Visual perception: an important skill in the academic achievement of the child

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VISUAL PERCEPTION: AN IMPORTANT SKILL IN THE
ACADEMIC ACHIEVEMENT OF THE CHILD

by

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CHAPTER I

THE PROBLEM

Introduction

Visual learning and visual perception are of paramount concern in the development of the child to effect an adequate adaptation to a school setting. It is of primary importance at all levels, but especially in the nursery school, kindergarten, and the primary grades.

The role of vision and visual learning is intricately connected with all aspects of a sighted child's learning—motor, cognitive, social and emotional. During infancy and early childhood, children, through their experiences and activities of every kind in their environment, develop the ability to visually experience shape, distance, size, etc., which originally came through other senses.¹

Remediation will be necessary if there are deficiencies in the above areas to counteract the effect of stress resulting from development of poor visual habits.

Statement of the Problem

The primary purpose of this research paper was to ascertain what part visual perception skills play in the child's performance in school. The primary research question asked was, "Is there a relationship between visual abilities and scholastic achievement?"

This study was concerned with research done on visual learning and visual perception development of the normal and retarded child, with particular emphasis on how this development affects performance.

A secondary purpose for this study was to identify and list tests and material which provide remediation and training in visual perception skills.

**Overview of the Problem**

A visual problem is caused by an inadequacy in the total sensory-integrative motor process. It is a well known fact that each child is unique. They vary in their genetic make up, in diseases and traumatic experiences in their lives, and in environmental surroundings. 2

There is evidence that improper diet and emotional difficulties will interfere with children's retentive ability and will decrease their concentration and comprehension ability. Likewise it is quite evident if they cannot hear well or if their visual acuity is not what it should be, they will miss essential work in the classroom. 3

In the light of the modern day concept of vision, there are many achievement problems that relate directly to visual deficiencies. Educators know just as with any other function, there are certain abilities or skills in vision that are necessary for an adequate performance in school tasks that are visually oriented. 4

An optometrist, Dr. Louis Jacques, says, "The eyes of a child are not mature enough to contend with the printed page before he or she is eight." 5

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3 Ibid, p. 300

4 Ibid, p. 300

5 Delwyn G. Schubert, "Visual Immaturity and Reading Difficulty," *The Elementary English*, XXXIV, (May, 1957), 323
Modern, functional optometry, in turn, is dedicated to improving the performance abilities of each and every child through an understanding of the problems caused by visual deficiencies.

As Forrest denotes, "Vision is more than just eyes and eyesight."\(^6\)

Since reliable sources indicate that at least 80% of learning occurs through the visual pathway, we must consider vision as a process that includes the retina of the eye as a sense receptor, the brain as a control center, and the muscles of the eye and the body as mechanisms to express the behavior responses triggered off by the sensory stimulations.\(^7\)

Visual Perception is one of the paramount psychological functions and developmental tasks of young children. Studies indicate that inadequate visual perception skills may hinder early school success and lead to in-attention, misbehavior, lack of cooperation, daydreaming and generally poor adjustment in the classroom.\(^8\)

**Definition of Vision and Visual Perception**

Vision as defined by Gesell is a complex sensory-motor response to a light stimulus mediated by the eye, but involving the entire action system. By this definition, fixation is a basic and primary visual function. All other visual functions in a sense aid fixation or they are refinements of fixation. All vision is an intricate functional complex.\(^9\)

The perception skills as related to visual perception are as follows:

**Visual Acuity** - The ability to see and to differentiate meaningfully and accurately objects in one's visual field

\(^6\) E. B. Forrest, p. 299

\(^7\) Ibid, p. 299


Visual Coordination - The ability to look at objects and symbols with coordinated eye movements.

Visual-Form Discrimination - The ability to visually differentiate the forms and symbols in one's environment.

Visual-Figure-Ground Differentiation - The ability to perceive objects in foreground and background and to separate them meaningfully.

Visual-Memory - The ability to recall accurately prior visual experiences.

Visual-Motor Memory - The ability to reproduce motor-wise prior visual experiences.

Visual-Motor Coordination - The ability to coordinate eye and hand tasks.

Visual Motor Speed Learning - The ability to learn visual motor skills from repetitive experience.

The foregoing definitions were cited because of their pertinence in apprehending the difficulties of visual learning.

Summary

An overview of the problem of visual perception indicates that visual acuity is paramount in insuring adequate academic achievement at all levels, but primarily at the outset of primary education. Optometrists, as well as educators, are now cognizant of the fact that misbehavior, lack of cooperation, daydreaming and other psychological mal-adjustments in the classroom may be consequent to faulty visual perception.

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CHAPTER II

REVIEW OF RELATED LITERATURE

During this decade, particular attention has been focusing on visual development of young children. This chapter is concerned with related literature on visual perception; its history and development; research studies concerned with the influence of visual perception on the graphic tasks of reading, writing and arithmetic. The effect of visual perception skills of the mentally retarded as compared with the normal child is also reviewed.

Historical Development of the Psychology of Perception

From early times there are descriptions of teaching techniques involving both visual and motor skills. Fernald observed examples of these procedures in the writings of Plato (427-347 B.C.), Seneca (3 B.C.), Quintilian (about 66 A.D.) and St. Jerome (403 A.D.).

Both Plato and Seneca were concerned with training the young child. Plato advised: "When a boy is not yet clever in writing, the masters first draw lines, and then give him the tablet and make him write as the lines direct" (Fernald, 1943, p. 27). Seneca suggested that the teacher use his hand to guide the child's fingers as he attempts to imitate the writing pattern of a word.

