THE RELATIONSHIP BETWEEN PERCEPTUAL-MOTOR ABILITY
AND ACADEMIC ACHIEVEMENT OF CERTAIN
DISADVANTAGED RURAL NEGRO CHILDREN

by
HANNA E. J. GILLION

A DISSERTATION

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CHAPTER I

PLAN OF THE STUDY

Introduction

During the last decade, considerable credence has been given to perceptual-motor development as an area worthy of consideration in remedial teaching and therapy programs for children with learning disabilities. The different perceptual-motor theories and programs are hailed by some educators and psychologists as new explanations which illuminate the whole concept of learning. They are dismissed by others as merely an unvalidated hypothesis or as new terminology for common sense ideas about growth and development. Nevertheless, perceptual-motor theories are making an important impact on the elementary school program.¹

Delineation of what is meant by perception and/or perceptual motor ability is difficult.

Kephart states, "We cannot think of perceptual activities and motor activities as two different items;

we must think of the hyphenated term perceptual-motor."²

In a panel discussion at an American Association of Health, Physical Education, and Recreation (AAHPER) Symposium, Wright³ hypothesized that any attempt toward a concrete universal definition of perceptual-motor ability would impose excessive structure on the particular work and would result in ambiguity. He suggested that different people would need to define the term(s) differently. Cohen, participating in the same discussion, differed with the above. He postulated that "definitions are a necessity." He hazarded the definition of

... all those functions of the body that have a voluntary motor component and depend upon some kind of sensory feedback and some kind of sensory perception prior to the motor act.⁴

Keogh,⁵ in reply to Cohen's definition of the term, mentioned that the term should be reversed to motor-perceptual ability, because the two terms cannot be divorced, nor can a distinction be made between what is perceptual and what is motor.

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⁴Ibid.

⁵Ibid.
Even though there was no consensus or concrete definition agreed upon, they seemed to agree that perceptual and motor should be considered as one system and studied in light of that supposition.

Cratty states that "the terms sensory-motor and perceptual-motor performance have been coined, indicating the important influence the sensory cues and perceptual process have upon the motor act."6 He does not elucidate.

Crawford defines perceptual-motor ability as "the intimate interrelationship between all the information decoding (receiving, comprehending) systems and the information encoding (expressing, reacting) systems." He differentiates between perceptual-motor and perception by defining perception as the "receiving of an impression by any of the senses."7

Mussen, Conger and Kagan regard perception as "an individual's organization and initial interpretation or categorization of what he sees, hears, touches, smells, or feels."8

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Cratty maintains that "perception is a global term having many meanings dependent upon the orientation of the person using it . . . . Perception is the process of giving meaning to experience."9

Frostig states that "visual perception is . . . the ability to recognize and discriminate visual stimuli by associating them with previous experience."10

Ayers maintains that

. . . motor performance is closely associated with perception, which in turn, is strongly related to purposeful motor activity. Any treatment designed to influence motor function cannot avoid affecting the perceptual process. Consequently, the interrelation of perception and motion is especially critical when treatment is planned to enhance central nervous system integration.11

Ames, director of research at the Gesell Institute, New Haven, Connecticut, believes that individual differences play an important role in the development of

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perceptual-motor ability. She gives the following causes for differences:

1. Some children are more mature (further along the growth gradient than others).
2. Individual differences exist in adequacy of co-ordination.
3. The way in which a child gets both sides of his body together—whether he is unilateral or bilateral in his motor approach to things, whether he manages to mesh the two sides of his body smoothly.
4. The body build of the child differs.¹²

Isom¹³ maintains that perception is a private process in that no one can be absolutely certain what is being perceived by another person. As a consequence, perception is measured or assessed by indirect, and often inferential means. The individual's assessment of and reaction to a given stimulus is influenced by his past experiences, pattern of values, and expectations. He lists the determinant factors:

1. Age of the child.
2. Language development.
3. Sight and sound.
4. Intersensory functioning.


Fleishman and Rich\textsuperscript{14} support the theory of individual differences in hypothesizing that, in individuals, kinesthetic and spatial-visual abilities do affect perceptual-motor ability.

A description of a child's progressive learning of perceptual skills is given by Vernon.\textsuperscript{15} He also considers individual differences in perceiving, and adds emotions to the list of affective items.

The subject of perception and perceptual-motor development is complex in that entire volumes have been written on selected aspects of this rather nebulous ability. Perception and perceptual-motor development seem to be more easily described than defined.

The various perceptual-motor training programs are designed to attain the goals of achieving more adequate perceptual functioning by improving directionality, spatial orientation, and visual perception of objects and events through sensory-motor experiences. The ultimate goal of perceptual motor training programs is improvement in general scholastic performance, in communication skills, and in


understanding number concepts.\textsuperscript{16} Evidence to support the various programs found in the literature is sparse, contradictory, and often times based on results from studies that have not been well controlled. Much of the evidence that is proferred to substantiate the programs' effectiveness comes from subjective judgments and observations rather than less biased sources.\textsuperscript{17}

The majority of the studies conducted in the area of perceptual-motor ability have been concerned with pre-readiness factors as determinants of reading success. Research that is concerned with other predictors of academic success is limited.

\textbf{Statement of the Problem}

The purpose of this study was to investigate the relationship, if any, between perceptual-motor ability and academic achievement of selected disadvantaged rural Negro children.

\textbf{Hypothesis}

The null hypothesis tested was that there was no statistically significant relationship between perceptual-motor ability as measured by the Purdue Perceptual-Motor Survey and academic achievement as assessed by the California

\textsuperscript{16}Hope Smith, "Motor Activity," p. 31.
\textsuperscript{17}Ibid.
Achievement Test with certain disadvantaged rural Negro children.

Scope of the Study

The total second grade population of two elementary schools in the Lowndes County, Alabama, School System were used in this study. The population consisted of 156 students. From that number only two students were eliminated from the study because they were not considered disadvantaged. Twenty-eight additional students were eliminated either because of their inability to score measurably on the selected achievement test or because of chronic absenteeism.

Definitions

Perceptual-motor ability was defined for the purpose of this study as "... the inseparable integration of perceptual and motor functions or activities as one interdependent and interrelated behavioral area."

Disadvantaged children were identified as those children whose total annual family income was $2,000 or less. Academic achievement was identified for the purposes of this study as being the level of performance attained on the California Achievement Test.

Limitations of the Study

This study was limited to rural Negro disadvantaged children in one school system in Lowndes County, Alabama.

Factors inherent in the two measurements used to assess the tested qualities were recognized as limitations.

The fact that there were no disadvantaged Caucasian children in the Lowndes County School System was considered as a further limitation of this study.

Those students for whom no achievement scores could be obtained were of necessity eliminated from the study. This fact was duly recognized as a limitation and all inferences drawn from the statistical analysis must be applied to the population of this study alone.

Organization of the Study

Chapter I was concerned with the purpose of the study, its problem, scope, definitions, and limitations. Chapter II provides a review of the related literature. Included are theoretical approaches to the study of perception; a review of motor training programs; studies that have been conducted relating perceptual-motor ability to facets of reading ability; school achievement and its relationship to perceptual-motor ability. Literature relating to certain aspects of the education of disadvantaged children is also reviewed. Chapter III describes the
selection of the instruments and population, the procedures and treatment of the data; Chapter IV presents the analyses of the data; and Chapter V presents the summary, conclusions and recommendations.
CHAPTER II

REVIEW OF LITERATURE

Introduction

The purpose of this study was to investigate the relationship, if any, between perceptual-motor ability and academic achievement of certain disadvantaged rural Negro children.

The literature is presented in two sections. The first section presents a discussion of the nature of perceptual-motor ability; the theoretical approaches to the study of perception; perceptual-motor training programs; perceptual-motor skills and reading ability; and perceptual motor ability and its relation to school achievement. The second section is devoted to disadvantaged children. Literature related to perceptual-motor ability of disadvantaged children is reviewed as well as a discussion of the hazards and guidelines for testing these children.

Perceptual-Motor Ability

Roach and Kephart have explained the essence of the perceptual-motor theory as:

A sequence of learning stages through which the child progresses. Later complex learnings are
built upon initial learnings in a hierarchical fashion . . . . The establishment of laterality, perceptual-motor match, and directionality is the result of motor movement patterns becoming generalized. Knowledge of movement patterns has long been recognized by psychologists as very important to the individual organism; the understanding and description of movement patterns, however, has frequently evaded the scientist's efforts. Motor patterns are complex movements which are more than the sum of individual specific skills. There are many motor actions available to respond and relate to environmental stimuli in a meaningful, consistent manner. Without such basic patterns, he has difficulty in the generalization of learning experiences.¹

Theoretical Approaches to the Study of Perception

The development of concepts in the study of perceptual-motor interaction were concomitant with the development of psychology as a science. Early empiricist philosophers such as Berkeley, Locke, Hume, and Hobbes were pioneers in the argument that sensory experience was the primary factor in the development of the way in which man perceives his world and the objects and events within his experience.²

The role that the various psychological theories have played in the formation of bases for perceptual-motor ability has been shown by various authors. Smith and


²Hope Smith, "Motor Activity," p. 28.
Smith divided these theories into four separate schools. They define a general theory of learning as "one that attempts to account for all learning phenomena in both animals and man within one logical parsimonious system." The four theories are: Contiguity Theory, Reinforcement Theory, Cognitive Theory, and Cybernetic Theory. Hope Smith has also categorized these into four theories: Gestalt Theory, Empiricistic Theory, Sensory Tonic Field Theory, and Developmental Theory.

The Gestalt Theory, the Sensory Tonic Field Theory, the Developmental Theory, and the Cybernetic Theory will be reviewed as being germane to this study.

Gestalt Theory

To the Gestalt psychologist, perception is exclusively "phenomenal" (i.e., observational in nature, and behavior is the direct result of the organization of the perceptual field). Six laws are advocated by this group to explain visual perception organization.

1. The law of proximity. Other things being equal, in a total stimulus situation, those elements which are closest to each other form groups.

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4Hope Smith, "Motor Activity," p. 29.

2. The law of similarity. When more than one kind of element is present those which are similar tend to form groups.
3. The law of closed forms. Other things being equal, lines which are enclosed in a surface tend to be seen as a unit.
4. The law of "good" contour, or common destiny. Parts of a figure which have a good contour or common destiny tend to form units.
5. The law of common movement. Elements are grouped when they move simultaneously and in a similar manner.
6. The law of experience. Comprehension of symbolic forms is partly dependent on the circumstances under which they are learned.

Many of these laws of perceptual organization are incorporated in some of the present day psychological investigations and theories of perception.6

Sensory Tonic Field Theory

The Sensory Tonic Field Theory originators were Gestaltists who believed that muscle tonicity or tension affects the visual perceptual field in such a way as to cause a modification in the way one perceives objects in space and that it has an effect on spatial orientation.

They tried to validate their theory by assessing the effect of body position upon the visual perceptual field.7

Vernon seems to support this theory by stating:

6Hope Smith, "Motor Activity," p. 29.
7Ibid.
Yet in fact, in all our actions, we demonstrate that we perceive accurately the position of the body in space and positions of objects in relation to the body and to one another. Were it not so, we would have difficulty in remaining upright and also in avoiding objects as we moved about, and in gauging their movements in space.8

**Developmental Theory**

Increasing credence has been given to the Developmental Theory during the last twenty-five years. One of the most renowned advocates of this theory is Jean Piaget whose observations of his own children led to his theories about stages in the development of intelligence.9

Piaget's theory attempts to explain human behavior within one system and to avoid quantitative data. His unawareness of Gestalt psychology until completion of his initial research explains the absence of any referral to other learning theories. Piaget concerns himself with the organization within the individual rather than with the stimulating environmental cues which are a major concern of most learning theorists.10

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8Vernon, *The Psychology*, p. 120.


In discussing Piaget's concept of perception, two facts are important. The major part of Piaget's endeavors, as well as those of his collaborators, has been guided by developmental intellectual functioning; the second is that much of his writing is in direct response to as well as a critique of the Gestalt approach to perceptual phenomena.11

Intelligence in human beings, according to Piaget, passes through various stages and rather than being fixed in terms of actual age, continuities are characterized by an order of succession. Intelligent behavior has two poles, figurative and operative. The figurative aspect precedes the operative and is functional at the pre-operative or sensory-motor stage. Figurative behavior is perceptual and is the clue for understanding the sensory-motor stage. The sensory-motor stage is further divided into six sub-stages, all of which are sequential.12

Piaget's work extends further than classical developmental theory; for, rather than waiting for his biological heritage to unfold, Piaget's work leads the concerned person to where he can begin to examine the assistive aspects that an environment can afford to its

11Ibid.
12Ibid.
children as they develop.\textsuperscript{13}

Hebb\textsuperscript{14} traces learning from infancy to adulthood and offers several principles in support of his treatise. His general proposition is that learning is influenced by earlier learning. He emphasizes the fact that perception is affected by past experience—what is learned is in terms of what is perceived. He supports his theories with seemingly well-founded experiments.

Smith and Smith\textsuperscript{15} criticize the developmental theorists in stating that they have not defined their perceptions, cognitions, and organizational processes in objective terms, and are consequently unable to show how the perceptual or cognitive patterns influence subsequent behavior.

\textbf{Cybernetic Theory}

Karl Smith, one of the originators of the Cybernetic Theory, describes it as "a theory of behavior that interprets activity as a closed-loop feedback controlled process, rather than as a series of discrete stimulus response units. The Cybernetic Theory analyzes,

\textsuperscript{13}Ibid.


