1979

The views of various professions on causes and treatment of learning disabilities - A literature survey and review

Michael A. Driscoll
Pacific University

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Abstract

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Degree Type

Thesis

Degree Name

Master of Science in Vision Science

Committee Chair

Subject Categories

Optometry

Michael A. Driscoll
Class of 1979
Pacific University
College of Optometry
Thesis Project

Title

The Views of Various Professions on Causes and Treatment of Learning Disabilities - A Literature Survey and Review.

Introduction

This literature survey is being done in order to discover the stances of various health professions concerning various aspects of the problem of learning disability in children.

Different professions have different views about each of these aspects, it is thought, and this project sets out to clarify what some of those differences are. A problem appears to exist in communication between the professions on this subject - one highlight of this is the inexact and unstandard definitions of simply the terms used. An attempt will be made to discover, among other things, whether there truly is such a large amount of disagreement among professions in this area, in light of the possibility of a communication gap. Therefore, not only differences, but also similarities will be sought in this survey.

It is hoped that both the writer and the readers of this paper will have a better, more balanced grasp of the subject of learning disabilities.

The writer wishes to thank Dr. Norman S. Stern of the optometry college faculty for his helpful assistance in this project.

Michael A. Driscoll

Class of 1979

Body of Project

A detailed review of literature of different professions concerning learning disabilities, especially in children.

Professions considered will include optometry, ophthalmology, psychology, education, psychiatry, and the speech-language-audition therapy professions.

Subtopics to be dealt with include the role of vision in learning, the role of audition-speech-language and its development in learning problems, the role of sensory-motor processes in learning, the role of emotion and motivation in learning, and the variations of the treatment plans, and the role of learning disabilities in child maladjustment.

Project Outline

I. The Role of Vision in Learning and Its Disabilities

- A. Optometry's Views
- B. Psychology's Views
- C. Ophthalmology's Views
- D. Education's Views
- E. Psychiatry's Views
- F. Speech-Language-Auditory Therapy's Views

II. The Role of Speech, Language, and Hearing (Audition) in Learning and Its Disorders

- A. Optometry's Views
- B. Psychology's Views
- C. Ophthalmology's Views
- D. Education's Views
- E. Psychiatry's Views
- F. Speech-Language-Auditory Therapy's Views

III. The Role of Sensory-Motor Processes in Learning and Its Disorders

- A. Optometry
- B. Psychology
- C. Ophthalmology
- D. Education
- E. Psychiatry
- F. Speech-Language-Auditory Therapy

IV. The Role of Emotion and Motivation in Learning and Its Disorders

- A. Optometry
- B. Psychology
- C. Ophthalmology
- D. Education
- E. Psychiatry
- F. Speech-Language-Audition Therapy

Outline, Cont'd

VI. The Roles and Variations of the Treatment Plans and Strategies

A. Optometry

B. Psychology

C. Ophthalmology

D. Education

E. Psychiatry

F. Speech-Language-Auditory Therapy

It should be noted that the views of the various authors may not necessarily reflect views of all other members of their respective professions. This is simply a study of small numbers of sample members of each profession. The work required to perform a detailed survey of a much larger number of authors would preclude the possibility and practicality of such a thesis.

I. Role of Vision in Learning and Reading Disabilities

A. Optometry's Views

1. Nathan Flax, O.D., in "Vision and Learning Disabilities - Optometry's Contribution" is quoted as stating:

"The static optical model of an eye as a camera is not adequate when one attempts to relate (learning), academic performance and visual function."

Flax cites a spectrum in the eye - care field, one end being those who view the eye and vision in the "camera" sense, to those who treat the visual system as a system that gathers and processes information, the latter group being under the con--viction that difficulties in this visual system can contri--bute to learning problems.

Another quote from Flax's article, pertaining to the outline:

"...it might be ... fruitful to analyze visual function from an optometric point of view in terms of the specific task requirements of learning, indicating areas of visual dys-function that can and do inpinge upon areas of academic per--formance. This has, in essence, been the optometric approach to this problem."

And, rather than ask whether visual function or vision is related to reading, Flax strongly prefers to ask task - oriented ques--tions, such as:

"What degree or level of visual acuity is necessary to achieve at a particular task?"

"What degree of accommodative consistency is necessary to sustain a particular task?"

"How long must this accommodative consistency be maintained?"

"Is it necessary that two eyes be utilized to be successful at a particular activity?"

Other questions Flax poses deal with factors such as degree of binocular fusion needed, presence of compensatory abilities in the visual system, the role of visual memory; accurate shape, form, and directional orientation information; role of eye-hand coordination; how much an impairment can deviate from norms before it interferes with a task; the contribution of visual information to the completion of a task; and what type of visual information would be necessary for the task.

Flax cites also the factors of visual acuity and refractive error in relation to reading, suggesting that for the early grades acuity would have to be extremely poor to interfere with reading (learning to read), because the letters are big and the words are widely spaced at that level, and that even substandard acuity should not be able to impair the reading of the college student, to a degree.

Refractive errors:

a. myopia -

if anything, this would be a help for reading or near work, provided it is not severe. (no figures given on what constitutes "severe")

b. hyperopia -

"High amounts of hyperopia ... have been correlated with inefficiency at reading." (Cited was the need of extra accommodative effort, with the implication being that this would distract the attention of the reader.). He says that hyperopia "... is not likely to prevent learning to read/decode. It can (however) become a deterrent to staying power and attention."

Suggestion:

hyperopia becomes more of a problem in the "reading-to-learn"

stage of 4th grade and up. (Smaller print, longer required duration, More crowded-together words.)

c. accommodative disorder or dysfunction -
Also a problem mostly in sustained reading, but not so much so in the first three grades ("learning to read" stage). But Flax cautions, "other children can not even overcome moderate accommodative difficulty and fail immediately". Again, though, Flax suggests that this becomes a problem only when the reading demands shift. Finishing quote:

> "Inefficient accommodative function is a significant factor in scholastic problems."

d. relation between accommodation and convergence -
if a child has moderate accommodative dysfunction which is not enough to cause a blur, he may still have problems from the fact that any accommodation can "reflexively stimulate an excessive degree of convergence which in turn disturbs the ability to maintain binocular vision at near. Fatigue, discomfort, inefficiency, loss of comprehension, and more frequently, avoidance can be produced in this matter. Bincoular fusion plays a very important role in reading disability when the reading symptoms are those of fatigue, avoidance, impaired comprehension and slow speed.

Binocular

problems generally do not prevent learning to decode other than their general contribution to problems of attention.

Flax notes importantly the presence of a paradox - greater binocular dysfunctions may cause fewer (less) difficulties than smaller ones can:

> for example, a child with strabismus can suppress when he reads, while one with smaller binocular dysfunction may encounter annoying blur or diplopia or both, with it being a constant battle to compensate for it, school work suffering all the more.

e. eye movements -

Flax cites that it is usually taken for granted that foveal fixation (proper aiming) is present by first grade, but that it really is not always present at those levels. Flax also maintains that a child's eye movements move mainly in response to physical stimuli such as motion, noise and "stimulus novelty," which is something he has to unlearn in the classroom setting, or else will have trouble maintaining attention. Another facet of eye movements discussed was that the as-yet unskilled reader needs more accurate fixations and movements than does a more experienced reader who can draw on context cues to gain meaning from his reading.

He also relates poor ocular-motor control to poor form-and-direction recognition, since "...eye movement information is a vital part of the process of deriving shape and orientation information from the visual stim-

-ulus."

Then he lists interplay between visual function and other sensory functions, and sensory-motor functions. "... early reflex behavior of the visual apparatus serves to permit, if not force, multisensory exploration simultaneously by eye, ear, hand, mouth, and possibly nose".

Flax suggests a hierarchial relationship among the senses which is supposed to evolve into a visually-dominated system, a process which may be short-circuited in reading or learning disabled children. He suggests that this is important to investigate, as vision is a developmentally formed function. "The analysis of vision ... with particular emphasis on its intersensory aspects is vital to complete understan--ding of the role of vision in learning disability. This becomes most important when dealing with the more severe forms of learning disorder, where the integrative aspects of visual function are more apt to be impaired."

We can contribute, he says, by using tests and treatments more applicable to the "subtle" aspects of visual function.

Optometric concerns, according to Flax:

a. utilization of both eyes simultaneously by patient;

b. ability to sustain accommodation, changing for different distances;

c. accurate eye movement control

d. development of intersensory aspects of vision.