Quintilian knew the value of knowing first the forms of the letters.

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2Ibid, p. 8
He then recommended that they be cut accurately upon a board for the child to trace. At the time of St. Jerome it was customary to trace with a stylus in wax.³

Fernald also described later instances of visual-motor training. Charlemagne (742-814) learned to write by tracing engraved tablets with a stylus. Locke (1632-1704) suggested that letters printed with red ink be traced with black ink. Brinsley (1612) reported that in the fifteenth century English schools a letter was sometimes traced with a dry pen.⁴

Yet all these early methods were only partially effective. Something more was needed to help the individual combine the two visual images which give solidity and depth.

Orthoptics began with the invention of the stereoscope by Sir David Brewster in England. Shortly after this in our country Dr. Oliver Wendell Holmes designed the open form of a stereoscope in popular use at that time. In 1863, Dr. Louis Emile Javal (1839-1907) one of the great figures of French and world ophthalmology of his time, adapted the stereoscope for the diagnosis and treatment of strabismus or cross eyes. He later published the first manual of strabismus for the treatment of squint (1896). Following him we have an Englishman named Claude Worth who developed the first ambloscope, to train the strabismic individual in the control of proper eye coordination for better vision.⁵

Others worked on correction of lateral and vertical muscle imbalance.


⁴Ibid, p. 8

Visual training as we know it today began in 1941. During World War II the question arose of how the accuracy of the gunfire of the pilots could be improved to avert ultimate defeat. The Navy set up a program called the "Navy School of Recognition Training" under Samuel Renshaw of Ohio University. They trained 4,000 instructors, who in turn trained their men, which in 1943, was one factor which led to complete victory for our armed forces.6

This preluded an adaption of this technique for adults and children to determine whether it would improve their visual skills in learning. Those who used them found some gratifying results.

Further studies were also conducted on infants. It was observed that infants would respond to certain properties of objects within a few days after birth. Harlow in 1951 suggested that they were most likely to see size and brightness-hue differences.7

There are evidences that the properties of objects which are so evident to adults are not discernible to the infant, such factors as detail, contour, form, etc. As noted by Kephart and others the infant's visual world is vague, ill-defined and very restricted.8

Birch and Lefford intimated in their study that the discrepancy often found between young children's ability to discriminate shapes and to dupli-

6 L. Anapole, p. 375


cate them may be caused in part by the fact that intersensory equivalencies are accomplished at different levels of maturity. For example, a five-year old child relates knowledge received visually concerning geometric forms easily with that received in a tactile manner, but not with that received kinesthetically.\(^9\)

Fabian found that young children tend to rotate geometric figures when reproducing them. As the child matures this inclination lessens and usually around seven or eight years of age completely disappears.\(^{10}\)

Studies of variations of line in copying performances have been made. Rice\(^{11}\) noted that in copying a diamond younger children use continuous line drawing, while older children tend to shift to the broken line type. Rice and Gesell\(^{12}\) observed the tendency of preschool children to draw vertical lines downward and horizontal lines from left to right. Both Ilg and Ames\(^{13}\) noted that age trends in the child's method of reproducing forms indicated the careful recording of direction of line.

Vertical pattern discrimination becomes a major question as a child

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\(^{10}\)A. A. Fabian, "Vertical Rotation in Visual-Motor Performance- its Relationship to Reading Reversals," Journal of Educational Psychology, XXXVI, (March, 1945), 129-131

\(^{11}\)Charlotte Rice, "Excellence of Production and Types of Movements in Drawing," Child Development, I (1930), 1-14


\(^{13}\)Francis L. Ilg and Louise B. Ames, School Readiness, Behavior Tests Used at the Gesell Institute, (New York: Harper and Row, 1965)
approaches school age. Letters, in terms of their physical properties are geometric forms. The child must be able to distinguish a "c" from an "o", which is a difference in closure. There may be reversal in letters and words because the child has not developed the finer points of vision skills, such as size, shape, position, place relationships, and habits of using eyes from left to right.  

Even if eyes are normal, children may have immature visual perception. They may see a thing but not notice its details. "Vision is one of the major contacts of the child with reality in his early experience," says Dr. Ward C. Halstead.  

**Visual Efficiency and its Relation to Academic Achievement**

Our culture today is one that places a high premium on visual ability, and we may not always be precisely aware of this. To elaborate, academic achievement frequently is determined basically by visual functioning, and sometimes our evaluation of academic achievement may really be an evaluation of visual ability.  

Researchers tell us children must be taught better visual and perceptual habits so that they may become good readers and achieve the highest in their academic work.

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Consider the various criteria for evaluating academic achievement. Reflect on the different visual tasks involved in any classroom subject or lesson. Consider the students performing these tasks. They must constantly shift their focus from far points to near points (blackboards, charts, etc. to books, and papers), and hold this focus without blurring. This is indeed a feat calling for delicate adjustment of six tiny eye muscles.\textsuperscript{17}

Children must furthermore move their eyes along the page in a proven order, sometimes with a definite speed, and at the same time process the meaning of the printed symbols. Thus we have a very complex operation. Since culture imposes such a high premium on efficient visual functions, teachers need to know that skillful visual functioning does not just happen. It is learned.\textsuperscript{18}

Frostig, Lefever and Whittlesey in their study found the overall problem was that a large proportion of the children who show either learning difficulties or poor classroom adjustment at the pre-school and primary levels are handicapped by disabilities in visual perception.\textsuperscript{19}

A child makes little distinction between right and left. He has to be taught which is his right hand and which is his left. Teachers often find that until children are six or seven years old they do not distinguish differences between reversed letters "b" and "d", "p" and "q". The same

\textsuperscript{17} Albert F. Graw, S. J., p. 364

\textsuperscript{18} Ibid, p. 364

difficulty often occurs in the reading of words and it may persist longer
then reversal of letters.  