\textsuperscript{15}Karl Smith and Margaret Smith, \textit{Cybernetic Principles}, p. 38.
describes, and conceptualizes behavior in terms of its feedback characteristics."\textsuperscript{16}

In closed-loop behavior, feedback refers to the sensory effects that are controlled and generated by response. A behaving individual is never at rest, but engages in continuous activity which is self-generating in that motor responses produce sensory feedback effects which, in turn induce and direct subsequent responses. Closed-loop systems readjust themselves continuously by means of their inherent capacity to discern directional differences. Open-loop systems are those with no internal feedback regulatory mechanisms whose reactions would be direct functions of external stimulating conditions.\textsuperscript{17}

Cybernetic theorists divorce themselves further from more traditional learning theorists by their refusal to study the behavior of animals and to draw parallels to human problems. They believe that the behavioral design of the learner, which develops to a significant extent independently of specific learning change, determines what he can learn, at what rate, and under what conditions.\textsuperscript{18}

\begin{thebibliography}{9}
\bibitem{17} \textit{Ibid}.
\bibitem{18} Karl Smith and Margaret Smith, \textit{Cybernetic Principles}, p. 1.
\end{thebibliography}
Perceptual-Motor Training Programs

Perceptual-motor training programs which have become fashionable during the last decade were begun in the early 1900's by Maria Montessori, Italy's first woman physician.\(^{19}\) Since that time various other writers and researchers have sought to improvise, elaborate, and/or improve on her basic idea.\(^{20}\)

The growth of motor therapy programs has been phenomenal in its magnitude, which has resulted in considerable educational controversy.

A resolution issued jointly by the National Education Association and the American Medical Association clearly shows the concern of these two organizations for more empirical research before wholesale adoption of perceptual-motor programs.

Whereas School personnel are beginning to utilize various methods of visual perceptual motor developmental training in attempts to alleviate academic learning disabilities, and

Whereas research has not substantiated that these methods are more effective than other procedures in remediation of these learning disabilities; therefore be it

Resolved that school personnel use caution and restraint in the application of these


perceptual development training methods until the reliability and validity of these techniques have been evaluated through adequate research.21

The American Association for Health, Physical Education, and Recreation jointly sponsored with the National Institute of Neurological Diseases and Blindness of the National Institute of Health a multidisciplinary symposium that clearly indicates the concern for the motor therapy programs. Participants included psychologists, neurologists, physiologists, physicians, child development specialists, educators, and therapists, as well as other qualified observers.22

Cratty, with tongue in cheek, has described these programs as follows:

Physical educators have not been slow to react. Spurred on by the theoretical pronouncements of a psychologist in the mid-west, a school seating engineer in Florida, and a doctor of education in Philadelphia . . . it was discovered that motor activities contributed to an even wider variety of human capabilities than was dreamed about in the 1930s. Crawling improved hearing, speaking, thinking, seeing, perceiving, abstract thinking, and cognating. Walking a balance board aids reading by heightening laterality. "Physiological, Optic, Neurological Organization, and Laterality-directionality" supplemented bland educational terms. Rousseau's "recapitulation" theory appeared in a new suit.23

21National Education Association-American Medical Association, "Resolution on Perceptual-Motor Training," April, 1968. (Mimeographed.)


Smith has raised valid questions. She believes researchers must actively seek adequate answers before continuing with motor therapy programs. The questions she raises are:

1. How much of the improvement is due to maturation?
2. Have these programs produced a Hawthorne effect?
3. Does the individual attention given the children in the program account for the improvement?
4. In using multiple remedial programs, which treatment or combination of treatments results in the observed improvement?
5. What motor activities are most effective—in what sequence and how many repetitions?
6. Are the pretests (motor or perceptual-motor) valid, reliable, and objective?
7. With what is known about specificity and transfer effects, how do gross motor activities promote improvement in reading?24

These and other similar criticisms have prompted Krippner25 to defend these programs. He maintains that a growing body of research lends support to the assertions made by the proponents of the various programs. He believes the contentions echo the writings of Piaget and Hebb, and that they support Hunt's attack on the concept of fixed intelligence. He, too, stresses the importance of more research and suggests that the advocates of pre-readiness factors and their relation to reading have not considered such nonphysiological attributes as interest and motivation.

The perceptual-motor programs of Frostig,


Doman-Delacato, Montessori, and Kephart have received the greatest amount of publicity by advocates as well as non-advocates. For this reason, these programs will be reviewed for this study as well as some of the practices currently found in some of the elementary schools which have their bases in one or more of the above mentioned programs.

**Frostig**

Frostig is perhaps the least controversial of all the perceptual-motor theorists.

The Frostig program consists of three levels, each published as a separate booklet. They are: *Beginning Pictures and Patterns*, *Intermediate Pictures and Patterns*, and *Advanced Pictures and Problems*. The program, though designed for pre-school children, is suitable for use with kindergarten and first grade children who have had no previous visual perceptual training.

The Frostig test contains five subjects which assess relatively distinct functions: eye-motor coordination, perception of figure ground, perception of form...

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26 Ibid.
27 Ibid.
constancy, perception of position in space, and perception of spatial relationships. Characteristics of the Frostig test are that it may be administered individually or in groups; the scoring is objective; the child's raw score for each sub-test may be converted to a perceptual age equivalent; and a total perceptual quotient can be derived in a manner similar to that used for determining Intelligence Quotient.29

The tests used in the Frostig studies have been sufficiently validated to the extent that it seems to be a statistically reliable tool for measuring perceptual-motor ability.30

Many references to the works of Frostig were cited in the literature. However, the majority of these works were concerned with the atypical child. Only those studies closely related to the present study were reviewed.

Cowles,31 in a study relating reading readiness to visual perceptual ability with first grade children, found a significant statistical relationship between the two.


30Ibid.

Using three groups, experimental, control, and instructional, he concluded that by instructing the experimental group in visual perception, as suggested by Frostig, significant differences were obtained when contrasted with two other groups of children who had received no visual perception instruction. Cowles found no statistical significance between the control and instructional groups. The relatively small sample of twenty-seven students for each group may lend itself to criticism. Even though Cowles' work dealt entirely with Negro children, he did not consider ethnic background as a limitation. The random sampling techniques used may have accounted for his elimination of this potential altering factor.

Rosen sought to answer the question,

If certain perceptual capabilities are predictive of reading achievement in the first grade, what will be the result on first grade reading, if any, of an addition to the readiness program, consisting of a systematic and concentrated perceptual training program?  

A total of 637 pupils from the Minneapolis public elementary schools were used in his sample.

The group was divided into twelve experimental classrooms and thirteen control classrooms. The experimental

classes received thirty minutes per day of visual perceptual training for twenty-nine days. Children in the control group received fifteen minutes of additional reading instruction above regularly scheduled basic reading instruction. Analysis revealed that there was no statistical difference in the two groups on reading ability. However, Rosen did find a significant relationship between perceptual motor ability and reading ability for boys who were initially classified as low perceivers when compared with boys in the control group.

Another study was conducted by Jacobs\textsuperscript{33} who sought to evaluate the Frostig program by testing whether children "respond with higher scores on the reading test after completion of perceptual-motor training programs." To achieve this evaluation, the effects of the program had to be distinguished from score increase due to normal development. The effectiveness at these age levels was tested in order to determine whether effectiveness was related to the age of intervention. The results showed that the first grade children benefited most from the Frostig program. The pre-kindergarten children benefited less than the first graders but more than the kindergarten children, and the

kindergarten group showed no difference in the Frostig test.

In a study using a sample of twenty-nine girls and forty-two boys, Olson\(^3^4\) found only a small significant relationship between the results obtained from the Frostig Developmental Test of Visual Perception and a reading ability test. The Frostig test was of little value in predicting the specific reading ability of the children who participated in the study. Olson also found that the Frostig test had little relationship to either mental or chronological age.

In a second study, Olson\(^3^5\) sought to investigate the relationship between school achievement, reading ability, and six visual perceptual abilities as measured by the Frostig Developmental Test of Visual Perception. A third grade population was selected for the study because, for most of the children in the particular grade, the reading difficulties described by Frostig could no longer be attributed to level of maturation. Results were obtained for sixty-four boys and fifty-seven girls. It was found that: (1) the total Frostig test was a fair predictor of school achievement and specific reading ability, (2) the

\(^{34}\)Arthur V. Olson, "The Frostig Developmental Test of Visual Perception as a Predictor of Specific Reading Ability with Second Grade Children," *Elementary English*, XLIII (December, 1966), p. 872.

Frostig test is a better predictor for girls than boys, (3) visual-perception difficulties and specific reading difficulties showed a moderate degree of correlation in some instances and no significant correlation in others, and (4) the results of this particular test on this particular population did not support Frostig's postulates concerning the relationship between her tests and specific reading abilities.

An additional study by Olson in which he compared achievement test scores and specific reading abilities to the Frostig test resulted in his finding significant correlation at the .01 level of confidence. An item analysis of some of the variables did not produce as high a correlation. The Frostig subtest, Form Constancy, had little predictive value.

The Frostig Developmental Test of Visual Perception was one of the instruments used in a study by Gallahue. He sought to determine the relationship between performance on the gross motor task and the figure-ground subtest of the Frostig test.

In the Gallahue study, eighty randomly selected

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kindergarten pupils were administered one of four figure-ground variations of a gross motor task in order to determine the effects of the various floor patterns on the performance of the test. Each group, of which there were four, was asked to walk in a lateral direction between the rungs of a ladder placed in a horizontal position over a floor pattern.

The scores of the gross motor task were correlated with the scores of the Frostig test and a significant relationship was found between the two items.

Gallahue concluded that accurate performance of a gross motor task with his groups of children was influenced by the composition of various figure-ground patterns, and that figure-ground perceptual ability is an important aspect of a kindergarten child's ability to perform a gross motor task accurately.

Doman-Delacato

Glen Doman, a physical therapist, and Carl Delacato, a doctor of education, are directors of The Institute for the Achievement of Human Potential in Philadelphia. The program which they originated for brain damaged children has been applied to children with reading disability. This program emphasizes motility, externally imposes body patterns which the child is unable to perform alone, and attempts to establish body awareness, position sense,
and hemispheric dominance.38

The Doman-Delacato Profile is the instrument used by some rehabilitationists to determine whether neurological disorganization underlies lack of reading ability. The profile evaluates neurological status by testing a child's competence in mobility, language, vision, audition, and tactile facility. Respiratory, sensory, and motor activities are prescribed in areas of deficiency. Proponents of this method claim that these activities improve neurological organization, and thereby lay the groundwork for the mastery of reading.39

The Institute's rehabilitationists admit that there have been few experimental studies conducted, but cite the improvement of the children in the program as evidence of the validity of their program.40

Wepman in a review of Delacato's book, The Diagnosis and Treatment of Speech and Reading Problems, levels an academic attack at the book and the author. He decries the amount of space that is devoted to "the climatic changes that have occurred over the past half billion years." He contends that Delacato discredits almost anything that others have done in this area, even though

39 Ibid.
40 Ibid.
their experimentation is more scientifically valid.

The postulation of a point-to-point correlation between structure and function has been found to be untenable in other scientific attempts; it is made no more tenable by the simple statement that it is true, as it appears in this book. His argument that function or exercise will produce neurological growth has had few adherents over the years.

Wepman concludes by making the rather strong statement "that neither the diagnosis nor treatment of speech and reading disorders have been materially benefited by the book, the theory, or the practice."41

Sister Joseph Cecilia, a Diocese Elementary Supervisor of the Diocese of Helena, Montana, subscribes to the Doman-Delacato program. The neurological program "is intended to treat existing reading problems and to prevent reading problems in the future." She admits that research projects have not been set up because of the time involved and lack of personnel; however, individual schools will compare the rate of improvement in former years in the reading score with that of the present year.

The "games or exercises" that she recommends for development of various attributes are those advocated by Kephart.42


Carney, in direct reply to the statements made by Sister Joseph Cecilia, reiterates all the criticisms directed toward the Delacato method: Delacato is not objective in reporting his results; his procedures are unscientific; and his neurological explanations are naive. Carney made a film study of children creeping using Delacato's hypothesis that the child with incomplete neurological organization would crawl and/or creep differently than the child with complete neurological organization. Some of the children used in her study had speech and hearing difficulties while others did not. From a statistical analysis of the evaluation by a panel of judges, it was shown that chance alone could have produced the results.

Robbins set up an experiment to test six hypotheses deducted from Delacato's theory of interrelationships of neurological organizations. Comparisons were made of reading and lateral development among three groups of second graders. The first group was exposed to a Delacato type program; the second group to a non-specific or placebo type program; the third group acted as the traditional control group. The results did not support the rejection of any of the null hypotheses thus suggesting that the Delacato type

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program did not enhance the lateral or reading development of the subjects, and that the postulated relationships between neurological organization and reading could not be supported by this particular study.

The null hypotheses tested were:

1. Creeping is not related to reading beyond chance expectancy.
2. Mean reading differences between subjects who are lateralized and those who are nonlateralized do not exceed chance expectancy.
3. Mean differences in reading between subjects who are lateralized and those who are nonlateralized do not exceed chance expectancy, when controlled for differences in creeping.
4. Mean post-test differences in reading between the group exposed to the experimental program and the other two groups are no greater than chance expectancy after pretest score differences have been controlled.
5. Mean post-test score differences between reading and arithmetic within the experimental class do not exceed chance expectancy when pretest score differences are controlled.
6. The proportion of subjects lateralized after exposure to the experimental program does not exceed by greater than chance expectancy the proportion lateralized before the program was introduced.44

Robbins listed the limitations of his study as:

inability to control the experimental variables; lack of relationship between his groups and the original Delacato groups; lack of random assignment of students to the various groups; and lack of an attempt to match the teachers of the various groups.

