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A Comparison of Responses Between Two Different Socioeconomic Groups on the *Boehm Test of Basic Concepts*

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AN ABSTRACT OF THE THESIS OF Teri Jones Geist for the Master of Science in Speech Communication: Emphasis in Speech Pathology/Audiology presented February 14, 1975.

Title: A Comparison of Responses Between Two Different Socioeconomic Groups on the Boehm Test of Basic Concepts.

APPROVED BY MEMBERS OF THE THESIS COMMITTEE:

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The primary purpose of this investigation was to compare the responses of white, lower-class kindergartners and first graders with white, middle-class kindergartners and first graders on the Boehm Test of Basic Concepts (BTBC) (Boehm, 1969) in order to determine if a statistically significant

difference existed between socioeconomic level and the number of concepts correctly identified on the BTBC. A secondary purpose was to determine if a significant relationship existed between concept development as measured by the BTBC and intelligence from an assessment of receptive vocabulary by using the Peabody Picture Vocabulary Test (PPVT) (Dunn, 1959).

One hundred white, lower and middle socioeconomic level children from two elementary schools in Portland were selected as subjects to be included in this study. Variables controlled were grade level, auditory acuity, emotional stability, and socioeconomic status.

The BTBC consists of fifty pictorial items, arranged in approximate order of difficulty and divided evenly between two booklets. Included in the fifty items are twenty-three spatial concepts, four time concepts, eighteen quantity concepts, and five concepts classified as miscellaneous. The PPVT was used to provide an estimate of a subject's verbal intelligence through a measurement of his receptive vocabulary. On both tests, the subject was instructed to point to the picture representing the stimulus item.

The results of this study revealed a relationship exists between socioeconomic status and the number of concepts correctly identified on the BTBC. This relationship was observed when the lower-class subjects were compared with their middle-class peers at each grade level, when all kindergartners were compared to all first graders, and in a comparison of the fifty lower-class and fifty middle-class subjects.

The subjects of the middle socioeconomic level tended to identify more concepts correctly than the subjects of the lower socioeconomic level, while the first grade subjects, generally, identified more concepts correctly than the kindergartners. An analysis of the conceptual areas of space, time, and quantity revealed that socioeconomic status was related to the number of concepts correctly identified when the fifty lower-class subjects were compared to the fifty middle-class subjects. The children of the middle-class identified more concepts correctly in each area than the lower-class subjects. Grade level also was related to the number of concepts correctly identified in each of the concept areas. The first graders tended to identify more concepts in each area than the kindergartners. When the scores of the lower- and middle-class subjects at the kindergarten level were compared, there was no relationship between socioeconomic status and the number of concepts correctly identified in each of the three areas. No relationship was observed between the scores of the two groups of first graders on the spatial concepts. Socioeconomic level, however, did effect the number of time and quantity concepts correctly identified. The subjects of the middle socioeconomic level, generally, identified more time and quantity concepts correctly than the subjects of the lower socioeconomic level.

These results suggest a higher degree of abstraction abilities may be found with increased age and a higher socioeconomic level. The findings also tend to support the views of

many researchers in the field of conceptual development who have stated that the language of the disadvantaged child inhibits his ability to abstract.

Results of a Pearson's Product-Moment correlation calculated between the subjects' scores on each of the tests indicated no significant correlation between the children's I.Q. scores and the number of concepts correctly identified.

A COMPARISON OF RESPONSES BETWEEN TWO DIFFERENT SOCIOECONOMIC
GROUPS ON THE BOEHM TEST OF BASIC CONCEPTS

by

TERI JONES GEIST

A thesis submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN SPEECH COMMUNICATION

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1975

TO THE OFFICE OF GRADUATE STUDIES AND RESEARCH:

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Words cannot express the gratitude I would like to convey to my wonderful parents for their enduring support throughout my education. Finally, to my husband I say, thank you for everything; we made it!

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CHAPTER I

INTRODUCTION AND STATEMENT OF PURPOSE

I. INTRODUCTION

Several terms are used today to describe children who are members of the lower socioeconomic class in our society. Synonymous terms include culturally disadvantaged, culturally deprived, socially disadvantaged, and underprivileged. A common element, which seems to be found in all of these, is that children from lower socioeconomic status backgrounds lack the ~~opportunity to learn through experiences~~ normally found in middle- and upper-class home environments which facilitate success in school (Bereiter and Engelmann, 1966; Havighurst, 1965). Bereiter and Engelmann (1966) asserted that in lower-class homes the cognitive uses of language are severely restricted between adults and their children, which impairs the ability to describe, instruct, explain, test, hypothesize, deduce, compare, and analyze. These cognitive processes obviously are essential to school success.

One of the cognitive uses of language which is hindered in the lower-class child is the development of concepts. A concept, as defined by Arnone (1971), is a personal understanding of a symbol, i.e., a mental image; it has certain characteristics: 1) it is identifiable; 2) it can be learned,

labelled, and forgotten; and 3) the acquisition of one concept can have a positive or negative effect on the learning of a second one. Concepts develop slowly from concrete to abstract and at different rates for different individuals (Arnone, 1971; Reed and Dick, 1968). An individual develops concepts through experiences in which he engages (Arnone, 1971; Reed and Dick, 1968). Differences in concept development do exist among different socioeconomic or cultural groups. The disadvantaged child lacks the language facility which is necessary for independent thinking and problem solving (Doyle, 1972; Bereiter and Engelmann, 1966). His deficit in language facility hinders his development of concepts (Doyle, 1972; Bereiter and Engelmann, 1966). An example of the phenomenon of differences in concept development among different socioeconomic or cultural groups can be illustrated by a study comparing Indian and non-Indian children, which found that the statistical differences in verbal concepts as measured by the Boehm Test of Basic Concepts were associated with differences in socioeconomic status or culture (Mickelson and Galloway, 1973). One study has been published which compared the responses of two different white socioeconomic groups on this instrument; the experimental groups were urban and rural. This researcher, however, found no studies which compared the responses of two different white socioeconomic groups in an urban setting using this instrument. It is felt, therefore, that a need presents itself to determine if a statistically significant difference exists.

II. STATEMENT OF PURPOSE

The purpose of this study was to compare the responses of white, middle-class kindergartners and first graders with white, lower-class kindergartners and first graders on the Boehm Test of Basic Concepts (Boehm, 1969). A secondary purpose was to determine if a significant correlation existed between concept development as measured by the Boehm Test of Basic Concepts and intelligence from an assessment of receptive vocabulary by using the Peabody Picture Vocabulary Test (Dunn, 1959).

The null hypotheses to be tested in this investigation were:

1. No statistically significant difference will exist ~~between the total number of concepts correctly identified by:~~
a) the lower-class kindergartners and the middle-class kindergartners; b) the lower-class first graders and the middle-class first graders; c) all lower-class and all middle-class subjects; and d) all kindergarten and all first grade subjects.

2. An analysis of the conceptual areas of space, time, and quantity will reveal no statistically significant difference between the number of concepts correctly identified in each area by: a) the lower-class and middle-class kindergartners; b) the lower-class and middle-class first graders; c) all lower-class and all middle-class subjects; and d) all kindergartners and all first graders.

3. No statistically significant relationship will exist between scores earned by all subjects on the Peabody Picture

Vocabulary Test and those scores earned by all subjects on the
Boehm Test of Basic Concepts.

CHAPTER II

REVIEW OF THE LITERATURE

For the purpose of the present study, a review of the literature relative to cognitive language development in children will center around four areas: 1) signs of school readiness relating specifically to which concepts should be possessed by a child previous to school entrance; 2) language development, chiefly of the lower-class child; 3) the development of cognition in children; and 4) the process of concept development in children.

I. SCHOOL READINESS

The concept of school readiness has been surrounded by more controversy than any other topic in education (Beller, 1970). The controversy seems to have at its base different ideas of determining when a child is ready to learn. Beller (1970) cited several educators who have held differing positions on school readiness. One such viewpoint is Rousseau's concept of readiness which was based on maturation. He, reportedly, criticized educators for not waiting for the necessary faculties to "ripen" in the child (Beller, 1970). Gesell's school of readiness was stated to be more interested in biological speculations about developmental changes in behavior than in behavioral changes resulting from an individual's

interaction with his environment. Gesell did not totally ignore the environment, however; he felt that environmental factors may influence a child's developmental sequences, but the basic foundation was laid by biological factors. Similarly, Ilg and Ames, who worked with Gesell, were reported by Beller (1970) to attribute changes in development to biological phenomena; environmental factors such as ethnic background, social class, and other environmental influences do not play an influential role in the determination of readiness. For Ilg and Ames, true readiness was said to be based on detailed observations of what children actually do under "normal circumstances" (Beller, 1970).

Beller (1970) felt the concept of readiness should be objectively defined, as he wrote:

Statements concerning readiness become more meaningful in the sense of being testable, when criteria of readiness are pinned down to specific activities or operations in such a way that their relationship to rate of learning and level of achievement of new activities or operations can be ascertained and in some way predicted.

Lee and Lee (1958) specified some considerations which have implications for the determination of a readiness to learn:

- 1) there exist in a child's life developmental periods when readiness for certain learning is at its optimum;
- 2) the child's readiness to respond to school tasks is greatly affected by the home environment;
- 3) one aspect of development may influence other factors;
- 4) the "emotional climate" of the home is of utmost importance;
- 5) an individual child's abilities vary greatly; and
- 6) maturation and learning both contribute to readiness.

In addition to these implications, they felt that a child's readiness to learn depends on a number of factors influencing his development; among them are motor development, development of self-concept, intelligence, the child's relationship with himself and the child's relationship with others (Lee and Lee, 1958).

Several researchers have commented on signs of school readiness. Behrmann (1972) enumerated certain questions to be considered in determining if a child is ready for school: 1) Does the child have a sense of time?; 2) Does he know left from right?; 3) Does he know the days of the week and months of the year?; 4) Does he understand the common words or phrases used in school, such as second, next to, and after?; 5) Can he follow directions? An examination of these questions reveals that some type of conceptualization is involved in each. Similarly, Locatis and Smith (1969) have stated that certain skills are a prerequisite for children entering the first grade, and without them children fail. Among these skills is a knowledge of basic concepts which is essential to learning in subsequent grades.

There seems to be a paucity of research detailing exactly what concepts children should know before entering school. Lee and Lee (1958) have stated that relatively little is known pertaining to the age at which it is possible for children to understand certain phases of various concepts. The concepts emphasized in the literature as having a bearing on readiness for learning are knowledge of color, names of animals, concepts

of space, size limitations and money, time and place orientation, knowledge of geometric shapes and the position of objects in space. The ability to perceive differences in objects and geometric forms is thought by Gulridge (1953) to be a signal for being ready to read.