Finally, Flax discusses how our terminology, though different from that of the "psychologist-educator"

while working in visual perception, is "beginning to converge on common ground" with theirs. We check the integrity of the visual system to check its ability to gather and structure visual information, while the psychologist deals with aspects of visual perception that "pertain to the classroom environment." However, since since we are able to check the apparatus for acquiring that visual information where they can not, we in optometry are in a unique position of being able to bridge the gap between anatomy-physiology and perception in vision.

It can be assumed that Dr. Flax speaks for a large segment of the functional camp of optometry, as we in the profession are widely aware of his stature.

2. Albert Sutton, O.D.

This optometric authority deals with the role of visual perception in one of his papers. Some visual syptoms he lists in learning-disabled child include:

> poor visual discrimination, poor visual memory, deficits in eye-hand coordination, spatial orientation, figure-ground organization, and general orientation of body.

Sutton also cites the importance of development of vision and visual perception and intersensory aspects of vision in the process of becoming able to learn adequately.

He does make the points that people assume:

1. on entering school, a child's visual perceptual processes are fully developed for grade level;

2. little needs to be done to strengthen this basic faculty;
3. he will automatically gather and retain basic information that he is exposed to.

Then Sutton implies that while these assumptions are true in most cases, there is a large number of children with whom the assumptions are not true, the ones with the learning problems.

Finally, he brings up his "Specific vs. Global" concept:

some children have a "specific" perceptual visual orientation, which governs the rest of his being to be oriented along the "inward" lines - restricted personality, toes pointed in, tiptoe walk, small writing, emphasis of specifics and details, and (visually) esophoric;

other children have a "global" orientation - exophoric, paying attention to "ground" more than to "figure", unrestricted, walking flat-footed, toes pointed outward, large writing, concern only on generalities.

Sutton points out the variability of this, too, with children going from one to the other of the orientations depending on tasks and outer and inner environment. (A child may go to "specific" when he starts doing school work.)

An example of what can be done:

put a globally oriented child in the front of the room, or otherwise the child will be easily distracted by all that goes on between him and the teacher. (Figure

vs. ground, the "figure" being the teacher.)

Globally oriented children may have learning rpoblems, as they seem to learn best through action and experience, with reading being an activity too abstract for them; it also takes them "out of their global patterns". Such children, Sutton says, do better on the performance scale than on the verbal scale in the WISC test. "They have difficulty getting down to specifics" - they can be "context readers", able to understand generalities in a story, but be unable to remember dates, names, and the like, more difficulty coming from smaller print.

3. Dr. Darell Harmon, O.D. -

This optometric authority also cites the need for proper visual perception and development for learning. An important point of Harmon's message is that of the need of "primary form experience" early in life, in "both 2 and 3 dimensions". (Neither one implying adequate understanding in the other number of dimensions, 3-to-2 or 2-to-3.)

He mentions how Getman agreed with the need of this, saying things like "if you can't do anything else, provide the form experience. Give the child a coffee pot, and let him play with it and take it apart so he can see circles and three dimensions and other types of forms". So Harmon discusses his agreement with Getman, saying that it is indeed "... a major part of the preparation for abstract symbolization and has to take place at a certain developmental time because we can not do anything about restoring the potential after that developmental time has passed."

So yet another optometric authority, a prominent one, cites the need of proper development of visual - perceptual abilities as necessary for proper learning ability to develop.

4. Dr. Ray Wunderlich, in his paper, "A Pediatric Look at the Maladapting Child", says on vision's role:

"Visual problems are frequently principal factors in a child's biosocial decline", which pertains to an actual series of physiological and psychological-social breakdowns that the child can end up experiencing.

5. Dr. Tole Greenstein, O.D. -

According to this notable functional optometry authority, as far as this inquiry can determine, much of learning disability is a result of reading disability.

"Not having mastered the first step, the decoding process, they become totally frustrated by the second, the cognitive phase. Therefore, instead of just a reading problem, such children begin to manifest problems in every subject area in which reading is the tool necessary for gaining knowledge." "It could be said that instead of merely having a reading problem, children then have problems reading which lead to full-blown learning problems."

Greenstein then goes on to discuss the importance of vision in reading, which will be discussed in various places in this section I.

6. Dr. Gordon McKee -

Out of his paper it will be of interest to state here

the role of eye movements.

To quote:

> "Optometry has long contended that a relationship exists between smooth ocular tracing, ocular saccadics and efficient reading skills. (Kirschner, 1967, Schorr 1968, Flax in 1970)". "The training of smooth and accurate eye movements is of paramount importance for many kinds of visual disabilities."

So, by and large, optometrists included in this study appear to contend that a relationship exists between "vision" (often defined more broadly and functionally than in the end-organ sense that the ordinary person ascribes to the process) and reading and learning disorders. Note that vusuomotor processes and visual-perceptual aspects of vision were referred to time and again in the quotes. This, of course, is one of the communication problems referred to at the outset of this writing, as professionals seem not to be able to agree on a single definition of vision.

I. Role of Vision, Cont'd

B. Psychology's Views

1. Jean Ayres, Ph.D., from "Sensory Integration and Learning Disorders" book.

This authority's book discusses mostly the neurosensory processes, so there are a few pages dealing with primarily visual perception rather than anything to do with many optometric ideas.

"Upon recognition that some learning disorders could be traced to perceptual deficits, visual perception came under immediate exploration, for the visual perception demands are rather obvious." She cites a study in which a group of 120 first-graders were tested, the results of which showed that "... substantial correlations exist between reading test scores and copying patterns or designs; (r=.52), and between reading and recognizing the reversed image of a stimulus figure (r=.49). Reading was less related to visual matchings of figures. More recent studies (for example, Punwar 1970) revealed a similar relationship between space visualization and reading as well as other academic work of young school-age children. (Ayres seems to use the terms "visual perception" and space perception interchangeably.)

"Irregularity in development of form and space perception is seldom seen independently of other sensory integrative problems among children. Usually it appears in conjunction with postural, ocular and somato-sensory disabilities. Nevertheless, statistical analyses have repeatedly indicated that a number

of behavioral dimensions related to form and space perception show sufficiently strong associative bonds to appear as a meaningful functional unit which can be postulated to be a neural subsystem. It involves several levels of simultaneous brain functions. As with other aspects of sensory integrative dysfunction, the lower levels are usually the seat of the problem, and judging by therapeutic results, are usually the first places to focus remedial work."

But also,

"Visual perception problems sometimes are related to brainstem disorders, but in some children they seem to be associated with right cerebral hemisphere involvement."

Ayres then ends that by saying that the two or more possibilities are usually not ever made distinct from one another in devising training programs, and also that all parts of the brain "contribute to the end product" of learning and can not easily be studied in isolation.

* And to tie together her beliefs on the role of visual perception:

"Man does not develop visual perception through his eyes alone, nor does he see by his visual cortex alone. Meaningful vision is produced only by integrated action among many parts of the brain, involving - in addition to visual stimuli - other sensory stimuli, especially somatosensory and vestibular and related motor behavior. Many children with such learning disabilities have visual perception problems, with inadequate ocular and postural reactions and deficits in other somatosensory functions which can be attributed, at least in part, to inadequate integrative process in the brain stem. One of the results of failure

of optimum brain stem integration is academic problems, especially in the early years when

perception assumes an important role in formal learning. It is proposed that many, but not all, visual perception problems associated with reading problems in young children are related to lack of normal maturation of brain stem mechanisms."

2. Marianne Frostig and Phyllis Maslow -

Their definition of vision/visual perception:

"...the ability to recognize and discriminate between visual stimuli by associating them with previous experiences."

"...it is visual perception that is primarily the medium through which human beings encounter their environment. Getman (1962) has estimated that 80% of our perceptions are visual."

Subfactors in visual perception, according to Frostig, that are important:

1. figure - ground perception -
   "...the main visual-perceptual deficit in children with 'neurological handicaps' " (Strauss & Lehtinen, 1949)
2. perception of position in space -
   without it, there is difficulty telling 'b' from 'd', and the like.
3. perception of spatial relationships -
   need for tasks like spelling - knowledge of sequences is necessary.
4. perceptual constancy-form perception -
   needed for discriminating fine details - 'n' from 'r', 'a' from 'd'.
5. visual-motor coordination -
   important for drawing, writing, copying.

3. Ross, Alan O. "Learning Disability - The Unrealized Potential" book.

"An eye examination is usually one of the first steps recommended, because if the child can not see what is written on the chalkboard, learning would obviously be difficult for him. There will also be learning-disabled children who are nearsighted or otherwise in need of corrective lenses, but their visual problem is not the basis of their difficulty."

