Visual-perceptual-motor skills and reading readiness

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VISUAL-PERCEPTUAL-MOTOR SKILLS
AND READING READINESS

by
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CHAPTER I

Introduction

A few generations ago people managed to get along quite well in the business and social world without the ability to read, but today this is no longer true. With the increase of automation and computerized technology, there is a demand for trained manpower. Many jobs have become obsolete, and it is predicted that all individuals in every occupational area will have to retrain themselves many times during their work careers to prepare for new jobs.

Reading is a key tool for retraining and maintaining employable skills. Much of a child's success in school and much of his adjustment in later life depends upon his ability to read accurately and quickly and to comprehend with precision the content of his reading.

The role of reading readiness in the school curricula has been recognized, discussed, and evaluated for many years by noted educators. Readiness for reading is based on varied criteria. Important criteria are a child's stages of growth: (1) mental, (2) physical, (3) social, and (4) emotional. School authorities in the past ten years have greatly emphasized the need for helping children to develop intellectually at the kindergarten level in
preparation for first grade formal reading instruction.
Only a few people have begun to investigate the role of
physical readiness in the preparatory readiness period for
later learning. It is the work of these people concerned
with the relationship of physical readiness and beginning
reading that are presented in this paper.

Statement of Purpose

The primary purpose of this paper was to investigate
current literature which discusses the visual-perceptual-
motor skills as fundamental to reading readiness.

Definition of Terms

Because the following terms have been used throughout
the paper, the researcher has found it necessary to present
their definitions at this time.

Laterality-Involves the awareness of one's body and
the ability to identify left from right.
Perception-The process of organizing or interpreting
the raw data obtained through the senses.
Perceptual-motor-A term describing the interaction of
various channels of perception with motor activity. The
channels of perception include visual, auditory, tactual,
and kinesthetic.
Visual-motor coordination-The ability to coordinate
vision with the movements of the body or parts of the body.
Visual perception-The identification, organization,
and interpretation of sensory data received by the individual
through the eye.\(^1\)

**Visual discrimination**—The ability to differentiate one object from another visually.\(^2\)

**Scope and Limitations**

The researcher reviewed literature which investigated visual-perceptual-motor skills and their effect on reading readiness. The research does not focus on the diagnosis of perceptual-motor problems, readiness programs, or performance tests for evaluating perceptual-motor readiness.

Since most of the research which tests the theories on perception and reading readiness is current, the paper has limited the research to the literature published within the past ten years.

**Summary**

The importance of reading is clearly recognized by educators and parents alike. Reading is the basic tool for all subjects in school, and failure in a school subject is frequently due to inadequate reading skills. The researcher has set out to examine literature which discusses the strengths and limitations of visual-perceptual-motor skills as fundamental to reading readiness programs.

In this chapter the purpose of the research was presented. The definitions of terms as well as the scope and limitations of the paper were also covered.

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2Ibid., p. 122.
CHAPTER II

Visual Perception and Reading Readiness

Both vision and reading are highly dynamic and involve perceptual, motor, and associative aspects. Vision is a cognitive act involving the converting of the raw data of sight into something meaningful. The oculomotor control is complex, so it is not hard to understand that many children are slow to develop sufficient control over eye movements to make the delicate pursuit and saccadic fixation movements required in reading. By integration of visual information with information from other senses and from the memory of previous experiences, the child builds a visual world. Vision is an information-gathering process involving integration of the sight data with other sensory-motor information to permit understanding of what is seen. This process becomes better developed as the child's readiness to learn to read becomes more pronounced.3

In discussing the development of the ocular motor performance systems, Getman states that movement of the eyes must be developed and controlled in a special manner for complete development of ocular mobility and other visual perceptual skills. The majority of children who are

consistently in the lower academic third of the group will characteristically demonstrate inadequacies of ocular mobility. The child should be able to move his eyes in effective combination with each other. The ocular system is unique among organismic receptor systems in that there are two information receiving, processing, and effector circuits that have to be matched and balanced. Any inadequacy in this bilateral relationship creates stresses that interfere with the reception and comprehension of information coming through the eyes. This stress is especially present in near-centered tasks such as reading and writing. Even anatomically complete and healthy eyes must learn to perform and these performance skills must include a movement pattern across lines of print. Additional performance abilities the child must learn include fixation on a target, saccadic eye movement from target to target, pursuit of both eyes on a moving target, and free rotations of both eyes in any and all directions of gaze and inspection. Well-teamed eye movements are essential to the steering of all general movements, both within and without the classroom. 4

Reading readiness demands good control of eye movements. Eye movements are visual as well as motor skills. While reading, a child fixates briefly at just a few places on each line of type and then makes a saccadic jump to another

Tinker reported that the relationship of oculomotor behavior to reading performance eventually led to photographing eye movements to aid diagnosis in reading clinics and other reading programs.  