Most children reflect a readiness to enter school. It has been stated, however, that lower-class children are deficient in the ability to master the cognitive uses of language, which is a disability that can cause them to be as much as two years behind their peers upon entering school (Bereiter and Engelmann, 1966). By the time most lower-class children reach school, they are already behind their middle-class peers. Bereiter and Engelmann (1966) have emphatically stated that the retarded language development displayed by lower-class children will prevent them from achieving academic success in school. Deutsch (1966) has noted that children from disadvantaged backgrounds, on the whole, enter school with a somewhat different language system than middle-class children. Their language systems appear to be simpler in syntax and less rich in descriptive terms and modifiers than is the language of the average, middle-class child.

Data suggest disadvantaged children suffer in the areas of perception, verbal skills, and attention (Deutsch, 1966), i.e., areas which represent crucial, underlying skills in school learning. In addition to these areas, Breshnahan and Shapiro (1972) felt the specific areas in which children from lower-class environments are deficient are reading, number

concepts, time concepts, auditory discrimination, visual discrimination, and symbolic representation. Since so many lower-class children are lacking in the crucial areas necessary for school success, one might say they do not display the academic skills necessary for school entrance as do other children of the same chronological age.

These children are headed for failure unless a rapid "catch-up" process is provided. Several individuals have offered suggestions relative to educating the lower-class child and helping him develop the cognitive uses of language in order to facilitate success in school. Biber (1967) outlined four kinds of essential experiences for the five-year-old child who is beginning school. She stated the lower-class child should: 1) have an extended opportunity to explore the physical world; 2) be helped to become increasingly sensitive to the world in which he lives; 3) have a full opportunity for "doing and making"; and 4) have support in his developmental tendency to deal with things indirectly, to symbolize them and to reproduce in his own particular way experiences that have been meaningful to him. As a supplement to this, Doyle (1972) stated that the disadvantaged child: 1) must be taught how to manipulate words into meaningful thought processes; 2) must learn differences in size, shape, and color; 3) must learn to classify and group things; and 4) must be made aware of tactile differences of soft, hard, rough, and smooth.

In summary, our educational system is based on conceptual

learning (Doyle, 1972). The ability to master the cognitive uses of language has been said to be a determining factor for a child to achieve success in school. As a result of the lower-class child's inability to master the cognitive uses of language, he may meet failure in school unless he is involved in a rapid "catch-up" process.

II. LANGUAGE DEVELOPMENT OF THE LOWER-CLASS CHILD

A brief examination of the language development of the lower-class child may offer insight into reasons why his language development does not adequately prepare him for school. The normal development of language is a process of refinement and growth. In most children (after the age of three years) the vocabulary increases and sentence structures become more complex. The environmental factor of economic status and cultural deprivation is highly correlated with language development. The language spoken in the homes of lower-class children seems to be typically poor in quality and quantity (Bloom, Davis, and Hess, 1965). Conversely, McCarthy (1930) has found that children from "superior" socioeconomic backgrounds will be superior in speech and language, with superiority most often being related to differences in the educational level of the parents.

Schiefelbusch (1967) has stated that the acquisition of language by the lower-class child is inhibited by two factors: 1) minimal social interaction; and 2) a lack of sufficient reinforcement. It would appear that a crucial relationship

exists between verbal interaction and language development. Merely stimulating a child verbally is not enough; in addition, a child must interact with adults. In examining this hypothesis, Neal (1967) found that verbal interaction is often absent from lower-class homes. Because of the lack of verbal interaction between children and adults in lower-class homes, the children learn language by means of receptive exposure, i.e., by hearing rather than by the correction of their own speech. Children in middle socioeconomic homes learn their language by feedback, i.e., by the correction and modification of their own speech. More explicitly, adults in middle-class homes, characteristically, tend to use words so freely and easily they teach them to a child at almost every opportunity (Bloom, Davis, and Hess, 1965). The following process is involved: encouraging the child to say the word aloud; correcting him when he says the word incorrectly or wrongly applies it; and reinforcing him when he uses a word or symbol correctly. The culturally advantaged child appears to have more access to this corrective feedback than other children.

According to Schiefelbusch (1967), the second factor which inhibits the acquisition of language by the lower-class child is a lack of sufficient reinforcement. Encouragement to talk and corrective feedback reinforcement are abundant in most middle- and upper-class home environments. Too often, the lower-class child's attempts at verbal communication are followed by negative reinforcement such as "Shut up," "Be quiet," or "Don't talk until you've been spoken to," which is grammatically

incorrect in and of itself. Additionally, he is corrected and is fed misinformation in the process. Consequently, the lower-class child has learned through trial and error that little verbalization is quite compatible with his environment, and as Wicker (1972) has stated: "Most of the time, most people behave in ways compatible with their environment."

Several others have commented on the language retardation of lower-class children. The language deficiencies possessed by lower-class children have been attributed to several factors; among them is the lack of social experiences in the lower-class child's home which seems to be the crucial factor relating to his failure to develop cognitive language (Brottman, 1965; Engelmann, 1966; and Deutsch, 1967). Disadvantaged children often are not exposed to situations which provide experience with cognitive skills. These situations have been outlined by Havighurst (1965) as a family environment which sets examples of reading, and one which provides a variety of toys and play materials of varying colors and sizes, posing a challenge to the child's ingenuity. A second situation is a family conversational experience which encourages the child to ask questions, answers his questions, and extends his vocabulary with new words.

The ways in which parents spend time with their children at meals, in play, and at other times during the day have been found to be central factors in developing skills which prepare children for school (Bloom, Davis, and Hess, 1965). Engelmann (1966) and Deutsch (1967) have stated that the activity of the

child's environment and his capacity to learn form a very firm relationship. The child's capacity to learn follows the activity of his environment, as it is the active verbal engagement of people surrounding the child which is the operative influence in the child's language development. Most disadvantaged children spend less time in direct interaction with their parents than do middle-class children. Bloom, Davis, and Hess (1965) found that a difference definitely exists between the amount of time spent in direct interaction between parents and children in middle-class home environments and that between parents and children in lower-class home environments. Usually, parents in lower-class homes do not have the skills in language to effectively use the time they spend with their children in order to foster the language and cognitive development that would help the child in school.

In conclusion, then, it can be said that one factor that seems to account for the lower-class child's retarded cognitive development is the minimal amount of stimulation and reinforcement experienced in the environment in which he spends his preschool years.

III. THE DEVELOPMENT OF COGNITION

Cognition has been defined in many ways, and these definitions have carried with them several speculations about the development of cognition. Minor (1973) defined it as: ". . . the process by which the organism acquires, stores, and utilizes information," while Phillips (1969) characterized cogni-

tive development as ". . . the process of selecting, discovering, and maintaining thought." Ellis (1972) felt this process involved such activities as thinking, reasoning, problem-solving, and conceptual learning. In reviewing the literature on cognitive development, it appeared to this investigator that psychologists and others who have studied intelligence indicate that cognition can only be inferred, i.e., the symbolic and mental processes involved in cognition are not directly observable. They are inferred from behavioral changes. Theories of the development of cognition seem to be based on inference. One of the most noted researchers of cognitive development in children, Piaget, formed his theory from extensive observations of the behavior of children and adults; he noted the child's surroundings and his behavior in those surroundings (Phillips, 1969).

Cognition has been considered to be one component of intellectual functioning. Guilford (1956 and 1961) theorized that intellectual factors are categorized into two major groups: 1) thinking, and 2) memory. The great majority of intellectual abilities are thinking factors. Thinking abilities were subdivided further into cognitive, productive, and evaluative abilities. Cognitive factors deal with the development of awareness of information and the recognition and remembering of this information. Productive abilities enable a person to act with this information. Evaluative abilities are utilized when it is necessary to determine the suitability, adequacy, or effectiveness of the results of thinking. Memory, the

second component of intelligence, is the retention and recall of information (Guilford, 1956). Guilford (1959) classified intellectual factors according to the kind of material or content involved. He proposed three kinds of material: 1) figural content or "concrete material such as is perceived through the senses, and which does not represent anything except itself," e.g., size, and color; 2) symbolic content which is composed of letters, digits, and other conventional signs; and 3) semantic content which takes the form of verbal meanings or ideas.

Several researchers have delineated components of cognition. Ellis (1972) divided cognition into the processes of thinking, reasoning, problem-solving, and conceptual learning. All of these processes were thought to be a part of learning, or the acquisition of new information.

According to Kagan (1971), however, an individual must possess a set of mental structures before he can learn. Schemata, images, symbols, concepts, and rules compose these mental structures, which give substance to thought. He attributed much importance to these structures stating:

- 1) They are the bricks and mortar of the larger structure called intelligence.
- 2) These structures are not located in any one place in the mind; nor do they have substance or physical dimension.
3. They are served by a set of cognitive processes which include perception, memory, evaluation, generation of ideas and reasoning. The interactions of these mental processes define thought.

Kagan described each of these mental structures. The schema ". . . is a representation of the critical features of a

specific event" and may be the earliest acquired of the structures. An image is more easily manipulated in thought and is defined as ". . . a detailed and elaborate mental picture created from a schema."

The best way to regard the relationship between a schema and an image is to view the former as the basic skeleton from which a complete and elaborate representation is built when cognitive processes perform on the schema (Kagan, 1971).

Symbols are ". . . arbitrary names for things and qualities." In contrast to schema, a symbol is an arbitrary way to name a thing; a schema is not arbitrary, but represents the features of a specific event. A concept stands for a common attribute among a group of schemata, symbols, and images. The main difference between a symbol and a concept is that the former stands for one object or event, while a concept represents something common to several objects or events. Concepts will be discussed further in a later sub-section of this chapter. Rules involve a set of procedures that effect a relation and/or state a simple relationship between two concepts. These five mental structures enable an individual to think and solve problems (Kagan, 1971; and Ellis, 1972). Experiences the child meets as he is solving problems enrich and strengthen these mental structures (Kagan, 1971). This investigator found the importance of experience in a child's life consistently emphasized by authorities who have written about the development of cognition and concepts.

