CALIFORNIA STATE UNIVERSITY, NORTHridge

VISUAL MEMORY TRAINING

FOR REMEDIAL READERS

A graduate project submitted in partial satisfaction of the requirements for the degree of Master of Arts in Education

Department of Reading Improvement

by

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ABSTRACT

VISUAL MEMORY TRAINING
FOR REMEDIAL READERS

by

Ivanka M. Dostal

May, 1974

This project was developed with the purpose of serving as a guide for the use of elementary teachers.

The theme is the training in visual memory skills for remedial readers.

The first part of this manual provides a background of current research on this topic. Insights relating to the importance of visual memory and their relatedness to the practical methods of reading instruction are evaluated.

The second part deals with instruments and techniques useful for the assessment of visual memory ability by the classroom teacher.

The third part highlights some of the prescriptive activities that can be used in the remediation of visual memory deficit.

References and additional information are included in the appendices.
CHAPTER I
Introduction

Remedial instruction, often termed compensatory training, has been an extremely active area of reading research. Methods of teaching reading to children below average level of achievement have been widely publicized. Delacato's, Kephart's and Frostig's theories received much attention, praise, and criticism.

However, the classroom teacher lacking the opportunity for wide experimentation can only use what is relevant in the framework of her own group of children with their specific needs.

It is often a problem to set up a diagnostic-prescriptive program within the classroom of average enrollment. Engelman (1969) expresses the opinion that often the suggested remedial activities - such as "...teach vocal encoding or teach visual memory," generate both relevant and irrelevant tasks and the burden of selection rests with the teacher.

In view of this necessity which had been revealed in my own classroom experience, I am attempting to focus on one area of remedial instruction in the hope of providing some useful ideas and solutions to the problem.
Making use of the child's best avenues for learning is often not enough. Deficiencies in a certain modality can be corrected by a developmental training program. This idea is supported by Silver and Hagin (1966), Frostig (1965) and Herr (1972).

The activities used to illustrate the principles should be used as models. As in any teaching situation, observes Gilliland (1965), adequate materials must be available for use by the teacher and pupils.

A well qualified teacher with originality and adaptability can do reasonably well with a minimum of materials, but with proper materials the same teacher will develop a superior program.
DEFINITION OF TERMS

Reading
A complex act involving reception of images, transformation of electrochemical responses to the brain, reception at the brain, perception of letters, words, and phrases, the immediate memory for what has just been seen. The association of the grapheme with past experience and then with the phoneme and lastly, the encoding of the input so it can be used in some meaningful way.

Memory
The ability to store pertinent information in the brain.

Remedial Readers
As defined by McAllister (1965)
Retarded readers are also referred to by a number of other terms such as non-readers, underachievers, bright underachievers, low achievers, reluctant readers and emotionally immature readers. These various terms have developed with our increased understanding of the nature and causes of retardation. They are used interchangeably with terms such as corrective, remedial and developmental. (p.19)

Sight Vocabulary
Vocabulary basic to beginning reading, acquired by sight and recognized and recollected instantly.
Limitations

This study-project is limited in its scope to the area of visual memory. No effort is made to incorporate other facets of remedial program into this manual.
Chapter II

Review of Related Literature

The Nature of Visual Memory

Attempting to define visual memory without some preliminary insights into the complex storage system of the human mind would be impossible.

Numerous studies have delved into the neurological, biological and pharmacological bases of memory.

Generally it is believed we possess a short-term memory (STM) and a long-term memory (LTM). Information stored in the STM survives about 15 seconds, according to Waugh and Norman (1968). The LTM storage is of longer duration.

Short-term memory plays a crucial role in understanding both written and spoken language. The particular features of memory stimuli getting increased attention are those that derive from modalities such as vision, hearing, speech, kinesthesis... states Crowder. (1972:251)

Samuels (1973) analyzes the content of short-term memory as originating from two sources. One of these is visual input. Visual input is recoded verbally, thus moving into short-term memory. The other source comes directly from auditory input.

It is possible, research indicates, that if verbal information is rehearsed or recoded, it can become part of long-term memory. Mackworth (1972), in reviewing many
models of memory by several writers states that important information is screened on its way through the channels and provides orderly data for long-term storage.

Long-term memory is explained in terms of associational learning, drawing the input both from auditory and visual stimuli processed through mediational strategies.

Mackworth (1972) further specifies the role of long-term memory in relation to the storage of words a child learns to read. She indicates:

The result of storing visual words is that sequential probabilities for letters are built up. Each letter in the input will tend to activate other letters that are most often found in relation to it. (p. 719)

Spache (1964) finds...

The stored memory traces for facts, words or physical acts may be chemical, electrical or both... They may simply involve a predisposition because of previous training. (p. 236)

Many interesting data were provided by researchers as to the nature of visual memory.

Geyer (1970) and Neisser (1967) proposed that the visual input processed into a visual store could be termed "iconic storage." Visual input is coded and converted into "icons." The characteristics of the icon are temporal and can be compared to Sperlings (1960) "visual image."

The icon or visual image is, psychological research manifests, the result of perceptual processes. When the stimulus is flashed it is stored briefly on the retina as an after-image. Bartlett (1932) experimented with the second
stage processing of visual input. Presenting his class with a picture of a cross between an owl and a cat he proceeded to have it drawn from memory. Some of the drawings resembled owls, some cats. He hypothesized that the impression depends on how the original image was recoded. Before the onset of language visual information is stored without verbal encoding.

As Samuels (1973) observes,

The function of visual memory is to enable the learner to recognize a visual stimulus that has previously been seen. Without this ability it would be impossible for the learner to profit from prior experience and learning. (p. 232)

The retrieval of visually stored images and schemata is essential to all the learning which uses abstract symbols.