The only thing he says much about visual perception is when he says that the Frostig DTVP test and associated training are of questionable value. (developmental test of visual perception)

"A group of reading-disabled children with 'visual-perceptual difficulties' identified on the Frostig test were given 16 weeks of daily training; during that period a control group received the same amount of teacher attention. At the end, there was no difference in reading achievement between (the trainees and the controls)".

4. Edith Klasen, Ph.D., "The Syndrome of Specific Dyslexia"

In a study of 500 students, some 28.6% had "visual-perceptual" disturbances, and 38.6% had combined visual-perceptual difficulties and motor difficulties, a total of 67.2%. (No test data; tests: Frostig's, Bender, Wechsler)

Klasen goes on to discuss how so many authorities are in controversy as to the role of vision and visual perception in learning/disability.

"The high percentage is not a surprising result, since all degrees and kinds, variations and combinations are included and since, as especially Getman emphasized, visual perception is not only

the most important modality in the visual task of reading, but also the most significant in the development of general intelligence."

"Those who believe visual perception plays a role:

1. American -

   a. DeHirsch b. Thompson c. Frostig d. Benton

2. European -

   a. Schomburg (W. Ger.) b. Prechtl (Neth.)

   c. Specht (W.Ger.) d. most other West German authors

Those who do not believe it plays (much of) a role:

1. American -

   a. Money

2. European -

   a. Lobrot (Frn.) b. Daniels (Eng.) c. Ellenhammer (Den)

Klasen agrees that more research is necessary on this subject.

C. Ophthalmology's Views

1. Herman Goldberg, M.D., in "Problems of Reading Disabilities" Goldberg does seem to make the distinction between end-organ processes, and visual-perceptual processes, saying basically that a learning problem can be caused by a blockage anywhere in the visual-perceptual centers. (Which, he admits, are hard to find, since "we are dealing with the brain.") However, he downgrades many optometric methods of treatment of reading disabilities, such as pursuit-fixation training, accommodative rocks, and the like, feeling that these do not deal with the problem that causes the reading problems.

"The simple fact is that there is no definite evidence of any

relationship between peripheral visual ability and reading problems." "In fact, some highly respected reading specialists have been misled to the extent that they have suggested the use of eye exercises as a helpful aid in reading problems."

Development:

"If a child does not develop the (visual) perceptual skills before the age of six, he could (end up) having learning difficulties."

2. Jack Hartstein, M.D., "Current Concepts in Dyslexia"

Hartstein also makes adequate differentiation between end-organ vision and visual perception.

His definition of visual perception:

"...the interpretation of sensory stimuli into the organization that finally leads to understanding or conception", or "the ability to recognize stimuli". (Being able to interpret them and correlate them with past experiences.)

Hartstein goes on to say that "disability in visual perception may be pathological, as in minimal brain dysfunction, or it may be nonspecific - simply a lag in perceptual development."

"One might ask the question, 'is there a correlation between visual-perceptual ability and reading achievement?' and the answer would be yes. Studies have shown that there is a medium to high correlation between (the two) at first grade level. However, this correlation diminishes at higher levels for two reasons:

1. Children learn to master the visual-perceptual tasks by means of cognitive abilities, the development of which becomes predominant at about 7½ years of age.

2. Some children have a late spurt in perceptual growth."

3. Jane Hurtt, same book, passage "Role of the Orthoptist in Reading Disorders"

This passage discusses Duane's 4 conditions, the convergence/divergence insufficiencies/excesses.

Also, she discusses orthoptic instruments and techniques, some but not all similar to those seen in optometry. The discussion centers on strabismus, amblyopia, and "motility", and the training and surgery involved.

"Although the percentage of poor readers with a motility problem is low, it is still important that this problem be ruled out and that the patient then be referred to the next person on the "dyslexia team".

D. Education's Views

1. B.R. Gearhart, "Learning Disabilities: Educational Strategies"

This author talks mostly about perceptual aspects of vision, too, saying:

"The child with visual perceptual problems may not be able to copy letters correctly, to percieve the differences between a hexagon and an octagon.. He may reverse letters or produce mirror writing." "All these perceptual problems may at first make the child seem to be lacking in sensory acuity...but when acuity checks out as normal, the possibility of a perceptual disorder must be considered."

Gearhart talks in terms of Frostig's views, from psychology, as far as testing and training is concerned. There appears to be a campaign underway to let teachers know that "20/20 is not everything".

2. Janet Lerner, "Children With Learning Disabilities"

"Visual perception plays a significant role in school learning-particularly in reading. Some children have difficulty in tasks requiring the visual discrimination of geometric designs and pictures. Other children (may) succeed at this task, but fail in the visual discrimination of letters and words."

Lerner's list of component skills in visual perception:

a. spatial relations b. visual discrimination

c. figure-ground discrimination d. visual closure

e. object recognition

Lerner recognizes optometry's contributions as follows:

"Optometrists, who are concerned with the visual function, have made key contributions. Many of the child's percepts come to him through the visual field. Visual acuity, visual perception, visual memory and visual-motor learning are all discussed by optometrists."

3. Marlin Jackoway, Ph.D., in"Current Concepts in Dyslexia"

Again the distinction is made between vision in the end-organ sense and in the perceptual sense. He points out that while ophthalmology will most probably say "no visual basis to learning disorders" if there is no refractive error or other eye anomaly, that optometrists will probably try a different approach, such as reading glasses or visual-perceptual training. He also said that a growing number of medical people of all kinds are referring such problems to such optometrists. It does not seem that this authority is biased one way or the other, despite the fact that the book this passage came from was written primarily by and for ophthalmologists.

4. Richard W. Burnett, same book:

Passage titled "Role of the Reading Teacher in Learning Disorders".

This discussed the role of school screenings, as with the Ortho-Rater or the Keystone Telebinocular. Then, it is a matter of suggestion rather than direct full scale referral to an ophthalmologist or optometrist. "If lenses have been prescribed, the pupil is expected to wear them for all testing and instruction. The uncertainty as to how a child will be received by a vision specialist if he shows only a possible deficiency in phoria or depth perception usually prevents referral for these conditions unless acuity is also impaired."

Burnett's areas of concern for the reading teacher, as far as vision is concerned, are as follows:

a. "Does he resist reading for more than a few minutes at a time?"

b. "Does he squint or hold his eyes unusually near to or far from the printed page?"

c. "Does his accuracy in pronouncing words appear to be related to changes in type size?"

"The obvious modifications in instructional procedures recommended might include keeping instructional periods short and offering them more frequently, varying work done at near point with chalkboard work, and using books with larger type."

So, all in all, most people in education avoid putting themselves into the position of claiming they are vision experts, and leave the problem up to optometry and ophthalmology, along with psychology for the perception aspects of vision.

I. Role of vision, cont'd.

E. Psychiatry's Views

1. H. Gofman, from "Dyslexia and Reading Disabilities", by Paine, et. al., "Etiological Factors in Learning Disorders of Children", "Unrecognized Visual Problems" -

"Strabismus and astigmatism especially seldom cause inability to learn to read but can contribute to slow and difficult reading."

2. Most of the other psychiatric literature this survey covered topics other than vision and visual perception - aspects such as the role of general physiological maturation, emotional aspects, cerebral dominance, thinking processes, and the like, leaving the vision aspects to ophthalmologists for the most part.

F. Speech-Language-Auditory Therapy's Views

1. Helmer R. Myklebust, in "Development and Disorders of Written Language"

Much of the work on the developmental aspects of language, especially in relation to reading, has concerned visual processes. However, often this work has been limited to visual acuity or eye movements and has not considered the neurology or the psychology of learning. Unless ability to hear and see is adequate, learning to read and wuite will be hampered. All clinical teachers should be aware of the importance of visual acuity, fusiom, stereopsis, and other factors constituting normal vision. Despite the relevance of these factors, and their possible significance to acquisition of language, they are frequently unrelated to learning disabilities. (Myklebust, 1973). As in the case of auditory processes, this discussion is limited to the more devel-

-opmental aspects (of vision)".

Myklebust cites the contributions of those who have given attention to visual processes, those such as Gesell, Amatruda, Charcot, Morgan, Hinshelwood, Money, Young, and Lindsley.

On psychology's study of maturation of vision and visual perception:

"Despite a broad body of knowledge, categories or types of visual learning deficits are not well-defined. Thus, in the following discussion operational classifications developed largely through clinical experience are stressed, with cognizance that audition and vision are not dichotomous but (are) semiautomatic functions. They are separate entities which must be integrated psychologically and neurologically. A deficit in one may have a direct effect, such as inability to learn and to remember what letters look like. An indirect effect occurs when the input can not be integrated with the experience gained through other modalities."

