Descriptive survey of the literature on visual perception in intermediate grade children

Darlene Norman

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A DESCRIPTIVE SURVEY
OF THE LITERATURE ON VISUAL PERCEPTION
IN INTERMEDIATE GRADE CHILDREN

by
Darlene Norman

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Chapter I

THE PROBLEM

Every classroom teacher is concerned with not only the students who succeed in his class but also those, who for some reason or another, do not succeed. A student's failure to succeed in reading is a major worry to his teacher because teachers are aware of the consequences of such failure. Harris states that a "non-reader is to a large extent cut off from cultural activities" and he finds such everyday activities as driving a car and reading a grocery list are out of his limits.\(^1\) Harris also noted that because "the importance of reading is clearly recognized by the elementary schools . . . more time and effort is spent on teaching reading in the primary grades than on any other phase of the school program."\(^2\)

In this modern day and age, that has produced such a variety of materials and approaches to the teaching of reading, the fact remains that there are children of average intelligence who do not succeed in learning to read. Such reading failures occur in the classrooms of experienced and capable teachers as well as in classrooms of less experienced and less able

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\(^2\)Harris, p. 3.
teachers. Bixel states that there are many children that have excellent intelligence and yet they "cannot achieve in school and often become 'drop-outs,'" due to the lack of visual efficiency. Some students with remedial help continue to resist any significant improvement after prolonged practice in reading. What relationship does inferior visual perception have to such reading disability cases?

Statement of the Problem

The purpose of this research is to study the nature and aspects of visual perception through a critical summary of the literature written since 1965.

Specifically, an effort will be made to: (1) understand the nature of visual perception, (2) cite tests that can be used to diagnose inferior visual perception, and (3) list methods that have been used to improve visual perception.

Scope and Limitations

This study is limited to the examination of visual perception of children in grades four, five, and six of the elementary school who are of normal ability and have difficulty interpreting and remembering the visual language symbols. Investigations of intelligence and reading ability will not be considered here, nor will inferior vision which

Significance

In the present day when there is much consideration given to perception and its relationship to the problems in reading, it would seem relevant to thoroughly understand the nature of visual perception, how it can be diagnosed, and some methods that can be used for its improvement. Furthermore, emphasis is usually placed at perception for young children and beginners in reading. This study aims at compiling literature which has been studied and reported about perception for older children.
Chapter II
REVIEW OF LITERATURE
The Modality Concept

There are 15 per cent of school children that can be classified as underachievers according to Wepman.¹ Learning theories that have been developed with the majority of students in mind do not accurately explain learning for the child with serious reading disability. Goldberg suggests that "visual and auditory dysfunctions may underlie the reception of symbols and create sensory obstacles."² Harris states that "deficiencies in visual perception are common, if not universal, among children who have serious difficulty in building a sight vocabulary."³ It was in working with children in a clinic environment that "the modality-bound nature of children's learning behavior was initially recognized."⁴ In


³Harris, p. 229.

⁴Wepman, p. 1.
the clinic environment it was found that many children had "greater facility in using one input pathway than in using another and--an observation of equal importance--they had considerably less facility along other pathways."¹

Wepman further suggests that "each person has a particular modality of choice in learning, a typology of 'audile,' 'visile,' and 'tactile' learners." For most children the visual modality and the auditory modality "seem to reach a stage of equalization of function by age nine: that is, whatever lags in development were present seemed to be overcome by that time. Usually, however, the modality showing the most rapid development indicated the child's predilection."² Therefore, the audile child matures earliest in an auditory sense and the more mature pathway is henceforth developed with greater ease. The visual function of such a child might develop either rapidly or slowly. If it develops slowly, reading might be nearly impossible since he would be using only the auditory percepts.³ Kephart writes:

For the child who has been unable to establish the three dimensions of Euclidean space in his visual world, the words on a page of print become an unintelligible mass of meaningless marks. They may not hold together into the compact groups, words and phrases, with which we deal. They may not hold still, but float about on the page. Worst

¹Wepman, p. 2.
²Wepman, p. 2.
³Wepman, p. 3.
of all, they may look different to him at different times and under different circumstances.  

Therefore, Kephart suggests that a child's reading difficulties might be due to his difficulty in seeing the words on the page.  