Visual memory is also categorized as part of the visualization system. Lerner (1965) refers to it as the ability to recall in one's mind a response when the sensory stimulus is not present. This level of learning is sometimes called "imagery." Visual imagery or the ability to create mental images with great clarity, to "see in the mind's eye," has been called by Radaker (1968) "inner perception," "re-perception" and "visualization."

Printed words are processed in two stages, "stimulus examination" and "memory examination" suggested Neisser and Beller (1965). Stimulus examination can be explained in terms of the visual input and its comparison with stored visual representations of words. Words are rejected on the basis of differences with the known target words. In order
to recognize a stimulus word its visual representation must be present in long-term memory.

We can safely assume, therefore, that visual memory is both short and long-term therefore of great significance to the reading act.
Visual Memory and Reading Achievement

Correlation studies examining the relationship between visual memory and reading achievement produced some interesting results. The age, grouping and socioeconomic status of the subjects are widely diverse. However, the approaches to the problem have many similarities, as will be shown in the following review.

Froehlich (1970) was intrigued by the relationship of visual memory for design and early reading achievement. The study also examined the influence of intelligence, and the differences between short and long-term memories for word recognition. Comprehension was also tested. First grade children made up the experimental and control groups used in the study.

The investigator constructed refined forms of Memory For Design Test in which components of form, orientation, and sequence were included.

The Gates McGintie Reading Tests and the Lorge Thorndike Intelligence Tests were also administered. Test results indicated that short-term memory for design was significantly related both to word recognition and comprehension. Intermediate memory for design yielded even more significant relationship to both areas of reading achievement tested. Froehlich concluded in her statement:

The relationship found between visual memory and early reading achievement seemed meaningful for education, in view of the negligible effect of
intelligence, the homogeneity of subjects, and the stability of the memory measures containing no verbal material or copying to distort the relationship. (p. 6400A)

King (1971) also tried to determine relatedness of perception and memory of visual stimuli to reading achievement. In her doctoral dissertation she analyzed these skills in readers from grades 4, 6 and 8. Determining reading achievement level through the Iowa Test of Basic Skills she formed two groups for her experiment. A 15 item memory-for-sequence-test revealed significant correlation between the ability to visualize and achievement in reading.

Rodenborn's (1969) findings were extensive in their correlational data because he undertook to explore the four most important subabilities in reading. He called them Auditory Visual Integration, Visual Auditory Integration, Auditory Memory and Visual Memory. Of interest to this study was his revelation that "only visual memory contributed significantly with mental grade."

In her review of Illinois Test of Psycholinguistic Abilities, Bateman (1968) reported that many children who manifest severe and persistent reading problems show impairment in visual memory.

In explaining the correlation between learning disability and reading achievement Carroll (1965) sought to devise a reliable measure by creating a Visual Memory Scale (VMS). This instrument was used in conjunction with intelligence and reading achievement tests on three groups of subjects.
These were normal, educably mentally retarded, and educably mentally retarded children with central nervous system impairment. Thus, the correlation found between the scores of VMS and reading achievement, not only indicated no appreciable correlation to intelligence, but also differentiated between normal and neurologically disabled subjects.

Recently Anderson and Samuels (1970) accumulated and interpreted data from a study with randomly selected third graders, that good readers achieved through consistent ability to encode distinctive features of visual stimuli.

First grade and early childhood development studies have been numerous in the past few years. Astill (1969) also found interest in first grade reading achievement level and the relationship of visual memory skills. She tested children from three ethnic backgrounds with a test she constructed – visual memory for discrete objects and visual memory for discrete symbols. In addition she administered I.T.P.A. subtest for Visual-Motor Sequencing and Metropolitan Achievement Test. Positive, significant correlation between visual memory and reading achievement subsequently confirmed her hypothesis.

It was concluded that given a moderate degree of language competence, visual memory becomes an increasingly critical factor in mastering initial reading skills.
Visual Memory Training

Will visual memory training have an effect on reading achievement? This question became the basis for several interesting studies.

Burkholder (1968) proposed to measure the effectiveness of the specialized training of underlying abilities on reading. Her study was conducted with second and third grade students. These were matched in age, I.Q., socioeconomic background, reading level and underlying abilities. She administered initially the Gray Oral Test, Stanford Reading Achievement, Wechsler Intelligence Scale for Children and the I.T.P.A. The experimental group underwent training of six months duration in the areas of perception, memory, closure and classification. The subjects were then retested in reading and underlying skills. The gains were evaluated and compared. The experimental group made significant progress in reading and showed maintenance of the skills even after the lapse of six months, when they were retested.

Memory of Figural Units — Visual Mode, when they were retested, can have a significant effect on reading achievement of first grade children, found investigators Hays and Pereira (1972). In a longitudinal study of two years duration, fifty lessons (constructed and compiled into a manual for teachers) were used for visual memory training sessions. The authors found a positive relationship
between visual memory and the ability to absorb instruction in the primary reading skills. They observed that...

The memory training techniques employed, contributed significantly to reading achievement. (p. 37)

Distinctive cues play a major role in the visual memory for words. Wolpert (1972) intrigued by the challenge of cues in relationship to the acquisition of reading skills, initiated a study with children without previous reading instruction. Focusing upon the cues of individual words namely length, (or the visual appearance of words) and imagery, (value derived from the meaning of the word) he tested the recall of high and low imagery words of varying lengths. His findings led him to believe that low imagery words needed to be taught in elaborate oral context.

An opposing viewpoint was expressed by Rees (1970) who pointed out that verbal and imaginal context facilitate acquisition but may have no effect on long-term retention. He used words such as "fish" and "telephone" singly and found 'fish talking on the telephone' had high incidence of retention among tested subjects.