Additionally, Kagan (1971) has outlined the sequence of events in problem-solving and stated that the major processes

involved are comprehension, memory, generation of ideas, evaluation, implementation, and occasionally reporting. These processes enumerated by Kagan coincide with some of Guilford's (1956 and 1961) processes outlined above. The child must first comprehend the problem, that is, his perception and interpretation of the problem must be accurate. The interpretation of events in the child's environment almost always takes place, but the form of interpretation changes with age. Kagan (1971) further contends that the infant or very young child usually translates experiences into schemata or images, but when he is older he will rely more on symbols and concepts. This change is thought to take place around five to seven years of age, and results from the ability of the child to focus his attention on more than one event at a time. The second problem-solving process, memory, allows the child to store information in order to solve a problem. A child under six or seven is able to hold only a few words or ideas in his mind if someone is speaking to him; his long term memory also is not as well developed as it is in preadolescence (Kagan, 1971). There are two major reasons for the young child's poorer memory: 1) the young child has not developed the language which enables him to label an event, in other words, the use of schema, images, symbols, concepts, and rules to label helps an individual hold the event in his memory; and 2) the child has either not yet learned or does not wish to use the device of rehearsal, i.e., spontaneous repetition of events to oneself in order to hold them in memory for later retrieval. The

third process in problem-solving is the generation of possible solutions, including the development of alternate ways to solve a problem. Kagan (1971) described three steps involved in the generation of solutions. First, the child searches his set of mental structures, especially his concepts and rules, for possible causes of an event that he does not immediately understand and then generates several explanations. Secondly, the child checks these explanations for consistency with his older rules about the event. If his explanation is in disagreement or contradicts an older rule which the child believes more strongly, he will probably reject the new explanation. Lastly, if the child finds an explanation that matches his experience and is not in disagreement or does not contradict an older rule, he will probably accept it as correct. After the generation of possible solutions to a problem, the child evaluates them. The final step in the problem-solving process is implementation which is the deduction of a conclusion from an idea that has been generated. The generation of an idea and deduction of a conclusion are the two cognitive processes which are regarded as the essence of thinking (Kagan, 1971).

Cognitive development is an ongoing process, and takes place in the child's life throughout infancy, childhood, and adolescence (Smart and Smart, 1967). The development of cognition has been seen from basically three positions, as outlined by Cooke and Cooke (1973) and Pines (1967). Cognitive theorists, including such authorities as Piaget and Montessori, view thought as developing from the organism-environment

interaction. They are concerned with how young children learn to think and how best to help them. Cognitive theorists believe that the lives of all children could be made much richer if their abilities were developed systematically from birth. Conversely, Gesell and other maturational theorists have described the development of children through extensive observations. Developmental changes are considered to be "embryological," i.e., a stage represents the total state of an organism at any given time. Behavioral theorists, chiefly Skinner, see the environment as a source of energy, which is directly or indirectly transmitted to the child through his interactions with the environment. The child's function in the environment is to emit observable behavior. Opportunities in the child's past and future development are responsible for his progressive development.

The early years of a child's life are important ones because learning proceeds more rapidly between the ages of birth and four than during any other comparable period of time in the child's life (Yardley, 1973; and Pines, 1967). Yardley (1973) has stated that both physical and mental growth rates start fast, peak between four and five years of age, and then begin to decelerate. She also speculated about the ages at which certain cognitive skills are developed. Between birth and four years, 50 percent of one's intelligence develops; whereas, 30 percent is developed between four and eight and 20 percent between eight and seventeen. Approximately 33 percent of the child's academic skills are attained before he is

six; 42 percent, between six and thirteen; and 25 percent, between thirteen and eighteen (Yardley, 1973).

The onset of expressive language and a rapid increase in the comprehension of speech marks an important stage in cognitive development. The development of language allows the child to learn through verbal mediation, thus, giving him more resources to solve problems (Smart and Smart, 1967). Kagan (1966) felt the most important development during this time is the growth of a labelling vocabulary. He stated that, with labels, the child acquires a set of symbols that allow him to categorize and conceptualize aspects of his environment which Smart and Smart (1967) felt enable him to have control over it.

The preschool child around four years of age shifts from a functional-relational basis for categorizing to an analytic or categorical one (Kagan, 1966). Instead of viewing an orange as only something to eat, he is now able to classify an orange as an object with skin or as a fruit. During his first four years of life a child has interacted with other people and has had many experiences which have enabled him to develop the cognitive skills necessary for logical thinking (Smart and Smart, 1967).

A further expansion of the child's cognitive skills occurs during the years from five to ten (Kagan, 1966). Two basic cognitive processes surface in the early years of school: 1) the growth of rules for transformations; and 2) the growth of the ability to evaluate.

In most children the development of cognition proceeds in an orderly, predictable manner. Their environment provides them with experiences necessary to the development of cognitive functioning. For disadvantaged children, however, the exposure to situations which provide experience with cognitive skills is not present (Brottman, 1965). The progressive development of the disadvantaged child is hindered because of the lack of opportunities in his environment; the faulty learning in the disadvantaged child is the product of a faulty environment not a faulty child (Cooke and Cooke, 1973). Cognitive psychologists assume that children who are deprived of early intellectual stimulation will never reach the heights of which they might be capable (Pines, 1967).

Smart and Smart (1967) stated the key part of cognitive growth is the acquisition of language, and any child who does not acquire adequate verbal symbols and who does not use them in thinking becomes retarded intellectually. Similarly, Blank and Solomon (1969) directly related the lack of a symbolic system for thinking in the disadvantaged child to his deficient language. Emmerich (1973) found that children less advanced in verbal knowledge were least likely to engage in cognitive skills in the classroom. Several other researchers have studied cognitive functioning in disadvantaged children. Wallace (1965) administered a number concept test to 250 children between the ages of five and nine, who were from three different socioeconomic groups. The results of this test did not reveal significant differences although the test scores were somewhat

higher in the upper socioeconomic groups. This led him to suggest the home environment may be important in the development of number concepts in children, and children whose environment was more stimulated tended to show a real understanding of numbers. Wulff (1974) studied the ability to draw inferences and to make generalizations in disadvantaged and advantaged students. He concluded from his data that learning styles of the disadvantaged students seemed to indicate they are less able to draw inferences and to make generalizations than are advantaged students. Meissner and Shipman (1973) found a higher level of information-processing skills and conceptual understandings among Head Start preschoolers who were members of the middle and upper socioeconomic classes. Golden and Birns (1971) found no differences among infants between eighteen and twenty-four months of age on an object test. They concluded that differences in intellectual development or cognitive style attributable to differences in socioeconomic status emerge somewhere between eighteen and thirty-six months of age when language is developed.

Yardley (1973) felt the parent is responsible for the emotional environment in which the growth of the mind takes place. She also stated the time to provide the child with help is before he enters school, since one-third of his ultimate intellectual skills will be mastered by six, and the growth of the brain is largely completed by age seven. When the disadvantaged child gets to school cognitive psychologists urge teachers to ". . . arouse the sluggish brains of children raised

by parents too poor, harried, or ignorant to teach them much that was relevant to school" (Pines, 1967).

By way of review, we have noted in this section that cognition is composed of several factors which are developed in an orderly, predictable manner, and is constantly growing as the child meets new experiences. Because experiences are essential in the child's development of cognitive functioning, he needs intellectual challenge from his earliest years (Yardley, 1973). The lack of stimulation the disadvantaged child receives may retard the development of intelligence, thus, providing a poor preparation for school.

IV. CONCEPT DEVELOPMENT

In the previous section concepts were stated to be an essential component of cognitive development and a component of the mental structures an individual must possess before he can learn. This section will expand on conceptual development, since a knowledge of concepts has been found to be essential to success in school.

Several researchers have studied conceptual development in children. Ward (1957) felt the extent of the understanding of meanings of words, as well as the ability to use them effectively in thought and communication, depends on the completeness and comprehensiveness of experiences through which that meaning is built. Experiences have been stated to be necessary for the development of language, and so too, are they necessary for the development of concepts. Ward (1957)

has stated that it is through experiences that an individual develops concepts. Similarly, Lee and Lee (1958) have commented that it is very important that a learner discover for himself the concept and its relation to others. To enhance his discovery, observation and self-discovery are required in the child's life. In a lower-class home, these opportunities often are not present; hence, the child's development of concepts may be impaired.

Arnove (1971) defined a concept as ". . . a personal understanding of a symbol, i.e., a mental image . . ." while Tennyson (1972) defined concept acquisition as ". . . the ability of the learner to correctly identify previously unencountered objects or events as members or nonmembers of a particular concept class." A child demonstrates that he has a concept of a word when he applies a word to a group of objects or events (Smart and Smart, 1967). Kagan (1971) saw concepts as part of an individual's mental structure which enable him to acquire new knowledge. A concept stands for characteristics of events, not for a particular event, and represents those attributes that are common to a collection of experiences. Kagan (1971) identified four important qualities of a concept: 1) degree of abstraction; 2) complexity, i.e., the number of dimensions necessary to define it; 3) differentiation, i.e., ". . . the degree to which the basic set of common qualities it represents can assume varied but related forms that describe slightly different versions of the idea"; and 4) centrality of dimensions, i.e., the number of central

dimensions required for one to derive meaning from a concept. The major areas of conceptual development have been stated to be: 1) properties, i.e., what is it like; 2) positional, i.e., where is it; 3) opposites; 4) quantification, i.e., how much is it; 5) comparisons; 6) association, i.e., relations and ideas; 7) time; and 8) motion, i.e., how does it move (Mann, 1972).

There are two different types of concepts, concrete and abstract (Kagan, 1971; and Doyle, 1972). Concrete object concepts refer to objects readily perceptible in the environment, such as, food and furniture. Those concepts with referents not directly perceptible, are abstract concepts. Examples of the latter are time, space, causality, and emotion. Kagan (1971) explained that a concept whose dimensions are close to experience is said to be concrete, while concepts whose dimensions refer to events that cannot be pointed to or experienced directly are said to be abstract. Moerk (1973) felt abstract concepts are based on sensory-motor interaction with the environment. The first concepts a child develops are concrete; abstract concepts are developed through repeated experiences, especially those verbalized by other people in certain ways (Smart and Smart, 1967). Abstract concepts are the most difficult to learn because of the necessity to include such large amounts of generalization when trying to abstract. Because of their retarded language development, lower-class children experience much difficulty with the cognitive function of abstracting.

This investigator found little evidence in the literature relative to the ages when children develop certain concepts; however, Engelmann (1966) felt that the concepts a child learns before his fifth birthday are among the most difficult he will ever encounter. He also stated that evidence of potential giftedness in the normal child is offered by the concepts he learns during his preschool years. Although not definite developmental levels, Engelmann (1966) provided a timetable during which certain concepts are acquired (Table I).

