a picture or design).
- (b) A score of 1 was assigned to a classification task if the child sorted materials according to one attribute (for example, if the child could find only one way to group the objects).
- (c) A score of 2 was assigned to a classification task if the child sorted the materials using two attributes.
- (d) A score of 3 was assigned to a classification task if the child sorted the materials using three attributes.
- (e) A score of 4 was assigned to a classification task if the child sorted the materials according to four or more attributes.

Simple Seriation

- (a) A score of 0 was assigned to a seriation task if the child formed subgroups with the objects or used the materials to form a graphic arrangement or design.
- (b) A score of 1 was to be assigned to a seriation task

if the child ordered the materials by trial and error.

- (c) A score of 2 was assigned to a seriation task if the child ordered the material correctly.

Conservation of Number

- (a) A score of 0 was assigned to a conservation of number task if the child did not realize that the two rows contain the same number of objects inspite of the displacement of objects.
- (b) A score of 0 was assigned to a conservation of number task if the child realized the two rows of objects were the same, but could not give a reason for his answer.
- (c) A score of 1 was assigned to a conservation of number task if the child knew there were the same number of objects in both rows inspite of the displacement of objects in one row. Furthermore he could explain why the two rows still had the same number of object.

Class Inclusion

- (a) A score of 0 was assigned to a class inclusion task if one or more responses were incorrect on a class inclusion task.
- (b) A score of 1 was assigned to a class inclusion task only if all the child's responses were correct on a class inclusion task.