Wepman points out that "the major importance of the modality distinction lies in the direction that it may give for assisting the underachiever. Too often the remedial reading teacher follows the same pattern in remedial work that the classroom teacher follows in general instruction." She needs to tailor the instruction to the individual child. "Where a lag in the developmental process along any of the modalities can be determined, the remedial task seems most properly directed at that modality." In another article written by Wepman he explains the value of the modality concept in this way:

A child's learning type--his maximal modality or pathway of learning, his differential ability to learn by eye, or by ear, or even by touch--needs to be understood before a particular approach to reading can be determined for him.  

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3 Wepman, p. 4.  

4 Wepman, p. 6.  

The Nature of Visual Perception

Visual perception is defined by Goins as "that process by which phenomena are apprehended by the mind through the medium of the eye."\(^1\) Frostig defines visual perception as "the discrimination and recognition of stimuli impinging on the senses."\(^2\) She enlarges on this basic definition by stating that "this ability includes not only the reception of sensory impressions from the outside world and from one's own body, but the capacity to interpret and identify the sensory impressions by correlating them with previous experiences."\(^3\) Crosby, who is a neurologist and a neurosurgeon, defines perception "as the ability to be aware of and conceive of a pattern or shape. This is a higher-order sensory function and involves interpretation and integration of the basic information of sight, hearing, touch, etc. In visual perception this is the recognition that a triangle, the end of a tent and a capital A are the same shape. . . ."\(^4\) Robinson alludes

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to this more complex concept when she writes: "visual perception probably involves many of the higher mental processes and consequently may be associated with intelligence, previous experience, language facility, and bodily well-being."\(^1\) In Spache's opinion visual perception "is one of the highest levels of neuro-muscular behavior of which man is capable."\(^2\) Goldberg elaborates on this line of thought with a detailed and comprehensive definition of visual perception that serves to clarify some of the vagueness in previously cited definitions.

Visual perception is the ability to recognize and use visual stimuli and to interpret these stimuli by relating them to previous experiences. Perceptual development is a function of maturity, and it is important in enabling the child to detect in the printed word clues which will enable him to read with speed, fluency, and understanding. Perception is different from vision or sight. When one reads the Snellen Test Chart, he sees it with varying degrees of resolving ability. A child may have 20/20, 20/30, or 20/70 vision as a measure of ocular acuity or resolving power within the eye. This, however, is not what we mean by perception. After the focused image leaves the retina, it continues as an electrical chemical change by way of the optic nerve to the lateral geniculate body and from the lateral geniculate body along the optic radiations to the occipital cortex. From the gray matter of the occipital lobe the impulse continues, with many synapses and cross connections, into the angular gyrus which is in the parietal lobe. It is in this area that we intellectualize, or develop the connotation of visual images. This is perception. From the parietal lobe the visually derived


stimuli continue to the frontal lobes, where conception and understanding occur.¹

Perception of Figure-ground.--Vernon considers the first essential stage in perception as the figure-ground stage in which a principal part of a stimulus, the figure, emerges from the remainder of the area called the ground. Seeing the figure apart from the ground contributes to the clarity of perception and eases the interpretation and integration processes.² Frostig describes the figure as "that part of the field of perception that is the center of the observer's attention."³

An important fact concerning figure-ground perception "is that an object cannot be accurately perceived unless it is perceived in relation to its ground."⁴ A child who has inadequately developed figure-ground discrimination often appears inattentive and disorganized. Because he hasn't the ability to screen out unimportant stimuli, his attention tends to jump to any new stimulus in the area around him. This may make it difficult for him "to draw a straight line between two boundaries because one of the boundaries captures

¹Goldberg, p. 94.
his attention and he directs his pencil towards it and along it.\(^1\)

In later school grades, a child who has difficulty in focusing his attention on one stimulus will find it hard to keep his place on the page. He may skip lines and sections. He may find looking up words in the dictionary to be abnormally hard since he has trouble focusing on and selecting the important figure from the ground.\(^2\)

Perception of Spatial Relationships--Boring writes concerning the process of perception: "The outstanding fact about visual and tactual space perception is that the spatial relations of the pattern of stimulation get themselves more or less correctly represented in perception. Perception, within limits and with known exception, mirrors stimulation."\(^3\)