In Delacato's reply to the above article he enumerated several other frailties within the study:

1. Laterality was evaluated by a study which the Delacato rationale does not use.
2. Treatment was not related to diagnosis as it is in the Delacato rationale.
3. The treatment period was too short.
4. Homolateral patterning was carried out for one month. This factor has not been related to diagnosis.
5. Robbins decreased the laterality of the experimental group.
6. Robbins did not follow a sequence in his neurological organization which Delacato decrees as being vital.
7. The entire concept of neurological organization was reduced to creeping and laterality when there are forty other items in the Delacato concept.\(^5\)

Delacato suggested that Robbins should review the studies that have been conducted and that they are listed in his book.

In reply to the above listed criticism, Robbins

summarized that Delacato is concerned with limitations only when they fail to confirm his position. He further replied to the listed limitations of his study by stating that the suggested ten studies also did not control the experimental variables. He rationalized that his study was valid because of Delacato's advocacy of universal applicability. Delacato had not used random sampling techniques nor had he followed other suggestions commonly acceptable in research of this type. Robbins further states in defense of his study that the forty-two suggested items had never been published and continued with a valid critique for all his purported failures in his sophisticated research.

Robbins concludes by stating that "theoretical issues are resolved in science and as Mr. Delacato has indicated, only through carefully controlled experiments." He suggested that a joint study be undertaken by the two of them.

Arner, an optometrist, commended Robbins for his detailed analysis but admonished other concerned persons to "not preclude sensitive reception to the concept that academic readiness is amenable to appropriate perceptual-motor training."

46Ibid.
Fishbein reports that 10,000 children are receiving treatment at more than thirty affiliates of the Institute for the Achievement of Human Potential in the United States, Canada, and abroad. He lists the "highly esteemed professional, medical, and health organizations in the United States and Canada" that have united to heap criticism on the theory, practices, and promotional procedures of the patterning system and its proponents. The organizations are: American Academy for Cerebral Palsy, American Academy of Physical Medicine and Rehabilitation, American Congress of Rehabilitation Medicine, National Association for Retarded Children, American Association on Mental Deficiency, American Academy of Neurology, and American Academy of Pediatrics. In addition, three Canadian organizations endorsed the declaration: Canadian Association for Children with Learning Disabilities, Canadian Association for Retarded Children, and Canadian Rehabilitation Council for the Disabled.

He finds the documented record of the patterning method of rehabilitation to be spotty, and concludes that the analysis and criticism of the Doman-Delacato method are sufficient to make one hesitate before allowing any child to undergo treatment with these techniques. He

finalizes his attack by stating: "in the face of all this, the burden of proof is definitely on those who are promoting this unestablished technique."\textsuperscript{48}

Krippner\textsuperscript{49} concluded that even though the Doman-Delacato method of perceptual training is the most controversial and perhaps has received more criticism than any other method, the Institute for the Achievement of Human Potential has a ten year waiting list of applicants who are seeking its services.

Montessori

The Casa dei Bambini was established in an Italian slum tenement by Maria Montessori in 1906. The success of this school in reversing the effects of poverty purportedly resulted from Montessori's emphasis on intrinsic motivation, sense training, and motor activities.\textsuperscript{50}

Orem\textsuperscript{51} describes the Montessori Method as "a spontaneous expansive educational system designed to afford the child liberty to move and act in a prepared environment encouraging self-development."

Orem further stated that the motor education

\textsuperscript{48} Ibid.

\textsuperscript{49} Krippner, "Evaluation of Pre-Readiness," p. 13.

\textsuperscript{50} Ibid.

program is designed to accomplish three purposes: (1) to aid the normal development of movement; (2) to foster this development when a child is backward or abnormal in any way; and (3) to encourage those movements which are useful in the everyday demands of life such as dressing, carrying objects, and similar related tasks.

There is a dearth of research involving the Montessori Method despite the number of years it has been practiced. One explanation for this is the fact that the European records were lost or destroyed during World War II.\(^{52}\)

Deutsch\(^{53}\) has suggested that compensatory education for the culturally deprived child might be patterned after the Montessori school because of the great diversity of needs within a group. He believes that through this method a child would be afforded an opportunity to select materials consistent with his own developmental capabilities. Deutsch believes that utilizing the Montessori Method would facilitate success experiences, positive reinforcement, and subsequent enhancement of involvement and motivation. He contends that language is improperly handled through this

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method.

Hunt\textsuperscript{54} concurs with Deutsch by stating: "... it may be wise to re-examine the educational contributions of Maria Montessori." He contends that teacher observations of the things that interest the child could be most fruitful in working with disadvantaged children. Hunt believes that the coded information stored in children from culturally deprived backgrounds differs from that stored in the children of middle class backgrounds. This difference would make it dangerous for middle class teachers to prescribe intuitively on the basis of their own experience in teaching middle class children.

Beyer\textsuperscript{55} postulates that the modern educational principles and the Montessori methods are in direct conflict. Beyer calls mundane the materials developed by Montessorians for use in developing specific concepts, and seems to think that creativity is stymied by the "didactic" materials. The focus of the Montessori method is too narrow, and she dubs the ritualistic procedures as monotonous. The child's feelings are overlooked and little encouragement is given


\textsuperscript{55}Evelyn Beyer, "Montessori in the Space Age?" \textit{National Education Association Journal} (December, 1963), pp. 35-36.
to social interaction. Beyer further states that,

according to the best modern thinking, helping a child relate to his world and to meet such emotional problems as fear, anger, or rejection is more important than having him trace geometrical shapes, shine his shoes, or wash his hands in ritualistic fashion.

A study conducted by Prendergast56 investigated the effects of two different nursery school programs, the Montessori and the conventional day nursery, on the development of perceptual motor skills and receptive language. A third group of children who had no nursery school experience were compared with these two groups at the conclusion of the study to determine the level of development of the three groups of children in their perceptual-motor and receptive language development.

Montessori students scored significantly higher in eye-hand coordination and auditory discrimination. They did not score significantly higher on the figure-ground and positions in space, though trends did favor the Montessori group.

Kephart

Newell Kephart, a Purdue University psychologist

and director of the Glen Haven Achievement Center, focused his initial investigation on the child who lacks readiness for language processes. More recently his writings have been concerned with the normal child who might have more subtle perceptual-motor difficulties.

Remedial perceptual skill training includes movement patterns that are designed to help facilitate perceptual learning. Kephart believes that these skills should ideally be mastered at home. The researcher has described procedures which parents can follow at home in fostering sensory-motor development.

The Purdue Perceptual Motor Survey is the only measuring device of this kind designed for use with second, third, and fourth grade normal children. It is divided into five major sections: body balance and posture, body image and differentiation, perceptual-motor match, ocular control, and form perception. The maximum individual score is eighty-eight.


58 Kephart, The Purdue, p. iii.


60 Roach and Kephart, The Purdue, p. 28.
Few studies have been conducted using the Purdue Perceptual Motor Survey, but The Slow Learner in the Classroom,\(^{61}\) which preceded the Purdue Perceptual Motor Survey, seems to have been a guide for measuring instruments devised by other researchers.

The first of Kephart's diagnostic procedures, which he later incorporated into the Purdue Perceptual Motor Survey, involved having children copy simple geometric forms: a cross, a circle, a triangle, a vertical diamond, and a divided rectangle. Lowder\(^{62}\) has found the ability to copy these forms to be significantly related to school achievement. The entire population of the first three grades in Winter Haven, Florida, constituted his study population. These children copied each of the geometric forms which were then evaluated by a panel of "expert judges." A correlation of .50 was found between copying forms and school achievement.

Haring and Stables\(^{63}\) used The Visual Perception

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Eye-Hand Motor Coordination Test, developed by the Children's Rehabilitation Unit of the University of Kansas Medical Center, in testing mentally retarded children. The test consisted of seven items: matching puzzles, coloring, cube and parquetry patterns, peg board patterns, cutting, drawing, and visual recall.

The experimental and control groups used in the Haring and Stables study consisted of thirteen and eleven children respectively. Perceptual-motor ability was determined by using Kephart's Perceptual Survey Rating Scale as set up in The Slow Learner in the Classroom. From the results gleaned from the survey, training sessions were initiated that pertained to work in areas where the greatest deficiency was noted.

The Visual Perception Eye-Hand Motor Coordination Test, which previously had been given at the onset of the experiment, was re-administered after completion of the training sessions. Results of the study indicated that:

1. There was no significant difference between the experimental group and the control group as evidenced by the results on the pre-test of visual perception, eye motor coordination.

2. There was a statistically significant difference in the mean gain scores of the experimental compared to the mean gain scores
of the control group in the post-test by seven months.


The authors concluded that a gross motor training program affects, in a positive way, the child's development in fine motor areas which have a direct effect on learning capabilities.

A more recent study conducted by Poindexter64 was concerned with the motor development of emotionally disturbed children. Though the author presented few details concerning the treatment of the data, the number of children in the study, the types of emotional disturbances or any procedure at length, she did relate the findings after having administered the Purdue Perceptual-Motor Ability Survey. It was found that the mean score of 55.33 for the emotionally disturbed group compared with the normal group (of which only scant description was given) of 79.77. This was significant at the .01 level of confidence.

It was concluded that: "emotionally disturbed children could be identified by the perceptual motor survey," and that "this should not be surprising as emotionally disturbed children are frequently identified by their emerging perceptual problems."

The Purdue Perceptual-Motor Survey has been subjected to standardization scrutiny and has been shown to be valid and reliable.\textsuperscript{65}

School Perceptual-Motor Training Programs

As a result of current emphasis on perceptual-motor ability, several school systems have devised their own perceptual-motor training programs. Some use parts of existing training programs and others have established seemingly unique avenues through which to examine for perceptual-motor deficiencies and ways of strengthening perceptual-motor ability.

Dayton, Ohio

The Dayton Program\textsuperscript{66} for Developing Sensory and Motor Skills in three, four, and five year olds is

\textsuperscript{65}Roach and Kephart, \textit{The Purdue}, pp. 13-27.

\textsuperscript{66}William Braley, "The Dayton Program for Developing Sensory and Motor Skills in Three, Four and Five Year Olds," Dayton, Ohio, 1969. (Mimeographed.)
designed as a preventive type program in the sensory-motor areas.

A Sensory Motor Manual is used by teachers as a guideline to insure that all children receive the same type of instruction. The manual includes body image, balance, basic body movement, symmetrical activities, eye-hand and eye-foot coordination, large muscle activities, fine muscle activities, and form perception and rhythm.

Research alluded to, though not fully described, indicated that children can be trained to develop in these areas.

University City, Missouri

The purposes of the three year research program of University City, Missouri, are to identify children's learning needs early and to design sequential specific learning activities to aid in the growth and development of each child.

Four year old children participated in the personalized developmental program. The children received a battery of tests to determine functioning level in receptive (visual-auditory), cognitive (association, integration, recall), and expressive (language, motor) skills. Children showing a severe lag in any of the skills

67 Helen Hartwid, "A Preschool Research Project," University City, Missouri, 1968. (Mimeographed.)
spent twenty minutes a day in activities planned to strengthen the weak areas.

A booklet for distribution to teachers, entitled Development Skills: Number One, Motor Skills, aids the teacher in understanding such items as: awareness of self, gross motor control, fine motor control, position in space, eye-motor control, and creative motor ability. In addition to the motor program, the project has focused on children who need assistance in the development of visual, auditory, and language skills.

One hundred children have been in the program for two years. In addition, 200 control children were given the same battery of tests each year. The overall purpose of the research is to measure the effect of the personalized program on achievement in school. These results will not be available until the end of the 1969-70 school year. Findings for the first year show that children performing well below their age-mates, after participating in a six month personalized program, reach a level comparable to or above the average of their peers.

University of Southwestern Louisiana

The University of Southwestern Louisiana's program

of activities was developed specifically for mentally retarded children or other children who have specific learning problems.

A program of motor developmental activities was constructed in which activities were arranged in sequential order progressing from simple movements to complex ones, gross movements to finely coordinated ones, movements of the neck and trunk proceeding to the upper and then lower extremities, and bilateral performance to movement of the preferred side. This pattern is followed in each of four areas of activity: exploration of movement, balance, airborne activities, and hand-eye manipulative skills. The ordering of the activity is not rigid, but serves as a guide for the teacher.

No research was reported as having been undertaken on this project.

New Haven, Connecticut

Pool activities are used in the New Haven program to help children move more efficiently, rather than to teach them to swim. There is no demand on the children to perform certain swimming strokes nor is there drill in elements of proper breathing. A creative method of discovering movement

in the water has been substituted and all children, swimmers and non-swimmers, participate. Water games, walking relays, occasional directive instruction, entering the water from different spots and different ways, are a few of the means used in attainment of the objective of helping the children discover for themselves their movement potential in the water.

Whether or not there is a transfer from this program to skills out of the water has yet to be proven, but advocates of the program contend that the prognosis leans toward the positive side.

Winter Haven, Florida

The "Learning to Learn Program" involves all of the first grade children in the Winter Haven schools. Its goal is to make it possible for children who are starting first grade to have an opportunity to organize and build a more effective foundation for learning. The program consists of testing, both standardized and informal; gross motor training; fine motor training; and concept building.

Activities used in attaining the objective consist of "template testing" and training, use of walking boards,

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balance boards, chalkboard exercises, various rhythmic activities, and many novel inventive kinds of activities. The perceptual-motor program sponsored by the Winter Haven Lions Club has received national acclaim. The club, composed of sixty-five members, publishes, advertises, and sells the materials used in furthering this program. Research is presently being conducted to determine the effectiveness of the program.