Piaget and Inhelder found that children of five or six often have
little notion of order, even of objects in a row.

Harris has observed that even if the eyes are functioning normally,
the child may have immature visual perception. Seeing a thing does not
always mean noticing its details. Many young children pay attention only
to the main characteristics of visual stimuli, size, shape and color and
overlook the details. When asked to match letters or words they don't
notice differences which are quite obvious to older children.

It is an assumption by Gestalt psychologists that perception has its
own course and sequence of ontogenetic development.

Because of an industrial study, Kephart in 1953 was led to conduct a
study to find out if visual limitations would affect school children's
work. The industrial study made produced the following conclusion:

Psychologists in the Occupational Research Center at Purdue
University proved from over a million tests that visual skill
has a great deal to do with success on the job in industry.
The visual handicaps directly affect efficiency and productivity.

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20 M. D. Vernon, "The Development of Visual Perception in Children,"
Education, LXXVIII, (May, 1958), 548-549

21 J. Piaget and B. Inhelder, The Child's Conception of Space,
(Humanities Press, New York, 1956), p. 37

22 A. J. Harris, How To Increase Reading Ability, (New York: Long-
mans, 1949), p. 29

23 James C. Coleman, "Perceptual Retardation in Reading Disability
Cases," Journal of Educational Psychology, XLIV, (December, 1953), 497
Kephart found a direct relationship between visual skills and school work. Children who see well work well. Those who are having vision problems do poorly.24

Experts have defined reading as a process of perceiving and understanding written or printed symbols. It is very important that serious consideration be given to the many visual problems that impair reading performance.

Feldmann in a study conducted on ninety-five children, kindergarten to grade five found a growth in some visual perception scores. These scores were assumed to be mostly influenced by age and experience. The conclusion of the study was that lack of synchronization of visual perception and required reading skills might impede school achievement.25

Coleman's investigation of the gross development of visual perception in a group of reading disability cases showed that in most of the cases the children were almost a year retarded in perceptual development when compared with their age peer group.26

Reading skills showed a positive relationship to visual perceptual development in a study made by Weathers. Adequate male and female readers scored significantly higher on the visual-perceptual tests of eye-motor coordination and figure ground relationships than did the inadequate


26James Coleman, p. 497-503
readers. Results of the study revealed significant differences in the visual perceptual development patterns of adequate and inadequate readers. Most showed problems in eye-motor coordination and perception of figure ground relationships.\(^{27}\)

Buswell\(^{28}\) and Taylor\(^{29}\) have provided evidence for increased efficiency of visual and perceptual skills associated with reading during the school years. However, Taylor has noted that the development of those skills, as measured by various eye movements, span of perception, and rate of comprehension, has been left largely to trial and error processes in the school program.

In a research study by Byrne, it was found that teachers of children with higher reading levels—above grade five—do not need to be concerned with the visual form in which they present words. This seemed to verify the fact that higher levels of reading were to use other means than configuration for the learning of words.\(^{30}\)

In a study by Elkind, Larson and Van Doorick results indicated that, in comparison with average readers, the slow readers performed less well

\(^{27}\) Lillian Louise Weathers, "A Comparison of Visual-Perceptual Development and Reading Achievement of Fifth Grade Adequate and Inadequate Readers," Dissertation Abstracts, XXVII, (March, 1967), 2756A - 2757A

\(^{28}\) G. T. Buswell, "Remedial Reading at the College and Adult Level," Supplementary Educational Monographs, 1939, No. 50, quoted by Bruce Amble and Siegmor Muehl, "Perceptual Span Training and Reading Achievement of School Children," Journal of Educational Psychology, LVII, (1966), 192-193


on the tests of perception activity and were less able to benefit from perceptual training than were their average reading peers. A reasonable summation could be thus made for perceptual activity as playing at least a part in successful reading.\textsuperscript{31}

The findings of Barrett's study in 1965 appears to sustain the conclusion that an optimum combination of visual discrimination tasks for predicting first grade reading achievement would contain tasks similar to reading letters and numbers, word matching, and pattern copying. It is thought that the sooner the teacher can observe children performing such visual discrimination tasks the sooner he will be able to decide their readiness for reading.\textsuperscript{32}

The use of tachistoscope for number training in Phillips' study proved to be no more effective than an ordinary workbook method or practice.\textsuperscript{33}

One more function pertaining to visual perception needs to be discussed because of its great significance for reading-memory for visual sequences. Some children can perceive accurately, both auditorally and visually; they can even combine the auditory and visual stimulus; but are unable to retain the words they have learned or cannot spell them because

\textsuperscript{31} David Elkind, Margaret Larson and William V. Doorick, "Perceptual Decentration: Learning and Performance in Slow and Average Readers," Journal of Educational Psychology, LVI, (February, 1965), 50-56

\textsuperscript{32} T. C. Barrett, "Visual Discrimination Tasks as Predictors of First Grade Reading Achievement." The Reading Teacher, XVII, (January, 1965), 276

\textsuperscript{33} J. L. Phillips, "Perception in Number Skill: Study in Tachistoscopic Training," Journal of Educational Psychology, XLV, (December, 1954), 465-466
they are unable to remember a sequence of letters. 34