So the point of this information is that while some members of the health professions may neglect the distinction between vision in the "acuity-end organ" sense and vision in the "perception" sense, most others do make that distinction.

Again, however, there always exists the problem of basic definition of the terms each profession uses - this factor compounds the work of an inquiry such as this in studying what the professions each believe is the role of vision in reading and learning and their disorders.

II. Role of Audition-Speech-Language Development

A. Optometry's Viewpoint

1. Jerome Rosner, O.D., in "Helping Children Overcome Learning Disabilities"

"Hearing"

"This is another important consideration, often overlooked. If the child has a reading problem, make certain that his hearing is unimpaired."

"Most reading problems are not caused by hearing problems. However, if the child does have a hearing problem, it will significantly affect his classroom performance, especially his ability to learn to read. Therefore, it should be determined at the outset."

Rosner then cites the importance of having good auditory perception skills to learn to read, skills such as auditory discrimination, auditory memory, and so on.

2. Skeffington, A.M., in "Vision - Its Impact on Learning" -

"The speech-auditory systems are important to vision because identification and categorization require labelling. The young child brings his own prelanguage system of labelling into conformity with that of his culture by matching vision with the speech-auditory processes. Language can then be used to efficiently code past experience so that it can be more readily stored and retrieved."

Outline of Skeffington's model of vision:

A. The antigravity process

B. The centering process

C. The identification process

D. The speech-audition process

E. The Emergent: Vision

(The above which seems to show how he and the OEP view the relative role of vision.)

3. Robert S. Arner, in "Vision - Its Impact On Learning", by Wold, Robert M. :

"The child ... begins to verbalize his perceptual processes as they occur; he uses language in order to maintain the orderly succession of his perceptions. As the naming or labelling stage of language progresses, the child notes similarities and differences between objects. Labelling is considered a gross sort of classification into groups and of course on the use of nouns.

"To make comparisons between objects we need a stable and extensive space world so that objects for comparison can be held in the mind while the relationships between them remain stable. By labelling the percept with a word and speaking this word, the child is able to make a percept reversible and reversible over and over again. With a word, we can anchor a percept and combine and recombine it with another percept as we need.

"When the word has become a symbol and has been freed from its attachment to perceptual representation, the child is able to enlarge greatly his experimental activity... In studying children we shall find that their progress consists both in learning words as names, labelling or representing things, but in the growth of power to use vocal behavior as a means of supplementing and in the end replacing other behavior... It is evident the higher we move in the direction of intelligent activity, the further we go away from concrete manipulation and purely perceptual activity."

II. Role of Audition-Speech-Language, cont'd

B. Psychology's Views

1. Marianne Frostig and Phyllis Maslow -

"Learning Problems In The Classroom"

"Visual perception has spatial dimensions; auditory perception has temporal ones."

Again the distinction is made, as in vision, between "acuity" and perception."

The authors mention that "diminished auditory awareness" can be a cultural problem - city children tuning out loud noises only to have trouble as a result of that in the classroom environment, along with difficulty in auditory perception due to not hearing a wide range of auditory stimuli. They discuss something called 'auditory figure-ground perception', which is "the ability to direct one's attention to relevant auditory stimuli, and to ignore irrelevant ones." People who are deficiently behind in this may have trouble following a conversation when a lot of people are talking, for example. They said there should also be present the ability to change the focus of listening from one stimulus to a new one, such as a child having to redirect his attention to the teacher when she starts lecturing while he is engaged in conversation with another student.

Auditory Discrimination:

1. Auditory-perceptual constancy, for example, is defined as "the ability to recognize auditory stimuli as being the same under varying circumstances..."

2. Discrimination of speech sounds -

"Discrimination of speech sounds

is of paramount importance in reading and spelling. The child who has difficulty with speech-sound discrimination will need systematic auditory training for an extended period of time. Since he will most likely not be able to learn to read by a phonic method, he must also be given extra help through visual-kinesthetic or linguistic approaches."

Other auditory-perceptual aspects discussed include:-

a. sound localization

b. recognition of auditory sequences

("Deficits in the recognition and discrimination of auditory sequences occur very frequently. A child may (be able to) percieve the temporal order of sounds in syllables and words correctly, and still be unable to reproduce an auditory sequence."

The importance of understanding concepts like "before" and "after" was cited as basic to this skill, keeping a short sequence in mind.)

c. auditory memory and imagery

"Many researchers (e.g., Orton, 1937) have concluded that reading difficulties stem at least in part from an inability to recall sounds in the proper sequence"

(Spelling would suffer from this deficit, they suggest.)

("Children with difficulties in memory for auditory sequences are able to analyze a word on repeat a short sequence immediately, but are unable to do so later.")

d. auditory analysis of words

(This is really next in the hierarchy of auditory skills, they imply.)

e. auditory synthesis - sound blending

on auditory sound blending, the authors say that a word "...should be pronounced as a whole word and also written a single color so that it is perceived auditorially and visually as a whole. Synthesis should always follow analysis."

f. associational functions

Quotation of part of the summary should tie their stand on the role of audition-speech-language together -

"There is no ideal curriculum for children at any given age level, and certainly the emphasis to be given specific auditory skills can not be established by a curriculum designed for a certain region or school system. The amount and focus of auditory training provided for a child depends on the existence or absence of deficits. Awareness of sounds and of grammatic speech may be emphasized more in the language arts curriculum in congested urban areas than in the suburbs. When reading is taught at an early age by phonic methods, it may be necessary to emphasize the early discrimination of speech sounds."

2. Jean Ayres, in "Sensory Integration and Learning Disorders", 1973.

"Audition understandably has been one of the main foci of attention in reading disorders, for hearing is basic to language development and reading as a language function, usually taught in conjunction with hearing and speaking." "...the results of clinical experience indicate that the relationship is closer than generally suspected. In that research (Ayres, 1972), children whose primary problem was in the auditory-language do-

-main and not in the visual-vestibular-somatosensory domain and who received sensory-integrative therapy made significantly greater gains in sight-reading scores over matched subjects." But Ayres continues, "Language was definitely not part of the essential program; activation and normalization and sequential memory abilities and definitely not to increased vocabulary."

Ayres only dealt with auditory perceptual problems, declining to deal with language problems in the book.

3. Alan O. Ross, "Learning Disability - The Unrealized Potential." (1977)

After discussing others' views for a page or two, Ross discusses "dichotic listening". (Child receives 2 different sounds, words or sentences through each ear, and is told to concentrate on one of them, even to remember them for later reproduction.)

"With such a method, children with reading problems have been found to experience difficulty, and learning-disabled boys have been reported to be unable to attend only to the information from just one ear. Thus, this provides another hint that learning disabilities may have something to do with selective attention."

4. Edith Klasen, in "The Syndrome of Specific Dyslexia"

Klasen et. al. observed that of 500 "dyslexic" children in a study, 112 had speech impediments, or 22.4%. (Stammering, stuttering, lisping, rhythm disturbance, poor articulation, etc.) Klasen does note that "language, in contrast to speech, depends on cultural rather than physiological factors."

"The high percentage of dyslexics with speech impairments is not a new or unique finding."

(Klasen defines the used term "specific dyslexia" as:

"...reading or spelling and various other language disabilities observed in students of normal intelligence who are otherwise at least average in academic and social achievements.")

Citing other research, Klasen gives the following:

(quoted from Critchley) -

Kagen in 1943 found speech defects in 30% of a sample of learning disabled children;

Hallgren: 41% in 1952;

Hibbert: 69% in 1961;

Dechant & Smith from Monroe: 27% of 415 in 1948.

Klasen,et. al., found "a statistically significant disparity, using the chi-square test and the 5% level of probability."

And, "In summary, then, most authorities from a variety of countries and scientific disciplines agree that speech impediments occur in a large proportion of retarded readers..."

(Apparently these researchers feel there is a link somewhere in the brain between audition-speech centers and those centers important to learning to read, Klasen stating that "quite possibly both go back to a common origin, and are different aspects of one basic disorder."

-German-speaking authors:

"...causation or at least cocausation through speech impediment;

-Anglo-Saxon and Swiss writers:

"...stress the high frequency of their occurrence and from there suspect a common causation."

-Neurologists and Psychiatrists:

"single etiological factor" suspected, regardless of country of origin, as they point to "the relationship between speech

functions and cerebral dominance, and to the frequency with which these two factors are associated."