TABLE I
APPROXIMATE AGE LEVELS WHEN CERTAIN
CONCEPTS ARE ACQUIRED

Age in Years	Concept
1.6 to 3.0	comparative words
1.6 to 3.0	position relations
1.6 to 3.0	geometric relations
3.0 to 4.0	time
3.0 to 4.0	between
3.0 to 4.0	right and left
3.0 to 4.0	before and after
3.0 to 4.0	new and old
3.0 to 4.0	same and different
3.0 to 4.0	first and second
3.0 to 4.0	today, tomorrow and yesterday

The development of the concepts of space, time, and number has been studied by several individuals (Ames, 1946; Gesell and Ilg, 1946; Ames and Learned, 1948; Boehm, 1967; Smart and Smart, 1967; and Ilg and Ames, 1972). Space is composed of many dimensions which are indicated by prepositions and

adjectives, e.g., "on," "under," "in," "above," "in front of," "behind," "high," "low," "thin," "thick," "vertical," and "horizontal" (Gesell and Ilg, 1946). The concept of space develops through sensory-motor experiences with the environment (Gesell and Ilg, 1946; and Smart and Smart, 1967). During the early part of his development of spatial concepts, the child relates space to his body, but as he grows older he begins to devote more attention to information he receives from adults (Smart and Smart, 1967). Gesell and Ilg (1946), Ames and Learned (1948), and Ilg and Ames (1972) have offered a table showing the development of concepts of space (Table II).

Yardley (1973) stated that space is perhaps the simplest problem with which a child has to deal. Gesell and Ilg (1946) felt the five year old's chief spatial interest is in what is here, i.e., he's extremely focal, being interested in the space which he immediately occupies. The child possesses little insight into geographic relationships. The extreme interest in "hereness," which is possessed by the five year old, has been expanded in the six year old. Gesell and Ilg (1946) noted the six year old is not only interested in specific places but in relationships between home, neighborhood, school, and community. The seven year old, reportedly, is quite interested in space with regard to his place in the world (Gesell and Ilg, 1946).

Time concepts were thought by Smart and Smart (1967) to originate with experiences of bodily rhythm, i.e., sensations the infant receives on a predictable schedule such as hunger,

TABLE II
ORDER OF APPEARANCE OF VERBALIZED
CONCEPTS OF SPACE

Months

---

12 Wiggles for "down;" gestures for "up"

15 Says "up"

18 Says "down," "off," "bye-bye," "all gone," "come," "go"

21 Says "on," "big," "here"

24 Says "up high," "in," "out there," "where," "go way," "fall down," "turn around," "other side," "all gone," "here." Interest in coming and going.

30 Uses rigid, exact space words: "right," "right here," "right there," "right up there," "up high," "home," "to," "around the table," "under the table." Words combined for emphasis and exactness; "way up," "up in," "in here," "in there," "far away." "In," "up," "on," "at," used most.

36 Begins to show interest in concepts of "left" and "right." Refinements of space perception: "back," "corner," "over," "over here," "from," "by," "up," "on top," "on top of," "gone away." Interest in detail and direction: tells where his daddy's office is; where his bed is; uses names of cities. Carries out commands in regard to "over," "crooked," "under," "big," "high," "long," "under," "on."

42 "Next to," "under," "between." Interest in appropriate places: "go there," "find." Interest in comparative size: "littlest," "bigger," "largest." Expanding interest in location: "way down," "way off," "far away." Puts the ball "in," "on," "under," "in back of the chair."

48 More expansive words: "on top of," "far away," "out in," "down to," "way up," "way up there," "way far," "out," "way off." The word "behind." Tells his street and city. Puts a ball "in front of," "behind," a chair. Words used most, "in," "on," "up," "at," "down."

60 Carries out commands in regard to: "few," "forwards," "backwards," "tiny," "smooth," "high." Interest in space, but not in spatial relations.

72 Distinguishes "left" and "right" on own body, but not on others; spatial concepts relatively undifferentiated.

TABLE II
ORDER OF APPEARANCE OF VERBALIZED
CONCEPTS OF SPACE

(continued)

Months

---

84 Still cannot distinguish "left" and "right" except in relation to own body.

---

eating, and fullness. The concepts of time and space are closely related, with many of the words used to describe time also used to describe space, e.g., "long and short," "near and far," "here and now," and "there and then" (Gesell and Ilg, 1946). The concept of time appears to be more abstract than space; i.e., it cannot be found to possess as many sectors as space, and does not change as much as space does. Time moves "forward" or "backward," whereas space moves "in," "on," "under," "there," "here," "in front of" and in many other directions. Smart and Smart (1967) found time and space are not differentiated until beyond childhood; however, as a child matures and encounters experiences, he becomes more able to identify time. His abilities to expect, defer, and manipulate time improve (Smart and Smart, 1967).

Gesell and Ilg (1946), Ames (1946), and Ilg and Ames (1972) presented a sequence of development of the concept time which is presented in Table III. Yardley (1973) commented that time is a difficult concept to learn, and remains at a very elementary stage in development during the first year in school.

Early, concrete experience, reportedly, serves as a basis for number concepts along with concepts of time and space (Smart and Smart, 1967). Three developmental stages in number conception were described by Smart and Smart (1967) for seventy-two children between the ages of four and seven:

- 1) Preconceptual. Number is responded to in conceptual terms. When the arrangement of objects is changed, it may change perception of number.

TABLE III
TREND OF DEVELOPMENT OF TIME CONCEPTS
THROUGHOUT SCHOOL

Months

---

18 Child lives in present; some sense of timing, but no words for time; finds it difficult to wait; attends to here and now; little perception for far off objects and events; no need to talk to him about the future; responds to "now."

21 Uses "now." Waits in response to "just a minute." Sense of timing improved, but continues to live in the present. May rock with another child, or sit and wait at the table.

24 Still lives in present; begins to use words to denote future; waits in response to "wait;" "pretty soon;" uses "going to" and "in a minute;" "now;" "today;" no words for past, but may use past verb tenses incorrectly.

30 Free use of several words implying past, present, and future, such as "morning," "afternoon," "some day," "one day," "tomorrow," "last night." More future words than past words.

36 Talks nearly as much about past and future as about the present. Duration: "All the time;" "all day;" "for two weeks." Pretends to tell time. Much use of the word, "time;" "what time?" "it's time," "lunchtime." Tells how old he is, what he will do tomorrow, what he will do at Christmas.

42 Past and future tenses used accurately. Complicated expressions of duration: "for a long time," "for years," "a whole week," "in the meantime," "two things at once." Refinements in use of time words: "it's almost time;" "a nice, long time;" "on Fridays." Some confusion in expressing time of events: "I'm not going to take a nap yesterday."

48 Broader concepts expressed by use of "month," "next summer," "last summer." Seems to have clear understanding of sequence of daily events.

60 Concerned chiefly with now; more common time words used by adults are now a part of child's vocabulary and he handles them freely.

TABLE III

TREND OF DEVELOPMENT OF TIME CONCEPTS
THROUGHOUT PRESCHOOL

(continued)

Months

---

72 Increasing knowledge of duration; shows little interest in learning to tell time beyond the hours.

84 Sense of time becoming more practical, detailed and sequential; tells time by clock by hours and minutes; aware of time from month-to-month, season-to-season, and in terms of years.

- 2) Individual numbers are responded to in conceptual terms. The verbal terms are very helpful here in achieving concepts.
- 3) Relationship among the individual numbers is understood.

In the early stages of number conception a child may count a number of objects one-by-one and state that there are, for example, seven apples; this represents a concrete number concept. As the child matures, he is able to abstract, and without counting one-by-one, is able to say there are seven.

During the preschool years the concept of all is developed and is fully conceptualized around five years of age (Smart and Smart, 1967). In the early stages of number conceptualization, the concepts one, some, and all are generalized to many situations (Smart and Smart, 1967). As the child meets experiences and observes the use of these concepts from others in his environment, he learns the correct uses of these concepts. The inability to abstract that children under five experience was demonstrated by Smart and Smart (1967). They presented several preschoolers with two series of trays that contained: a dog and a bird; a dog and a pig; a dog and a cow; and a dog and a sheep. Although every child recognized each tray had a dog, few children under five expressed the fact that all trays contained dogs.

Several other researchers have also speculated about the age at which children develop certain concepts. Rohles (1971) designed a study using four series of seven problems each consisting of 3, 5, 7, 9, 11, 13, and 15 blocks. He administered the problem to 402 male and 381 female children between the

ages of three and thirteen. The task required the children to select the middle block. Results showed the ability to select the middle block began to emerge at the three year level, developed rapidly through year six, and became fully developed by year eight. Similarly, Tsai, Chun-Wei, and Chien (1968) found the concept of "middleness" is not well developed among preschool children between the ages of two and five. As the child's age increases, however, his scope of conceptualization is expanded to the point that when he reaches school age he is beginning to master the concept of "middleness." Palermo (1973) found four and five-year old children performed better than three year olds on tasks requiring them to identify a lesser amount of something; whereas, three-, four-, and five-year olds performed equally as well among themselves with response to tasks involving the concept of more. The concept of more was known by more children than the number of children knowing each of the concepts same and less.

Maratsos (1973) studied the understanding of the word big in thirty-three, four and five year olds, and concluded children around three years of age do not have a meaning for big which is tied to the vertical dimension. To the three year old, big meant overall size. Conversely, the four and five year olds defined big almost without exception as referring to the greater extension along the vertical dimension. Some children from four-and-a-half to five-and-a-half were able to judge size in terms other than height, as they gave the word "heavy" as a response to one of the stimulus items.

The researcher suggested this problem may be a semantic one with the terms big and tall being equated (Maratsos, 1973). From his observations, he suggested that to children of these ages big refers to height because when parents speak of their "big" child they usually mean "tall."

Differences in concept acquisition have been found among socioeconomic groups. Boehm (1967) found socioeconomic status, race, and age may be equally important influences on the attainment of concepts. She designed a study to describe the development of comparative concepts in primary grade children relative to age, grade, socioeconomic status, race, predominately integrated and segregated school conditions, sex, and intelligence. Her subjects were 1,286 pupils in grades kindergarten through third. The results of her study showed the development of comparative concepts is related not only to age/grade, but also to school conditions, race, IQ, and occupational levels of parents. Her third grade pupils from the lowest occupational levels obtained mean scores similar to kindergarten pupils from the highest occupational levels.

Houck, Biskin, and Regetz (1973) used the Boehm Test of Basic Concepts to compare the performances of urban and rural kindergartners and first graders. The rural subjects came from a county in Appalachia. In the urban and rural groups, the children were further subdivided into socioeconomic groups based on the father's occupation and level of educational attainment. The results of their study showed virtually no differences between the reliability coefficients of the lower-

class urban and rural kindergartners. Significant differences, however, did exist between urban and rural middle-class kindergartners and urban and rural middle-class first graders, with the urban childrens' reliability coefficients the elevated figures. Although these results do not show differences among socioeconomic groups, they do reflect differences in home environments.

Thomas (1966) studied the conceptualization of thirty, white advantaged children and thirty, white disadvantaged children as demonstrated by their performance on an object sorting test. The children were to classify their responses into four subdivisions according to use, situation, category, and physical characteristics. The results showed the concept behavior of disadvantaged subjects was of a "lower quality" than that of advantaged subjects; the disadvantaged children were not as able to conceptualize and classify their responses as the advantaged children.