Whisler (1973) also reported the positive influence of visual memory training on improvement of reading skills. In an intensive training program with 295 first graders visual memory for letter form and word recognition were stressed. All posttests showed gains in both visual discrimination and total reading ability by the experimental group.
It was concluded,

That when the first grade basal reading program is supplemented with training in visual memory, higher visual discrimination skills and total reading achievement were an apparent result.

Smith and Corrigan (1959) recommended that basal method of instruction be augmented by special reading therapy in visual decoding.

From the optometric viewpoint Hendrickson (1969) stresses importance of visualization:

(It)...is the keystone for symbolic interpretation and reading. The necessity exists for conditions to be arranged so that the child may have the opportunity of experiences and learn in the areas of deficiencies. (p. 55)

Posner, Lewis and Conrad (1972) emphasized,

Moreover, as important as is learning to read, there are other, equally respectable, skills that should not be neglected. Tests can be devised to find specific defects in the abilities of children that block their progress. (p. 185)

Many studies seem to support the idea that skills relating to visual memory of words should be developed for better reading achievement. Some, such as Jensen's study of individual differences in visual memory (1969) and Bergan, Zimmerman and Ferg's (1971) study of the effect of grouping of stimuli and content on visual memory, further define the necessary steps in achieving the best possible program for reading skill development.

Jensen (1969) stated...

The only source of individual differences in visual and auditory memory would be in the effectiveness with which subjects transformed visual input into an auditory trace. (p. 127)
CHAPTER III

Assessment of Visual Memory Skills

There are many children who are unable to read successfully, and unless they are given help to overcome their problems, their difficulties will become increasingly worse. Teachers are constantly seeking ways to provide the large number of children with reading problems some means of getting personalized instruction, confirm Otto and McMenemy (1973).

The initial steps in helping a child below average level in reading (remedial range) is through diagnosis of his strengths and weaknesses. Some basal readers provide Readiness Tests for each grade level. In other schools test batteries are given before grouping takes place. In any event the major skill areas of visual and auditory discrimination, vocabulary and comprehension should be evaluated for each child at the beginning of instruction. When severe deficiencies are noted some tests in the Visual Memory area should be administered.

In this chapter some standardized tests and subtests will be discussed, as well as some informal types of measurement.
Standardized Tests

According to the Seventh Yearbook of Mental Measurement (Buros 1972) The Durrell Analysis of Reading Difficulty (Harcourt) is designed for use by pupils from the non-reading to the sixth grade reading ability level. Its various subtests assess oral reading, silent reading, listening comprehension, word recognition and analysis, naming letters and visual memory for words. The last subtest is given at the primary and intermediate level.

In the primary test the pupil is shown a letter or a word for 2 or 3 seconds, when the stimulus is removed the pupil reproduces the stimulus on his record book. In the intermediate test the child is asked to write the word from memory.

Another highly recommended testing tool is the I.T.P.A. (Illinois Test of Psycholinguistic Abilities) comprised of ten subtests. One of the subtests is Visual Sequential Memory Test.

The I.T.P.A. profile provides a detailed picture of performance in all of the ten subtest areas. Motivation, or lack of it, however, does seem to affect its reliability. Caution should be taken in interpreting the scores of the unmotivated child. As a test of language perception and short-term memory abilities the I.T.P.A. presents a valuable tool for diagnosing learning difficulties. It is designed to be used with normal children.
The Mills Learning Methods Test uses four different procedures for teaching ten words a day for four consecutive days. A delayed recall test is given the day after each session and a mean "delayed recall" score is compiled. All the responses are summed up and divided by four. The four procedures tested are the visual, the auditory, kinesthetic or tracing and a combined method with equal stress on visual, auditory and kinesthetic.

Memory For Design Test (Graham and Kendall) is designed for the use with children age 8.5 or over. It takes 5 to 10 minutes to administer. This test consists of 15 simple straight line designs. The subject is shown one at a time for 5 seconds each. He is then required to reproduce each design from memory. An objective scoring system has been developed, which allows the accumulation of normative data. Many of the studies in current research have used this test in their measurement of Visual Memory.

The Slingerland Screening Test for Identifying Children with Specific Language Disability (Educators) Grades 1 - 4. Subtests one through five assess visual motor coordination, visual memory, visual discrimination and visual memory to motor coordination. It also tests auditory skills, and measures the ability to recall and pronounce words.

The Leavell Visual Imagery Test (Keystone) provides information as to the subject's interpretation of his space world and his ability to visualize and reproduce simple objects. Reproducing simple objects from memory, completing
pictures such as ice cream cone, drawing a two wheeled scooter are difficult for the dyslexic children and those suffering from reversal tendencies.

There are no reliability statistics available on the Leavell test, however, details may be obtainable from the publishers.

**Informal Tests**

Classrooms teacher's time is generally filled to capacity with teaching and very little time can be allotted for testing of individual children. Often teacher judgment helps them to select the children who seem to be in need of more thorough diagnosis.

Wayne, McNemeny and Smith (1973) expressed the concern:

Teachers often want to know just how specific and how intensive their diagnostic work must be. Of course there is no stock answer. After administering a battery of diagnostic tests, emerging results help to determine what additional information is needed. (p. 111)

Carter and McGinnis (1970) found that visual memory can be investigated by presenting to the child a picture rich in detail. After having the child examine the picture in detail remove it from view. Then questions can be asked for the recall of all that the child remembers.

Visual memory can also be appraised by brief flash of a geometric design which is later reproduced by the subject from memory.
Kennedy (1973) in turn advises:

An excellent check on student's memory of details is to record on tape his description of an object. After a period of 24 to 48 hours without the opportunity for a second examination of the object, have him describe it from memory. Record this description also. Compare the two recordings for the number and accuracy of details. If most of the details were recalled after a lapse of time, there is little doubt that he has perceptual memory to learn reading skills. (p. 107)

Simplified forms of informal testing are described by Potter and Rae (1973).