Barsch reminds us that . . . "spelling must be regarded as a visual-spatial phenomenon embedded in the general conceptualization of language as a visual-spatial phenomenon." It is the order and sequence of letters which are essential in serial placement. Transposition of letters in written or oral spelling must be considered as an error in visualization. The ability to visualize the word before spelling it or copying it is the critical constituent in spelling. 35

Barsch holds that any activity that teachers use to develop skills in visualizing will have an effect on spelling efficiency. 36

Hendrickson, from an optometrical viewpoint, based on clinical experience in visual development and child development, also says in regard to spelling the basic problem is in form discrimination and ample visual imagery or visualization of shapes. 37

Visualization is a process of visual comparison, visual recall, and visual imagery that permits one to see or experience again a previously seen or experienced incident or object. It is the ability to "see" and know a thing or place, idea or concept of the past, to manage or view it


35 R. H. Barsch, "Visual-Spatial Concept in Spelling," Academic Therapy Quarterly, III (Fall, 1967), 6

36 Ibid, p. 6

from any angle. 38

Many children do not have an adequate skill of visualization. Visualization is the outgrowth of many earlier experiences of the human organism. It is the integration of what they feel or do with what they see. Some children have not learned to align and maintain alignment of the eyes on what they are feeling or doing while they are doing it. 39

There are three components of visualization. First is the skill of visual comparison, that is, the recognition of differences and similarities by looking. The second phase of visualization development is visual recall. This is developed through many experiences in preschool years. The third component is visual projection, which is an outgrowth of visual comparison and visual recall or memory. Visual projection is the knowing the differences of objects and how they look without seeing or feeling them. It is the ability to visualize past experiences and relate them. 40

As the child learns to visualize, he learns to look and observe. He learns to see, listen, and know more. He learns the visual ability of interchanging symbols for experiences, and he learns to manipulate symbols sufficiently to produce a good writer, a good reader and a good speller.

The frequency of visual perceptual disturbances and their relationship to perplexities in beginning reading and emotional adjustment warrant special attention to these deficits. Treatment should be concerned with

38 Hendrickson, p. 39

39 Ibid, p. 40

40 Ibid, p. 41-42
improvement of the underlying deficits while the child's best abilities for learning new academic skills and subject matter are exercised.

**Visual Perception Development of the Brain-Injured**

It seems that the elementary sensory perceptual phenomena is the ability to determine that one part of the visual field differs from another. Of primary importance then is this ability to distinguish one figure from another. A comparison of contours is necessary to determine the similarities as well as the differences between contours. We do not perceive a complex form at once but rather various parts of the form, which later are integrated into the complete impression. 41

It is of paramount importance that while shifting our attention from part to part the relation of the parts to the whole be kept in mind.

In certain perceptual phenomena the impression of the whole can only be derived from a combination of its parts, as in the case of a circle whose sides are outlined by a chain of smaller circles. 42

It is this merger of parts into wholes with which the brain-injured child has obvious difficulty. He is able to perceive the parts but does not blend them into wholes. Since the brain-injured child is most often apt to see only parts, when given a tachistoscopic presentation he will frequently reveal his difficulty by responding to a detail of a total pattern. The normal child will usually acknowledge the presentation as a whole. 43

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42 Ibid, p. 56

43 Ibid, p. 57-58
Since brain-injured children seem to be attracted to the details of any object rather than to the wholeness, they will be captivated by a button, a flower, a broach, or some small detail rather than the whole. This is also found in writing and arithmetic problems, in which they seem to lose themselves in details rather than acquiring concepts of the perceptual object as a whole. 44

Teachers are aware that children who have difficulty with reading, spelling and copying are unable to sound out a word by seeing and saying the parts in a systematic arrangement. Training in form perception, preliminary to the above subjects involve helping the child to see an integrated pattern, and to associate the individual parts as components of the whole. 45

Winters and Gerjuoy found in their study that the correlations between eye-movements and verbal report are higher for normals than for retardates. Retarded children who were more consistent in their organization of eye-movements and verbal reports gave more correct answers and scored higher on a reading test than retardates who were less consistent. It was postulated that reading experience assists in the development of consistency between perceptual and verbal patterns of response. Retardates who achieve some reading skill are better able to organize related stimulus materials than retardates without this skill. 46


Retardates take longer than normals to develop perceptual meanings. Their perceptual behavior tends to be more rigid and as a consequence, they have greater difficulty in obliterating perceptions. In the case of retardates with brain damage, much more severe perceptual problems are present, and such children may have greater difficulty in perceiving accurately even simple geometrical forms or discriminating between like forms.47

Some researchers such as Dr. Lisa Gellner have stated that the primary difficulty in brain damage is brain stem lesions which have resulted in partial perceptual losses.48

McMurray summarizes a number of research studies showing that cerebral lesions cause disturbances in visual perception.49

Zeaman, House and Orlando also indicated that mental retardation may be associated with difficulties in ability to solve visual discrimination problems.50

Gallagher in his study, however, states that the brain-injured children are not a homogenous group. He found that only a minority of the brain-injured children in his sample had definite perceptual problems and that


many of these children had adequate perceptual abilities in accordance with their general mental development.\footnote{J. J. Gallagher, "A Comparison of Brain-injured and Non-Brain-injured Mentally Retarded Children on Several Psychological Variables," Child Development Monograph, XXII, No. 2 (1957), as cited in Betty Hunt Bradley, "Differential Response in Perceptual Ability Among Mentally Retarded Brain-Injured Children," Journal of Educational Research, XLVII, No. 8 (April, 1964), 423}

Implications from the above studies caution the use of the labeling of visuo-motor disability or deficiency in visual perception as primary criteria of brain injury.