Wasik and Wasik (1972) administered an instrument entitled the Concept Assessment Kit-Conservation to 117 children in an ungraded primary school for culturally disadvantaged children. This kit measures eight areas of conservation: two dimensional space, number, substance, continuous quantity, discontinuous quantity, area, and length. For each area the subject must first recognize that two objects are equivalent along a tested dimension; he must then make a judgment on their equivalency after one object has been changed. The scores of the subjects were compared with the norm, and

results indicated the children in the experimental group were from one to two years below the norm for the conservation tasks.

Concept development in disadvantaged children has been said to be content-centered rather than form-centered, and reasoning more inductive than deductive (Gordon, 1965). An example of this is the concept dog. A child with an inability to abstract would have difficulty classifying a dog as an animal. He would think of him as something that has four legs and barks (content), and not as part of a large category of living things called animals (form). Gordon (1965) also felt time orientation in middle and upper-class children is more consistent with reality than it is in lower-class children. This most likely results from the lower-class child's inability to use abstract symbols to represent and interpret his feelings, his experiences, and the events of his environment.

In summary, all children proceed through a period in which they develop certain concepts; concrete object concepts develop earlier than abstract concepts; and observations and experiences have been held to be necessary to concept development. The lower-class child develops his concepts at a later age than the middle-class child, and because of his delayed language development, he experiences much difficulty with the cognitive function of abstracting.

This chapter may be concluded by stating this investigator has found literature supporting the notion that upon school entrance most children from lower-class homes are

sufficiently delayed in language and cognitive development to warrant remediation. Their inability to master the cognitive uses of language impairs their ability to succeed in the academic areas. Most evidence points to the home environment of the lower-class child as the largest contributor to his delayed language development. Engelmann (1966) felt all healthy children who have parents interested enough to try teaching concepts will learn the concepts. It appears this teaching is absent from most lower-class homes because most of the parents in these homes do not have the skills in language to effectively use the time they spend with their children to facilitate the language and cognitive development that will help the children in school.

It was also shown that several authorities consider a knowledge of basic concepts to be essential for success in school. Since the lower-class child is often behind his school age peers in cognitive development, a rapid "catch-up" process is necessary to prevent the children from experiencing academic failure. Identifying the concepts which the child lacks would be an essential first step in this process.

CHAPTER III

METHODS AND PROCEDURES

I. SUBJECTS

Using a random sampling table, one hundred white, lower and middle socioeconomic level children from two elementary schools in Portland School District Number 1 were selected from a subject pool of 150 and were included in this study. Fifty of the children were kindergartners and fifty were first graders. At each grade level, twenty-five children comprised each of the two socioeconomic groups.

II. VARIABLES

Variables controlled were grade level, auditory acuity, emotional stability, and socioeconomic status. Sex was not a variable and all of the subjects were from a Caucasian population.

Grade Level

The grade levels included were kindergarten and first grade. A child who had repeated or was repeating either of these two grades was not included as a potential subject in this study.

Auditory Acuity

Normal hearing was determined by consulting with the classroom teacher and/or speech clinician. A child who was reported by the teacher to have a suspected hearing loss, difficulty following directions in class, or whose parents had reported a hearing loss was not included as a potential subject. During the time of this investigator's testing, the speech clinician at the two schools was administering a test of auditory discrimination. The results were noted, and a child displaying an auditory discrimination disorder was not included as a potential subject.

Emotional Stability

Emotional stability was a subjective judgment made by this examiner. A child whom she felt did not understand the directions, did not respond, did not attend to the task, or otherwise was a behavior problem was not included as a potential subject in this study.

Socioeconomic Status

The determination of socioeconomic status was made on the basis of the United States Bureau of the Census Working Paper Number 15, Methodology and Scoring of Socioeconomic Status. The procedure was to assign a number determined by the occupation of the chief income recipient in the child's family. Values ranging from 01 to 40 were considered to be lower socioeconomic status and those from 41 to 83, middle socioeconomic status. After consultation with the principal,

children who were on the free lunch program also were considered to be lower socioeconomic status.

The occupation of the chief income recipient in the child's family was obtained by first consulting the school records on each child, which listed the parents' occupation and/or employers. If only the employer was listed and not the occupation, the child and/or a staff member who was familiar with the parents and occupation was consulted. In situations where both parents were employed, the occupation used was that of the chief income recipient.

III. INSTRUMENTATION

Instruments

The Boehm Test of Basic Concepts (BTBC) was designed as a screening and teaching instrument. Information gained from administration of this test may be used as a baseline against which to measure progress after a period of instruction. The test reportedly identifies concepts a child has not yet grasped, but which are essential if he is to understand what others are telling him. This test, therefore, can be used as an effective teaching instrument to enrich the area of concept development. The BTBC has two lettered Forms, A and B; each form includes two numbered Booklets, 1 and 2. Each test form consists of fifty pictorial items, arranged in approximate order of increasing difficulty and divided evenly between the two booklets. Forms A and B are comparable, i.e., the same fifty concepts appear in both forms. In Forms A and B,

Booklet 1, the order of presentation of the concepts is identical; the pictures and test stimuli in each form, however, are different. Similarly, Forms A and B, Booklet 2, contain the same order of presentation, while the pictures and test stimuli differ in each form. Included in the fifty pictorial items are twenty-three spatial concepts, four time concepts, eighteen quantity concepts, and five concepts classified as miscellaneous. For the purposes of the present study, Form A, Booklets 1 and 2, were utilized.

The Peabody Picture Vocabulary Test (PPVT) was designed to provide an estimate of a subject's verbal intelligence through measuring his receptive vocabulary. The test consists of numbered plates arranged in approximate order of difficulty, with each plate having a stimulus item to which the child is to point. Testing begins with the stimulus item corresponding to the child's chronological age, and is discontinued when a basal and ceiling have been established. The test yields a raw score, which can be converted into three types of derived scores: 1) Mental Ability; 2) Intelligence Quotient; and 3) Percentile Equivalent. There are two forms to the test of approximate equivalence, lettered Forms A and B; both forms use the same plates. For the purposes of the present study, Form A of the PPVT was used.

Test Administration

During the first six weeks of the school year 1974-75, the Boehm Test of Basic Concepts and the Peabody Picture

Vocabulary Test were administered to approximately one hundred-fifty children in Portland School District Number 1. All testing was executed on an individual basis. The test administration procedure differed at each school because this examiner was asked to conform to a testing procedure which had been previously established by the school and the speech clinician.

At School A, the tests were administered to the kindergartners and first graders within a period of a week in conjunction with a screening program conducted by the school speech clinician. On the first day of testing, Form A, Booklet 1, of the BTBC was administered to each child. The child was seated at a table across from the examiner with the test booklet placed in front of him. The examiner read the test stimuli as they appeared in the test manual, and the child pointed to the picture he felt was the correct response to the stimulus item. The examiner recorded an X in the space provided on the record sheet if the child was correct; if the child's answer was incorrect the examiner left the space blank. The administration of Booklet 1 required approximately seven minutes per subject.

During the following week at School A, the kindergarten and first graders were administered Form A, Booklet 2, of the BTBC and Form A of the PPVT. For the administration of Form A, Booklet 2, of the BTBC the child was seated next to the examiner with the test booklet placed in front of him. The examiner read the test stimuli as they appeared in the test

manual, and the child pointed to the picture he felt was the correct response to the stimulus item. Scoring was identical to the procedure utilized in the administration of Form A, Booklet 1. After the administration of Form A, Booklet 2, of the BTBC, the child was administered Form A of the PPVT. The child remained seated next to the examiner with the test booklet in front of him. The examiner read the test stimuli as they appeared in the test manual, and the child pointed to the picture he felt was the correct response to the stimulus item. The child's responses were recorded on the score sheet, and scoring proceeded according to the specifications outlined in the test manual. The administration of the two tests required approximately ten minutes.

At School B, each kindergarten and first grade student was administered the two tests. For each of the tests the child was seated next to the examiner with the test booklet placed in front of him. The examiner read the test stimuli as they appeared in the test manual, and the child pointed to the picture he felt was the correct response to the stimulus item. After the administration of Form A, Booklets 1 and 2, of the BTBC, Form A of the PPVT was administered to each child. Scoring of each test was identical to the procedures followed at School A. The total administration for the two tests required approximately fifteen minutes.

IV. DATA ANALYSIS

The data were analyzed in terms of means, standard

deviations, and "t-tests" to determine if a relationship existed between BTBC scores and socioeconomic status.

Four t-tests were performed comparing the difference of the total number of concepts correctly identified by: 1) lower-class kindergartners and middle-class kindergartners; 2) lower-class first graders and middle-class first graders; 3) all kindergartners and all first graders; and 4) all lower-class and all middle-class subjects.

An item analysis of the subjects' responses was made to determine the number of concepts correctly identified in each of three of the four areas assessed by the BTBC (space, time, and quantity). In terms of the number of concepts correctly identified in each category the following groups were compared: 1) all kindergarten and all first graders; 2) all lower-class kindergartners and all middle-class kindergartners; 3) all lower-class first graders and all middle-class first graders; and 4) all lower-class and all middle-class subjects. T-tests were performed on each of the three concept areas in each of these four groups of subjects.

Due to the process of varying the testing procedure at each school, t-tests were performed to ascertain the existence of any effect of this variable on the test scores. The following groups were compared: a) the lower-class kindergartners at School A and the lower-class kindergartners at School B; b) the middle-class kindergartners at School A and the middle-class kindergartners at School B; c) the lower-class first graders at School A and the lower-class first

graders at School B; and d) the middle-class first graders at School A and the middle-class first graders at School B.

For the purpose of determining a correlation between the subjects' intelligence scores and their BTBC scores a Pearson Product-Moment correlation was calculated.

CHAPTER IV

RESULTS AND DISCUSSION

I. RESULTS

In order to determine if the variable of different testing procedures at the two schools had any effect on the BTBC scores, the mean and standard deviation were calculated for each compared group of lower- and middle-class subjects at each school (see Table IV). The mean BTBC scores ranged from 34.40 for the lower-class kindergartners at School A to 33.00 for the lower-class kindergartners at School B; 41.40 for the middle-class kindergartners at School A to 35.45 for the middle-class kindergartners at School B; 37.22 for the lower-class first graders at School A to 39.31 for the lower-class first graders at School B; and 41.20 for the middle-class first graders at School A to 42.06 for the middle-class first graders at School B. To determine if the differences in means were statistically significant, t-tests were performed on the scores of the subjects of each socioeconomic group in each grade between schools. The four values of t appear in Table V and indicate no statistical significance for three of the four compared groups. The 1.95 value of t for the middle-class kindergartners at the two schools is significant at the 0.05 level of significance on a two-tailed test.