In the visual memory test, the task is to retain an image viewed for three to six seconds. The child is presented items that differ in external configuration, size, rotation, or order or may be reversed. Both geometric shapes and meaningful words are presented and the difficulty of the material gradually increases. (p. 22)

The test in this case is a set of twenty-two teacher prepared cards and a response sheet on which the child circles correct items. Stimulus cards are held up for the slow count of three.


The Number Letter Recall sequences include such items as Roman Numerals or mixed digit and letter stimuli.

Carroll (1972) also provided some guidelines for visual memory testing instruments. His VMS Scale was based on the Benton Visual Retention Test and on the Memory for Design Test. He devised 35 stimulus cards with a single
black design and 35 cards with four designs (multiple retention plates). The retention plates had the original design and three variations - inverted, rotated or incomplete designs.

Stimulus cards were exposed for five seconds, one at a time. Prior training in simple discrimination indicated whether the child could discriminate the S design.

The multiple retention plates were used by the children to point out the design corresponding to the stimulus they had observed.

Herr, in General Patterns of Reading Programs indicates how we can diagnose some of the visual memory defects through observation.

1. The child forgets what he has read.
2. Unable to remember words.
3. Poor memory for visual materials.
4. Fails to use picture clues.
5. Can remember only short sequence.

Finally, any of the suggested activities can be of use in informal assessment whether initial or continuous, depending on the usefulness in a given circumstance.
CHAPTER IV
Visual Memory Development

Tasks and Activities

Visual recall and retention must be sufficiently developed to ensure success in abstract learning tasks and reading. Activities utilizing matching, sequencing and verbal description from memory are recommended.

These can be grouped into four categories.

1. Simple Recall Activities (concrete objects).
2. Symbol Recall Training (geometric shapes, colors, pictures).
3. Letter, Word and Phrase Training
4. Imagery Training (Visualization) (word meanings, association, poetic passages)

Depending on the need and level of development the suggested activities can be adapted in many ways to help the individual child. Sufficient reinforcement must be provided to augment each activity.

The ideas for the following activities come from several well known books. The credits will be given in the bibliography, however, because in many instances it was difficult to determine where the ideas originated.

I. Simple Recall Activities

1. What's changed?

Show the child three or four objects on a table in certain order. The objects are arranged in different sequence while the
child's eyes are closed. He has to rearrange them in the right order. (Increasing the number of objects increases the difficulty.)

2. Cumulative Sequence Development Game  
(This game can be played with a group of children)

a. The first child comes to a table with displayed object and touches one.

b. Second child touches the same object and one more.

c. Each additional player must touch the objects in sequence and add one more for the next player to recall.

3. Opaque Projector Mystery

Arrange assorted objects on the table in front of a child. Project a duplicate object on the screen with the projector, remove. Have pupil find one in his assortment. Basic forms and designs can also be used in this manner.

4. Who Changed Places?

Children sitting in a circle close their eyes, (sitting at desk they can put their heads down) while two children who have been tapped by the teacher change places. The rest of the players look around and fold their arms to signal if they know the answer. The teacher asks for responses.

Variation: Have no children change places or tap three children to change places.

5. Peg Board Designs

A peg board design is shown to a group of children (simple, three color designs are recommended). After limited exposure children work at individual peg boards, reproducing the design. The original is then checked for accuracy.
II. Symbol Recall Training

1. A page of a magazine, picture dictionary, or catalogue is opened. The child is asked to look carefully at all the things he can see. After a limited time, close the book and have the child recall the details.

2. Magazine Picture Match

Briefly show the pupil a cutout object or person from a magazine picture. Remove. Show duplicate picture intact and have the original object located.

3. Dominoes

Use large picture dominoes for exposing and recalling visual patterns.

4. Picture Card Sequencing

Arrange several individual picture cards in chalk tray. Cards are then removed, shuffled and given to one of a group of children to rearrange in the original sequential order.

5. Comic Strip Characters

Cut out and collect different poses of a favorite character. (Stickers of some can be found in office supply stores or 5 & 10¢ stores). Cards with character are duplicated so that both teacher and child have a set of these. Again, the method of briefly flashing one card is recommended. Ask the child to find same pose in set he holds.

6. Match the Design

This activity can be used at a learning center. With the aid of the tape recorder, a flip chart with numbered cards having various designs ranging from simple to complex, the activity can be done independently. Teacher records directions such as, "Look at card number 1. When you hear the bell, cover the card. Use your parquetry blocks to make the same design that was on the card. When you are ready to check, turn card back so you can see the design." To continue the game the child will put the headphones back on and listen to next set of directions.
Variations: This game can also use puzzles, cuisinaire rods or other manipulatives.

7. Flannel (or felt) Board Activity

For this activity a large flannel board for the teacher and small flannel boards for children are needed. Each child has a duplicate set of geometric designs. These can be in various colors. Children are given time to explore the use of the flannel boards. The teacher then instructs them to put away their geometric shapes under their flannel boards. She places one geometric design on her board and asks the children to look at it carefully. After the design is removed, children find the same one in their set and place it on their flannel boards. Their work is checked. For increasing difficulty, one color is used for all the shapes.

8. Slide Projector Activity
(Developing visual memory for designs)

Whole class can participate. 2 x 2 slides are used. Each slide has lines and one dot in various positions, e.g.,

Slides are flashed, child reproduces design by drawing it on a sheet of paper. Care must be taken that the paper is folded into squares ahead of time and each square numbered for easy organization. Slide is flashed again for self-checking. To increase difficulty, two or three designs are flashed in succession for sequential memory development.