Perceptual-Motor Ability and Reading

The majority of correlation studies which have been done with perceptual-motor ability have been related to the many faceted area of reading ability.

No attempt has been made to trace the historical account of perceptual-motor ability and its relationship to reading ability, as it is believed that this is not the direct domain of this study.

Studies previously cited in the paper as having a direct relationship to the various perceptual-motor training programs will not be replicated in this section.

The studies cited will be separated into the research dealing with auditory, visual, and perceptual-motor ability.
Auditory

Morency\textsuperscript{71} reports on a longitudinal study which is still in progress. The parameters of the overall study include articulation, intellectual auditory and visual perception, oral motor movements, visual motor ability, and reading readiness all of which were measured upon completion of kindergarten and will be compared with later achievement testing.

The current findings of the study show a developmental progression in perceptual ability; a low correlation between improvement in auditory modality with improvement in visual modality; an individual progression of perceptual abilities along lines of modality preference at differing rates in the same individual.

Sterritt and Rudnick\textsuperscript{72} have related the ability to transpose from auditory and temporal to visual-spatial patterns and to reading ability in their study. Thirty-six fourth grade boys were given tests in intelligence, reading, and hearing before being tested on perceptual ability. Three perceptual tests consisting of auditory signals to be


translated into movement patterns were administered to each subject. The results indicated that subjects of high intelligence scored high on the reading test and made few errors in the three perceptual tests. Regression equations indicated that visual perception declined in importance from third to fourth grade, and auditory and I.Q. became more important in the individual differences in reading ability.

Visual

Fuller\textsuperscript{73} evaluated three different factors: visual perception, intelligence, and reading achievement in an attempt to more fully understand reading achievement. Tests covering the above cited factors were administered to 347 junior high school students. The tests included the Minnesota Percepto-Diagnostic Test, The California Test of Mental Maturity, and Science Research Associates Reading for Understanding Placement Test. Correlation coefficients were very stable in terms of change when partial correlations were used. An analysis of multiple regression and correlation was calculated. The combination of the three factors was more powerful as a predictor than if any one of them was

\textsuperscript{73}Gerald B. Fuller, "Effectiveness of Visual Perception, Intelligence, and Reading Understanding in Predicting Reading Achievement in Junior High Children," *Journal of Educational Research*, LX (February, 1967), p. 281.
used alone. It was found that 76 per cent of reading achievement was attributed to the relation of reading achievement to visual perception, intelligence, and reading for understanding.

Elkind and Weiss\textsuperscript{74} used a population of eighty-five children, ranging in age from five to eight years. Each child was presented with and asked to name structured and unstructured arrays of familiar figures. The tendency to explore an unstructured array increased systematically with age. The results were interpreted as supporting the position that perceptual performance is a joint function of the perceptual developmental level and the nature of the stimuli configuration. The view was presented that patterns of visual exploration are, in effect, motor skills.

Bakker,\textsuperscript{75} in an attempt to determine if sensory dominance plays a role in reading ability, tested thirty-two children--ten normal readers, ten non-resistant backward readers, and twelve resistant backward readers. A difference threshold procedure was administered to measure visual and


kinesthetic sensitivity. The researcher tested the hypothesis that the failure of the visual system to be dominant in sensory systems may lead to reading difficulty. Results supported this hypothesis. In addition, it appeared that the dylectics differed from normal readers in lower visual sensitivity. It was further hypothesized that the existence of smaller visual dominance in dylectics may be responsible for kinesthetic interference in the visual information process in reading.

Keogh and Keogh\(^\text{76}\) compared thirty-nine educationally subnormal boys, ages nine and ten, with eighty-four normal school boys, ages six through nine, on ability to copy four simple line patterns by drawing and walking. The subnormal subjects were similar to six year olds on both tasks and were significantly worse than all other age groups. No difference between walking and drawing were found for the normal boys, but the educationally subnormal subjects were significantly poorer in ability to walk than to draw patterns. The objective and subjective scores suggest the educationally subnormal boys had extreme difficulty in organizing their gross movements to represent patterns, to define points of reference within the space, and to orient themselves both spatially and temporally.

according to visual cues. They appeared to have real
difficulty in making the appropriate sequence of motor
response to the visual organization of space.

The purpose of Barrett's\textsuperscript{77} study was to determine
the ability of nine reading readiness factors, seven of
which required varying degrees of visual discrimination,
to predict first grade achievement and to determine how
well the various combinations of the nine factors predict
first grade reading achievement.

From a sample of 724 students, it was found that
reading letters and numbers was the best single predictor
of first grade achievement. A combination of visual
discrimination tasks would be a better predictor than a
single item. Pattern copying measured a type of visual
ability in predicting first grade achievement.

A study by Van de Riet and Van de Riet\textsuperscript{78} sought
to determine if underachieving boys had more difficulty in
visual motor coordination than did nonachievers. The
study groups consisted of forty-five subjects in the
underachieving group and forty-five subjects in the control
group. Each group was administered the Ellis Visual Designs

\textsuperscript{77}T. C. Barrett, "Visual Discrimination Tasks as
Predictors of First Grade Achievement," \textit{The Reading Teacher},

\textsuperscript{78}Vernon Van de Riet and Hani Van de Riet, "Visual-
Motor Coordination in Underachieving and 'Normal' School
to determine the degree of difficulty in visual-motor performance. The results showed no difference between the two groups, and thereby, the conclusion was reached that severe underachievement is not generally the result of brain damage, but of other causative factors, presumably psychological.

**Perceptual-Motor**

McCormick and associates matched forty-two underachieving first grade children for age, sex, I.Q., and reading grade level and randomly assigned them to one of three groups. One group received perceptual-motor training, the second group performed exercises, and the third group served as a control. Perceptual-motor activities consisted of "cross-lateral crawling, walking, balancing, jumping rope, etc." The experiment resulted in statistically significant gains for the group which received the perceptual-motor training but not for the other two groups.

**Perceptual-Motor Ability and Academic Achievement**

As previously stated, the majority of the research that has been conducted has related perceptual-motor ability

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to reading. There is a dearth of research in this area that correlates perceptual-motor ability with academic achievement.

A motor therapy program was initiated by Godfrey to facilitate academic achievement. The program was loosely structured and was composed of problem-solving activities designed to elicit movement patterns and to permit experimentation. Gymnasium and pool activities were used in the therapy program. A case study basis was used to report the findings. The four participants in the therapy program were compared with four non-participants. At the conclusion of the program, it was found that scholastic achievement scores for all participants increased. I.Q. scores showed little change, but improvement in school grades was noted. None of the matched non-participating cases showed comparable results or improvement. Godfrey suggested that, although the sample was small, the implications seemed to be that physical activities contribute to academic achievement.

Oliver, using two matched groups of educationally

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sub-normal boys, compared the experimental group with the control group to ascertain the effect of physical activity on school achievement. The results showed that the improvement by the experimental group in physical qualities and abilities was highly significant. There was also a significant improvement in mental tests.

The conclusion drawn was that these effects were achieved through the medium of physical activity. The improvement was so marked as to prompt the researcher to suggest that more emphasis be given to physical activities for educationally sub-normal boys.

The twenty lowest functioning children in a kindergarten class were studied by Painter\(^2\) who divided the group into experimental and control groups. The experimental group was given a systematic rhythm and sensory-motor activity program based on Barsch's Movegenic theory and on suggestions from Kephart. Significant mean gains were made by the experimental group in the expected areas of remediation, thus demonstrating the efficiency of such a program in a group setting within a regular public school kindergarten.

McClanahan83 sought to measure the effects of thirty-five hours of visual perceptual training on the mental maturity, perceptual skills, and reading performance of "slow learning" first grade children and children enrolled in classes for the educable mentally retarded. Pretest and posttest used with each group involved perceptual-motor ability and mental maturity. Following the pretest period, the experimental subjects were given thirty-five lessons of perceptual-motor skills. The control subjects were given no perceptual-motor training.

When compared with the control group the first grade experimental group of "slow learners" achieved significantly higher scores on all tests but the achievement test. The educable mentally retarded group achieved higher mean scores on the posttest, but their scores were not significant.

Roach and Kephart,84 using teacher's ratings of pupils as an evaluation of academic success, found a significant relationship between perceptual-motor ability and academic achievement. The Purdue Perceptual-Motor

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Survey was used to assess perceptual-motor ability. A Pearson coefficient of correlation between total scores obtained on the perceptual-motor survey was obtained as an estimate of concurrent validity. The significant concurrent validity was .654.

Disadvantaged Negro Children

The last decade has given rise to an increased awareness on the part of economists as well as educators, of the need for compensatory education for the disadvantaged children in the United States.

This awareness has not been without dilemma. Problems have arisen concerning the definitions or labels to attach to this strata of society that constitutes one-third\(^{85}\) of the national population. Words have been used interchangeably and synonymously to identify the disadvantaged—deprived, socially deprived, poor, needy, underprivileged, and others. This semantic difficulty prompted Jules Feiffer\(^{86}\) to caustically illustrate in cartoon fashion, his interpretation:

I use to think I was poor
Then they told me I wasn't poor, I was needy
Then they told me it was self defeating to think of myself as needy, I was deprived


Then they told me deprived was a bad image,
   I was underprivileged
Then they told me underprivileged was overused
   I was disadvantaged
I still don't have a dime
But I have a great vocabulary.

Identification of the disadvantaged has not been
without quandary. Some have sought to place a strict
economic price on this condition, others have sought more
definitive measures such as social, educational, and regional
identifications of this elusive characteristic.

Havinghurst\(^7\) has stated that at times the dis-
advantaged child has been categorically identified as all
children of manual workers. He does not concur with this
identification, however.

Marans and Louie define the disadvantaged child as

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\ldots \text{a child deprived of the same opportunity for}
\ldots \text{healthy growth and development as is available to the}
\ldots \text{vast majority of other members of the large society}
\ldots \text{in which he lives.} \ldots \text{children born into the}
\ldots \text{poor families which produce a disproportionate}
\ldots \text{incidence of academic failures and of lower socio-}
\ldots \text{economic group membership among their full grown}
\ldots \text{offsprings.} \quad \text{\cite{88}}
\]

Poverty is currently defined by reference to
cost-of-living budgets. Attempts have been made to

\[^{7}\text{Robert J. Havinghurst, "Who are the Socially Dis-}
\text{advantaged?" Journal of Negro Education, XXIII (Summer}
\text{1964), 210.}\]

\[^{88}\text{Allen E. Marans and Reginald S. Louie, "Hypothesis}
\text{Regarding the Effect of Rearing Patterns on the Disadvantaged}
\text{Hellmuth (Seattle, Washington: Bernie Straub and Jerome}
\text{Hellmuth, Co-Publishers, 1967), p. 21.}\]
identify annual income figures that mark the minimum requirement to meet the basic needs at an "economy" level. The figure most frequently quoted as marking the poverty line in the United States today is an annual income of three thousand dollars for a family of four.\(^89\)

Objections to this definition are easy to make. Many families consist of more than four persons and many consist of less. Some families live in small towns in which cost of living is less than this designated amount assumes.\(^90\)

More definitive methods have been suggested in identifying the disadvantaged families. These suggestions range from categorically stipulating all families with income less than five thousand dollars to an intricate equation system based on salary and non-salary income. Whatever the criterion used to assess poverty, the percentage of families included is not affected two percentage points in either direction.\(^91\)

Characteristics of the Disadvantaged

Black has categorized the characteristics of the disadvantaged child into: language factors, learning patterns, readiness for instruction, and school behavior.


\(^90\) Ibid., pp. 208-209.

\(^91\) Ibid.
Language factors

1. Disadvantaged children understand more language than they use. An estimate has been made that at grade two, the vocabulary of these children is one-third that of normal children and at grade six, about one-half.

2. Disadvantaged children frequently use a great many words with fair precision, but not necessarily those words that are representative of the school culture.

3. Disadvantaged children frequently are handicapped in language development because they do not perceive the concept that objects have names and that the same objects have different names.

4. Disadvantaged kindergarten children use fewer words with less variety than do kindergarten children of higher socio-economic income families.

5. Disadvantaged children use a significantly smaller proportion of mature sentences.

6. Culturally disadvantaged children learn less from what they hear than do middle class children.

Learning Patterns

1. Disadvantaged children tend to learn more readily by inductive than by deductive approaches. The hypothesis is presented that the low self-esteem induced by long economic deprivation, discrimination, or both, may cause pupils to distrust their own judgment or conclusions; they need the support of an authoritarian figure in the classroom. The difficulty in using a discovery technique in teaching disadvantaged children is obvious for this reason.

2. Disadvantaged children generally are unaccustomed to "insight building" by external use of lectures and discussions at home. The lack of verbalization in the lower class home diminishes the child's level of responsiveness.

3. Disadvantaged children are often symbolically deprived. Imaginary playmates are much less acceptable to the parent of the disadvantaged child. Parents tend to look upon such imaginings as lying and to punish when observed.
4. Disadvantaged children need to see concrete applications of what is learned, to gain immediate sensory and topical satisfaction. The importance of a series of well defined instructional tasks and attendant goals, continued verbalization, and frequent elevation of progress is implied by this factor.

5. Disadvantaged children tend to have poor attention span and consequently experience difficulty in following the orders of the teacher.

Readiness for Instruction

1. The disadvantaged child often is characterized by significant gaps in knowledge and learning.
2. Disadvantaged children generally have had little experience of receiving approval for success in a task.
3. Disadvantaged children are characterized by narrow experience outside the home.
4. Deprived children have little concept of relative size.