TABLE IV
 MEAN BTBC SCORES AND STANDARD DEVIATIONS
 FOR THE NUMBER OF CONCEPTS CORRECTLY
 IDENTIFIED FOR EACH GROUP OF
 LOWER- AND MIDDLE-CLASS
 SUBJECTS AT EACH SCHOOL

School and Group	Number of Items	Range of Scores	Mean	S.D.
A 1.	50	31-39	34.40	2.65
2.	50	37-47	41.40	3.44
3.	50	29-45	37.22	5.11
4.	50	29-47	41.20	4.66
B 1.	50	22-44	33.00	7.81
2.	50	16-45	35.45	6.29
3.	50	30-47	39.31	5.07
4.	50	36-47	42.06	3.08

Groups

1. lower-class kindergartners
2. middle-class kindergartners
3. lower-class first graders
4. middle-class first graders

TABLE V
 VALUES OF T RELATIVE TO BTBC RAW SCORES FOR
 THE COMPARISONS OF THE SUBJECTS OF
 EACH SOCIOECONOMIC GROUP IN
 EACH GRADE BETWEEN SCHOOLS

Comparison Groups	t	df
lower-class kindergartners at Schools A and B	.37	23
middle-class kindergartners at Schools A and B	1.95*	23
lower-class first graders at Schools A and B	.95	23
middle-class first graders at Schools A and B	.54	23

*significant at the 0.05 level

The results of this study revealed a significant relationship between socioeconomic status and the number of concepts correctly identified by the subjects, as well as between grade level and the number of concepts correctly identified on the BTBC. Tables VI and VII indicate the mean scores on the BTBC and standard deviations (S.D.) for each of the combined kindergarten and first grade subjects and the two groups of subjects separated into socioeconomic groups.

For the lower-class subjects the means on the BTBC were 33.28 for the kindergartners and 38.56 for the first graders with standard deviations of 7.12 and 5.18, respectively. The mean scores on the BTBC and standard deviations for the middle-class subjects revealed a mean of 36.64 for the kindergartners and 41.72 for the first graders, with standard deviations of 6.30 and 3.83, respectively.

T-tests were performed on the BTBC scores of the lower- and middle-class kindergartners; lower- and middle-class first graders; all kindergarten and all first grade subjects; and all lower- and middle-class subjects. Table VIII reveals the results of these tests and indicates the levels of significance on a two-tailed test.

The mean age in months for the kindergartners was 65.76 months with a standard deviation of 3.27, and the mean for the first graders was 76.14 months with a standard deviation of 3.88 (see Table IX). To determine if the difference in BTBC scores between the two age levels was significant, a t-test was performed. A t of 14.41 indicated the difference

TABLE VI
MEAN SCORES AND STANDARD DEVIATIONS FOR THE
NUMBER OF CONCEPTS CORRECTLY IDENTIFIED
ON THE BTBC FOR COMBINED KINDERGARTEN
AND FIRST GRADE GROUPS

Grade	Number of Items	Range of Scores	Mean	S.D.
Kindergarten	50	16-47	34.96	6.93
First Grade	50	29-47	40.14	4.82

TABLE VII
MEAN SCORES AND STANDARD DEVIATIONS FOR
THE NUMBER OF CONCEPTS CORRECTLY
IDENTIFIED ON THE BTBC FOR EACH
SOCIOECONOMIC GROUP

Socioeconomic Group	Number of Items	Range of Scores	Mean	S.D.
lower-class kindergartners	50	22-44	33.28	7.12
middle-class kindergartners	50	16-47	36.64	6.30
lower-class first graders	50	29-47	38.56	5.18
middle-class first graders	50	29-47	41.72	3.83

TABLE VIII
T-TEST VALUES FOR THE NUMBER OF
CONCEPTS CORRECTLY IDENTIFIED
ON THE BTBC

Socioeconomic Group Comparisons	t	df
lower-class kindergarten/middle-class kindergarten	1.73*	48
lower-class first grade/middle class first grade	2.40**	48
all kindergarten/all first	4.31***	98
all lower-class/all middle class	2.36**	98

* significant at the .05 level

** significant at the .01 level

*** significant at the .005 level

TABLE IX
MEAN AGES IN MONTHS, STANDARD DEVIATIONS
AND VALUE OF T FOR THE SUBJECTS
IN THIS STUDY

Subjects	Range of Ages in Months	Mean	S.D.	t	df
Kindergartners	59-71	65.76	3.27		
First Graders	70-83	76.14	3.88	14.41*	98

* significant at the .005 level

was significant at the .005 level, suggesting the BTBC is sensitive enough to measure the differences between children in the two grade levels included in this study.

An analysis of the conceptual areas of space, time, and quantity on the BTBC was conducted. The test contains twenty-three spatial concepts, four time concepts, and eighteen quantity concepts. Five concepts classified as miscellaneous were not analyzed. The mean number of concepts correctly identified in each category at each grade level together with the standard deviations are indicated in Table X. It is to be noted that the means on the BTBC were 18.24 and 19.98 for spatial concepts, 2.36 and 3.00 for time concepts, and 11.20 and 13.46 for quantity concepts for the kindergartners and first graders, respectively. The small difference in means for the time concepts is probably attributable to the fact that there are only four time concepts on the test.

T-tests were performed on each conceptual category on the BTBC analyzing the number of concepts in each category correctly identified by: 1) all lower-class kindergartners and all middle-class kindergartners; 2) all lower-class first graders and all middle-class first graders; 3) all kindergartners and all first graders; and 4) all lower-class and all middle-class subjects. These results are presented in Table XI.

These figures indicate no significant relationship between socioeconomic status and the number of concepts correctly identified on the BTBC in the three conceptual areas at

TABLE X
MEAN SCORES AND STANDARD DEVIATIONS FOR
EACH CONCEPT AREA ON THE BTBC
BY GRADE LEVEL

Grade	Concept Area	Number of Items	Range of Scores	Mean	S.D.
Kindergarten	Space	23	9-23	18.24	2.84
	Time	4	0-4	2.36	1.17
	Quantity	18	5-16	11.20	2.87
First	Space	23	14-23	19.98	2.11
	Time	4	1-4	3.00	.94
	Quantity	18	8-18	13.46	2.09

TABLE XI
MEANS, STANDARD DEVIATIONS, AND VALUES OF T
FOR EACH CONCEPT IN FOUR COMPARISON
GROUPS ON THE BTBC

Comparison Group	Concept Area	Means	S.D.s	t	df
1.	Space	17.80/18.68	2.67/2.96	1.07	48
	Time	2.12/ 2.60	1.30/ .99	1.45	48
	Quantity	10.32/11.60	2.98/2.68	1.56	48
2.	Space	19.68/20.28	2.41/1.74	1.00	48
	Time	2.60/ 3.40	1.02/ .75	3.07***	48
	Quantity	12.80/14.12	2.02/1.96	2.27*	48
3.	Space	18.24/19.98	2.84/2.11	3.48***	98
	Time	2.36/ 3.00	1.17/ .94	2.91***	98
	Quantity	11.20/13.46	2.87/2.09	4.43***	98
4.	Space	18.74/19.48	2.71/2.55	1.39	98
	Time	2.36/ 3.00	1.22/1.01	2.78***	98
	Quantity	11.56/12.86	2.83/2.48	2.45**	98

*significant at the .025 level

**significant at the .01 level

***significant at the .005 level

Comparison Groups

1. lower-class kindergartners and middle-class kindergartners
2. lower-class first graders and middle-class first graders
3. all kindergartners and all first graders
4. all lower-class subjects and all middle-class subjects

the kindergarten level and in the area of spatial concepts at the first grade level. A significant relationship does appear to exist, however, between socioeconomic status and the number of time and quantity concepts correctly identified at the first grade level. The first graders of the middle socioeconomic level correctly identified more time and quantity concepts than did their lower-class peers. In addition, a significant difference exists in all concept areas when one grade level is compared with another and in time and quantity concepts when one socioeconomic group is compared to another. The first grade subjects correctly identified more concepts than the kindergartners, while all of the middle-class subjects correctly identified more time and quantity concepts than all of the lower-class subjects.

To determine the relationship between the children's intelligence quotients (I.Q.) as measured by the PPVT and the BTBC scores a Pearson's Product-Moment Correlation was calculated. Results revealed a correlation coefficient of 0.08, which indicates an extremely weak relationship existed between the performances on the PPVT and the BTBC.

II. DISCUSSION

Prior to the discussion of the actual null hypotheses tested in this investigation, the variable of the testing procedures will be considered. This investigator feels, generally, the variable of different testing procedures utilized at the two schools did not effect the subjects' scores on the

BTBC. A statistical analysis performed on the BTBC scores for the subjects of each socioeconomic level in each grade between Schools A and B, revealed this variable did not effect the performances of three of the four compared groups: a) the lower-class kindergartners at Schools A and B; b) the lower-class first graders at Schools A and B; and c) the middle-class first graders at Schools A and B. The variable, however, did appear to effect the scores of the middle-class kindergartners at Schools A and B. When the BTBC means of the middle-class kindergarten subjects at the two schools were compared, a t of 1.95 indicated statistical significance at the 0.05 level on a two-tailed test. This figure may be reflected in the fact the mean of the middle-class kindergartners at School A (41.40) is above the BTBC mean for all of the middle-class kindergartners (36.64), and closely approximates the mean score for all of the middle-class first graders (41.72). By contrast, the mean for the middle-class kindergartners at School B (35.45) more closely approximates the mean of all of the middle-class kindergartners (36.64). A standard deviation of 3.44 for the middle-class kindergartners at School A indicates their scores more closely centered around their mean (41.40) than the scores of the middle-class kindergartners at School B (mean, 35.45; standard deviation, 6.29). Since the variable of different testing procedures at the two schools did not influence the BTBC scores of three of the four compared groups, this investigator feels the results of this study were not due to any great extent to the ununiform

testing procedures.

It was the primary purpose of this study to determine if a statistically significant difference existed between two groups of children in the number of concepts correctly identified on the BTBC. A secondary purpose was to determine if a positive correlation existed between intelligence as measured by the PPVT and scores obtained on the BTBC. The study tested three null hypotheses. Each will be discussed in this sub-section.