9. Color Sort (color visualization exercise)

A chart board with slits should be used. In the top row of slits cards are placed with different color on each card. The child is given a set of familiar objects - banana, grapes, apple, etc., drawn in black line only. He is asked to place the designs under the color he remembers the object to be. Teacher checks his choices and his reasons for putting the cards in certain columns. (Old workbooks can be cut up for this purpose.)
10. **Which Animal?**

Children are given a sheet of paper with pictures of nine animals. When the teacher flashes a card with one animal picture on it, the children are asked to find the same picture on their sheet.

11. **Clap In**

A group of children is seated in a semicircle around the teacher. Various designs are drawn on 5 x 8 cards. The teacher shows a particular design to the children and asks them to clap each time it is flashed. If some children have difficulties identifying the design, some individual training activities with shape recognition should be provided.
Word Recognition - Sight Vocabulary Development

In a program designed to remedy a deficit in visual modality it is of importance to consider remedial measures concerned with sight vocabulary.

Undeveloped readers at all grade levels need a fair sized sight vocabulary to provide them with some degree of independence in reading. Inasmuch as often these pupils have difficulty in acquiring a sight vocabulary, much time and planning must be devoted to this task.

Vernon (1971) states in his comments on remediation:

Visual perception of the printed material is basic and primary. This involves not merely the discrimination of simple shapes and patterns, but also the analysis of the complex forms of words into their constituent elements, the letters, and the recognition and identification of the essential shape and orientation of word. Hence, a good visual memory is necessary. (p. 173)

Harris (1972) cautions the teacher:

To create a vast reservoir of words the reader recognizes instantly. This enables the reader to concentrate on the message and not worry about the mechanics of analyzing words. (p. 174)

Harris feels that children profit from reinforcement of sight vocabulary through the use of flashcards, tachistoscopes, and experience charts.

Much needed repetition is to be provided, depending on the child's inherent intellectual abilities, concludes Moyle (1968). He refers to a table compiled by Gates (1930) stating the number of repetitions necessary.
The teacher should, of course, also consider that much of the research quoted in this study did not find a high correlation between I.Q. and visual memory. Fernald also disagreed with this particular comparison (comments Moyle) because in her work with children, she found the children did not respond due to the fact they had been frustrated by failure. It is, therefore, at best an indication that the teacher should plan for repetition and reinforcement for the numerous activities presented. All words may not require the same amount of repetition before they are retained visually.

At the Frostig Center of Educational Therapy during the lectures given to visitors, the philosophy behind the instructional approach was discussed.

Frostig believes that reading disabilities should be viewed in terms of developmental lag. In the area of visual memory development a program stressing activities that provide overlearning are planned. To keep the task of sight vocabulary acquisition simplified, the linguistic method of reading is emphasized.

Kinesthetic activities, such as "blind writing" of the new word to be remembered are planned. In 'blind
writing' the child closes his eyes as the teacher guides his hand writing the word on the chalkboard. This is done to reduce interference and increase the capacity for visualization.

In *But He Knew the Word Yesterday!* Ann Marie Frostig Miller (1970) commends the experience approach to teaching or reteaching the sight vocabulary. She indicates that this provides the child with much reinforcement of the words he is learning. Words from each child's story are written in different colors and kept in an envelope at the back of each individual's book. These words are also reproduced on Language Master flashcards for independent review.

Establishing the foundation of a good number of sight vocabulary words can be done through various techniques. At first, however, we must consider the important cues by which the child recognizes the words we are presenting.

Harris (1972) feels that configuration and striking characteristics of words provide for recognition.

Marchbanks and Lewis (1965) disagreed with this viewpoint when their study results indicated that shape of a word was the least used cue in word recognition by children.

Visual memory techniques for learning whole words fit into the category of associative learning. Basically the learner attempts to associate a written symbol with an image or perception that he has of an object or a person.
Woodworth (1954) finds that the visual impression during a brief exposure must be more detailed than what we consider to be general word shape.

Some other cues must be present beside those of configuration and striking characteristics. Braun (1968) theorizes that the children read easily if the words are presented in categories of high imagery content. Such words are words of feeling or security: happiness, sadness, mother, laugh, house. Children will apply extra energy to retain words of high imagery content.

How are we, then, to deal with those words that do not have imagery value? Short high frequency words such as 'what,' 'these,' 'then,' are crucial to the child's development of independent reading skills and yet are not easily remembered. They provide very little in terms of cues, and should be learned in context. However, other methods for memorizing are also suggested in the literature mainly tracing and tachistoscopic training of automatic responses. The McMenemy (1973) or Dolch lists can be used.

To involve the child in activities that require building up visual memory habits, variety of games and activities should be utilized.

The following games can be adapted to various levels:

1. **Word Hunt**

   Two children have a race finding words in two columns written by the teacher after the words are flashed (or pronounced).
2. **The Train Game**

Two groups of children are seated in rows behind each other. Each group is representing a train. Sight vocabulary cards are flashed to each child in succession. The child that does not recognize the word has to hold it. The train with the lightest load wins.

3. **Flashlight Flash**

One child holds flashcards of sight words (or new vocabulary) children need to study. The lights are turned out and children take turns flashing the flashlight to illuminate each card. As the children carefully look at the word for a few seconds, the card is removed from view. Lights are turned on, and children try to write the flashed word from memory. The procedure is then repeated.

4. **Penlight Writing (flashlight)**

For individual practice with an aid (or teacher) children can try to write with a thin-beam flashlight on a dark surface. This exercise also develops understanding of letter sequences.

5. **Letter Sequence Practice**

Using an article or short story in a workbook the teacher finds words of high frequency children need to recognize. For example, a word such as their. Throughout the article one of the letters of this particular word are blocked out, e.g., their, their, their. Children are observed as they attempt to pronounce the words. Any difficulty should be noted for future use in the development of similar materials.