School Behavior

1. Disadvantaged children generally are unaware of "ground rules" for success in school.
2. Disadvantaged children frequently end the reading habit before it is begun.
3. Disadvantaged children are at a marked disadvantage in timed test situations. Accurate determination of their potential and their achievement must be obtained through some technique which does not penalize them with rigidly defined time limits.
4. Disadvantaged children need assistance in perceiving adults as people of whom one asks questions and receive answers.

Bloom\textsuperscript{93} maintains that the Negro disadvantaged child has all the learning problems of other culturally deprived children, plus the special problems created by the prejudice and attitudes of others. Examples of some of the special problems faced by the Negro disadvantaged follow.

**Economic Aspirations\textsuperscript{94}**

The organized system of economic, political, and educational sub-ordination of Negroes, both in the South and in the North, has systematically barred Negroes from skilled or white-collar jobs in business, industry, or government.

**Educational Aspiration\textsuperscript{95}**

The segregated schools have meant inferior education for Negro children. The dual school systems have resulted in crippling economic handicaps for the families of Negro pupils. This has resulted in short term goals because of lack of security in their economic life. Education and preparing for skilled jobs are long term goals. Economic deprivation inevitably weakens the


\textsuperscript{94}Ibid.

\textsuperscript{95}Ibid.
interest of most Negro families and children in striving for long term goals in education.

Cultural Deprivation\textsuperscript{96}

The cultural deprivation is a result of segregation and poverty and lack of educational goals. This cultural handicap includes the lack of books, a dialect that the children learn in the home, and the level of parental interest in education.

Poor Self Image\textsuperscript{97}

The poor relationship between pupils and teachers, the use of tests for purposes of classification rather than diagnosis, the primers and readers, and the curriculum as a whole severely damage the confidence and the basic self-esteem of the child from the low socio-economic groups. This results not only in a poor self image, but often in self contempt.

Riessman,\textsuperscript{98} though not denying any of the above items as being characteristics of disadvantaged children, suggests that there are positives within the disadvantaged groups that can and should be capitalized on within

\textsuperscript{96}Ibid.

\textsuperscript{97}Ibid.

educational circles.

Some of the "positives" he considers worthy of educational consideration as avenues for teaching are: slowness in performing intellectual tasks; hidden verbal ability that has been absorbed in present day culture by the Beatnik and the musician; the attitude of the dis-advantaged toward education and school as being two separate ideas; cooperativeness and mutual aid that mark the extended family; the avoidance of strain that accompanies competitiveness and individualism; the equalitarianism in informality and humor; the freedom from self blame and parental overprotection; the children's enjoyment of each other's company and lessened sibling rivalry; the enjoyment of music, games, and sports; the ability to express anger; the freedom from being word bound; an externally oriented rather than an introspective outlook; a spatial rather than temporal perspective; content-centered, not a form-centered mental style; a problem-centered rather than an abstract-centered approach; and the use of physical and visual style in learning.99

Riessman concluded by saying that the mental style of the socially and economically disadvantaged learners resemble the mental style of one type of highly creative persons.

99Ibid.
Eisenberg concurs with Riessman's attitude toward positives in the backgrounds of the disadvantaged. He reiterates some of the above points and adds further to the list: cooperativeness—mutual aid and equalitarian values—responsibility for family chores. He concludes that the effective teacher will capitalize on these characteristics in compensatory teaching.

Perceptual-Motor Ability and the Disadvantaged Child

The proposition that culture influences perception is highly plausible. However, there exist very few cross-cultural data that unequivocally support this point of view. Accumulated studies have reported, almost without exception, cultural differences in behavior that could very well indicate differences in perceptual ability. As a result, even without full substantiation, the prevailing view in the cross-cultural literature is that perceptual responses are subject to cultural influences. The theoretical bases for this assumption have been found in the child rearing practices of the different cultures.

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Conditions such as an infant being left in a crib for long periods of time and the failure of the mother and the environment to provide stimulation for the exercise of perceptual apparatus have been used to exemplify deficiencies which result in inadequate development of perceptual ability.\footnote{102}{Marans and Louie, "Hypothesis," pp. 27-28.}

Bruner\footnote{103}{Jerome S. Bruner, "The Cognitive Consequences of Early Sensory Deprivation," in The Disadvantaged Child, ed. by Joe L. Frost and Glenn R. Hawkes (Boston: Houghton Mifflin Co., 1966), pp. 138-141.} states that early deprivation robs the organism of the opportunity to construct models of the environment and also prevents the development of efficient strategies for evaluating information. Because of this, it becomes difficult for the infant to utilize probable rather than certain cues, the former requiring more efficient strategy than the later. Whether failure to master the elements of such strategies for transforming information before a certain period of growth produces an irreversible loss is uncertain, as is the determination of why critical periods are critical. That there is impairment of strategy under a deprived regimen seems to be evident.

Bruner continues that an organism must develop a model of the environment for two reasons. Doing so is a
way of conserving information in the way of concepts or universals; the organism is thereby able to extrapolate and interpolate on the basis of partial information, to perform the kind of inference that may be called "going beyond the information given."

The capacity to utilize cues and to extract information from cue-significant encounters is part of the perceptual development. Early deprivation robs the organism of the opportunity for constructive models of the environment, and also prevents the development of efficient strategies for evaluating information. As a consequence, it becomes more difficult to utilize the probable rather than the certain cues, the former requiring a more efficient strategy than the latter. 104

Marans and Louie105 though not denying the possibility of the lack of stimulation as a deterring factor in the perceptual growth, submit that there may be too much stimulation for the infant to perceive and integrate adequately into a better understanding of his environment. They maintain that stimuli are frequently so excessive that they prohibit any feedback to the developmental requirements

104 Ibid.

105 Marans and Louie, "Hypothesis," p. 28.
of the baby—learning words or learning to grasp or to walk. As a result, Marans and Louie hypothesize that in providing a protection for himself that the environment fails to afford, the infant must resort to his limited repertoire of adaptations and defenses. In most cases, these primitive defenses consist of forms of withdrawal from the environment rather than facilitating a comprehensive interaction with or control of sources of stimuli.

Hunt,106 in his attack on the concept of fixed intelligence, concurs with the above treatise and further maintains that even though these characteristics do exist, they are not irreversible. He believes that the provision of compensatory preschool experiences for the disadvantaged child can alleviate many of the educational retarding factors found in the disadvantaged child's environment.

Deutsch107 in agreement with Hunt, suggests that compensatory programs should be continued through the third grade in order to alleviate the adverse effects of the infant's experiences of the disadvantaged culture.


Bloom,\textsuperscript{108} in essence, agrees with Bruner in his statements concerning the reasons for lack of perceptual ability in deprived children. Bloom states that perceptual development takes place through the sensory modalities such as vision, hearing, touch, and even taste and smell. At the beginning of the first grade there are differences between culturally deprived and culturally advantaged children because of the amount and variety of experiences they have had in their perceptual development. The linguistic development of the child is linked with his perceptual development. The lack of verbal communication in disadvantaged homes is viewed as a deterring factor in perceptual development.

Few studies show the relationship between perceptual-motor ability of disadvantaged children in relationship to school success per se. However, there seems to be a growing awareness of the need for consideration of this facet of compensatory education for disadvantaged children.

A study by Boger\textsuperscript{109} provided rural Caucasian and

\textsuperscript{108}Bloom, Davis, and Hess, \textit{Compensatory}.

Negro children with stimulating visual materials involving reasoning ability of a perceptual nature to determine whether training would enhance performance on subsequent I.Q. tests.

Experimental subjects in the Boger study were twenty-five Caucasian and twenty-nine Negro children in grades one and four. Control subjects were twenty-two Negro and twenty-eight Caucasian children. Each group was an intact classroom under a single teacher. The Otis Quick Scoring Mental Ability Test and The California Test of Mental Maturity were given to the control and experimental groups before the training period of the latter was begun. The five month training period provided practice in the following directions: noting details, perceiving spatial relationships, detecting likeness and differences in pictorial and geometric pattern, and developing increased coordination of eye and hand movement.

The Negro groups scored significantly lower than the Caucasian groups on all items tested. The total group of rural children was below average on the norms for the intelligence tests. However, both Caucasian and Negro experimental groups showed significant increases in total I.Q. and California non-language scores. As evidenced by the results of a retest, gains were maintained five months
after the training period.

Boger suggested that training in visual perception might enable rural pupils to react more effectively in situations requiring perceptual discrimination and concurrently increase the intelligence scores.

Although not concerned exclusively with perceptual training, Brazziel and Terrell\(^{110}\) reported results of a six-weeks readiness program for disadvantaged first grade children. Perceptual-training was one aspect of their readiness program. Other training areas were vocabulary, development, word reasoning, and ability to follow directions. The experimental class had reached the fiftieth percentile on The Metropolitan Readiness Test at the end of six weeks as compared with the control group which scored at the fifteenth percentile.

Roach and Kephart\(^{111}\) found a statistically significant difference between the means of various socio-economic groups that were used in standardization of the Purdue Perceptual-Motor Survey. Mean differences ranged from 79.00 for the children of unskilled labor groups to 88.59 for the


children of skilled labor families. The mean score for the professional group was 84.50; the semi professional, 83.57; farmers, 82.00; clerks, service and office workers, 87.52.

Testing Disadvantaged Children

Following the Supreme Court's school desegregation decision of 1954, considerable controversy arose around the alleged genetic intellectual inferiority of Negro Americans. Support for this position was found in the work of Audrey Shuey 112 a psychologist at Randolph-Macon Women's College in Lynchburg, Virginia. She seemingly ignored the newer conceptions of intelligence and relied on research conducted prior to World War II. Three-fourths of the studies cited were conducted in the South. The great bulk of this research found most Negroes lower in I.Q. than Caucasians. She interpreted this fact as pointing to the presence of some native differences between Negroes and Caucasians as determined by intelligence tests. She eliminated the possibility of impoverished environment as being a plausible explanation by citing a 1939 investigation by Tanser of Negro and Caucasian children in Kent.

County, Ontario, Canada.\textsuperscript{113} The term "cultural bias" has been coined as a result of the considerable amount of research that has been conducted concerning the discrepancy between Negro and Caucasian intelligence test scores.

Eells has explained his interpretation of cultural bias of intelligence tests by stating:

Most presently used intelligence tests (both individual and group) are so constructed and so administered that scores on them are influenced by cultural backgrounds of the children taking the tests, in such a way that children from certain kinds of cultural backgrounds receive scores that are not accurate reflections of their basic intelligence.\textsuperscript{114}

The decade of the 1960's has witnessed a mounting attack on testing in the schools; primarily the criticism has been aimed at those tests standardized for large groups of pupils, and in particular, on tests of intelligence.\textsuperscript{115}

In 1964, New York City schools discarded the group-administered I.Q. test altogether and substituted a series


of teacher judgments. The change was made partially as a result of pressures from civil-rights groups who argued the cultural bias of the I.Q.116

Standardized tests currently in use present three principal difficulties when they are used with disadvantaged minority groups:

1. They do not provide reliable differentiation in the range of the minority group scores.
2. Their predictive validity for minority groups may be quite different from that of the standardization and validation groups.
3. The validity of their interpretation is strongly dependent upon an accurate understanding of their social and cultural background of the group in question.117

Characteristics of minority group children that affect test performance when contrasted with the middle class child are hypothesized by Fishman and associates to be:

The lower class child is less verbal, more fearful of strangers, less self confident, less motivated

116Ibid.

toward scholastic and academic achievement, less competitive in the intellectual realm, more "irritable," less conforming to middle-class norms of behavior and conduct, more likely to be bilingual, less knowledgeable about the world outside his immediate neighborhood, and more likely to attend inferior schools.118

The first of the current studies involving the cultural bias of intelligence tests was conducted by Ells and Associates. Their study analyzed the behavior of pupils from high and low social status backgrounds on more than 650 items in several widely used group intelligence tests.

The seven major findings of the study revealed significant implications of cultural bias.

1. Correlation between I.Q.'s (or percentile ranks on certain tests) and the Index of Status Characteristics vary with the test used and the age level tested. When the special high and low status groups are contrasted, the mean I.Q.'s of the high-status pupils are from eight to twenty-three I.Q. points higher than those from the low-status pupils, with the amount varying from test to test and from age level to age level.

2. About one-half of the items for nine and ten year old pupils and about eighty-five percent of the items in the tests for the thirteen and fourteen year old pupils show difference between high and low status groups large enough to be significant at the one percent level. On the other hand, more than one-third of the items from the tests for the younger pupils, and about a tenth of those from the test for the older pupils show status differences too small to be significant even at the five percent level.

118 Ibid., p. 134.
3. Mean status differences are largest for verbal and smallest for picture, geometric-design, and stylized drawing items. Mean status difference for different types of tests questions (opposites, analogies, etc.) vary from category to category, but no consistent trends appear and no meaningful generalization appears to be possible regarding the types of questions showing large or small differences provided the form of symbolism is held constant.

4. Practically all the items showing unusually large status differences are verbal in symbolism. A substantial number of them involve what appears to be a relatively academic or bookish vocabulary.

5. There is some tendency for pupils in both status groups to check one of the first two distractors of a five choice question more frequently than any of the last three, but no significant status difference is found with responding to this tendency.

6. Differences between the mean I.Q. and mean percentile ranks of low-status ethnics and low status non-ethnics are small, and are in most cases not significant.

7. Status differences in I.Q. terms appear to be on the basis of all the tests used in this study larger for the thirteen and fourteen year old pupils, but the age comparison depends upon the test used.119

A more recent study by Deutsch and Brown120 investigated some of the factors which influence the development of intellectual functioning in children. The study was based on 543 urban children stratified by race, social class, and first or fifth grade level. The mean I.Q. was significantly higher for Caucasian than for Negro groups.