Mosse, a New York psychiatrist, says that a large number of brain areas "must be intact and must interact flawlessly."

Luckert, Doman and Delecato:

These three agree that there is a connection between cortical zones and reading disabilities.

Harris noted that two particular speech defects existing most often with reading problems were lack of articulation and paralalia.

Smith and Dechant believe that speech and reading have centers in the brain that are close together, and Betts concluded that "90% of disabled readers need medical assistance before special educational measures".

Behaviorists Goldiamond and Dyrud "stress the complexity of the reading process, dependent as it is on current as well as on former reinforcements, and on total behavior. They deny the existence of evident, consistently associated neurological symptoms, accepting only various behavioral deficits as occurring in association; these are: delay in motoric speech development, inability to learn clearly articulated speech at the right time, prolonged baby talk, lisping, stuttering, stammering, specific reading-writing disorders, word blindness, etc." Emphasis here is on environmental and social factors, disregarding motivations, intelligence, emotion, and the like.

Klasen agrees that these physiological aspects of learning disabilities "must not be neglected or ignored by educators

or psychologists."

Klasen's quoted summary on this subject of speech disorders:

"As long as scientific certainty is unattainable, we tend to believe, in accordance with our observations, that multiple and complex combinations of endogenous as well as exogenous causes may contribute to the picture. Differential diagnosis is difficult and can only be arrived at in individual examinations. Even then many questions remain open. It is certain, however, that we will encounter many cases of associated speech and reading-spelling disabilities."

Delayed Speech Development:

164 of a sample of 414 children in Klasen's 500 sample, or 39.6% "did not even speak words by the time they were 18 months old." Many had severe delays such as to ages 2 and 3.

Orton (1937) was said to have stated or implied that "all language functions were interrelated and that dyslexic children especially tended to have had developmental delays in their speech."

DeHirsch, from Klasen:

"...reading-spelling disability must be considered as one aspect of a complex disorder; she felt that all difficulties in spoken or written language result from retarded speech comprehension"

Wepman:

Klasen states that Wepman "thought it possible that both delayed speech and reading disabilities could be traced to inadequate development in auditory perception."

The reason Klasen and the other authors in the book considered speech disturbances and delayed speech development separately was that they had "observed that apparently neurologically

based learning difficulties seem to manifest themselves in two different forms:

structural and functional disturbances.

Speech impediment appears to be related to the former, and retarded development of speech to the latter. Although the clear differentiation into two groups of this kind is diagnostically most difficult, the educational consequences are important. The dyslexic with a general developmental retardation does learn more slowly, but he may eventually reach a normal, or even above average, achievement level. His handicap is less resistant to special educational help; he is less inclined to be hyperactive, distractible, and he is less often a discipline problem. Ideally these children should be placed in groups by themselves."

C. Ophthalmology's Views

1. Goldberg and Schiffman, in "Dyslexia-Problems of Reading Disabilities" -

"The speech-hearing tests are the most important because the child's capacities in interpreting speech are major factors in his ability to learn. Therefore it is important to know not only how a child hears, but how much he hears. Can the child distinguish and differentiate between sounds that he hears? A child who has difficulty differentiating between sounds may be a child with a learning disability."

"If a child can not hear properly, he can not understand the instructions of the teacher. In a group of children studied at the Kennedy institute in the summer of 1970, it was found that auditory-perceptive difficulties were strongly

correlated with 'dyslexia' in 54% of the cases."

Their definition criteria for 'dyslexia':

1. "The reading disability is specific"
2. "There is a tendency to reverse letters and words"
3. "The confusion extends over all of reading"

The authors cite the importance of auditory memory as follows:

"In order for a child to compare two or more speech sounds, he must use auditory memory. This is a much more difficult process than visual discrimination, and may account for the relatively high frequency of auditory-perceptual deficiencies in children with dyslexia."

They proceed to mention that Foulke (1964), Harley (1966), and Flowers (1964) did some experiments, referred to in turn by Witkin, in "Auditory Perception: Implications For Language Development" (Journal of Research Development in Education, University of Georgia, Vol. 3, No. 1, 1969, pp. 53-71), which implied that listening comprehension can be improved by training. "An excellent article..." states Goldberg.

They continue that 90 words per minute is the average reading speed of a blind person reading Braille, that 250 words per minute is the average speed of a high school senior, and that 175 words per minute is the average speed of voice on a voice tape for the blind, concluding that "The rate of thought is five times the rate of speech and good listeners utilize this time gap more efficiently than poor listeners."

On auditory sequencing:

"Sentances are made up of a series of sounds presented in a sequential order. There is some suggestion that impairment in auditory sequential memory is related to reading disabili-

ties, but there is not sufficient observation or research

available for a definite statement on the problem."

On the problem of motor aspects of language:

> The suggestion here is that if the child does not have difficulty speaking, it may be due to a motor disorder somewhere in the speech mechanism.

At any rate, they state that "varying degrees of disability in any of these areas can make the child a high risk for dyslexia."

Final paragraph of that chapter, to summarize:

> "Children should be studied as they reach school age to determine if their auditory abilities equal their visual abilities. We should not make the mistake of approaching children as if they learned equally well by all systems. Instruction should be individualized to the point of grouping visual learners and auditory learners, at least in the early grades and until the time that the child learns to compensate for any inadequacy in either channel of learning."

D. Education's Views

1. Janet W. Lerner, in "Children With Learning Disabilities"

Lerner starts her discussion of the role of audition-language with the following:

> "Many kinds of learning are dependent on language development and the individual's facility with verbal symbols. The ability to grasp the abstract appears to be related to one's mastery of language. Two examples of learning that is limited by language differences or deficiencies appear in research studies of inner-city children and of deaf children."

a. inner-city children:

"restricted code of language" is mentioned, which, according to Bernstein (1964) is supposed to "impede further learning." Also, Bloom in 1965 observed that "parents of inner-city children are not as likely to provide the kind and amount of corrective feedback found in typical middle-class environments."

Whether it is a language deficiency that exists in city children or merely a language difference, Lerner maintains that the restricted vocabulary can cause city children to have difficulty and fall behind in the classroom.

b. deaf children:

The deaf child's "ability to develop concepts is substantially affected" by his handicap, according to Lerner.

"Research reveals that the educational achievement level of the deaf child is three or four years below that of the hearing child. As a result of his deficiency in development of verbal language functions, the intelligence quotient of the average deaf child is about ten points lower than that of the hearing child." (Pinter, Eisenson and Stanton in 1945)

Such people as Vygotsky (1962), Piaget (1952), and Luria (USSR, 1961) have studied the role of language in thinking, but with inconclusive results as to the relationships.

Yet Lerner still cites the importance of language and its development as follows:

"...it plays an increasingly important part in thinking processes. Words become the symbols for objects and classes of objects, and for ideas. Language permits us to speak

of things unseen, of the past, and of the future. It is a tool that helps us to learn, retain, recall, and transmit information, and to control our environment."

Later in the passage, an interesting quote from Lerner is as follows:

"It is interesting to note that much of our knowledge of language development comes through the observation of exceptional children and their language deviations."

Lerner mentions Mackintosh, who in 1964 stated that the acquisition of language skills follows the hierarchy of the following:

1. listening 2. speaking 3. reading 4. writing.

"A firm foundation is required at each level before the next skill level can be effectively added or integrated."

Diagram:

INPUT SKILLS		OUTPUT SKILLS
1. Listening		1. Speaking
2. Reading	>--Integrative Process->	2. Writing

Lerner then discusses the communication process, starting as an idea in the brain of the sender being sent out, encoded in the form of speaking or writing, to the receiver, who decodes the message by either the listening or the reading process, bringing the message into his brain as an idea.

The point is that a breakdown can happen at any place in this chain, as Lerner elaborates:

"For example, in the encoding portion of the communication process, the impairment could be in the stage of formulating the idea, in encoding it into spoken and written language symbols, in the memory or sequences

of previous symbolic experiences, in the brain signals to the motor mechanism used in speaking or writing. In the decoding portion of the communication process, the impairment could be in the reception and perception of the symbols through the eye or the ear, in the integration of these stimuli in the brain, or in the recall or memory as it affects the ability to translate the sensory images into an idea."

Some language disorders that often exist in learning disabled children include: "Inner language disorders"

a. inability to assimilate experiences.

Example: child not being able to associate the sound of a bark with a dog.

b. lack of ability to "preverbally internalize and organize experiences, the antecedents of language and speaking."