6. **Twins**

Flashcards for several players are provided with the same words printed or written on each player's pack. The game begins with the leader holding up and pronouncing a certain word. The players try to find a matching card and place it in front of them on the table. Time limit is set for looking through the sets. The first player to be rid of his pack wins.

Variations: This type of activity played with homonyms increases the difficulty level.
7. Scrambled Letters
(Develops Visual Sequential Memory)

Using lists of simple words at first, chart two columns on chart paper. In one column scrambled words are placed (e.g., tea - eat), in the other words represented by the scrambled letters. Care must be taken not to place these words opposite each other. Level of difficulty is increased if the correct words are not shown until the scrambled words are unscrambled.

8. Delayed Recall Activity

To teach new vocabulary (after words were presented in context) select five new words shown with pictures of objects they represent. Discuss with the child clues of shape, beginning and ending letters, medial vowel, etc. Have the child write the word on the board from memory. All other words are introduced in the same manner. After a lapse of 24 hours the game is played again but this time only the picture is shown. Child tries to remember the word and reproduce it again from memory. Each time the written word is checked and a score of successes kept for immediate reinforcement.

9. Group Tic-Tac-Toe

Six to eight children can participate in this game. Each child is given a duplicated sheet with a large tic-tac-toe grid reproduced on the paper several times.

On the overhead projector using acetate drawing of the same grid flash some boxes already filled with letters. The children compete in completing the grid recalling the flashed letters in appropriate boxes. Directions are given as to the length of words (e.g., 3 letter words can be placed beginning left to right, up and down, obliquely. Example:

```
<table>
<thead>
<tr>
<th>C</th>
<th>Flashed letters</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
</tr>
<tr>
<td>R</td>
<td></td>
</tr>
</tbody>
</table>
```

<table>
<thead>
<tr>
<th>Possibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>C A T</td>
</tr>
<tr>
<td>A A A</td>
</tr>
<tr>
<td>R T R</td>
</tr>
</tbody>
</table>

The first child able to find four words wins.
10. **Thumbs Up - Thumbs Down**

Practice words in assorted meaning categories - such as cookies, come, dish, jump, what - are printed on flashcards. The teacher holds up a flashcard and says: "If you ever did what the card says, put your thumbs up, if you have not, put your thumbs down." Each word is flashed for about five seconds. If a child is doubtful, the teacher asks them to read the word. Another type of question that can be asked for a different set of words is: "Are these good to eat?" (cookies, penny, dog, some seeds, chocolate milk)

11. **Nonsense Game**

Motivating children to participate in what really are drill activities is sometimes difficult. Amusing questions or riddles are helpful. Teacher asks a series of questions. An answer card is held up for the answer and the children respond by holding up a "yes" or a "no" card.

1. Can you eat this? Jump
2. Can you wear this? Home
3. Does this word rhyme with mother? May
4. Can you swim in this? Pool

12. **Directional Phrase Recall**

Phrases indicating action (- out of bed, away from mother, over a string into a show, the other morning, ask the box, etc.) and some not making much sense are flashed for the children to see while the teacher asks, "Can you go?" Children hold up yes or no answer card in response.

13. **Missing Letter Game**

Sheets are duplicated and provided for a group of children needing work on the same set of sight words. The words are printed (typed) with some of the letters omitted. For example: _ace (race), _orse (horse), _ig (pig), _eep (sleep). Teacher flashes a card on which the correct form of the word is printed. Duration time should be about 3 seconds. The children fill in missing letters.

The foregoing games and activity suggestions are made or implemented with few supplies usually available in the
school. I have included suggestions for some of the more sophisticated devices of tachistoscopic nature in Appendix I.
Imagery Development

Imagery training helps children conceptualize the abstract ideas and gives the children another tool for problem solving. It also has a generalized effect which transfers to tasks of varying degrees from concrete to abstract. These conclusions were made by Radaker (1962) who conducted several pioneering studies into the relatedness of imagery training and academic achievement.

Creation of images for certain selected words was the basic training device employed by Radaker.

Ray (1970) commenting on the lack of imagery among students said: "We could hardly attach much meaning to the comment, 'The sunset was really beautiful yesterday evening,' if we have not had the experience of seeing a beautiful sunset. Nature is so diverse in its multitude of forms, we can easily reach a state of dull meaningless stereotypes in relating to it with words."

We have often encountered in classroom discussion with children the very limited vocabulary content and the apparent lack of sensitiveness to word meanings. In the age of television which provides visual images in rapid succession, the children's needs seem to be satisfied in that area. When asked to write poetry often they are completely at a loss for comparative words of high imagery value.

Taking Radaker's and Ray's advice we can develop short training sessions with the children for imagining words with clarity in their 'mind's eye,' whether they are of
high imaginal content such as "thunderstorm" or low in imaginal content - such as "front."

Radaker's extensive studies in imagery training led him from experimentation with the creation of images for fantasy scenes, to the training in imagery for low frequency words.

In both types of imagery training, dimensions were found by which he estimated the degree of success each child was experiencing. Boldness, brightness and conformity of each image were given measurable scores.

If a few training sessions prove interesting and rewarding for the teacher and children, the effort can be directed toward more difficult tasks such as phrase imagining, poetry memorizing and forming of visual images for entire stanzas.

Creative observation of ink blot pictures, pulled string paintings, and other abstract artwork will broaden the powers of observation in children.

This area of visual memory is still barely explored. Imagination plays a great role in the area of comprehension and has, perhaps, been more often correlated in research with that reading skill.