The first hypothesis tested in this investigation was: No statistically significant difference will exist between the total number of concepts correctly identified by: a) the lower-class kindergartners and the middle-class kindergartners; b) the lower-class first graders and the middle-class first graders; c) all lower-class and all middle-class subjects; and d) all kindergarten and all first grade subjects. Relative to this hypothesis, the results of this study show a significant difference between socioeconomic groups in the number of concepts correctly identified on the BTBC. A significant difference was also shown to exist between the number of concepts identified correctly and grade level. The lower socioeconomic group generally identified fewer concepts correctly than the middle socioeconomic group. These results appear to be in agreement with previous research conducted on the disadvantaged child's cognitive and conceptual development. Researchers have stated the disadvantaged child displays a language which inhibits his development of cognitive

skills such as understanding of concepts (Brottman, 1965; Engelmann, 1966; Deutsch, 1967; Pines, 1967; and Yardley, 1973). The development of an inadequate language system was stated to be the result of several factors: 1) a lack of stimulation materials in the environment; 2) a lack of reinforcement for talking; and 3) a lack of social experiences in the lower-class child's home (Brottman, 1965; Havighurst, 1965; Engelmann, 1966; Deutsch, 1967; and Schiefelbusch, 1967).

At each grade level the middle-class subjects correctly identified slightly more than three concepts on the BTBC than their lower-class peers. These results would tend to support Moerk's (1973) contention that the language reflected by the lower-class child impairs his ability to abstract. The differences in the number of concepts correctly identified on the BTBC by each socioeconomic group within a grade level may be a reflection of the difficulty the lower-class subjects experienced in abstracting. Perhaps the pictures on the test did not provide a concrete foundation on which to base their responses. Bereiter and Engelmann (1966) have stated that unless the disadvantaged child is provided with a rapid "catch-up" process he may fall further and further behind his middle-class peers. The differences in the number of concepts correctly identified on the BTBC between the socioeconomic groups at the first grade level appear to be more significant than at the kindergarten level, and would appear to support Bereiter and Engelmann's (1966) view. When the grade levels were combined, findings revealed a significant relationship existing

between all lower-class and all middle-class subjects in the number of concepts correctly identified. Again, this may be attributable to the difficulty the lower-class children had in identifying some of the more abstract concepts of time and quantity.

The findings of this study revealed that the number of concepts correctly identified on the BTBC increased with age when the socioeconomic groups were combined. This investigator suggests that the significant relationship that was found between the number of concepts correctly identified by all kindergartners and all first grade subjects was effected little by the lower-class subjects' scores. It might indicate that both lower- and middle-class first graders identified more concepts than the lower- and middle-class kindergarten students, respectively, i.e., both lower- and middle-class students "know" more concepts at the first grade level than at the kindergarten level. The smaller standard deviation of the first grade subjects (4.82) shows that their scores more closely clustered around the mean (40.14) than did the scores of the kindergarten subjects (standard deviation, 6.93; mean, 34.96).

The significant relationship between the ages of the kindergarten and first grade students appears to indicate that the BTBC is sensitive enough to measure differences in concept development between children in these two grade levels. An examination of the concepts in Appendix A gives the reader an indication of the difference between grade levels. When

comparing all kindergartners with all first graders it can be seen that the average difference between the number of concepts correctly identified on the first booklet (concepts 1-25) was 3.56. By contrast, the average difference between the two grade levels on the second booklet (concepts 26-50) was 8.16. These figures reflect the degree of difficulty in each of the two booklets with Booklet 2 being more difficult. It seems to this researcher that a higher level of abstraction is required to identify concepts in the second booklet, a level of abstraction which may be more developed in a first grader. The significance found in the t-test may, therefore, be related to the difference of 10.38 months between the mean ages of the two grade levels, a "maturation superiority" in age favoring the first graders.

The second hypothesis was: An analysis of the conceptual areas of space, time, and quantity will reveal no statistically significant difference between the number of concepts correctly identified in each area by: a) the lower- and middle-class kindergartners; b) the lower- and middle-class first graders; c) all lower- and middle-class subjects; and d) all kindergartners and first graders. An analysis of the conceptual areas of space, time and quantity on the BTBC revealed no significant relationship between socioeconomic status and the number of concepts correctly identified in each of the three areas at the kindergarten level. Figures 1, 2, and 3 illustrate that at each three-month interval the two socioeconomic groups closely approximate each other on time

Figure 1. Average number of space concepts correctly identified on the BTBC by kindergartners (59-71 months) and first graders (70-83 months).

Figure 2. Average number of time concepts correctly identified on the BTBC by kindergartners (59-71 months) and first graders (70-83 months).

Figure 3. Average number of quantity concepts correctly identified on the BTBC by kindergartners (59-71 months) and first graders (70-83 months).

Figure 4. Average number of concepts correctly identified on the BTBC in each of three categories by kindergartners (59-71 months) and first graders (70-83 months).

concepts and at most age intervals on spatial concepts. The intervals of 59 to 63 and 64 to 67 months indicate a wider range between the lower- and middle-class subjects on the quantity concepts; the same relationship may be found at the 68 to 71 month interval for the spatial concepts (see Appendix B). The statistical analysis indicates that these three differences were not great enough to result in a statistically significant difference between the lower- and middle-class subjects at the kindergarten level. The number of spatial concepts correctly identified by the first graders did not differ significantly between the lower- and middle-class subjects; nor did they differ when the fifty lower-class subjects were compared to the fifty middle-class subjects. The explanation for this may be that the spatial concepts are the least abstract of the three conceptual areas; presumably, the differences in abstraction levels of the time and quantity concepts separates the two socioeconomic groups more significantly. The average values for each three-month interval for both grade levels may be found in Appendix B.

The development of concepts in each of the three areas measured by the BTBC appeared to be significantly related to grade level. Results of an item analysis comparing the fifty kindergartners with the fifty first graders revealed, generally, that the average number of concepts in each area increased with each three-month interval (see Figure 4). The spatial concepts increased from 17.73 at the youngest kindergarten age interval to 19.66 in the youngest first grade age

interval; 18.5 to 19.83 in the second age intervals; and 18.27 to 20.41 in the third. Similarly, quantity concepts increased from 10.5 to 13.13 in the youngest intervals; 11.05 to 12.77 in the second age intervals; and from 11.38 to 14.77 in the third (refer to Figure 4). The time concepts also increased, but the range was not as wide as the other two areas (see Appendix B). This might be attributable to the small number of time concepts on the entire test. As a child matures he meets new and more varied experiences which help him to develop the ability to identify objects in terms of their common properties. This ability is a component of conceptual development. The increase in the number of concepts correctly identified may be a reflection of the increase in experiences possessed by the maturing child, experiences which also assist the child in his ability to abstract. The ability to abstract is a necessity for a child to respond correctly to this instrument.

This researcher observed an interesting phenomenon in the responses to the items left and right. The tasks were to identify "the bird on the left" and "the box over the right end of the line." Almost consistently, the children reversed these two, i.e., the response was the "bird on the right" and the "box on the left." Gesell and Ilg (1946) have stated that six- and seven-year olds are able to distinguish left and right only in relation to their own bodies. In support of this, it is important to note that the kindergartners in this study identified these two spatial concepts correctly less often than their first grade peers (refer to Appendix A), an

indication that first graders are beginning to develop an ability to distinguish left and right other than in relation to their own bodies.

The third hypothesis tested in this investigation was: No statistically significant relationship will exist between scores earned by all subjects on the Peabody Picture Vocabulary Test and those scores earned by all subjects on the Boehm Test of Basic Concepts. Relative to this hypothesis, Ellis (1972) has stated that intelligence is an important factor in conceptual learning. Children with more intelligence were said to display an ability to solve conceptual tasks consistently faster than less intelligent children. The reason appears to be a result of the more intelligent child's greater ability to construct hypotheses and to use verbal mediating responses, which ". . . enable humans to respond to instances in terms of their common properties" (Ellis, 1972). A result of this study which would not tend to support this belief is a Pearson's Product-Moment correlation calculated between the subjects' PPVT I.Q. scores and BTBC raw scores, which revealed an insignificant relationship between the two tests with a correlation coefficient of 0.08. This investigator feels that the lack of a significant relationship may be an indication an intelligent quotient for a hearing vocabulary is not related to the ability to identify concepts. These two tests apparently assess two different skills. Appendix C gives the reader an indication of the lack of a relationship between the two tests by listing the PPVT I.Q.

score and the BTBC raw score for each subject.

CHAPTER V

SUMMARY AND IMPLICATIONS

I. SUMMARY

The primary purpose of this investigation was to compare the responses of white, lower-class kindergartners and first graders with white, middle-class kindergartners and first graders on the Boehm Test of Basic Concepts (BTBC) (Boehm, 1969) in order to determine if a statistically significant difference existed between socioeconomic level and the number of concepts correctly identified on the BTBC. A secondary purpose was to determine if a significant relationship existed between concept development as measured by the BTBC and intelligence from an assessment of receptive vocabulary by using the Peabody Picture Vocabulary Test (PPVT) (Dunn, 1959).

One hundred white, lower and middle socioeconomic level children from two elementary schools in Portland were selected as subjects to be included in this study. Variables controlled were grade level, auditory acuity, emotional stability, and socioeconomic status.

The BTBC consists of fifty pictorial items, arranged in approximate order of difficulty and divided evenly between two booklets. Included in the fifty items are twenty-three spatial concepts, four time concepts, eighteen quantity con-

cepts, and five concepts classified as miscellaneous. The PPVT was used to provide an estimate of a subject's verbal intelligence through a measurement of his receptive vocabulary. On both tests, the subject was instructed to point to the picture representing the stimulus item.

The results of this study revealed a relationship exists between socioeconomic status and the number of concepts correctly identified on the BTBC. This relationship was observed when the lower-class subjects were compared with their middle-class peers at each grade level, when all kindergartners were compared to all first graders, and in a comparison of the fifty lower-class and fifty middle-class subjects. The subjects of the middle socioeconomic level tended to identify more concepts correctly than the subjects of the lower socioeconomic level, while the first grade subjects, generally, identified more concepts correctly than the kindergartners. An analysis of the areas of space, time, and quantity revealed that socioeconomic status was related to the number of concepts correctly identified when the fifty lower-class subjects were compared to the fifty middle-class subjects. The children of the middle-class identified more concepts correctly than the lower-class subjects. Grade level also was related to the number of concepts correctly identified in each of the conceptual areas. The first graders tended to identify more concepts correctly in each area than the kindergartners. When the scores of the lower and middle-class subjects at the kindergarten level were compared, there was no relationship

between socioeconomic status and the number of concepts correctly identified in each of the three areas. No relationship was observed between the scores of the two groups of first graders on the spatial concepts. Socioeconomic level, however, did effect the number of time and quantity concepts correctly identified. The subjects of the middle socioeconomic level, generally, identified more time and quantity concepts correctly than the subjects of the lower socioeconomic level.

These results suggest a higher degree of abstraction abilities may be found with increased age and a higher socioeconomic level. The findings also tend to support the views of many researchers in the field of conceptual development who have stated that the language of the disadvantaged child inhibits his ability to abstract.