In general the evidence for a relationship between perception and learning has not always been favorable. It appears, however, that certain cultural experiences do affect perceptual abilities related to academic achievement. Kephart found that by practice on special exercises designed to enhance spatial orientation, an improvement in the perceptual and academic abilities of retarded children was made.\footnote{Newell C. Kephart, The Slow Learner in the Classroom, (Columbus, Ohio: The Charles Merrill Co., 1960), 120-123}

The problem which most teachers find in the control of the eye is the learning of where to focus the eye. The solution to this problem seems to be based upon the knowledge of what the information should be and how to obtain it. This can be best illustrated by the development of the eye-hand coordination.\footnote{Clara M. Chaney and Newell C. Kephart, Motoric Aids to Perceptual Training, (Columbus, Ohio: Charles E. Merrill Co., 1968), p. 19}

In the early years of learning the child learns to control his hand so that it can supply him with consistent exploratory data. He then learns to focus his eyes on his hand as it moves about. He depends upon the infor-
mation from the hand for consistency and matches the action of the eye to it so that the visual knowledge is also consistent and matches that of the hand.\textsuperscript{54}

If the child fails to learn to use his eyes and hands in unison, learning often suffers. This is one of the problems that retarded children often portray. It has been found that most children who have ocular motor problems also have gross motor problems, including inadequate or rigid balance.\textsuperscript{55}

Diagnostic tests and teacher observations have revealed that retarded children have difficulty in comprehending wholeness. Besides failure to see details in relation to the whole, they frequently confuse foreground and background in a picture.\textsuperscript{56}

Retarded children generally function best on a concrete level. They may be able to relate what they see, or what activity is taking place, but at the same time be unable to associate what they see to other objects or other events, or to explain the meaning in relation to the setting.\textsuperscript{57}

An intense interaction between perception and language characterizes the early learning of children. Developmental growth of size and pattern perception skills is traced from the manipulative play of the toddler to the first grade child's efficiency in perceptual skills. Teachers realize

\textsuperscript{54} Clara H. Chaney and Newell C. Kephart, p. 20

\textsuperscript{55} Ibid, p. 113

\textsuperscript{56} Marion J. Erickson, The Mentally Retarded Child in the Classroom, (New York: The MacMillan Co., 1965), p. 8

\textsuperscript{57} Ibid, p. 19
that perception skills are closely associated with reading and spelling success. Because these skills are often lacking in the retarded child's development, it is important to have effective readiness programs that include the combination of perceptual and language activities.

Summary

The development of Perceptual skills has taken us back to Plato (427 B.C.), Seneca (3 B.C.), and Quintillian about (60 A.D.). . . all of whom used some primitive method using both visual and motor skills to teach. The real visual training as we know it today began with the training of service men in 1943.

Harlow made studies on infants in 1951, as did Kephart, Birch and Lef ford on very young children, to find the part vision plays in their world. Left to right sequence, reversal of letters and closure were found to be some of the problems for the school age child.

Because of the high premium that our culture places on visual acuity, studies have been examined to see what relation visual efficiency has on academic achievement. Frostig, Lefever, and Whittlesay found that a great proportion of children who show learning difficulties have disabilities in visual perception. Kephart and Coleman also found a relationship between vision skills and school work.

Weathers, Buswell, Taylor, Elkind, Larson and Van Doorick indicated by their studies that perceptual skills played a significant part in reading success.

Byrne, however, in his 1963 study found that after grade five visual form did not play as important a part as in the primary level in learning to read.
Phillips (1954), Barsch (1967) and Hendrickson (1967) found that skills in visualizing had a great effect on spelling efficiency.

Feldman in his 1961 study found that lack of synchronization of visual perception and required reading skills might impede school achievement.

It was noted that from the frequency of the researches to note the relationship between visual perceptual disturbances and reading, spelling, writing, as well as emotional adjustment in some cases, there was significant evidence for attention to be paid to perceptual skills for the best development of academic success.

The effects of visual perception on children's learning for the normal and retarded was studied through a view of research articles written by prominent people in this field. When comparing the retarded child with the normal it was found that according to Strauss and Kephart (1955) the brain-injured child has obvious difficulty in the merger of parts into wholes. The retarded child is attracted more to details than to the whole picture.

Winters and Gerjuoy in their 1967 study postulated that reading experience assists in the development of consistency between perceptual and verbal patterns of response. Retardates who achieve reading skill, therefore, are better able to organize related materials than retardates without this skill.

Dr. Gellner (1959) and McMurray (1954) postulate the theory that brain lesions result in partial perceptual losses or cause disturbances in visual perception. Also, Zeaman, House and Orlando (1958) indicate that mental retardation may be related to difficulties in solving visual discrimination problems.

Gallagher (1957) cautioned the pigeonholing of brain-injured children, because he found only a minority of his sample had definite perceptual problems.
Erickson (1965) a man close to our own day, says the retarded child often has difficulty in relating details to the whole. He found they may be able to relate what they see, but not associate it to other events or explain its meaning in relation to the setting, as would the normal child in the classroom.

Kephart (1960) found that special exercises designed to enhance spatial orientation helped to improve the perceptual and academic abilities of retarded children.

The retarded child is often lacking in the perceptual skills because he does not have the learning experiences of a normal child. Educational material of all kinds should be available to help this child develop the perceptual skills necessary for the fullest academic achievement.