Visualization, imagery and imagination must be closely related, if not completely inseparable. In forming mental images, vast resources of stored stimuli must be recalled to facilitate such activity. Descriptions, ideas, and words all play a part of importance in the reading process.
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APPENDICES
Appendix 1

Commercial Teaching Materials for the Development of Visual Memory

1. **Visual Sequential Memory Exercises** published by Development Learning Materials, 7440 Natchez Avenue, Niles, Illinois 60648.

   These exercises are designed to help the student to perceive a sequence, commit the sequence to immediate memory and reproduce the sequence according to instructions. The drawings progress from geometric shapes to manuscript and cursive letters. Finally, actual words are used. These materials were developed and tested by the educational staff of the Marianne Frostig Center of Educational Therapy.

2. **Perceptual Communication Skills** by Selma Herr (manual and workbook) published by Instructional Materials and Equipment Distributors (IMED), 1415 Westwood Boulevard, Los Angeles, California 90024.

   The purpose of the workbook is to help the individual increase his visual acuity and awareness and to develop greater insights. The book may be used for all grade levels. At higher levels the book is self directed. The workbook includes exercises for visual acuity, visualization, patterns of closure, structural patterning, speed of word and object recognition, awareness of the environment, memory training, etc. Fifteen pages are devoted to the development of visual memory. Black and white line pictures are presented on one page, questions pertaining to the pictures on the next. The questions are of descriptive nature asking the child to remember the details of what they perceived.


   Includes listings of many commercially produced games and supplies cross referenced under the particular skill they can be utilized to develop.
4. Listening Library, Inc., 1 Park Avenue, Old Greenwich, Connecticut 06870.

A series of seven filmstrips labeled "Developing Techniques in Concentration" designed to aid primary students to develop skills in concentration, a longer attention span and a selective memory.


A set of seven filmstrips which can be ordered singly or in a series. Filmstrip number five is titled Visual Memory. It provides training in visual recall of position of pictures after 10 second frame exposure. Children are required to recall 2 designs and compare with the next frame by holding up a card which corresponds to the number of design selected.


Simple attachment for the slide or filmstrip projector. The same company offers slides and filmstrips for use with this device. Shutter speed adjusts from 1 second to 1/100 second. The slides and filmstrip focus on words, word groups, and familiar objects. The device is designed for training memory for speed recognition and comprehension.


A workbook for the use of development of visual perceptual skills. Also applicable for memory training.


A teacher's guide for developing many fine learning center and individualized activities. Excellent comments for developing objectives for each activity, materials specified and lesson plans.


11. **The Language Master** (2 new battery operated units. Textbook sized and weighing only 3 pounds.)

These machines utilize special flashcards which can tape-record and play back teachers and students voices. Can be equipped with headphones. Some prerecorded, preprinted materials available under many headings.


Tachist-O-Flasher. A device which converts any slide or filmstrip projector to a manual tachistoscope. Some operated mechanically, the new model Pro-tach is operated electronically. Materials available for use with this device are of many levels, concentrating on the area of sight and phrase vocabulary development. Filmstrips come in sets with a teacher's manual for each set.


Visual memory training using mnemonic devices. The child is given a coloring book which contains line drawings of the mnemonic pictures. The child is asked to color and trace the pictures. Key sentences under the pictures are also traced. Sentences stress a phonetic rule - such as "Cyclone the Yellow Pony Can Fly" for different sounds of the letter 'y.' The company has other materials coordinated with this basic program - such as slides, flashcards, Concentration game.

14. **Design Blocks and Patterns** - Ideal Company 1973
Syl Bern Educational Supplies, 9037 Reseda Boulevard, Northridge, California 91324.

The Ideal Design Blocks set consists of nine 1" green and white blocks and twelve 6" x 6" design cards. Designs on the front side of each plastic coated card are outlined in black. Each design on the reverse side follows a grid pattern. Blocks are arranged to match the design.
15. **Large Colored Beads and Patterns** - Ideal Company  
   (available at Syl Bern - as item above)

   This set includes 144 beads and 16 pattern cards  
   (eight 2 1/2" x 11" and eight 2 1/2" x 5 1/2").  
   The pattern cards have designs matching the colors  
   of the beads. The beads and the printed designs  
   come in sphere, cylinder, cube and ellipsoid shapes.

16. **Pyramid Puzzles** - Ideal Company (available at  
   Educational Supplies stores)

   Pyramid Puzzles consists of nine plastic laminated  
   pattern cards on which are printed colorful stripe  
   patterns. Eighteen colorful strips of rubber-like  
   'Tactilmat' are 1" wide and vary in length from  
   1" to 12".

17. **Kaleidoscope Puzzles** - Ideal Company

   Twelve colorful 6" x 6" puzzles printed on heavy  
   board and plastic-coated for hard wear. A sheet  
   of stimulus patterns is also provided for repli­  
   cation.

18. **Large Parquetry and Patterns** - Ideal School Supply,  
   Oaklawn, Illinois 60453.

   Contains 16 plastic laminated cards on which are  
   printed colorful designs in graduated difficulty.  
   Also included are 156 pieces in 8 colors made of  
   'Tactilmat' used in constructing the interesting  
   designs. Utilization of parquetry materials have  
   application in developing higher level of manipula­  
   tive skills, visual memory and visual shape  
   discrimination.

19. **Logus, Jr.** - Ideal Company, Ideal School Supply,  
   Oaklawn, Illinois 60453.

   A game containing two game boards with many letters  
   that can be slid around to form words. A deck of  
   cards designating words for each player and how  
   many moves are allowed to place the letters in the  
   right sequence. Highly motivating. Reinforces  
   visual sequential memory.
Appendix 2

Sample Activities

Make a Word

Objective: To teach visual sequential memory of words.