According to Berkeley's hypothesis we get our ideas of space, size, solidarity, etc. from memories of our past experiences. "Normally we don't see things as being more or less distant from us--instead we see things as being at some place in space, and we also perceive our bodies at some specific place within the same framework."\(^4\) It is thought that


the muscles that perform accommodation and convergence are primary depth cues to visual perception. If this is true the act of observing spatial distance would consist of these three elements: "kinesthetic sensations from the muscles of accommodation and convergence; plus those memories of the previous kinesthetic sensations of reaching or walking that had become associated with the specific accommodation and convergence sensations; and finally, the 'pure' visual sensations such as the color patches. . . ."¹

In keeping with the experiential concepts of the theory, Hochberg points out that "the body image provides a spatial framework within which muscular behaviors are coordinated."²

Kephart writes that a child must have an adequate appreciation of body image in order to establish space structure.³ Dr. Lydia Duggins has found that certain skills of visual space are fundamental to the optimum growth in reading ability.⁴

According to Money, a deficit in space form skills will not create reading problems unless it is related to the areas

¹Hochberg, p. 44.
²Hochberg, p. 44.
in the brain that mediate language.\textsuperscript{1} It is the feeling of Natchez that when children have a deficit in the development of spatial orientation, it often affects the language areas. As a result "the mix up words, saying ostekra for orchestra, read unelse for unless and write clam for clam."\textsuperscript{2}

**Perceptual Constancy.**--The Gestalt psychologists define perceptual constancy as the fact that "a form tends to preserve its proper shape, size and color."\textsuperscript{3} The phenomenal factor is that "as an object recedes from an observer its retinal image diminishes in proportion to its distance from the observer. In perception, however, the object appears to lose size much less rapidly, or it may even be perceived as constant in size."\textsuperscript{4} Changes of the retinal image vary according to the different distances an object is from an observer or the amount of light falling on it. For example, if one would tilt a square, the retinal image is actually diamond shaped but the observer sees it as a square.\textsuperscript{5} Hochberg describes constancies as mechanisms by which an observer sees a correct observation of the world. Size changes are


\textsuperscript{3}Boring, p. 254.

\textsuperscript{4}Boring, p. 288.

\textsuperscript{5}Vernon, p. 119.
not usually noticeable in normal visual perception because the size tends to remain constant.¹

According to Frostig a child with improperly developed perceptual constancy may learn letters and numbers in a particular form or context and "he may be quite unable to recognize the same symbol when it is presented in a different manner."² It may seem like a completely new word to him if presented in another size, color, or context. She states that a child with this disability would have a most difficult time learning to read or work with symbols.³ Previous experiences of this writer in teaching children who couldn't recognize a known word when they encountered it in different contexts and forms would support her conclusion.

¹Hochberg, p. 50.
SUMMARY

It has been found that some children have a greater facility in using one of the sensory input pathways such as visual, auditory, kinesthetic, and tactile, and less facility along other pathways. Learning which modality is a child's predilection and which modality may be lagging in development is recommended for the purpose of structuring and individualizing a remedial reading program for him.

Visual perception is the ability to recognize, interpret, and integrate visual stimuli. This involves a neurological process that takes place between the pure visual act and the interpretation and integration which is done by the brain.

Three aspects of visual perception are the perception of figure-ground, the perception of spatial relationships, and the perception of constancies. Impairment in the development of each of these aspects affects reading disabilities in different ways.
Chapter III
DIAGNOSIS AND TRAINING OF VISUAL PERCEPTION

Diagnosis

Crosby cites impaired visual perception as the most common cause of neurological reading disability. It's a matter of a child having "a brain dysfunction which inhibits his ability visually to appreciate and discriminate a shape and/or pattern." ¹

Silver supports this position with results from a study done on a group of fifteen children with "specific reading disabilities" at the Bellevue Hospital Mental Hygiene Clinic. None out of ten of these children had specific problems in visual perception. ²

Crosby considers the Bender-Gestalt a primary means of measuring visual perception. ³ Silver used the Bender-Gestalt test for measuring the visual percepts in his study. ⁴ Another authority, de Hirsch, cites the Bender-Gestalt for

¹ Crosby, p. 118.
³ Crosby, p. 115.
⁴ Silver, p. 244.
evaluating visuomotor functioning as one of the most important used in the clinic with which she is associated.\(^1\) Goldberg also recognizes the **Bender-Gestalt** for measuring perceptive qualities.\(^2\)

Harris points out the need for further research but he cites the **Bender** for diagnosing "marked disturbances of visual perception or visual motor coordination."\(^3\)