These children have to be helped to overcome most of their learning deficiencies through integration of the different avenues of perception. These children must at least have the feeling that they are understood, and that their parents and school care and are willing to help them in every way. The result would be the elimination of a lot of frustrations and happier human beings.
CHAPTER III

ATTEMPTS TO MEET THE PROBLEM

It seems that as the child matures inaccuracies in perceptions, which would constitute a serious handicap to the child's learning, quite naturally die out and become relatively unimportant at about the age of seven for most children. This chapter is concerned with those children for whom visual perceptual difficulties persist to prevent successful academic achievement.

The Aims of Visual Training

The aim of visual training is to teach the student better eye coordination, fusional range, to increase accommodation facility, make for greater convergence flexibility, and accelerate the speed and span of perception to enhance reading, writing and arithmetic performance.¹

It is important to develop smooth, rhythmic oculomotor control. This is to have both eyes operating as a team in the conjugate fixations from left to right on lines of print. Also fusion must be built to its highest degree. Stable fusion is an important factor for efficient reading.²

Another very important perceptual skill is efficient hand and eye coordination. Visual functioning does not just happen it is learned.

¹L. Anapole, "Visual Training and Reading Performance," Journal of Reading, X (March, 1967), 376
²Ibid, p. 377

25
Since visual perception has been implicated as a factor of some importance in readiness especially for reading, educators must look for ways to build this readiness.

In order to meet the visual problems of beginning school children, the child must be properly prepared to meet the stress and strain of continuous near-point demands. This can be done to some extent in the preschool developmental years.3

The following is a partial list of tests and materials that will help to identify difficulties in this area and build a more efficient visual functioning system. The child will then have greater competency in using visual skills necessary for any particular task facing him at any given moment.

Tests Used to Detect Perceptual Difficulties

Developmental Test of Visual Perception. This is a test containing five subtests which test the areas described below:

Eye-motor coordination--a test of eye-hand coordination involving the drawing of continuous straight, curved or angled lines between boundaries or various width, or from point to point without guidelines.

Figure-ground--a test involving recognition of certain figures against increasingly complex grounds. Intersecting and hidden geometric forms are used.

Constancy of shape--a test involving recognition of certain geometric figures presented in a variety of sizes, shadings, textures, and positions in space, and their discrimination from similar geometric figures. Circles, squares, rectangles, ellipses, and parallelograms are used.

Positions in space--a test involving the discrimination of

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reversals and rotations of figures presented in series. Schematic drawings representing common objects are used.

Spatial Relationships—a test involving the analysis of simple forms and patterns. These consist of lines of various lengths and angles which the child is required to copy, using dots as guidepoints. 4

The Frostig test, with age norms which range from five to nine years of age, can be individually administered. It can also be administered to groups of two to eight children depending on age and whether there is a proctor to assist when there are more than four children to be tested.

A Visual Motor Gestalt Test and Its Clinical Use. This test is generally used to assess visual-motor development, as well as an assessment of emotional maturity of children. It is an individual test consisting of nine geometric figures, each printed on a separate card. One card is presented at a time, and the child is asked to make a figure like it. The test is recommended for individuals from four years of age through adulthood. It is sometimes used as an exploration of such things as retardation or loss of cognitive function in adults and children. 5

Illinois Test of Psycholinguistic Abilities (ITPA). The ITPA is one of the more comprehensive tests designed to identify specific abilities or disabilities of the child. It has three subtests to help identify visual disabilities.

The Visual Decoding is used to assess ability to interpret


meaningful pictures, and to group or match pictures according to conceptual categories.

The Visual-Motor Sequencing is said to assess the ability to correctly reproduce a sequence of configurations of symbols which the child is allowed to observe for five seconds and then required to duplicate the sequence. Visual memory plays an important part in this test.

The Visual-Motor Association is designed to assess the child’s ability to relate meaningful visual symbols with each other.6

Kirk and McCarthy have pointed out that the main purpose of this test is to identify specific abilities or disabilities. This is so an educational program can be set up on the basis of the findings.7

Developmental Test of Visual-Motor Integration. This test is for group screening and an individual diagnostic instrument for problems related to integration of visual and motor skills. The format is suitable for group or individual administration. The age norms are from 2 to 15 years. It is designed primarily for pre-school and primary level.8

Visual Training Materials

A book that has an excellent chapter on teaching pre-school and nursery children to use hands and eyes is, TEACHING THE RETARDED CHILD TO TALK by Julia D. Molloy. A sample of the material in this book will be found in Appendix A.

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7 Ibid, p. 33-34

Frostig Program for the Development of Visual Perception. This program is to be used as a preventive and developmental program. It is best used at ages 3 1/2 to 7 1/2. The program deals with 5 areas of visual perception. Worksheet exercises are coordinated with 3 dimensional games and experiences. The 1966-1967 revision is available in "Pictures and Patterns" training booklets.10

Fairbanks-Robinson Program, Level 1. Level 2 Perceptual-Motor Development. This new program develops through complex activities, perceptual motor skills. It introduces exercises in line and form reproduction, visual tracking and figure-ground, 2 and 3 dimensional spatial concepts part-whole organization, and reproduction of color sequences.11

Visual Perception Training Materials. These Materials are useful in preschool and primary settings, as well as remedial programs. This company offers several sets of materials applicable to the visual skills. Individual sets, consisting of ditto-masters, are economical and practical. The subject areas include "Visual discrimination," "Seeing likeness and differences," "Visual Motor skills," and "Visual readiness skill."12