"Receptive language disorders"

a. inability to understand verbal symbols: e.g., receptive aphasia. Some children may have difficulty understanding single words, while others may be able to but instead have difficulty understanding phrases and sentences of those words. Others still may have difficulty relating certain words to different shades of context or meaning, such as the word 'run' as it relates to the action, versus 'run' as it pertains to a score unit in baseball or a tear in a lady's nylon stocking.

b. acholalia-

a parroting of words or sentences without understan-

-ding the meanings.

"Expressive language disorders"

a. expressive aphasia -

Defect accompanied by lack of verbal speaking and an excess of gesturing. (E.g., pointing to a faucet instead of saying "I want a glass of water")

Speech and language are understandable to such a child, but he has a poor output facility.

b. dysnomia -

"Deficiency in expressing and remembering what words sound like."

c. apraxia -

Inability to move the tongue and mouth in such a way as to produce certain sound or sounds.

Aspects of linguistics and psycholinguistics as they relate to learning disabilities:

1. Phonology -

System of speech sounds in a language. "The recognition, analysis, and synthesis of phoneme elements in written words, often referred to as phonics, is difficult for some children."

2. Morphology -

System of "meaning-units" in a language - for example, morpheme "boy" + morpheme "s" = "boys", the plural of "boy". So the child with difficulty with the morphological structure of English might say "I have twenty cent" or "there go three boy."

3. Syntax -

The grammar structure in a language. "A car pushes John

versus "John pushes a car." A child who has problems here would have difficulty arranging or rearranging words into appropriately meaningful sentences.

4. Intonation -

Pitch (melody), stress (accent patterns), and juncture (pauses) of a language. (Spoken)."White House" versus "a white house." Children with problems here may be given to speaking in monotones.

Problem -

The child has to learn word-by-word at first while speech by that time in his life is already something that flows together almost as a single unit. (Paraphrasing Lerner.) A problem inherent in studying linguistics and language development in children is that it is next to impossible to know when the child starts to use a "complex mechanism of language, "because of the seeming suddenness of the process, according to Noam Chomsky (1967). Chomsky also believes that many aspects of language learning are innate, and unfolding in process, the same general way walking is.

"The information obtained from such work (studying language and linguistics development) promises to provide important guidelines for teaching children with language disabilities."

Psycholinguistics combines the disciplines of psychology and linguistics; psychology is said to be concerned with factors of "input", such as those things which cause a speaker to say given words at a given time, while linguistics is concerned with factors of "output", the language itself.

Lerner's view of this:

"Several 'promising developments' in psycholinguistics which are related to learning disabilities are discussed in this (the following) section." In other words, the psycholinguistics expert is concerned with the complete communication process.

So again, here is a case of a professional's views on the role of a factor in learning disabilities being predicated on what that professional has seen or read from other professions.

E. Psychiatry's Views

1. S.A. Szurek, in "Learning and Its Disorders," Vol. 1

Szurek mentions a handful of professionals who are concerned about child development, maturation, and similar topics, saying:

"Psychiatrists interested in children naturally take a lively interest in the results of the work of these other specialists (physiologists, pediatricians, psychologists, educators, and physical training specialists). Psychiatrists often collaborate with them in clinical work with individual children, since all aspects of a child's development affect or contribute to his personality growth and integration. But the special field of interest of child psychiatry are the feelings of the child, the attitudes he develops toward himself, and all those influences that help to mold them."

So, presumably, at least this psychiatric authority leaves audition-speech-language aspects of learning disability to those who are titled to perform the testing and training of this aspect. This is also how all the other contributers to this book take their stand.

2. Paine, et. al., "Dyslexia and Reading Disabilities", article titled "Effects of Auditory Training on Reading Skills of Retarded Readers"

This was a study on city children of low-income backgrounds, with the assumption that such children have auditory deficiencies as a result of always being exposed to harsh, loud city noises, engaging a kind of suppression of audition, and that the vocabulary in their homes is restricted.

(Learned inattention...especially for stimuli unpleasant to the subject.")

"In summary, the hypothesis is that the use of a developmental auditory training program for socially disadvantaged young retarded readers might render them better able to benefit from the training in reading which they were receiving. If, indeed, the program did improve a skill which underlies reading, then results might not be immediately apparent. So provision was made for evaluation both immediately after the conclusion of training and 1 year later."

It was a sample of third graders in midtown Manhattan, N.Y. Hearing and vision acuity difficulties and low intelligence were screened out, as were gross neurological problems.

One group received reading training only; another received auditory training only; another received reading and then auditory training; a control group received no training.

Reading tests used:

Gates Primary Reading Test - Paragraphs

Gates Oral Reading Test

Gates Sight Vocabulary Test

Roswell-Chall Word Part Test

Auditory testing attempted to assess the following areas:

Recognition, Discrimination, Attention, and Memory.

"The auditory skills were ordered on the basis of what the staff considered to be a developmental sequence. In each area the emphasis was on activities involving the sounds of language. It was expected that once the auditory skills were known, transfer of them to reading would occur automatically. For this reason the reading and auditory aspects of the program were kept separate with no attempt to relate the two programs, except

through a minimum number of verbal, non-visual explanations of the relationship."

Discussion of Results:

The results presented show little evidence to support the hypothesis for the study; that is, that a developmental auditory skills program facilitates remedial retraining for socially disadvantaged retarded readers for the ages included. None of the treatments was shown to be related to increased reading achievement, although some interaction effects were shown among tutor, time, ethnic group, and treatment variables. Further, reading scores obtained after treatment from the combined experimental groups were not significantly higher than those for the control group."

"... it was expected that the learning of specific auditory skills required for reading would generalize to the learning of more general auditory skills. It appeared that this generalization did not occur. The tests used seemed therefore inappropriate."

There was also uncertainty as to whether the children had really learned any of the instruction.

"The crucial factor was seen to be the practice in application of auditory skills to learning to read, which the reading-only group had been given.

Apparently the learning of auditory skills was not enough; practice in the transfer and application of skills to the reading situation is evidently an equally important step."

A second study was done, similar to the first one, with the exception that the auditory-only group was replaced with a reading-and-auditory-training-simultaneously--given group. However, the results still came out largely the same.

"There were no post-treatment score differences among treatment groups or between the combined treatment groups and the control group."

Since the results did not outwardly support the hypothesis, the writers deemed it possible that third grade was "past the optimal age" for such generalization to occur, that is, having a newly acquired auditory skill generalize to reading skills, or that it is possible that training of older children requires a more concerted effort.

So the writers do not deny the importance of auditory skills in learning to read, despite the data and results that the study yielded.

(Shirley C. Feldmann, Dorothy E. Schmidt, Cynthis P. Deutsch)

F. Speech-Language Professionals' Views

1. Leonard Becker, Speech pathologist, Miami, Fla., in Hartstein's Book, "Current Concepts in Dyslexia"

"Sometimes difficult for the eye of the educator to discern, a deceptively simple yet crucial fact is usually underestimated, overlooked or disregarded in the understanding of reading and reading problems: i.e., reading is learned from the speech of the student. Many of the auditory-articulatory operations in learning printed word recognition are based on, or have striking similarities to,

the auditory-articulatory operations in oral communication."

Becker then notes that there are many such auditory-articulatory operations that are unique to the process of the perceptual operations of reading.

He states that children learning to speak will "...make close approximations to what they hear, and continually refine their production of speech by matching it against their perception of the speech around them."

Problem:

At first the child learns whole words at a time, while in school he has to switch to putting symbols (letters) together to make those words - and according to Becker, of teaching reading:

a. Visual induction of auditory-articulatory recall
(Upon presentation of visual letters, child must say the given sounds.)

b. Auditory induction of visual-motor recall
(When teacer says sound, child points to a written word or letters.) (Or writes them.)

Becker then discusses the process of a child's learning to match his attempted speech sound with those of the teacher; then Becker states:

"Every different syllable, word, and phrase has a unique patterning of positioning of oral movements, a concomitant and distinctive acoustical pattern, and a concomitant and distinctive auditory image to be mentally recorded. Auditory perception of speech and articulation are composed of

numerous interacting perceptual subfunctions. In the development of printed word recognition, heavy demands may be placed not only on the auditory ... or articulatory system, but, more commonly, on the combined systems, which function as a singular mechanism.

On word attack skills:

Word attack requires recall of speech sounds (auditory memory) and the ability to rapidly relate and synchronize speech with oral movements. The blending of sounds is an intermediate stage in the hierarchy of teaching levels of reading and is not inherently automatic."