**The Bender-Gestalt Test.** — The **Bender-Gestalt** test was developed by Lauretta Bender, and it can be used with children aged four and over. It consists of nine cards that are copied by the child. Testing and interpretation are done by a clinical psychologist. No data on reliability and validity is included in the test and this deficit prompted Blakemore to write in his review of the test, "We still await the research which will demonstrate the test’s validity and usefulness."\(^4\)

Clinicians have found the **Bender-Gestalt** useful because one of its many uses is to make evaluations of perceptual-

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\(^2\) Goldberg, p. 95.


motor functioning and/or neurological dysfunction. The Koppitz Scoring System has been developed to provide criteria for use in evaluating each drawing. It also provides age norms to which individual total scores can be compared.¹

Silver recommends the Marble Board test of Strauss and Werner for measuring visual figure background.² An adaptation of it is used by de Hirsch.³

The Marble Board Test.--The marble board test consists of two identical cardboards, eleven inches square, each containing ten rows of ten holes. The cardboard is light gray and the holes are dark gray. The distance from the center of one hole to the center of another is one inch; the diameter of a hole is 6/16 inch.⁴

It is necessary to have about fifty black marbles (diameter, 11/16 inch) and thirty red marbles (diameter, 8/16 inch) for administering the test. The examiner uses one board to construct the mosaic patterns and the subject copies these patterns on the other board.⁵


⁵Strauss, p. 31.
The examiner constructs the first pattern on the board in such a way so the subject cannot watch his moves. The subject is then asked to copy the pattern while the examiner records each of his moves on a squared paper record blank. He does this by using arrows and numbers to show where a marble was put first, second, third, etc.\(^1\)

Strauss and Lehtinen state that "two or more incoherent moves on more than two patterns give strong indication of disturbed visuomotor perception." The reader is cautioned that results from administering this test may provide additional support for understanding a student's failure in manual tasks but gross evaluation should not be made on too narrow criteria.\(^2\)

Bannatyne has found Frostig's Developmental Test of Visual Perception one of the most useful for diagnosing visuo-spatial disorders. He warns, however, that "there is a need for more 'pure' visuo-spatial tests which are uncontaminated by other sensory or motor functions."\(^3\)

Frostig Developmental Test of Visual Perception.--This test explores five areas of visual perception: (1) eye-hand coordination, (2) figure-ground perception, (3) perception of form constancy, (4) perception of position in space, and (5)

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\(^1\) Strauss, p. 33.

\(^2\) Strauss, p. 35.

perception of spatial relationships. The total test results are given in a Perceptual Quotient which has a median of 100. It is believed that a PQ of 90 is necessary for learning to read.¹

One disadvantage of this test is that the norms only go up to age nine. It was used, however, by Weathers in her study of the visual perception of adequate and inadequate fifth grade readers. The study was done in Salem, Oregon, with thirty-one adequate and thirty-one inadequate fifth grade readers as determined by scores on the Stanford Achievement Test. Adequate readers scored 5.0 grade level and above. Inadequate readers scored 3.1 grade level or below. Their mean age was 10 years 3 months. Weathers found significant difference between the visual perception of the adequate and inadequate readers on the Eye-Motor Coordination and the Figure-Ground subtests of the Developmental Test of Visual Perception. The data revealed a significant difference between the visual-perceptual tests, as a total task, as well as showing significant patterns in the visual-perceptual development of adequate and inadequate readers.² More studies need to be done to determine its usefulness at the intermediate grade level since it was developed for younger children.

¹O'Connor, p. 73.
²Lillian L. Weathers, "A Comparison of Visual Perceptual Development and Reading Achievement of Fifth Grade Adequate and Inadequate Readers" (Ph. D. dissertation on microfilm, University of Oregon, 1966), p. 44.
O'Connor researched the relationship between the Bender-Gestalt Test and the Frostig Developmental Test of Visual Perception. His study was done in Lawton, Oklahoma. The results of his study indicate a substantial relationship between the two tests. He interprets his findings as indicating that both the "Developmental Test of Visual Perception and the Bender-Gestalt test are measuring, to some degree, the same behavior."¹

O'Connor cautions about the lack of validation studies for both tests² and he recommends using the Bender-Gestalt as a classroom screening instrument and the Developmental Test of Visual Perception for further individual diagnosis.³

Wepman states that the Illinois Test of Psycholinguistic Abilities develops quite accurately the modality differential in language acquisition.⁴ Bannatyne also considers it useful because the children with visuo-spatial handicaps will do poorly on the items involving visual perception.⁵

**Illinois Test of Psycholinguistic Abilities**—This is a test given by the psychologist which reflects (1) modes of

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¹O'Connor, p. 76.