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Negro children at each socio-economic level scored lower than Caucasian children at the same level and Negro-Caucasian differences increased at each higher socio-economic level. Further investigation showed a significantly lower score for children in father-absent homes as compared to children in intact families. This finding was more marked at the fifth grade level than at the first grade level. The results suggest either a cumulative effect of father-absence, or elements in the test at grade five which directly relate to the father's role in the family. Effects of pre-school experiences were also noted. At the fifth grade level, the I.Q. of children who had attended pre-school were significantly higher than those who had not. At first grade, the trend was evident, but not statistically so.

It was concluded that as social-class level increases, the influence of race becomes increasingly manifest. These findings support the author's cumulative deficit hypothesis: that deprivation influences have greater effect on later developmental stages than on earlier ones.

A study by Hill and Giammatteo121 investigated socio-economic status and its relationship to vocabulary,

reading, comprehension, arithmetic skills, problem solving, and composite achievement scores. Correlations suggest that socio-economic status was an important factor in school achievement. The mean scores obtained in basic skills indicated that children from high socio-economic groups were eight months ahead of the low socio-economic groups by grade three in vocabulary achievement, nine months ahead in reading comprehension, six months ahead in arithmetic skills, and eleven months ahead in problem solving. The average total achievement scores showed seven months difference between the high and low socio-economic group.

Because of these and other significant studies which show low socio-economic status as a deterring factor in intelligence testing, several authorities have suggested that group I.Q. testing be discontinued.

Yourman has stated that the social forces behind New York City's Board of Education decision to discontinue group I.Q. testing are:

1. The difficult task of resolving some de facto school segregation of pupils that results from housing and residential area discriminations and economic factors.
2. Popular attacks on testing of all kinds, both in schools and industry.
3. The social, emotional, and ethical turmoil of the Negro social revolution.
4. A growing opinion among educators and psychologists that group intelligence tests do not have high predictive validity in measuring capacity to learn when pupils tested differ significantly in
cultural experiences from those for whom the tests and norms were developed.122

Yourman contends that unless there is assurance that teachers can consistently interpret and use tests properly, there is strong support for the substitution of achievement measurements—which lack the characteristics of exactness and permanence and which can be improved by mutual pupil-teacher efforts.

Attempts have been made to create "culture fair" intelligence tests which appropriately assess, on a pretest and posttest administration, the quality and quantity of growth along newly conceived dimensions considered important for effective early childhood intervention procedures. The newly created tests, not fully standardized, include The Meier Puzzle Perception Test, The Meier Paint Blot Test, The Meier Self-Concept Assessment, The McAfee Auditory Discrimination Test, The McAfee Preposition Test, The Talking Typewriter Test,123 and The Johns Hopkins Perceptual Test.124


124Miller, Education for, p. 82.
The Johns Hopkins Test, parts of which have been standardized, is still in its incubation stage. It is designed for use in testing brain damaged, retarded, and disadvantaged children. Also, it is designed to elicit three types of tasks: (1) a task where the child only has to point; (2) a task where he has to fit a form into a formboard; and (3) a drawing task.\textsuperscript{125}

Wechsler maintains that the substituted intelligence tests do not measure a sufficient number of the abilities that make up individual intelligence. He criticizes the Johns Hopkins test for this reason. He further states that culture free tests fail to attain their end because the items usually employed are subject to particular environmental experiences. He concludes his defense of the I.Q. test by stating:

\begin{quote}
\hspace{1cm} it is true that the results of intelligence tests are unfair to the disadvantaged, but it is not the I.Q. that has made them so. The culprits are poor housing, broken homes, a lack of opportunity, etc., etc. If the various pressure groups succeed in eliminating these problems, the I.Q.'s of the disadvantaged will take care of themselves.\textsuperscript{126}
\end{quote}

The assistant superintendent, recently retired, of the New York Schools, Arthur Hugson, has attacked that system's abolishment of the I.Q. tests. He contends that

the substitution of achievement tests and teacher judgment for I.Q. tests is the same as substituting "handful for ounces and pounds, span for more exact measure of inches and feet."127 His arguments and queries in support of his contentions are:

1. Achievement tests can help measure educational attainments, but some indicators of achievement potential are also needed.
2. Intelligence tests are the most promising and most useful instruments of measure in this area.
3. Intelligence tests have proved their worth in measuring the potential of average and above average students.
4. Must we toss away instruments that were developed over several generations in the hope that we can develop more adequate substitutes overnight?
5. The scores made by minority group children on intelligence tests do not prove these children to be inferior, but that their environment lacks elements basic to good education.

Coffman128 maintains that all efforts should not be concentrated on making fool-proof tests, but that efforts should be directed toward improving the sophistication of test users.

_Summary_

Perceptual-motor ability is a relatively new term that has been recently introduced into the jargon of

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educators. Because of its newness there is not a consensus on definition. There does seem to be agreement that perception and motor ability are interrelated and should be used as a hyphenated word.

Various psychological theories have been examined or elaborated on to explain how perceptual abilities are developed. Psychological theories that have a direct basis for perceptual-motor training are the Gestalt Theory, Empiricistic Theory, Developmental Theory, Sensory Tonic Field Theory, Contiguity Theory, Reinforcement Theory, and Cybernetic Theory.

The perceptual-motor training programs that have been developed as a result of increased emphasis on perceptual-motor values are many and varied. Some appear to be educationally sound; others do not. Categorically, these programs have not been subjected to sufficient empirical research to warrant conclusive judgment concerning the worth of each.

Research conducted on the relationship between perceptual-motor ability and reading has clearly shown that some relationship between the two attributes does exist. However, the extent and magnitude to which this relationship does exist has yet to be determined.

The research on the relationship that exists
between academic achievement and perceptual-motor ability is inconclusive. The dearth of studies concerned with these two items would suggest the need for more research to be conducted that is related to the multi-faceted components of academic achievement.

Characteristics of disadvantaged children in general and Negro children in particular have been examined. There is considerable disagreement as to identifiable names and criteria for categorizing individuals into the disadvantaged groups.

The fact that disadvantaged children have lower perceptual-motor ability than do the non-disadvantaged children is generally an accepted fact by most authorities. To date, research has not shown this thesis to be either tenable or untenable. Some researchers have maintained that the results of deprivation are irreversible—others contend that through compensatory educational measures these factors can be alleviated, if not eliminated.

The controversy that surrounds the use, non-use, and misuse of group tests in general, and intelligence tests in particular, with disadvantaged children has not been reconciled. The fact that these tests are biased toward the white Anglo Saxon Protestant world, indicates to some researchers that they should not be used at all. Others suggest that they be used as diagnostic tools and
not as conclusive evidence of ability or inability. Another group of researchers contends that these tests are an evaluation of a child's performance in the culture in which he must live, and therefore are adequate tools for assessing potential success in that culture. The racial overtones for cessation of group testing can be heard throughout the discussions, as it has been found that minority or ethnic groups are groups that score significantly lower on all group tests. It has been pointed out that instead of eliminating group testing in the schools, efforts should be made to eliminate the causative factors that result in lower scores for disadvantaged groups.
CHAPTER III

PROCEDURES AND TECHNIQUES

The purpose of the present study was to investigate the relationship, if any, between perceptual-motor ability and academic achievement of selected disadvantaged rural Negro children.

A description of the context of the research, the selection of the population, the selection of the instruments, the procedures, and the treatment of the data are included in this chapter.

Description of the Local Situation

Lowndes County, Alabama, situated in the south-central part of the state, is surrounded by Autauga, Montgomery, Crenshaw, Butler, Wilcox, and Dallas Counties.\(^1\) This county that is steeped in tradition and with "Black Belt Culture," was first settled by pioneers from Georgia and Tennessee. The present Caucasian inhabitants are nearly all descendants of the original settlers.\(^2\)

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\(^2\)Ibid.
According to the 1960 United States Census, of the total 15,417 inhabitants of Lowndes County, 12,439 are Negro, and considered to be totally disadvantaged. The county is considered totally rural. Only two towns, Fort Deposit and Hayneville, have been incorporated.

The chief source of income is through agriculture and agriculturally allied occupations. A garment factory, located in Fort Deposit, employs 353 persons and is the only large-scale employer in the county. Not all employees in this factory are Lowndes County citizens, however.

During the 1968-1969 school year, there were 5,000 children enrolled in the Lowndes County School System, and of that number, 4,650 were Negro. Twenty-nine schools were in operation in Lowndes County during the 1967-1968 school year. During the following school year, this number was consolidated into six schools—five of which were totally Negro, and one was predominately Caucasian. A private school, located in Lowndesboro, had a student population of 250 Caucasian students. The only public

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3Ibid., p. 133.
predominately Caucasian school is located in Fort Deposit, and of the 350 students enrolled in the twelve grades, ten are Negro.

The public schools of the county are heavily funded by various governmental sources.

**Selection of the Sample**

The methodology and procedures of this study were explained to the Superintendent of Education of Lowndes County. Permission to involve the children of Lowndes County was given by her, contingent on the approval of the principals and teachers of each school.

The proposed data gathering procedures were explained to the supervisor of instruction, who suggested that the entire second grade population of three schools, two Negro and one predominately Caucasian, be used. These schools were suggested as being representative of the entire county system in that the two Negro schools represented high and low scholastic achievement, and as previously stated, the one predominately Caucasian school in the county, represented the Caucasian population.

Each of the principals was advised of the proposed data gathering procedures. The principal of the predominately Caucasian school indicated to this writer that there were no disadvantaged Caucasian children in the school.
The predominately Caucasian school was eliminated from the study for this reason. The principals of the two Negro schools were very receptive to the idea of the proposed study and suggested that the investigator meet with the teachers involved.

The proposed study was then explained to the second-grade teachers whose students would participate in the study. All expressed an interest in the study and volunteered their cooperation.

Selection of the Instruments

The Purdue Perceptual-Motor Survey was selected for the determination of perceptual-motor ability, and the California Achievement Test was used to assess the achievement level of each student.

The California Achievement Test

The California Achievement Test was selected primarily because it is the Alabama state-adopted achievement test. The administrative personnel of the Lowndes County School System suggested its use to this investigator so that it could be included in the permanent records of the children involved.

Description of the Instrument

The manual of directions for the California
Achievement Test describes the test as: "a series of comprehensive tests designed for the three-fold purpose of facilitating evaluation, educational measurement and diagnosis." It is designed to be used by teachers with a minimum of formal training in standardized testing and in diagnostic procedures as well as with specialists in the field.

Each of the four levels contains three tests: reading, arithmetic, and language. These tests are further divided into two parts each: the Reading Test consists of Reading Vocabulary and Reading Comprehension; the Arithmetic Test consists of Arithmetic Reasoning and Arithmetic Fundamentals; and the Language Test consists of Mechanics of English and Spelling. Each of the two parts, with the exception of Reading Comprehension and Spelling, are also divided into sections.

Reading Vocabulary

The Reading Vocabulary Test consists of four sections: Word Form, Word Recognition, Meaning of Opposites, and Picture Association. The seventy-five items in this section serve as an aid in diagnosing a pupil's

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specific difficulties in reading vocabulary.

Reading Comprehension

The two areas covered in the Reading Comprehension section are following directions and interpretation of materials. These two fields are presented in the form of one fifteen item test.

Arithmetic Fundamentals

Addition and subtraction are the two subtests considered in this section. It is designed to determine a pupil's specific responses as an aid for diagnosing difficulty in arithmetic fundamentals.

Mechanics of English

Capitalization, Punctuation, and Word Usage are the three components of Test 5. The three sections sample thirteen different elements of the mechanics of English and provide information for diagnostic purposes.

Spelling

Twenty words are used in this test. They are scaled in order of difficulty. Spelling is included because of its use as a means of written expression.
Reliability and Validity of the California Achievement Test

Linden and Linden\(^7\) have questioned the reliability and validity of the 1963 edition of the California Achievement Test. They maintained that there is some room for doubt on the validating procedures. The Kuder-Richardson Formula numbers twenty-one internal consistency estimates reported in the 1963 manuals were based upon single-grade groups ranging in size from 115 to 384. These data were obtained at the time of the 1957 revision of the California Achievement Test. No information about the procedures used for drawing samples was given nor was an explanation offered for the small sample size.

Linden and Linden\(^8\) in an analysis of the reliability of the California Achievement Test found that the Reading Score, the Total Arithmetic Score, and the Total Language Score ranged from .86 to .96. The correlation of these indices fall below .80 for Reading Comprehension, Arithmetic Reasoning, and Spelling at the lower primary levels; Spelling at the upper primary level; and Arithmetic Reasoning at the elementary level. Estimates for battery Total Score for each of the five the California Achievement


\(^8\)Ibid.
Test levels were obtained by applying the Spearman-Brown Prophecy Formula to an average reliability estimate calculated for a given set of six subtests, equally weighed. These somewhat questionable estimates ranged from .95 to .98.

Except for the Junior High School level Reading Test, the content of the 1963 edition had not been revised since 1957. Some congruent validity estimates for the 1963 edition have been published.9

Relationships among the California Achievement Test raw scores and the California Test of Mental Maturity, Short Form were obtained for sub samples in grade three, grade eight, and grade ten drawn from the 1963 norm sample. The Pearson correlation coefficients between the California Achievement Test Total Score and California Test of Mental Maturity-Short Form Total Scores ranged from .179 to .84. Pearson r's for California Achievement Test subtests versus California Test of Mental Maturity-Short Form subtests derived from the same sample ranged from .39 to .85.

The conclusion made by Linden and Linden is that the California Achievement Test, as an academic achievement

9Ibid., p. 58.
battery, is limited in scope and content coverage.