On "single-letters" versus "whole word" methods of reading instruction:

"Generally, it appears that children who demonstrate deficiencies in auditory-articulatory functions are more vulnerable to methods that employ relatively large units of reading. For some children with perceptual deficiencies in auditory-articulatory areas, even classic methods of teaching phonics involve units that are too large and processes that are too rapid and complex."

On perception of speech:

"Perception of speech, and production of speech, which together comprise the great intermediary between the child's visual perception and his language system, provide the matrix for printed word recognition. As the nature of the perception of speech and the production of speech becomes better understood, many solutions to the problems in these and related areas (meaning learning disabilities?) may emerge."

On bases of speech perception in reading:

"The auditory aspects of learning to read involve the following: differentiation between similar complex speech sounds, extraction of individual speech sounds and of parts and transitions from spoken syllables and words, rejection of interfering similar and superfluous sounds, suppression of background noises, identification or verbal recall of speech sounds and combinations, that may be spoken rapidly by the teacher, and association of sounds and letters. The auditory aspects of of reading disability are especially related to disturbances of sequential analysis of rapid acoustical changes within speech sounds and within transitions between successive speech sounds. Children with suspected deficiencies in auditory perception of speech related to reading usually demonstrate normal sensitivity for pure tones and perform reasonably well on many routine audiological speech tests used for assessing sensitivity and discrimination with the deaf."

On "articulatory microdistortions"

What constitutes this defect is consistent or inconsistent mispronunciations of letters or diphthongs in a very minor, often unnoticeable way, such as saying "boike" for "bike", or "het" for "hat". These, according to Becker, "can produce havoc for the child as he attempts to match or associate his individual sounds or groups of sounds with letters." Also, "(they) can preclude or retard learning to read even different letters that have similar sounds. Microdistortions ... can result in major problems of matching, word attack and word recall. Microdistortions of diphthongs have been observed frequently in teen-age students with severe reading problems.

It is interesting that diphthongs in speech for oral communication are expected to be mastered by the age of 3½ years, according to Templin's norms."

So, apparently this authority believes that speech-audition-language plays an important role in learning disability.

2. Helmer R. Myklebust, in "Development and Disorders of written Language"

Myklebust has a simple hierarchy of systems of language skill acquisition:

a. auditory first;

b. reading (visual receptive);

c. writing (visual expressive).

On this subject, Myklebust says:

"Using this frame of reference, it seemed propitious to include a group of reading disability children in the studies of development and disorders of written language. Practical considerations involved implications for remedial reading, but on a theoretical basis these children might provide vital clues concerning the interrelations between auditory and visual language."

Auditory Language

1. Auditory Receptive Language

Comparative findings for normal and reading-disability children were presented, tests of comprehension and then auditory-to-visual facility.

a. test #1 required instruction comprehension, bringing an appropriate word to mind, and writing that word in readable form.

Development patterns were similar in that both groups

reached a plateau at 13 years. Poor readers, however, were well below the level of the normals in this test, at about the 9 year age level for the task.

b. test #2 required matching what was heard with what appeared on the page. Developmentally, the reading-disability children gained more during 2-year intervals than did controls. (Apparently from no training.) Their performance at 15 then matched that of normals.

Overall, the two tests indicated that reading disability children were 3 to 4 years behind normals in the ability to comprehend instructions, although they were not intellectually inferior to the normals.

TABLE 39. Comparison of normal and reading-disability children on auditory receptive language

	Normal			Reading disability			
Age	N	Mean	S.D.	N	Mean	S.D.	U **
			--Test #1 Comprehension--				
9	43	14.3	2.3	14	10.6	3.0	3.81**
11	60	16.0	2.4	44	12.8	2.4	5.90**
13	49	16.9	2.1	58	14.2	3.0	4.91**
15	47	16.3	1.9	10	13.7	2.4	3.14**
			Test #2 Auditory to Visual				
9	43	20.7	4.6	14	17.5	5.4	2.17*
11	60	24.3	4.4	44	19.6	5.2	4.57**
13	49	25.9	4.2	58	22.5	5.1	4.32**
15	47	26.7	1.8	10	24.8	4.3	1.58

*p less than .05.
**p less than .01.

2. Auditory Expressive Language.

"When auditory receptive language is limited auditory expressive language is (necessarily) modified; output is dependent on input. It is evident that the poor readers were inferior in the use of spoken language." Since the tests of auditory-

-expressive language did not require reading or writing, it was presumed that it measured different skills.

**Finding:

"It is significant ... that the reading disability group was most inferior on test #1, ability to give opposites. They performed at a level 3 to 4 years below normal on this test."

Possible relations to reading disability:

"Reading-disability children probably are ... limited in auditory recall; they understand the task and comprehend the word given by the examiner, but are unable to bring to mind the specific word required." (Amnestic aphasia.)

"Or some may have been able to comprehend the task, understand the word provided, and recall the required word, but unable to utter it." (Expressive aphasia, a form of apraxia)

Summary of Myklebust's views on auditory language:

"The findings for auditory expressive language did not indicate that the deficit in output was directly reciprocal to deficiency in input. Rather, these children had language deficits separate and distinct from their limitations in auditory receptive. Therefore, this population of reading disability children did not present a unitary problem - a deficiency only in reading - but were limited in auditory language, receptively and expressively. These limitations were more substantial than would be expected on the basis of differences in cognitive ability. If remedial reading is to be effective, this broader scope of learning disabilities must be considered and auditory language deficiencies must be stressed, rather than

only the visual as is commonly done."

- Also, while the reading-disability children in Myklebust's study were below average in auditory language, they were even further below average in read language, and even more so in written language. (Sample of 156: 60 at age 11, 49 at age 13, 47 at age 15.)

"The reading-disability child has a generalized language deficit, the predominant base being poor auditory receptive and auditory expressive language. This basic disturbance persists and precludes (also) cross-modal learning so that the visual equivalents remain isolated and detached."

So Myklebust, another auditory-speech-language authority, appears to believe highly in the role of those processes and abilities in the problem of reading-learning disabilities.

III. Role of Sensory-Motor Processes in Learning Disability

A. Optometry's Views

1. Homer Hendrickson, O.D.

"Someone once said, 'if it doesn't get into the muscles, it does not get into the mind.' There is movement involved in each of the senses. Without movement in the end organs there is very little or no input to the central nervous system. Hence, the need to move fingers over a surface to feel, to move a substance or liquid in the mouth to taste, for the micromovements of the eye to see, etc. Vision (for example) develops under the active tutelage of touch. Bishop Berkely wrote, 'vision alone is incapable of supplying us with our knowledge of size, space, position and movement.'

"Movement is the key to learning and thinking. The baby develops through movement. "The neuromuscular pattern (measured electrically by the electromyograph) is identified as the same when one 'thinks' of moving as when one makes a movement. The difference is one of degree." (S. Jacobsen). From this evidence, no wonder Skeffington has said, "thinking is a movement pattern; vision is a movement pattern." Vision can be depicted as a prehensile movement. The experiences (movements) of the child and (even the) infant, as he develops, determine his learning."

Hendrickson discusses many of Gesell's concepts, such as the tonic neck reflex, the startle reflex, the righting reflexes, and statokinetic reflexes, the latter of which are, according to Getman, are "states of dynamic and positive immobility; a state of relaxed attentiveness, or the readiness to go into specialized action." (The state of the body when one is try-

-ing to learn something in school, presumably.)

Another concept brought out by Hendrickson is that of feedback. "Feedback is essential to learning", says Weiner. (Norbert Weiner, "Cybernetics", 1948)

The example of feedback in vision given was that of the eyes being kept from overshooting a target when fixating an object. Skeffington's four "overlapping circles" (vision audition, tactuality, kinesthesis) were discussed also, that is the tie-in between them. It is all a "battle against gravity." "The antigravity processes provide him (the infant) with information about where he is in space."

Hendrickson goes on to say, "through movement, and the resulting inputs from muscles to brain, the infant learns a body scheme; he becomes aware of his body and its parts operating against gravity." "Out of the antigravity subsystems is derived a zero point in space, an egocentric locus, a point of origin for spatial relationships outside the body. They answer for the human the question 'Where am I?'"

Another of Skeffington's areas of performance is "centering." "It is defined as an area of attention. One can, at will, center on,attend to,the inputs of hearing, touching, tasting, smelling, seeing or movement. Ideally the attention can shift from one to another as needs arise to solve problems of the moment."