Visual perception is learned and is based on sequential development of physiological actions of the child. Getman holds that the child must have acquired all possible body manipulative skills before he can be taught to read. He paraphrases Hebb in regard to the totality of the organism and states: "The ultimate in mental ability is the result of the ultimate in motor ability."  

Research by Getman and Hendrickson indicates that children who have visual-perceptual deficits are generally low, not only in reading, but in all academic achievements and are poorly adjusted in the classroom.  

Look stated that vision is a complex visual-perceptual-motor process and is directly related to the learning ability of a child. A child's development and learning ability are

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7 Getman, *op. cit.*, p. 58.

dependent upon smooth, normal, visual-perceptual-motor system growth and function. When visualization has been fully attained, a child finds it less essential to use the other perceptual modes to verify incoming information. He is ready to comprehend visual symbols— to learn to read.  

Ellingson stated that no matter what specific form reading disability takes for a particular child, the one word that describes this problem area is perception. Visual perception is the key to reading. Visual-motor coordination is important to space perception and planning motor sequences which leads to reading readiness.

Discussing form perception development in the child as important in the word analysis method used in learning to read, Kephart stated that the child who is weak in form perception has real difficulty because he is asked to break down into a serial order the parts of a globular whole which for him has no parts. The development of adequate form perception depends upon adequate learning of basic sensory-motor skills. Clinical evidence indicates that training programs designed to increase form perception ability can aid the child in increasing his achievement level.

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Taking into consideration the developmental stages of visual perception has been of value in standardizing test forms. Beery and Buktenica, in the construction of a test of geometric form reproduction, have evolved a series of 24 forms to be used as a predictive instrument. The Developmental Test of Visual-Motor Integration focuses upon the pre-school age range with a view to early identification and remediation. The test was devised as a measure of the degree to which visual perception and motor behavior are integrated in young children.12

Another widely used test that is designed to measure five operationally defined visual perceptual functions is the Frostig Developmental Test of Visual Perception. The five visual perceptual functions evaluated are eye-motor coordination, figure-ground perception, perception of constancy, perception of position in space, and perception of spatial relationships. Frostig has also developed a visual-perceptual training program for young children used in many schools throughout the country.13

Linn reported on a project utilizing the Frostig Program for Development of Visual Perception used with 30 kindergarteners in Shawnee County, Kansas. Fifteen children

12Keith E. Beery, Developmental Test of Visual-Motor Integration (Follet Educational Corporation, Chicago, 1967), pp. 11-12.

were involved in the special visual perceptual training program for 20 minutes per day for a three month period. In first grade it was discovered that the experimental group that received the special perceptual program was 2-4 months ahead of the control group on the Metropolitan Achievement Tests. 14

In an investigation of seventy-five severely retarded readers, Sherk found that the mean scores of fifty-one experimental group readers were significantly low on the Frostig Developmental Test of Visual Perception. He stated it was evident that visual-perceptual-motor deficits were found in groups of retarded readers. 15

A study done by Hagin, Silver, and Hirsch involved a group of 40 boys, eight to eleven years of age, considered to have specific reading disabilities. The group received individual teaching in specific perceptual areas progressing from simple to the most complex, according to perceptual maturation sequences. From this study it was concluded: (1) that perception is modifiable by training, and (2) that improved perception is reflected in increased reading achievement. 16


The identification of factors in child development which contribute most to a child's readiness to read and also success in reading achievement have been extensively studied. Visual perception and discrimination have received as a great deal of attention.

In a review of the literature pertaining to studies for pre-reading visual discrimination, Barrett considers the relative values of verbal (the ability to see likenesses and differences in forms and/or symbols) and non-verbal (naming letters or copying forms/or symbols) visual discrimination as predictive of first grade reading achievement.\(^\text{17}\)

In summarizing studies which compared verbal and non-verbal discrimination tasks under similar conditions, Barrett observes:

First there is an indication that verbal visual discrimination is a somewhat better predictor of reading achievement than is nonverbal visual discrimination. Second, five investigations permit a comparison of the value of discrimination of words and letters as predictors of reading. Finally, the studies of Potter (1949) and Barrett (1965) give some support to the notion that visual discrimination of geometric designs have possibilities as indices of reading readiness for reading. Certainly, the tasks considered in these studies or tasks similar to them warrant further investigations.\(^\text{18}\)