²O'Connor, p. 76.

³O'Connor, p. 78.


⁵Bannatyne, p. 216.
input and output, (2) levels of organization, and (3) psycho-linguistic processes. It consists of nine subtests which have been constructed to differentiate defects in the process of communication, the levels of language organization and the channels of language input and output.¹

Subtests related to the area of visual perception are: Test 2, Visual Decoding; Test 4, Visual Motor Association; and Test 9, Visual-Motor Sequential. Norms on this test go up to age 12.

The Monroe Group Diagnostic Reading Aptitude and Achievement Tests.--This is an aptitude and achievement test for grades 3-9. The test can be given to large groups such as thirty or forty children at one time. It includes sixteen subtests which are grouped in the areas of Educational, Word Discrimination and Aptitude. In the Aptitude group there are two subtests related to visual perception. They are Letter Memory and Form Memory. The results are in percentile form with the age factor considered. The cover provides a profile chart for quick diagnosis of weaknesses and strengths in the Aptitude area of the tests. Visual, auditory, motor, and language subtests compile the total aptitude profile.²


This is a valuable instrument that could be used for class-wide screening purposes. Administering sixteen sub-tests may seem overbearing but many of them are only two minutes long. The whole test could easily be administered to a class in two sittings. The results would provide invaluable information on reading strengths and weaknesses and modality strengths and weaknesses.
Methods of Training

Remedial training for the child with inadequately developed visual perception can be approached by structuring a remedial program suitable for the individual child. Remedial programs proposed for perceptual difficulties are of three types: (1) a program designed to circumvent the perceptual difficulty, (2) a program aimed at improving the perceptual ability, and (3) a combination program, like a two-pronged remediation plan, the objective of which is to both circumvent the problem when possible and to also improve the perceptual ability.

Circumvent the Problem.—This would include using a non-distracting environment for a distractible child. Distractibility can be controlled to some degree by removing or covering borders or pictures in textbooks. For the child that has difficulty in maintaining the stability of a figure, it could be outlined with a colored or a heavy black line. Another method would be using a machine that exposes only one line of print at a time for the child who can't read without interference from other words on the page.¹

In describing the visual dyslexic child in a clinical environment, Johnson advocates a basic approach to reading

that capitalizes on the strengths and circumvents the basic weaknesses. It has been her experience in the past that neither bombarding the deficit nor raising all skills to a normal readiness level were beneficial. They begin by teaching a few consonant sounds and short vowels, and the student is taught to blend them into meaningful words. When he is able to attack several words consistently, phrases and sentences are presented.¹

Training the Perceptual Ability.--Wolinsky feels that in the case of an individual with inadequate perception it is necessary to correct the process that has not been completed or fully realized.²

Kaufman suggests that it might be more valuable to train children who have perceptual inadequacies in the skills he needs within the academic area. For example, provide exercises in learning to identify syllables in words rather than doing related exercises such as geometric forms.³

Frostig has many ideas and methods worth trying. Most of them fall into the category of training to improve the perceptual ability. She suggests that children with defective


³Kaufman, p. 125.
figure-ground perception be given exercises in finding particular words in a dictionary, a glossary, a table of contents, or narrative.\(^1\)

Another suggestion given by Frostig is the intensive teaching of one-syllable words because if a child substitutes or transposes letters as he reads, he is indicating a difficulty in perceiving figure-ground and/or spatial relationships.\(^2\)

When a child has difficulty in differentiating between similar letters such as \(b\) and \(d\), and \(v\) and \(w\), it would be helpful for him to cut out circles and sticks from construction paper and assemble the letters.\(^3\)

Children who reverse letters with words should practice reproducing words with individual letters after words have been exposed either by tachistoscope or for longer periods of time.\(^4\)

The use of an L-shaped marker which is pushed slowly along so that the horizontal arm underlines the word that the child should be reading, aids in keeping the place and

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selecting the figure from the ground. In a very severe case it might be necessary to use a window so that only one word is exposed at a time.¹