Results of a Pearson's Product-Moment correlation calculated between the subjects' scores on each of the tests indicated no significant correlation between the children's I.Q. scores and the number of concepts correctly identified.

II. IMPLICATIONS

Clinical

The results of this study would appear to indicate to classroom teachers and/or speech clinicians that the BTBC could be utilized to devise language enrichment programs for a whole classroom in a lower socioeconomic setting. This instrument would lend itself to pre- and post-testing to serve

as a measurement of progress. An important part of this enrichment program should be provisions of experiences and activities which will enable the disadvantaged child to classify and group things. Learning to think of objects in terms of their common properties is an important first step in forming concepts.

The findings of this investigation also may imply that preschools and kindergartens should be provided for children in lower socioeconomic neighborhoods. These preschool experiences will provide the disadvantaged child with an opportunity to develop concepts that he will need to succeed in school. As a supplement to this, indications are that this instrument could be an essential part of a preschool screening program. Results could be imparted to the parents, the implication being that they could facilitate the child's development and understanding of these concepts before he enters school.

Research

This investigator suggests that further research utilizing the BTBC might be using a larger population, one sufficient enough to establish norms for this area. Different socioeconomic groups and races could be used. Results of the norm standardization could serve as an indication to teachers of the performance of their students in relation to children of the same age in this geographic area.

It is also suggested that a more extensive item analysis

be done. One analysis could be a notation of the picture to which the child points in response to each stimulus item. This researcher observed that certain trends appeared in the items the subjects felt were correct. An analysis of this type would provide information relative to the child's stage of the development and understanding of certain concepts. Another analysis, which could be performed, would be a statistical analysis to determine in which order the concepts are developed. This type of analysis would provide general data relative to the years during which the concepts of space, time, and quantity are acquired.

Finally, it is felt that a correlation could be made between the BTBC and other tests assessing the knowledge of basic concepts, e.g., Engelmann's (1967) Basic Concept Inventory. If a statistically significant correlation exists between the two, the implication would be that the results of each test could be utilized in language enrichment, preschool and/or kindergarten programs.

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APPENDIX A

NUMBER OF CHILDREN IDENTIFYING EACH CONCEPT CORRECTLY ON THE BTBC BY SOCIOECONOMIC LEVEL AND GRADE LEVEL

Context Categories:

S - Space (location, direction, orientation, dimension)
Q - Quantity (and number)
T - Time
M - Miscellaneous

<u>Concepts</u>	<u>Category</u>	<u>l.c.k.</u>	<u>m.c.k.</u>	<u>l.c.1st</u>	<u>m.c.1st</u>
1. Top	S	23	22	23	23
2. Through	S	25	24	24	25
3. Away from	S	17	18	22	24
4. Next to	S	22	24	23	24
5. Inside	S	25	23	25	25
6. Some, not many	Q	22	24	25	24
7. Middle	S	23	23	25	25
8. Few	Q	22	24	20	17
9. Farthest	S	24	23	25	24
10. Around	S	25	23	25	25
11. Over	S	24	23	25	25
12. Widest	Q	22	24	22	23
13. Most	Q	21	24	25	25
14. Between	S	22	22	23	23

<u>Concept</u>	<u>Category</u>	<u>l.c.k.</u>	<u>m.c.k.</u>	<u>l.c.1st</u>	<u>m.c.1st</u>
15. Whole	Q	16	22	21	23
16. Nearest	S	25	25	25	24
17. Second	Q	16	22	18	24
18. Corner	S	19	23	19	22
19. Several	Q	23	23	23	24
20. Behind	S	19	23	23	24
21. Row	S	22	23	24	25
22. Different	M	20	22	18	22
23. After	T	16	18	22	21
24. Almost	Q	15	19	20	20
25. Half	Q	15	17	20	20
26. Center	S	21	21	23	23
27. As many	Q	13	15	19	23
28. Side	S	13	19	16	19
29. Beginning	T	13	14	13	19
30. Other	M	16	20	21	24
31. Alike	M	15	16	15	19
32. Not first or last	Q	14	13	19	21
33. Never	T	13	16	13	19
34. Below	S	22	23	24	25
35. Matches	M	19	18	20	18
36. Always	T	10	16	18	24
37. Medium- sized	Q	13	17	16	21
38. Right	S	13	14	20	13
39. Forward	S	11	13	13	21

<u>Concept</u>	<u>Category</u>	<u>l.c.k.</u>	<u>m.c.k.</u>	<u>l.c.lst</u>	<u>m.c.lst</u>
40. Zero	Q	11	17	23	25
41. Above	S	19	22	23	24
42. Every	Q	16	21	23	25
43. Separated	S	12	8	11	22
44. Left	S	10	17	20	12
45. Pair	Q	8	4	4	7
46. Skip	M	6	7	14	14
47. Equal	Q	0	2	3	5
48. In order	S	9	10	10	12
49. Third	Q	5	10	9	16
50. Least	Q	6	4	8	10

APPENDIX B

AVERAGE VALUES FOR EACH THREE MONTH INTERVAL

BY SOCIOECONOMIC STATUS AND GRADE

LEVEL FOR THE BTBC

<u>Months</u>	<u>Concepts</u>	<u>lower s.e.s.</u>	<u>middle s.e.s.</u>	<u>combined</u>
59 to 63	Space	17.80	17.50	17.73
	Time	2.50	2.50	2.50
	Quantity	9.80	12.25	10.50
64 to 67	Space	18.14	18.72	18.50
	Time	2.12	2.36	2.16
	Quantity	10.28	12.72	11.05
68 to 71	Space	17.37	19.00	18.27
	Time	2.12	2.90	2.55
	Quantity	10.75	11.90	11.38
70 to 73	Space	19.37	20.00	19.66
	Time	2.62	3.42	2.77
	Quantity	10.12	12.28	13.13
74 to 77	Space	19.55	20.11	19.83
	Time	2.22	3.33	2.77
	Quantity	12.55	13.00	12.77
78 to 83	Space	20.12	20.66	20.41
	Time	3.00	3.44	3.23
	Quantity	13.25	15.55	14.77

APPENDIX C

PPVT I.Q. SCORE AND M.A. AND BTBC RAW SCORE FOR EACH SUBJECT

<u>Subject</u>	<u>C.A.</u>	<u>PPVTMA</u>	<u>PPVTI.Q.</u>	<u>BTBC Raw Score</u>
1.	5-9	5-1	89	27
2.	5-10	5-1	101	33
3.	5-6	6-3	103	35
4.	5-7	4-3	77	34
5.	5-1	5-1	103	31
6.	5-10	8-7	127	33
7.	5-2	9-5	142	39
8.	5-3	5-1	100	33
9.	4-11	4-0	85	22
10.	5-3	5-9	103	26
11.	6-2	5-11	99	44
12.	5-1	3-11	83	22
13.	5-11	5-11	99	33
14.	5-5	5-9	107	40
15.	5-10	6-8	107	44
16.	5-6	6-3	103	24
17.	5-8	5-7	95	32
18.	5-4	4-7	92	28
19.	5-4	6-10	118	30

<u>Subject</u>	<u>C.A.</u>	<u>PPVTMA</u>	<u>PPVTI.Q.</u>	<u>BTBC Raw Score</u>
20.	5-1	7-1	120	44
21.	5-9	6-1	103	40
22.	5-3	5-11	109	23
23.	5-1	6-8	116	44
24.	5-10	6-8	107	29
25.	5-7	9-5	135	42
26.	5-4	8-1	129	37
27.	5-10	7-1	111	41
28.	5-6	6-6	105	43
29.	5-7	5-2	91	39
30.	5-8	10-5	145	47
31.	5-4	5-9	107	32
32.	5-9	5-11	99	39
33.	5-7	5-7	95	37
34.	5-7	7-3	113	40
35.	5-9	4-11	87	35
36.	5-9	6-8	107	43
37.	5-8	6-8	107	36
38.	5-3	7-3	122	27
39.	5-5	5-1	100	37
40.	5-8	5-9	97	29
41.	5-7	6-6	105	40
42.	5-10	5-2	81	40
43.	5-6	4-11	87	35
44.	5-7	7-1	111	45

<u>Subject</u>	<u>C.A.</u>	<u>PPVTMA</u>	<u>PPVTI.Q.</u>	<u>BTBC Raw Score</u>
45.	5-4	6-8	116	31
46.	5-9	5-9	97	16
47.	5-0	7-1	120	40
48.	5-0	5-9	107	32
49.	5-1	6-3	114	38
50.	5-8	6-6	105	37
51.	5-11	5-5	93	29
52.	6-1	4-11	87	39
53.	6-5	5-5	91	29
54.	6-9	6-10	98	38
55.	5-10	7-3	113	38
56.	6-7	9-2	122	45
57.	5-11	6-3	103	36
58.	6-5	7-6	115	43
59.	6-3	9-2	133	38
60.	6-4	7-6	115	43
61.	6-7	7-10	108	47
62.	6-4	5-11	99	37
63.	6-8	7-8	106	45
64.	6-0	6-10	109	45
65.	6-3	6-8	107	42
66.	6-7	6-6	95	30
67.	5-10	7-10	119	34
68.	6-7	8-3	112	42
69.	5-10	7-3	113	41

<u>Subject</u>	<u>C.A.</u>	<u>PPVTMA</u>	<u>PPVTI.Q.</u>	<u>BTBC Raw Score</u>
70.	6-2	5-1	89	34
71.	6-3	7-3	113	34
72.	6-4	6-1	101	38
73.	6-7	7-8	106	41
74.	6-7	7-6	104	32
75.	6-11	6-3	93	44
76.	6-11	7-6	104	47
77.	6-1	7-1	111	38
78.	6-11	7-10	108	42
79.	6-5	5-11	99	44
80.	6-0	7-10	119	45
81.	6-2	6-3	103	29
82.	6-0	7-1	111	43
83.	5-11	7-3	113	41
84.	5-10	6-10	109	42
85.	6-9	5-9	87	41
86.	6-9	6-8	96	47
87.	6-5	10-4	143	43
88.	6-7	7-6	104	40
89.	6-4	6-6	105	44
90.	6-5	11-4	143	39
91.	6-2	7-3	113	41
92.	6-10	7-8	106	40
93.	6-10	6-8	96	46
94.	6-2	6-10	109	43

				<u>BTBC Raw</u>
<u>Subject</u>	<u>C.A.</u>	<u>PPVTMA</u>	<u>PPVTI.Q.</u>	<u>Score</u>
95.	6-2	6-10	109	42
96.	6-0	7-6	115	42
97.	6-3	7-10	119	36
98.	6-9	7-8	106	43
99.	6-0	7-6	115	38
100.	6-7	7-6	115	47