Perceptual-Motor Performance and Reading Readiness

The early motor response of the child is the earliest

\(^{17}\)Thomas C. Barrett, "The Relationship Between Measures of Pre-Reading Visual Discrimination and First Grade Reading Achievement: A Review of the Literature," *Reading Research Quarterly*, 1, No. 1 (Fall, 1965), p. 53

\(^{18}\)Barrett, op. cit., p. 73.
behavioral response of the human organism and represents the beginning of a long process of development and learning. Through motor explorations, the child begins to find out about himself and the world around him. These motor experimentations and his motor learnings become the foundation upon which such knowledge is built. Motor activities play a major role in intellectual development. 19

Children's games are intended to develop the child's sense organs and his motor system. Manipulation of objects, and his body in relation to these objects, perfects his sensory motor process and teaches a child to match sensory data. The child is building a perceptual motor process which allows him to adjust his behavior to varied demands. As a result of deficiency in basic perceptual-motor skills, many children are less able to participate in the formal educational activities which are arranged for them, and they are less able to learn from these activities. They, therefore, become the slow learners and poor readers in the classroom. 20

Further discussing deficiencies in basic perceptual-motor skills, Radler and Kephart stated that such breakdowns in the developmental sequence may be the results of environmental deprivations, injuries or defects in the organism, 19

19 Dunsing and Kephart, op. cit., pp. 35-41
20 Ibid., pp. 3-6.
or emotional pressures with which the child has been unable to cope.

In order to help the child, it is necessary to locate the stage at which learning failed, to supply the necessary learning, and to assist him in more advanced stages of development which now becomes the basis of the new learning. 21

In discussing readiness for learning, Dunsing and Kephart concluded that readiness is more than a loosely-organized group of skills which a child must either possess or not possess. It consists of an accumulation of generalizations which allow the child to deal increasingly effectively with his environment. Learning disabilities may be viewed in terms of difficulties in this developmental sequence. When such difficulties occur, there are gaps in the sequence which will affect all future learning either by limiting or distorting it. Dunsing emphasized the therapeutic use of sensory stimulations and motor skill training as a groundwork for higher functioning. 22

In an effort to show a relationship between the motor development of a child and his academic readiness, Getman used a diagram. In this diagram, which is cone shaped, there is a row of beads at the base which represents the innate response system. Immediately above the base is a row of

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beads illustrating the general motor system; these are lettered C-W-R-J-S-H. Of these he states:

The second row of beads represents the general motor systems of locomotion which include mobility skills all teachers can observe. Those that adults can especially guide and elicit in assisting the child to develop his "minding body" are (C) creeping, (W) walking, (R) running, (J) jumping, (S) skipping, and (H) hopping. These are the actions that allow the child to explore and develop the skills with which he will wage his contest with gravity. Kindergarten and primary teachers have utilized these activities for many years—in many instances without knowing why they were using them—but insightfully confident there was some relationship to academic readiness.23

Discussing the learner and the learner's developing readiness to read, Barsch said that details of a child's spatial world study area must be such that it will trigger his visual-perceptual-motor skills for success. Attention must be given to his spatial world. The learner should have proper orientation to "front," "back," "side," "up," and "down."24

Henry suggests that reading disabilities may be a failure to develop specific perceptual-motor skills to an expected proficiency. Pre-school experiential skills consisting of visually-controlled general and special action skills of body movement, along with visual-perceptual developmental experience, are needed. The skill and accuracy of eye-hand coordination in producing drawn and written


symbols become the foundation to visual interpretation of likenesses and differences in words and numbers printed in workbooks and texts. 25

Rutherford conducted a project to determine the effects of a perceptual-motor program on the readiness development of kindergarten pupils. He used two groups. One, the control group, played on a regular playground using three slides, and two jungle gyms, for 30 minutes per day. The experimental group spent 30 minutes per day in the following directed activities: (1) walking boards, (2) creeping activities, (3) obstacle course, (4) bouncing tubes, (5) stunts, (6) balance boards, (7) tether ball, (8) pirate ball, (9) stepping stones, and (10) Marsden ball.

The difference between the total groups was significant at the 1 per cent level of confidence. According to Rutherford, this tended to indicate that the experimental program was more effective than the control program in developing reading readiness. 26

The Achievement Center for Children at Purdue University discovered that numerous boys and girls were helped to improve academically by taking part in a program of motor activities used as an integral part of a perceptual-motor training


A three-year study showed that the group with the high motor proficiency had a greater number who achieved "excellent" or "good" ratings in reading than the groups with low motor efficiency.  