In view of the high correlations reported between The California Achievement Test scores and The California Test of Mental Maturity-Short Form scores, the unique utility of The California Achievement is seriously questioned.\textsuperscript{10}

The authors of the California Achievement Test, Tiegs and Clark,\textsuperscript{11} reported that the test battery had been reviewed by curriculum experts, research specialists, college professors, teachers, and state department of education personnel. The number and identity of these people were not disclosed.

The Purdue Perceptual-Motor Ability Survey

All existing perceptual-motor training programs were investigated in selecting an instrument to measure perceptual-motor ability. The Purdue Perceptual Motor Survey was the only instrument found that had been developed for use with first, second, third and fourth grade normal children. All other instruments had been developed for use with atypical children or with pre-school children. The survey had been subjected to standardization techniques and had been found to be valid and reliable.

\textsuperscript{10}Ibid., p. 59.

\textsuperscript{11}Tiegs and Clark, \textit{Manual}, p. 9.
Description of the Instrument

The survey is divided into five categories: balance and posture, body image and differentiation, perceptual motor match, ocular control, and form perception. Each of the categories contain sub categories ranging from two to seven items.

Balance and Posture

Walking board.--This item consists of having a child walk a board six feet long, four inches wide and two inches thick. The board is six inches off the floor. The subject walks the board forward, sideways, and backwards. This item seeks to determine whether the subject has learned to use both sides of his body in a balancing task, if he can use appropriate muscles when faced with losing balance, and if the subject can transfer and generalize his prior learning to a new situation.

Jumping.--This subtest, which consists of the child's jumping with various combinations and sequence of movements, is helpful in detecting children who possess problems in relation to laterality, body image, or neuro-muscular control.
Body Image and Differentiation

**Identification of body parts.**—This facet of the Survey is designed to ascertain if, as the name implies, a child is aware of and able to name his various body members and if he is aware of the bilateral relationship between paired members.

**Imitation of movements.**—The principal areas of performance which this item attempts to measure are neuromuscular control and the translation of visual clues into motor movements. This is done by having the subject imitate various arm positions.

**Obstacle course.**—This subtest consists of three tasks which indicate how the child reacts spatially to his environment. The tasks include having a child step over a stick, go under a stick, and go between a stick and a wall.

**Kraus-Weber.**—The original test was developed to measure physical fitness. It is included in this survey for the same purpose because of the high correlation of performance on this test and school achievement. The task involves having the subject lie flat on a mat and raise his shoulder up for a count of ten; the second part consists of having him raise his legs straight off the mat to
a count of ten.

_Angels in the Snow._--An adaptation of a child's game, this item is designed to determine problems in neuromuscular differentiation and specific problems of right or left sidedness. The task consists of having the child move a limb or various combinations of limbs from visual and verbal directions.

Perceptual-Motor Match

_Chalkboard tasks._--Chalkboard tasks include having the subject: draw a circle; draw a double circle using both hands; draw a connecting lateral line; connect two vertical lines using two hands; and copy eight different motifs that are judged for rhythm, reproduction and orientation. Problems of directionality and perceptual-motor matching may be discerned through the use of these tasks.

Ocular Control

_Ocular pursuit._--This series of tasks is designed to determine the ability of the subject to establish and maintain visual contact with a target. The task is designed to reveal the extent of control, not the reasons for failure of control. The task consists of having the child follow the direction of a penlight with his right eye, left eye,
both eyes, and finally to have both eyes converge on the light at a point.

Form Perception

*Visual achievement form.*--The child is asked to copy seven simple geometric forms: circle, cross, square, triangle, horizontal diamond, vertical diamond, and divided rectangle. The subject's performance is rated on the basis of the form perception he demonstrates and also on his method of organizing his drawings on the page. This facet tests the child's ability to make adequate spatial and constructional judgments and his form perception.

**Procedures**

It was decided to use two intact groups as samples instead of randomly selecting the subjects. The groups were determined on the basis of total school achievement.

Collection of the data was begun after the initial interviews with the administrative personnel involved.

A vacant room was unavailable in one school for use in this study. Consequently, the closed end of a corridor was designated as the area for collection of data. The area was secluded from the rest of the school--only two rooms were located on that wing of the building. A portable chalkboard was used to partition that portion of the corridor. The second school had no available classroom,
but the faculty lounge was allocated for the purpose of collecting the data. Both areas were well lighted, adequately ventilated and of adequate size.

The classroom teachers, having been advised of the nature of the Purdue Perceptual-Motor Survey, were asked to send one child at a time to be tested. At the conclusion of each individual test the child was escorted back to the classroom by this examiner and another child was conducted to the testing area. The amount of time involved in the testing of each child varied according to the astuteness of the child and the clarity of the investigator. Average time necessary to complete the test battery was approximately twenty-five minutes per child.

Each subject's score was recorded on a separate score sheet. These, along with his visual achievement forms, were filed according to classrooms. A random sample of the visual achievement forms are included in the Appendix.

Conversation was attempted with each child before, during, and after the testing procedures. Almost categorically, the children would attempt to answer a direct question, but none of them ever asked a direct question of the investigator, nor did they ask for clarification of any instructions not understood. Abortive attempts were made in interpretation of instructions as they understood them.
As the child entered the testing area, the purposes of the equipment were explained to him. He was then instructed to walk the balance board forward, backward and sideways. In a few cases, when further clarification was needed, the examiner demonstrated the procedure.

The child was then instructed to stand away from the walking board and to skip. After performing this task, he was instructed to hop on alternating feet and various other combination of hopping movements as outlined in the instruction booklet.

Identification of body parts was the next item. The subject was told to touch his shoulders, hips, head, ankles, ears, feet, eyes, elbows, and mouth. The group experienced difficulty in the identification of elbows and hips. Almost all of the mistakes made were in the identification of these two parts of the body.

The subtest of imitation of movement involved having the examiner move her arms in one of seventeen different ways and having the student imitate the movements. The child was simply instructed to follow the movements. Only a few of the students paralleled the movements.

The obstacle course presented very little difficulty for this group. A tumbling wand was held against a wall and the child was instructed to go over and then under the stick. He was next asked to go between the stick and
the wall. Very few had any difficulty in performing this task.

The Kraus-Weber test involved having the child lie prone on a tumbling mat. He was instructed to place his hands behind his neck and raise his head and shoulder off the mat. He was then directed to put his head down and raise his legs without bending his knees. Some difficulty was experienced in the latter.

Angels in the Snow was perhaps the most difficult of all the test items. The subject was instructed to lie on his back with his arms and feet together. Each child was given practice instructions for the desired movement. The examiner pointed to the arm and/or leg to be moved and the child tried to perform the task. Abortive movements were prevalent as were over-flow movements.

The chalkboard task followed the Angels in the Snow. The child was asked to draw a circle on the chalkboard. Initial direction of the hand was noted as well as size of the circle. The double circle, a task that required the use of both hands, proved difficult for some. The inability to move both arms at once as well as disproportional circles was common. Lateral lines, which involved the connection of two Xs, were not as difficult for the subjects as was the vertical line. The latter involved the use of both hands.
The rhythmic writing task involved instructing the child to reproduce various motifs below those put on the board by the examiner. Rhythm, reproduction, and orientation on the board were factors to be considered in recording these scores. Difficulty was experienced in copying the cursive b's, p's, and pb's, though some of the children had difficulty with all items.

Ocular pursuit involved having the subject follow a moving penlight. Major difficulty was manifested in the child's moving his head instead of his eyes. One child was found who was totally unable to move his eyes in any direction. Collaborative examiners were asked to confirm this fact, which they did. Of all the children tested, only one wore glasses.

In the last task the subject was asked to reproduce a set of geometric figures which were placed in front of him on four-inch by six-inch cards. He was allowed to manipulate the cards if he desired. Major difficulty arose from the divided rectangle and the vertical and horizontal diamonds. Ratings were based on likeness to the original figures and organization on the paper.

As a result of the timidity of the children with this investigator, it was decided that the classroom teacher should administer the California Achievement Test. The Lowndes County Supervisor of Instruction and this investigator
assisted the classroom teachers in administering the achievement and I.Q. tests. This aid was rendered in the form of explanation of the mechanics of the test and of explanation of the instructions. The tests were hand-scored by this writer.

**Treatment of the Data**

The statistical technique used to determine the relationship between perceptual-motor ability and school achievement for this study was correlation, using the Pearson correlation coefficient. These data were processed by IBM Computer, 360-50, with a program written by Barker. The null hypothesis of no differences between test items was tested with a significance level of .05 arbitrarily set.

**Summary**

Lowndes County, Alabama, is situated in the "Black Belt" section of the state of Alabama. The majority of the citizens are considered disadvantaged.

The sample used in this study was 127 rural disadvantaged second grade Negro children.

The Purdue Perceptual Motor-Ability Survey was

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13 Harry R. Barker, Jr., Professor of Educational Psychology, College of Education, University of Alabama.
selected to be used in the assessment of perceptual-motor ability and the California Achievement Test was selected to assess academic achievement.

The Pearson correlation coefficient was the statistical technique used to determine the relationship between perceptual-motor ability and school achievement. These data were processed by an IBM Computer 360-50.
CHAPTER IV

FINDINGS AND INTERPRETATIONS

Two instruments, the California Achievement Test and the Purdue Perceptual Motor Survey, were administered to 127 students from the Lowndes County, Alabama, School System who were in the seventh month of the second grade. On the basis of the scores obtained, comparisons were made between the instruments to test the null hypothesis of no statistical significance between perceptual-motor ability and school achievement in selected Negro disadvantaged children.

Statistical Description of the Population

Table 1 shows the mean chronological age for the 127 subjects to be 99.06 months with a standard deviation of 7.91. The average chronological age of a student who had progressed normally through school to the seventh month of the second grade could be expected to be 97 months.\(^1\) The subjects in this study were somewhat older than the normal expected chronological age.

\(^1\)Tiegs and Clark, *Manual*, p. 46.
The mean intelligence quotient for this group, as evidenced in Table 1, was 75.64 with a standard deviation of 17.28. The average intelligence quotient range is considered to be from 90 to 110. The mean intelligence quotient for this group was 14.36 intelligence quotient points below the minimum of normal expectancy. On the basis of the California Test of Mental Maturity-Short Form, this group could be considered below the average expectancy for second grade students.

Description of the Test Results

Table 2 presents the mean score for the group on the California Achievement Test. The Total Achievement Battery mean score was found to be 131.80 with a standard deviation of 49.73. For a grade placement of 2.7 a total
TABLE 2
MEAN AND STANDARD DEVIATION FOR THE CALIFORNIA ACHIEVEMENT TEST AND THE PURDUE PERCEPTUAL MOTOR SURVEY

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>California Achievement Test</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading</td>
<td>46.54</td>
<td>18.23</td>
</tr>
<tr>
<td>Arithmetic</td>
<td>48.84</td>
<td>20.87</td>
</tr>
<tr>
<td>Language</td>
<td>36.87</td>
<td>18.90</td>
</tr>
<tr>
<td><strong>Purdue Perceptual-Motor Survey</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance and Posture</td>
<td>12.89</td>
<td>2.04</td>
</tr>
<tr>
<td>Body Image and Differentiation</td>
<td>14.54</td>
<td>2.56</td>
</tr>
<tr>
<td>Perceptual-motor Match</td>
<td>18.82</td>
<td>4.00</td>
</tr>
<tr>
<td>Ocular Control</td>
<td>11.60</td>
<td>3.18</td>
</tr>
<tr>
<td>Form Perception</td>
<td>4.79</td>
<td>1.72</td>
</tr>
</tbody>
</table>

score of 217 to 220 could be expected. On the basis of the California Achievement Test, these subjects were one year and two months below the normal expectant grade placement.

2Ibid.
The mean Total Reading score for the subjects was 46.54 with a standard deviation of 18.23 (Table 2). For a grade placement of 2.7, a score of 79 would be expected. Therefore, these subjects were one year and three months below the expected Total Reading Achievement.

The Total Arithmetic mean score was 48.84 with a standard deviation of 20.8 (Table 2). A Total Arithmetic score of 80 was necessary to obtain a 2.7 grade placement. This would indicate that the group in this study is one year and three months below the expected grade placement.

A score of 36.87 with a standard deviation of 18.90 was obtained for Total Language (Table 2). A score of 60 to 61 was necessary to obtain a grade placement of 2.7. This would indicate that the subjects in this study were eleven months below the normal expectancy on the California Achievement Test.

A comparison of the mean scores for these subjects and the expected mean scores for grade placement is shown on Chart 1.

On the Purdue Perceptual-Motor Survey, the mean score of the subjects in this study was 62.84 with a standard deviation of 49.73. The highest possible score for Total Perceptual-Motor Ability was 88.

The subjects used in this study achieved a mean score of 12.89 on the Balance and Posture section of the
CHART 1

COMPARISON OF HIGHEST POSSIBLE PURDUE PERCEPTUAL-
MOTOR SURVEY SCORES WITH THE MEAN
OF THE STUDY GROUP

<table>
<thead>
<tr>
<th>Balance and Posture</th>
<th>Perceptual-Motor Match</th>
<th>Ocular Perception</th>
<th>Form Image</th>
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</thead>
<tbody>
<tr>
<td>28</td>
<td>X</td>
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<tr>
<td>27</td>
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<td>0</td>
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</tbody>
</table>

X = Highest Possible
O = X Score for Study Group
test. When compared with a possible score of sixteen for this subtest, an existing difference of 3.11 was found.

A mean score of 14.54 with a standard deviation of 2.56 was found for the subtest of Body Image and Differentiation. When this score was compared with a possible score of twenty, it was observed that the subjects used in this study were 5.46 points below the highest possible score.