Spache recommends many simple exercises for improving perception such as tracing around simple pictures and practicing with puzzles, cubes or peg boards. Geometric cut-outs of masonite within which a child can draw the geometric figure with chalk, paint or crayon have proved helpful in some cases. A teacher could draw geometric forms, patterns or shapes on the blackboard and after exposing them for a predetermined time, she could erase them and have the child try to reproduce them. Gradually the size of the patterns should be decreased and the complexity increased in order to arrive at material more similar to the reading task.²

The use of tachistoscopic techniques are recommended for developing the visual perceptual ability by Pollack and Piekarz. They suggest three types of exercises:

1. Group tachistoscopic exercises using non-verbal film-strip material
2. Group tachistoscopic exercises using verbal film-strip material
3. Individual tachistoscopic exercises using verbal and non-verbal material.³

¹Frostig, "Visual Modality and Reading," p. 29.
Dr. Lydia Duggins has developed a complete program for improving perceptual skills in reading which is presented in her book, *Developing Children's Perceptual Skills in Reading*. A great deal of emphasis is placed on the motor skills and use of body image in relation to the shape of letters. The program begins at the non-reading level by teaching the names of letters, then where the sounds are located in words, and the names of vowels that are heard in a word. It proceeds slowly into the use of long vowel sounds with consonants, learning the short vowel sounds, and relating them to consonants. Throughout the program there is much verbalizing and a maximum use of body position for developing new concepts and relationships such as where a vowel is located in a word. To promote comprehension in reading certain thinking skills are taught. These are categories, paired comparisons, linked thinking and expanding word meanings. Many of the exercises are valuable for children at beginning levels in reading. Some of the methods would be excellent with middle grade children who are reading on primary grade levels. These include the approaches used in relating short vowels to consonants, learning about syllables in words and developing thinking skills.¹

perceptual difficulty alongside activities proposed for the purpose of improving the visual imperception.

Crosby recommends using as much phonics as one can give them thereby making use of an excellent auditory perception and circumventing the visual perception as much as possible. At the same time they should be doing exercises for improving the basis for visual perception through the use of tactile perception. This could include activities like cutting out paper letters, feeling plastic letters, writing in a sandbox and other kinesthetic techniques.\(^1\) He also expresses the importance of their need of a great deal more time than can be given in a normal classroom for extensive drill, further work on differentiating between letters and simple words they form and patience shown in pointing errors for repeated trials and retrials.\(^2\)

In a similar way, Wepman's philosophy is to capitalize on the preferred modality. In so doing one should teach as much as possible through methods aimed at the preferred modality. For example with an audile child one could use a great deal of phonics. Meanwhile, a separate training program should be directed at developing the impaired pathway. Then when both pathways are ready to add something to the other, they should be brought together.\(^3\)

\(^1\)Crosby, p. 128.
\(^2\)Crosby, p. 126.
\(^3\)Wepman, "The Perceptual Basis for Learning," p. 358.
Chapter IV
SUMMARY OF DIAGNOSIS AND TRAINING

There is no perfect instrument for measuring visual perception. The need for an instrument that would test "pure" visual perception that is uncontaminated by other sensory or motor functions has been expressed repeatedly.

Tests that have been found useful for indicating a difficulty in visual perception to date are:

1. Bender-Gestalt for overall visual perception
2. The Marble Board Test for figure-ground
3. Frostig Developmental Test of Visual Perception for eye-hand coordination, figure-ground perception, perception of form constancy, perception of position in space, and perception of spatial relationships
4. Sections of the Illinois Test of Psychological Abilities relating to modality concepts
5. Monroe Group Diagnostic Reading Aptitude and Achievement Tests.

Remedial programs for perceptual difficulties suitable at the intermediate grade level fall into three categories: (1) a program designed to circumvent the perceptual difficulty, (2) a program aimed at improving the perceptual ability, and (3) a combination program involving both (1) and (2).
(1) Methods that circumvent the problem are:

1. A machine that exposes only one line of print at a time.

2. A basic reading program which teaches a few consonant sounds and short vowels and then teaches the blending of them into meaningful words.

(2) Methods that train the perceptual ability are:

1. The intensive teaching of one-syllable words.

2. The manipulation of letters cut from circles and sticks made out of construction paper.

3. Tachistoscope exercises.

4. An L-shaped marker moved under the line being read.

5. Letter shapes taught using motor skills and relating body image to the shape of the letters.

(3) Methods proposed for a combination program are:

1. A strong phonics program along with exercises involving tactile perception such as writing letters in a sandbox.

2. More time for extensive drill and further work on differentiating between letters and simple words.
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