Early and Kephart conducted a training program for a third grade boy who had motor and perceptual-motor problems and low academic and reading problems. They helped him achieve a better internal organization because they believed his reading problems stemmed from his lack of internal organization. The program lasted for a nine-week period, one hour per day of training.

Results showed a marked improvement on the post-test, Purdue Perceptual Motor Survey. A striking gain in reading rate as well as oral and silent reading comprehension were made on the Durrell Reading Test. The Slingerland Test showed a decrease in reversal errors, indicating internal organization had greatly improved.

Bond and Tinker concluded that an appreciable number of disabled readers exhibit poor motor coordination which is manifested by awkwardness in walking, running, writing, and athletic activities. Tests of motor precision tend to yield better scores for superior readers than for


non-readers. These reading disability cases lack precision in motor control, such as in making motor adjustment required in reading, and in bodily adjustments needed to attend persistently to selected stimuli.29

An investigation was conducted involving first-grade pupils at Jefferson Elementary School in Berkeley, Illinois. The purpose of the investigation was to determine the effects of perceptual-motor training on reading achievement. The control group received a standard physical education curriculum. The experimental group received perceptual-motor training in a developmental sequence based on various studies of motor development. The results indicated that those who were initially reading below grade level and received perceptual-motor training showed clear and significantly larger gains in reading achievement over the control group on the Lee Clark Reading Test.30

A program of sensory-motor activities to meet individual needs was added to the school curriculum of the physical education program in Pontiac, Michigan. The program was included since it was found that the learning of reading and other subjects was restricted because many children had

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lacked these activities.  

In a study which rated 220 elementary pupils in the Los Angeles area as being disabled readers, Shearer found that sixty-six per cent manifested perceptual-motor problems.

The study of LaCruz and LaVeck found that readiness to read depends a great deal on sensory and motor input for an effective learning experience. Children are slow learners because of poor performance due to various sensory and motor deficits.

Werner and Twohig both conducted research studies at Cardinal Stritch College on perceptual-motor development and reading achievement. Werner, using matched pairs of second grade children (a superior reader versus a retarded reader), investigated the relationship between skill of performance in tests requiring balance, awareness of body image, concept of directional orientation, spatial relationships, and the ability to follow and imitate perceptual-motor performances. The data obtained supported the conclusion that, "In general, retarded readers exhibited lesser skill in the performance of the perceptual-motor tests."


Twohig worked with the same matched pairs of children but investigated the relationship between reading achievement and skill exhibited in completing the seven Visual Achievement Forms of the Perceptual Motor Survey and the Rhythmic Writing subtest of the same survey. The Rhythmic Writing subtest showed a difference significant at the .01 level of confidence in performance between good and poor readers. On the test of developmental drawing, no difference was found between the means of the superior and retarded readers.\(^{35}\)

The previous studies have all been concerned with perceptual-motor performances and reading readiness. Degrees of individual differences in motor development as related to reading readiness is a problem of concern. Even though this lack of motor development may not necessarily prevent a child from becoming an average reader, it may handicap him to the extent that his reading will be impaired or interfered with in a mild manner. For this reason, the classroom teacher must be able to identify these motor deficiencies in the initial stages of reading.\(^{36}\)


Limitations of Visual-Perceptual-Motor Training

Recent research is challenging the importance of visual-perceptual-motor training as it relates to reading readiness. Researchers are concluding that special programs utilizing perceptual training either have no effect upon the reading comprehension of poor readers, are unwarranted, or do not make a significant difference in reading ability.

In discussing perceptual-motor programs, Balow warns that such programs should be recognized for what they are—non-specific additions to the curriculum which will probably help teach children important general behavioral skills necessary for success in school. It should be emphasized that these programs are clearly not replacements for the careful diagnosis and direct teaching of basic school skills. 37

Falik attempted to test the efficacy of providing special perceptual-motor training as part of the general kindergarten curriculum. Ninety entering kindergarten children were administered the Anton Brenner Developmental Gestalt Test of School Readiness. Children falling within the lower two-thirds of their groups were compared for reading readiness at the end of the first year and for reading achievement at the end of second grade. The experimental group, which received perceptual-motor training,

showed no significant gains over the control group, seriously questioning the relevance of special training as part of the general curriculum for non-clinical groups.\(^3\)

A study concerned with the effects of Kephart's perceptual-motor training procedures upon the reading performance of poor readers was conducted by Sullivan. The study was conducted during a six-week summer session. The children came from grades 4 to 12. There were 41 subjects in each group. All pupils received two hours of reading instruction daily. Experimental pupils received perceptual-motor training for one half hour daily for six weeks. Results showed that perceptual-motor training had no effect upon reading comprehension of poor readers.\(^3\)