A mean score of 18.82 with a standard deviation of 4.0 was found on the Perceptual-Motor-Match Subtest. When compared with a possible score of 28, it was found that the subjects were 9.18 points below the highest possible score.

A mean score of 11.50 with a standard deviation of 3.18 was achieved by this group on the Ocular Control subtest. The possible number of points for this subtest was sixteen. A point difference of 4.50 was observed between the possible number of points and those scored by the subjects in this study.

The highest possible number of points for the Form Perception subtest was 8. The mean score of 4.79 with a standard deviation of 1.72 indicates that the subjects used in this study were 3.21 points below the highest number of points possible.
A comparison of the mean scores on all items of the Purdue Perceptual-Motor Survey as scored by the subjects, and compared with total possible points is shown on Chart 2.

Correlations

Correlation was the statistical technique used to determine relationship existing between perceptual-motor ability and school achievement of this study. The Pearson correlation coefficient was used for all variables. Since the writer had access to an IBM Computer, 360-50, it was deemed wise to use the computational formula for \( r \). The formula is discussed in Spence, et al.\(^3\) The formula is:

\[
 r = \frac{\sum XY - \bar{X} \bar{Y}}{\sqrt{\sum x^2 \sum y^2}}
\]

In testing the significance of the correlation, Table D from Spence, et al.\(^4\) was used. Portions of this table were abridged from Table VI of Fisher and Yates, the remainder of the table from Snedcor.

Coefficients were computed between scores derived from the California Achievement Test, with subtests in

\(^3\)Spence, et al., Elementary Statistics, p. 120.

\(^4\)Ibid., p. 236.
CHART 2
COMPARISON OF THE EXPECTED GRADE PLACEMENT WITH THE MEAN OF THE STUDY GROUP ON THE CALIFORNIA ACHIEVEMENT TEST

<table>
<thead>
<tr>
<th></th>
<th>Total Reading</th>
<th>Total Arithmetic</th>
<th>Total Language</th>
<th>Total Battery</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.7</td>
<td>X--------------X--------------X--------------X--------------X</td>
<td></td>
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<td>2.6</td>
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<td>2.5</td>
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<td>2.0</td>
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<td>1.9</td>
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<td>1.8</td>
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<tr>
<td>1.4</td>
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</tr>
</tbody>
</table>

X = Highest Possible
O = X Score for Study Group
Reading, Arithmetic and Language, and the Purdue Perceptual-Motor Survey, with subtests in Balance and Posture, Body Image and Differentiation, Perceptual-Motor Match, Ocular Control, and Form Perception. These data are presented in Table 3.

**Total California Achievement Test Scores and Total Purdue Perceptual-Motor Survey**

The coefficient of correlation between the total California Achievement Test and the total Purdue Perceptual-Motor Survey for the population was .278. The null hypothesis of no statistically significant relationship between school achievement and perceptual-motor ability was rejected at the .01 level of confidence.

**Total Reading Score and Subtests of the Purdue Perceptual Motor Survey**

- **Total Reading score to Balance and Posture.**—An $r$ of .128 was obtained between the total Reading score and the Balance and Posture subtest. This correlation was not statistically significant.

- **Total Reading to Body Image and Differentiation.**—The coefficient of correlation between Total Reading and Body Image and Differentiation was .160. This correlation was not significant.
<table>
<thead>
<tr>
<th>Purdue Perceptual-Motor Survey</th>
<th>California Achievement Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
</tr>
<tr>
<td>Total</td>
<td>0.278**</td>
</tr>
<tr>
<td>Balance and Posture</td>
<td>0.128</td>
</tr>
<tr>
<td>Body Image and Differentiation</td>
<td>0.160</td>
</tr>
<tr>
<td>Perceptual-Motor Match</td>
<td>0.247**</td>
</tr>
<tr>
<td>Ocular Control</td>
<td>0.267**</td>
</tr>
<tr>
<td>Form Perception</td>
<td>0.337**</td>
</tr>
</tbody>
</table>

* Significant at the .05 level

** Significant at the .01 level
Total Reading to Perceptual-Motor Match.--A correlation between total Reading and Perceptual-Motor Match of .247 was obtained. This correlation was statistically significant at the .01 level of confidence.

Total Reading to Ocular Control.--Between Reading and Ocular Control a correlation of .267 was computed. This correlation was statistically significant at the .01 level of confidence.

Total Reading to Form Perception.--A correlation of .337 was determined between these two variables and was significant at the .01 level of confidence.

Total Arithmetic Scores and the Subtests of the Purdue Perceptual-Motor Survey

A correlation of .052 was found between Total Arithmetic and Balance and Posture, of .076 between Total Arithmetic and Body Image and Differentiation, and of .171 between Total Arithmetic and Perceptual-Motor Match. None of these correlations was significant.

Total Arithmetic to Ocular Control.--Between Total Arithmetic and Ocular Control an r of .193 was found, which was significant at the .05 level of confidence.
Total Arithmetic and Form Perception.--The correlation of .269 between Total Arithmetic and Form Perception was significant at the .01 level of confidence.

Total Language and Subtests of The Purdue Perceptual Motor Survey

No significant correlation was found between Total Language and Balance and Posture for a correlation coefficient of .051, between Body Image and Differentiation with an r of .084, and between Total Language and Perceptual-Motor Match with an r of .170.

Total Language and Ocular Control.--A significant correlation at the .05 level of confidence was found for the r of .192 between Total Language and Ocular Control.

Total Language and Form Perception.--The correlation coefficient of .260 between Total Language and Form Perception showed a significant relationship at the .01 level of confidence.

Summary

In this study a significant correlation was found between the mean total scores on the California Achievement Test and the mean total scores on the Purdue Perceptual-Motor Survey, at the .01 level of confidence.
No statistical significance was found between the Balance and Posture and Body Image and Differentiation sections of the Purdue Perceptual-Motor Survey and any part of the California Achievement Test. A comparison between the Perceptual-Motor Match subtest of the Purdue Perceptual-Motor Survey and the Arithmetic and Language section of the California Achievement Test showed no statistical significance.

Statistical significance was shown at the .05 level of confidence between Ocular Control subtest of the Purdue Perceptual-Motor Survey and the Arithmetic section and Language section of the California Achievement Test.

The .01 level of significance was obtained in the following comparisons: Perceptual-Motor section to the Reading section and Ocular Control to the Reading section. All of the comparisons made except the Form Perception of the Purdue Perceptual-Motor Survey with the Reading, Arithmetic, and Language sections of the California Achievement Test were significant at the .01 level of confidence.

The analysis of these data showed a significant relationship between the California Achievement Test and the Purdue Perceptual-Motor Survey, but only between certain sub-sections.
CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary
The purpose of this study was to investigate the relationship between perceptual-motor ability and academic success of disadvantaged rural Negro children. In March 1969, two instruments, the California Achievement Test and the Purdue Perceptual-Motor Survey, were administered to a group of 127 second grade Negro students from the Lowndes County, Alabama, School System.

Scores from the California Achievement Test and the Purdue Perceptual-Motor Survey were analyzed using the Pearson correlation coefficient to determine the relationship between perceptual-motor ability and school achievement.

Null Hypothesis
After collecting the data and processing these for use with the IBM 360-50 computer, the following null hypothesis was tested: there is not a statistically significant relationship between perceptual-motor ability as measured by the Purdue Perceptual-Motor Survey and academic
achievement as measured by the California Achievement Test with certain disadvantaged rural Negro children. The Pearson correlation coefficient method of analysis was used and the null hypothesis was rejected at the .01 level of confidence.

Comparisons were made between the sub-sections of the Purdue Perceptual-Motor Survey and the California Achievement Test. The following relationships were not statistically significant: Balance and Posture to Reading, Balance and Posture to Arithmetic, Balance and Posture to Language, Body Image and Differentiation to Reading, Body Image and Differentiation to Arithmetic, Body Image and Differentiation to Language, Perceptual-Motor Match to Arithmetic, and Perceptual-Motor Match to Language.

The relationship between Ocular Control to Arithmetic and Ocular Control to Language was significant at the .05 level of confidence.

Significance at the .01 level of confidence was found in the relationship between Perceptual-Motor Match to Reading, Ocular Control to Reading, Form Perception to Reading, Form Perception to Arithmetic, and Form Perception to Language.

Although the correlation of the mean scores of the Purdue Perceptual-Motor Survey and the California Achievement Test was found to be significant at the .01 level of confidence, it should be noted that no significant
correlation was found in the Balance and Posture section and the Body Image and Differentiation section of the Purdue Perceptual-Motor Survey, when compared to the three sub-sections of the California Achievement Test. The strength of the Purdue Perceptual-Motor Survey, in this study, seems to lie in three areas: the Perceptual-Motor Match, Ocular Control, and Form Perception. Two comparisons, Perceptual-Motor Match to Arithmetic and Perceptual-Motor Match to Language, were not significant in these three sections. They lacked only .003 and .004 points to be significant at the .05 level of confidence.

This study found a significant relationship between perceptual-motor ability and school achievement at the .01 level of confidence. These results support the findings of Poindexter\textsuperscript{1} and Roach and Kephart,\textsuperscript{2} who found a similar significant relationship between the two variables when the Purdue Perceptual-Motor Survey was used as the instrument to assess perceptual-motor ability.

The fact that the subjects used in this study made a low mean score on the California Achievement Test and

\begin{itemize}
\end{itemize}
the California Test of Mental Maturity-Short Form, tended to support the theory of Eells and others who theorized that disadvantaged children do not perform well on timed pencil and paper tests due to the cultural bias of the test rather than to innate ability.

Conclusions

On the basis of this study, the following conclusions were drawn:

1. Subjects used in the study were older than would normally be expected at this grade level.

2. Intelligence scores as measured by the California Test of Mental Maturity-Short Form were lower than might be expected in normal population distribution.

3. There was a significant relationship between scores attained on the Purdue Perceptual-Motor Survey and the California Achievement Test.

4. There was no significant relationship between the Body Image section of the Purdue Perceptual-Motor Survey and the Reading, Arithmetic, and Language sections of the California Achievement Test.

5. There was no significant relationship between the Body Image section of the Purdue Perceptual-Motor Survey and the Reading, Arithmetic, and Language sections of the California Achievement Test.

6. There was a significant relationship between the Perceptual-Motor Match section of the Purdue Perceptual-Motor Survey and the Reading section of the California Achievement Test.

7. There was a strong relationship between the Perceptual-Motor Match section of the Purdue Perceptual-Motor Survey and the Arithmetic and Language section of the California Achievement Test.

8. There was a significant relationship between the Ocular Control section of the Purdue Perceptual-Motor Survey and the Reading, Arithmetic, and Language sections of the California Achievement Test.

9. There were significant relationships between the Form Perception section of the Purdue Perceptual-Motor Survey and the Reading, Arithmetic, and Language sections of the California Achievement Test.
10. The significant relationship found between the Purdue Perceptual-Motor Survey and the California Achievement Test may be accounted for by three subtests of the Purdue Perceptual-Motor Survey: Perceptual-Motor Match, Ocular Control, and Form Perception.

11. The Form Perception section of the Purdue Perceptual-Motor Survey was more strongly related to achievement as measured by the California Achievement Test than any other section of the Purdue Perceptual-Motor Survey.

Recommendations

On the basis of the findings of this study, twelve recommendations are offered.

1. Further research needs to be conducted in order to investigate the relationship of perceptual-motor ability and school achievement.

2. Further studies need to be conducted in order to investigate the relationship of perceptual-motor ability and school achievement with other disadvantaged groups in controlled-experimental situations.

3. The inclusion of physical education activities in the elementary school curriculum should be considered because of the indicated relationship
between perceptual-motor ability and academic achievement.

4. Research needs to be conducted in order to investigate the relationship of perceptual-motor ability with school achievement with disadvantaged Northern children.

5. For the subjects in this study remedial programs should be developed in reading, arithmetic, and language.

6. More research into the culture-free test area is needed. Tests which will more accurately measure the intellectual competencies of the disadvantaged Negro child should be developed.

7. Further research into the intellectual, physical, social, and emotional strengths and weaknesses of disadvantaged Negro children in the South is essential.

8. Further research to determine what methods of teaching, types of materials, and curriculum content is best suited to the specific needs of the disadvantaged Negro child in the South is needed.

9. The preponderance of low scores on the California Achievement Test suggests the need
for curriculum review by the Lowndes County School System.

10. It is not known to what extent the California Achievement Test and the Purdue Perceptual-Motor Survey norms are applicable for rural southern disadvantaged Negro children. Additional data should be obtained.

11. Personnel of the Colleges of Education within the State of Alabama, or the State Department of Education, serving as consultants, should collect and dispense to the Lowndes County School System recent findings in the area of cultural deprivation and compensatory education.

12. The suggested institutions should make themselves readily available for consultation with the faculty and administrative personnel of the Lowndes County School System.
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APPENDIX

RANDOM SAMPLE OF THE VISUAL ACHIEVEMENT FORMS
Boy
Age-111 Months
Boy
Age: 94 months
Boy
Age - 93 Months
Boy
Age-102 Months
Boy
Age: 95 Months
Boy
Age-101 Months
Boy
Age-100 Months
Boy
Age-118 Months
Boy
Age-100 Months
Boy
Age-94 Months
Girl
Age-94 Months
Girl
Age-94 Months
Girl
Age-99 Months
Girl
Age-99 Months
Girl
Age - 122 Months
Girl
Age: 103 Months
Girl
Age-92 Months
Girl
Age-94 Months
Girl
Age: 90 Months
Girl
Age-99 Months
Girl
Age-105 Months
Girl
Age-112 Months
Boy
Age - 102 Months