Teaching Resources. These Resources have several programs relating to


12 Visual Perception Training Materials, (Pennsylvania: Continental Press, 1958), quoted from material received from the Continental Press Representative for the Wichita, Kansas Area.
training in visual skills. They are: (1) Dubnoff-School Program--sequential perceptual motor exercises; (2) Dubnoff School Program--directional-spacial-pattern board exercises; (3) Erie Program--perceptual motor teaching materials; (4) Pathway School Programs--eye-hand coordination; and (6) Ruth Chever Program--visual-motor perception teaching materials. All materials are applicable for pre-school and primary classes. They are adaptable to facilitation of normal visual perceptual development. They can be used for remedial work and also for children with special learning difficulties. Exercises are for such areas as eye-hand coordination, figure-ground discrimination of likenesses and differences in basic geometric shapes. 13

A Sensory-Motor Approach to Visual Discrimination by L. Gould. This series attempts to link perceptual cognitive skills in the pre-primary, primary, and special education programs. Presentation is made through a tachistoscope and workbooks, containing similar material. Students thereby get practice in coordinating visual fixations to and from distant and near-point tasks. Materials used include geometric forms and figures, as well as numerals, and letters, designs to develop eye-hand coordination, improve visual memory, and facilitation of an analytic approach to one's environment. 14

Look and Write by Stanford E. Taylor. This is an eye-hand coordina-

13 Teaching Resources, (Boston, Massachusetts: 100 Boylston Street), cited from Covers of Exceptional Children, (February, April, May, 1969) and The Instructor, (December, 1967), p. 39

tion for primary grades.\textsuperscript{15}

\textit{The Remediation of Learning Disabilities}, by Robert E. Valett, Ed. D. This book has an excellent chapter on suggested remedial material or activities to use in the development of perceptual-motor skills.\textsuperscript{16}

\textit{Visual Tracking} by R. Geake and E. P. Smith. It is a self-instruction workbook. The program is designed to facilitate visual discrimination, left to right direction, and skill in following a line of print. The format involves lines of letters with the task being to find and mark in order each of the letters of the alphabet. Practice is used to overcome errors in reading and writing such as reversals, omissions, substitutions and additions. Level of material is for beginning readers and remedial assistance to slow readers of all ages.\textsuperscript{17}

\textit{Reading Readiness Kit} by Goldstein and Edith Levitt. The kit is best suited for children with mental ages of 3-6 or 4-6, who have special difficulties. Reading Readiness workbooks are also available for those with mental ages of 4-6 to 5-6. Subject matter for the program consists of activities related to formation of cognitive skills of visual and auditory discrimination. In the unit on "Visual Discrimination," the program is divided into sections: (1) objects, (2) colors, and (3) forms. The kit

\textsuperscript{15}Stanford E. Taylor, \textit{Look and Write}, (Huntington, New York: Educational Developmental Laboratories), as cited in a brochure published by the Educational Developmental Laboratories Co.


provides worksheets to parallel materials and lesson outlines suggest supplementary activities.\textsuperscript{18}

\textit{Perceptual Training Activities Handbook} by Betty Van Witsen. It is a book of perceptual training activities. It may be used at different age levels—gives step by step advancement. In addition in chapter two there are a number of suggestions that have been found helpful in bringing behavioral problems of a child within his control. Samples of material found in this book are to be found in Appendix B.\textsuperscript{19}

This is just a sample of the materials that are available for training in visual skills. Appendix C presents a Catalogue listing of companies having material for visual training.


CHAPTER IV

SUMMARY AND CONCLUSION

Summary

The importance of visual skills for academic success is noted from the research done in chapter two. It may appear to some that these inaccuracies in perception will disappear as the child matures. This is not true in all cases and proves a considerable handicap to many a child struggling to read, spell or write in the regular or special education class.

Each child must be helped to improve the primary visual abilities of eye movements, visual coordination, eye-hand coordination, visual acuity, visual-figure-ground differentiation and visual memory.

Visual training has grown out of research done in some of our country's best universities. Visual training was used during the war to help our men to act quickly and accurately and now many school children are benefiting from the training.

Visual training is a process of teaching children to see properly. They are taught the best visual and perceptual habits in order that they may read, write, spell and figure better.

Conclusion

As noted earlier, many researchers have established the fact that visual skills are a vital component to the full development of the child.
Educators thus realize how important visual perception is in our society where pictures, words, sentences, symbols, etc., play a significant part in our everyday lives.

Gradually we are beginning to recognize that academic achievement is inconceivable without basic perceptual ability. Consequently the skill of visual perception must be developed to its fullest potential just as other skills which make for a well adjusted member of society.
HOW CHILDREN GROW IN USING HANDS AND EYES

Level I
Use of hands
A. Reach for something with the whole hand.
   Take hold of something.
   Let go of something.
B. Use of thumb and fingers to take hold of something.
   1. Without using the eyes (Child is feeling or listening);
      Use sand, water, things to squeeze like clay, sponge;
      Things to hear like rattles, musical blocks, squeaking soft toys.
   2. Using the eyes:
      Use things to push like wooden cars or train, picture that squeaks.
C. Reach for something with both arms.
D. Hold something large, like stuffed animal or big doll, with both arms.
E. Start to use fingers instead of flat hand to hold something, or to poke at something.
F. Hold something with one hand and something else with the other hand.

G. Pick up something and put it somewhere on purpose; put balls in large basket or box; fill large peg board with 1" dowels. (for peg board, see "Materials You Will Need," in Appendix.)