Buckland and Balow designed a study to determine the effect of visual perceptual training on perceptual readiness and word recognition skills of low readiness first grade children. The study also sought to determine the influence of the Frostig visual perceptual training materials. The Metropolitan Readiness Test was used to screen the children. Eighty-eight pupils comprised the experimental group. Results indicated no significant differences between the


two groups in perceptual readiness or word recognition following the two month treatment period. It was suggested that visual perception worksheets might be better used for selected individual pupils rather than for groups of pupils who are simply low in readiness.40

Roach conducted and evaluated an experimental program of perceptual-motor training with slow readers. Children, aged 95 months to 160 months, were selected for an eight-week summer reading program at Indiana University. The experimental group received 30 minutes per day of the following activities: (1) balance and laterality, (2) body image activities, (3) gross perceptual-motor matching activities, (4) chalkboard activities of finer perceptual-motor tasks. This study indicated that perceptual-motor training was not effective in raising the achievement levels in reading when training is given in small groups of six to eight children.

Roach also stated that there appears to be an age variable, since studies on younger children have produced significant positive results. He concluded that the lower age limit of 95 months used in his study may be too late for efficient modification of perceptual-motor behavior.

on a group basis.\textsuperscript{41}

A project was conducted by Wiederholt and Hammill evaluating the Frostig-Horne Visual Perceptual Program. Kindergarten and first grade classes in an urban Philadelphia school were selected for a sixteen-week training program. After 186 worksheets were completed, academic readiness tests were administered. It was concluded that kindergarten and first grade pupils who were trained in visual perception scored no higher than their controls on the academic or readiness tests. Therefore, the use of this program does not appear to be warranted.\textsuperscript{42}

Research involving 121 children at the third grade level studied the relationship between the Frostig Developmental Test of Visual Perception and reading achievement. It was concluded that "the results of the testing on this population do not support Frostig's postulates concerning the relationship between her tests and specific reading difficulties."\textsuperscript{43}


Four kindergarten groups in a small Midwest public school were selected by Church to study the effect of visual perception training and beginning reading. The results indicated that a formal program of training in visual perception was not superior to an informal program that utilized manipulative materials. No better results on a visual perception measure or on a reading achievement test were indicated with the formal program.\footnote{Marilyn Church, "Does Visual Perception Training Help Beginning Readers?" The Reading Teacher, Vol. 27, No. 4 (January, 1974), pp. 361-364.}

**Summary**

In this chapter, the researcher first attempted to survey literature that was supportive of visual readiness. Getman, Tinker, and others were cited as researchers in support of visual-perceptual programs for young children.

Perceptual-motor performance and readiness for learning and reading readiness were also covered. Motor performance research was kept distinct from visual perception, although the studies surveyed integrated the two headings.

The latter research reviewed the limitations of visual-perceptual motor training as it pertained to reading readiness.
CHAPTER III

Summary and Conclusions

The researcher set out to examine literature published within the past ten years which discussed the strengths and limitations of visual-perceptual-motor skills as fundamental to reading readiness programs.

The study was divided into three areas: visual perception and reading readiness, perceptual-motor performance and reading readiness, and the limitations of visual-perceptual-motor training.

Getman, Beery, and Tinker were among the researchers cited in support of visual-perceptual programs. While these researchers may differ slightly among themselves regarding particular techniques, they seem to agree on two fundamental assumptions. One, that visual-motor adequacy is important, if not essential to reading readiness and academic success; and two, that these visual-motor processes are trainable in most children.

Kephart sees reading as a perceptual art as well as a language art. He feels that, although language facility and specific reading skills are important aspects of reading, the interpretation of a printed page begins with a concrete perception manipulation. Unless this perceptual manipulation is systematic and can be
systematically related to the child's body of perceptual information about the universe, trouble in reading and general academic learning can be expected.

All supportive research of visual-perceptual-motor skills and reading readiness was met by challenging research stating that special visual perceptual and perceptual motor training does not significantly improve reading readiness. Of the cited programs employing visual-perceptual-motor skills, those with older children as subjects met with less success than programs whose subjects were very young.

In conclusion, the researcher feels that there is not sufficient conclusive evidence to indicate that motor programs result in significant gains in reading readiness. Special visual-perceptual-motor programs may have a part in the school curriculum, but they should not be used as a substitute for normal academic programs. They should, instead, act as supplemental additions to these programs. It appears, by examining the research, that the success rate of the visual-perceptual-motor programs with younger subjects is indication enough that program planners should concentrate on beginning programs at the earliest level.
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