Materials: 1 large clipboard divided into two columns. One column is narrow - about 3”, the other about 9”. Cloth tape is fastened to 9” x 3” transparencies to make pockets.

<table>
<thead>
<tr>
<th></th>
<th><img src="flag.png" alt="Picture" /></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="link_letters.png" alt="Picture" /></td>
</tr>
</tbody>
</table>

(Pictures and words can be frequently changed)

Procedure: Using link letters (Milton Bradley), the child attempts to put together the word he glimpsed written on the other side of the picture of the flag. After his task is completed he writes the word in his vocabulary book.

Variations: This activity can be done without picture if the word has no visual representation. A blank card has the word on the reverse side.
Homonym Word Board

Objective: To teach visual discrimination and memory for homonyms.

Materials: 1) One sturdy plywood board in which hooks have been provided spaced at four inch intervals. It is advisable to have a stand for this board to provide a steady base. 2) Set of picture cards of two words (homonyms) which have proved troublesome for recognition. 3) Set of transparencies cut to fit over each picture. A word is printed at the bottom of each.

Procedure: Working individually at this task the child tries to find the words that match the pictures. For self checking a cardboard answer sample is provided. For example, two words in need of developing might be hole - whole or tail - tale.
Clues for Detectives
(Learning Center Activity)

Objectives: Visual memory for details development.

Materials: Paste a colorful picture on a large piece of chipboard. On lower half past a flap to cover the question.
1 egg timer.

Procedure: How well do you remember? Asks the question on top of the flap. Directions are given below.

1. Look at the picture above 'Be a detective.'
2. Set the egg timer. When it is empty open the flap to answer the questions. Do not look at the picture until you tried to answer all the questions from memory.

(These directions can also be tape recorded for those who cannot read well enough.) On the inside of the folder are some simple questions, e.g.:

1. A man is sweeping the street. True□ False□
2. A girl fell on the sidewalk. True□ False□
3. The market is painted pink. True□ False□

The child checks true or false boxes which follow each question. Answer boxes are covered with contact or laminated. Self check is provided when picture is revealed on completion.
Pass the Word

Group Competition Game

Objectives: To remember a word from brief exposure and reproduce it correctly.

Materials: A long strip of paper, folded accordion fashion.

Procedure: Ask the children to form teams. Each team has a leader to whom the teacher flashes a card with a word printed upon it. The child writes the word on the top of the accordion folded paper. This sheet is passed on and the next player observes the word written before and attempts to reproduce it. No copying is allowed, each person must quickly fold back the word they have seen.

Suggestion: This game is more suitable for older children.
Visual Memory Training Cards

Materials: A set of cards to develop memory for design.
This set consists of twelve cards. More cards of similar nature may be created to add to the set.

Procedure: Prepare the children for a game that will require them to be careful observers. Explain that you will flash some numbered cards which have designs on them. After a count of five the children will have to draw the design they saw on their paper. Have the children's papers folded into sections and numbered in sequence.

Imagery: To provide training in imagery have children tell you later what each picture reminds them of. They can be used for creative writing starters also.
Flashcard Magic

Objectives: To reinforce visual memory recall of sight words.

Materials: Six to eight cards with sight words for practice. Flash card rack (wooden)
Cards are displayed next to each other on the rack.

Procedure: Four to six players are asked to look at each word carefully. They can take turns reading them aloud.

The teacher asks the children to close their eyes, being careful not to leave an empty space. Children open their eyes and try to visualize which word is missing. It is wise to begin with about five cards altogether. Increasing the number increases the difficulty of the task. The child that guesses which card is missing gets a point. A person with the most points wins.
Can You Remember Charlie?
(Group game of visual recall)

Objectives: To provide experience in visualizing stimuli - delayed recall.

Materials: All kinds of fun dress up clothes with incredible combinations of colors and accessories.

Procedure: One child dresses up while the others are told to observe the child as he briefly comes in and turns around and leaves. Older children can list clothing and details on paper. Younger children can answer verbally. The teacher can ask leading questions such as: "What color was the hat?" "What did Charlie have in his right hand?"

Variations: For girls we can substitute Irma for Charlie. For increased difficulty give the children things to carry. A flag, a scarf, a toy.
**View Master Medley**

**Objectives:** To recall sequence from memory after presentation of visual stimuli.

**Materials:** Gaf Viewmaster and some reels of Disney Characters or fairy tale pictures.

**Procedure:** Working with about three children at a time, have them look at each picture in the viewmaster until they see as many as you wish to start with. A good start is 3 pictures at a time. Each child tells what they observed in each projection. Recall of colorful details is encouraged. Checking of children's impressions is made easy by the full descriptions provided on the reels. If the child is not successful recalling details and sequence, he may look again for self-check and reinforcement.

*Increasing difficulty -* have children view the whole reel and recall sequence of pictures.
Visual Imagery for Words

Materials: Some pictures with striking scenery. These are kept out of view.

Procedure: A group of children sitting closely around the teacher. The teacher asks: "Can you imagine a cold, snowy, wintry day in the country? Close your eyes and imagine what it would look like." After a brief pause she asks the children to have snow covered trees in their picture and an old house with a picket fence.

In a little while the children open their eyes and see a picture of a scene that has been described. Comparisons are made about each impression - how much color and detail the children visualized.
Overhead Projector Acrostics

Objective: To visualize words among a series of letters. To remember letter sequence for individual words.

Materials: Acetate cut into strips of 1" x 8". (It is wise to have a supply of 20.) Each strip has some letters printed in squares at one inch intervals.

The strips are numbered in the corner.

Procedure: Ask children to come up to the overhead projector. They are asked to manipulate the strips until a word is formed. The words can be read up and down as the strips are matched. Matching more than three strips increases the difficulty. Children can make lists of how many words they are able to make.