Level II
Noting that things are alike or different because of color, shape or size.
A. Handle smaller things than used in Level I; use 1/2" peg boards and progress slowly to smaller peg boards.
B. Place small things in right order. Use common objects; balls, little cars, plastic spoons. Later use circles squares, triangles, stars, etc. Select, match and sort
   1. by color
   2. by shape
   3. by size
C. Then—using blocks, color chips, form boards, stacking trees, nesting blocks—select, match and sort
   1. by color
   2. by shape
   3. by size

Level III
Putting parts together to make something whole
This means using hands and eyes; noticing that things are alike or different. Because what is touched or seen now means something, the child can put small parts together to make a different and whole objects.
9. The teacher makes two sets of stencils, about 5 inches square, of a circle, square, equilateral triangle, horizontally oriented rectangle, vertically oriented rectangle, and horizontally and vertically oriented diamonds. Set 1 should consist of the solid shape; Set 2, then, is the frame with the shape cut out of it. The bottom edge should be black, to orient the child. The child traces both kinds of stencils at the chalkboard. Meaning should be associated with each shape.

10. The child uses similar stencils, but only 4 inches square; and traces them on paper at his desk, naming the shape and associating meaning with it.

11. The child colors the shape within the stencil frame.

12. The child colors the traced shape without the aid of the stencil.

13. Two shapes are combined, and meaning is associated with the resulting figure, for example:

```
ICE CREAM CONE     HOUSE
```

14. More than two shapes are combined, and meaning is associated with the result, for example:

```
CAR         CLOWN
```

15. Follow stencils on the peg board.

Peg Boards

<table>
<thead>
<tr>
<th>Peg Board</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Horizontal line</td>
</tr>
<tr>
<td>B. Vertical line</td>
</tr>
<tr>
<td>C. Square</td>
</tr>
<tr>
<td>D. Rectangle</td>
</tr>
<tr>
<td>E. Triangle</td>
</tr>
<tr>
<td>F. Parallelogram</td>
</tr>
<tr>
<td>G. Trapezoid</td>
</tr>
<tr>
<td>H. Hexagon</td>
</tr>
<tr>
<td>I. Octagon</td>
</tr>
<tr>
<td>J. Diamond</td>
</tr>
<tr>
<td>K. Cross</td>
</tr>
<tr>
<td>L. X</td>
</tr>
<tr>
<td>M. Star</td>
</tr>
</tbody>
</table>

16. After the child can follow the shapes in 15 using stencils, have him copy the single forms, without the stencils.
17. Have him copy designs that combine forms; see example at left.
18. Have him copy letters; see example at left.
19. Have him copy more complicated figures, with meaning; see example at left.

20. First trace, then copy patterns, using the blocks at first, later pencil and paper.
   A. Single square.
   B. Combination of squares to make a big square.
   C. Single Diamond.
   D. Combination of Triangles.
   E. Single triangle.
   F. Combinations of triangles
   G. Combine two forms.
   H. Combine more than two forms.
   I. Combine forms into meaningful pictures (Sailboat, flower, airplane, etc.).
   J. Leave the color out of the picture he is to copy

Parquetry Blocks

21. The child designs patterns that are symmetrical, working directly with the parquetry blocks, then copies the design.
22. Apply the designs and patterns to functional material; for example, have the children make a book cover, a birthday card, posters, book plates, gift paper, and so on. This kind of activity can be encouraged by having a class collection of good advertising art that uses basic forms, so that the children can see the application of what they have learned.21

ACME SCHOOL SUPPLY CO.
Educational Supplies and Teaching Material
for Home, School, Church
1807-A 21 Ave. S.

AVISCO
Equipment from the World of Audio-Visual
77 W. Washington St.
Chicago, Illinois 60602

BECKLEY-CARDY CO.
1900 N. Narraganset
Chicago, Illinois 60639

CHILD CRAFT EQUIPMENT CO.
Toys That Teach
The Growing Years
155 E. 23rd Street
New York, N. Y. 10010

TEACHING RESOURCES
100 Boyston Street
Boston, Massachusetts 53404

WESTERN PUBLISHING EDUCATION
Preschool Material
1220 Mound Ave.
Racine, Wisconsin 53404

CHARLES E. HERRILL PUBLISHING CO.
Visual Experiences for Creative Growth
1300 Alum Creek Dr.
Columbus, Ohio 43216

L. W. SINGER COMPANY, INC.
New Visual Aids
501 Madison Ave.
New York, N. Y. 10022

MILTON BRADLEY CO.
Educational Materials
74 Park Street
Chicago, Illinois

COMMUNITY PLAYTHINGS
Rifton, New York 12471

DEVELOPMENTAL LEARNING MATERIALS
3505 N. Ashland Ave.
Chicago, Illinois 60657

GOLDEN PRESS EDUCATIONAL DIVISION
Preschool Materials
850 Third Ave.
New York, N. Y. 10022

SCIENCE RESEARCH ASSOCIATES INC.
General Catalog
For the Crucial Beginning Years
259 E. Erie Street
Chicago, Illinois 60611

R. H. STONE PRODUCTS
Mor-Pla, Teaching Aids for 1968
10279 Livernois
Detroit, Michigan 48221

THE JUDY COMPANY
Visual Manipulative Materials
Minneapolis, Minnesota 55401

DAVID C. COOK PUBLISHING CO.
1967-1968 Catalog
850 N. Grove
Elgin, Illinois 60120

CONTINENTAL PRESS, INC.
Catalog of Continental Press Publications
Elizabethtown, Pennsylvania 17022

FOLLETT EDUCATIONAL CORP.
Special Learning Materials for the Special Child and Those with Learning Difficulties
1010 West Washington St.
Chicago, Illinois 60607

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Unpublished Materials