Three concepts Hendrickson (and many other optometric authorities) expounds on are:

a. crossing the midline, with eyes, hands, and legs.

b. laterality (knowledge from inside of left and right.)

c. directionality

All of these are said to be critical for a child to possess if he is to be able to distinguish 'b' from 'd' or 'p' or 'q', or 'on' from 'no', and so on.

2. William M. Ludlam, O.D.

"Review of the Psychophysiological Factors in Visual Information Processing As They Relate to Learning", in Vision and Learning Disability

Ludlam here discusses psychophysiological mechanisms which have been found to be responsible for changes that take place in a person whose academic performance becomes improved as a result of visual training.

Three factors Ludlam wishes to discuss, quoted:

1. Eye movements, information acquisition and perception;
2. Short term visual memory;
3. The relationship of visual and oculomotor control, encephalographically recorded cortical patterns and attention.

DISCUSSION

1. Eye Movements, Information Acquisition and Perception

First, Ludlam comments that the 'percept' of vision is a seemingly continuous phenomenon, but that the neural information comes in in discrete units. "...the sequential packaging of information is of utmost importance to coherent visual perception. This is obviously true in a serial visual act such as reading." He then notes that there are various ways different languages read and write, concluding that there is no natural scan path for humans.

Then Ludlam cites the importance of foveal fixation to clarity of vision and the fact that a succession of such fixations is necessary for the person to be able to take in all the detailed information on the object of regard. Such an "object of regard" can of course be a sentence.

"During the viewing of a stationary object, the eyes engage in an alternating sequence of: a steady fixation at a point of interest followed by a fast eye movement to take up a new fixation point. The fast eye movement is called a saccade and usually takes up about 10% of the viewing time. The sequence of fixations and saccades in viewing a given scene has been shown by Gaarder to be non-random and by Noton and Stark to in fact be repeated in a serial feature scan pattern."

The point made by this is that many fixations are needed to bring in visual information in a 'piecemeal' fashion, and this takes accurate eye movements. (Here, Ludlam is saying that this paper is only trying to show how eye movements can influence reading, not the converse.)

Various visual training methods for various visual anomalies are then discussed, and Ludlam implies that the one common thread among all these is the need of improving the "fixation reflex", along with that of improving control of eye movement.

Noton and Stark concept of eye movement and perception:

"the features which are matched are the angles and curves in the object which yield the most information; the memory traces recording the features assemble the internal representation either with

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Noton and Stark concept of eye movement and perception:

"the features which are matched are the angles and curves in the object which yield the most information; the memory traces recording the features assemble the internal representation either with

eye movements or internal shifts in attention which are connected in a preferred order resulting in or from the scan path.

"Noton and Stark conclude from this analysis of the spatial aspects, that eye movement patterns of visual information acquisition "indicate a distinctly serial conception of visual learning and recognition." "

To sum up then, "a preferred scan sequence enhances speed of perception."

On alignment and posture:

"The relationship to reading of such factors as alignment and posture which have been expounded by many authors was shown to have physiological relevance by Miller. In an electromyographic study of the recti muscles he found that the total innervation to the recti muscles is smallest with the eyes symmetrically converged on an object in the midline and largest for extreme asymmetric convergence. In any biological information transmission system, those conditions producing the least interference "noise" would, in general, by producing the highest signal-to-noise ratio, be the preferred arrangement for facilitating continued attention, comprehension and retention of the transmitted signals."

One of the factors discussed was that of the threshold, the visual threshold, is highly raised during the voluntary saccade of activities such as reading. This is supposed to "smooth the discontinuous visual input." An 80% loss of energy in the VER signal was also mentioned.

Incidentally, this phenomenon was found to be absent in involuntary saccades. (Duffy and Lombroso, in "Nature",

Vol. 218, pp. 1074, June 15, 1968.)

"Since voluntary eye movements 'chop' or package the visual information input flow and head movements do not, the question arises as to what type of 'packaging'of visual input occurs in reading when scanning is accomplished by a mixture of head and eye movements which produce the fixations and saccades across a line of print."

"Thomas reports in studies of viewer's eye movements utilizing the Mackworth camera that when a subject's interest is aroused, there are significantly more total eye movements, more corrective eye movements to bring the object of interest to the fovea, fewer blinks and the eyes are opened wider than when a more passive scan pattern of a less interesting object is monitored. Kolers in numerous experiments on reading which involved reversing the words in the text and scrambling the text finds that the direction of the reading scan 'is a more important variable than the meaning or sense of the message.' Moses points out that the innervational control of the extraocular musculature is unique in that the nerve-muscle ratio approximates 1/10 whereas that of a typical skeletal muscle, the soleus, is found to be 1/120. This accounts for the very precise gradations possible in the motor control of eye movement. This accounts also for the reduction in scanning efficiency when because of problems in accommodation, convergence and fixation which are often accompanied by too close a reading distance, a given individual will scan with the head as a whole, using neck musculature rather than oculomotor and resulting in frequent loss of place, skipping words, word reversals and fatigue when attempting to read. Such a case

has been recently described by Ludlam, Twarowski and Ludlam."

Another important sensory-motor aspect discussed was the accommodative reflex, which can only be stimulated in the presence of accurate foveal fixation, as that is said to be the only area of the visual field capable of appreciating blur or 'defocus'. (Studies by Crane, Campbell, and Fincham were cited.)

Ludlam concludes this section of his treatise by saying that much or almost all of the detection and training of such visual difficulty has long been and still is in the domain of optometrists. Goal and role of the training: "Once the fixation and accommodative and oculomotor control mechanisms have done their part and through a saccade have brought about a precise foveal fixation, the visual information is now quickly entered into short term memory for further processing."

A list of what visual training seeks to accomplish: (quote)

1. Improvement in clarity of vision, i.e., enhanced contrast in form perception.
2. Maintainance of stable clear vision.
3. Reduction in the muscular 'noise' in the system.
4. Increase in the habitual near working distance, thereby reducing the demand on accommodation and convergence and also improving the ocular scan capability.
5. Improvement in the rate and accuracy of sequential acquisition of visual information.
6. Improved maintainance of information in short term memory.

7. Improved efficiency of transfer from short term to long term memory.
8. Enhanced ability to maintain the 'hot line' of visual attention by suppressing much of the occipital encephalographic activity not related to visual processing.

"Thus in training accommodative-convergence and fixation skills the optometrist is manipulating a highly leveraged multifaceted physical, physiological and psychological function which has great potential to alter the learning process. Some optometrists, not fully aware of the high leverage available to them in fixation, pursuit, accommodative and convergence training to improve visual attention and visual memory in patients with learning and reading problems, have been utilizing lower leveraged 'peripheral and gross motor' approaches in an attempt to accomplish similar ends."

So the above paragraph sums up Ludlam's views on some sensory-motor aspects of learning and reading problems quite succinctly.

3. Dr. Darell B oyd Harmon, O.D.

Dr. Harmon has these basic views on sensory-motor aspects:

"Optometry has stressed for a long time, that we have to be concerned not only with localization but with orientation in visually centered matters. Dr. Cohen's research showed that localization and orientation are two different physiologic processes, due to the fact that they were related to two different gravitational mechanisms.

Localization was related only to the gravitational mechanisms that function as a result of labyrinthian processes. The labyrinth gave a reference for the position of things in space, and out of that position in space, from that axis of reference, came the necessary accommodative effort to resolve what lay at various positions. But Dr. Cohen's activities in this field, first reported in 1959, indicated that localization alone was not sufficient to make for accuracy of resolution; nor was it sufficient to make for adequacy or accuracy of the acquisition of meaning in visually centered experience. It took orientation - another mechanism related to gravity - the mechanism of postural alignment and body alignment, to bring to the child, and the adult for that matter, the relationship of what was localized to meeting the needs of the individual in a visually centered situation. The gravitational mechanisms involved were those that had to do with postural alignment. They had to do with the necessary body mechanics of maintaining alignment with visually centered tasks or localizations with least effort."

4. Robert M. Wold, in Vision: its Impact on Learning

Wold talks about gross motor aspects as follows:

"In developing, a child moves from a motor to a visual world. This does not mean to imply that both senses are developing in an orderly sequence, independently, one after the other. What it is referring to is the relative dependence of the organism to the sense for survival. The young infant, as he is developing, tends to move from a primary motor world to a

motor-visual world to a visual-motor world to a visual world...

"Motor skills...must be learned. The infant, with normal apparatus, must develop these skills through practice., guidance, and motivation.

"As his action system develops and matures, he will develop the ability to sit, then stand, walk, run, hop, and finally, skip. Developmentally, all of these motor patterns will relate to his knowledge and awareness of his world and his later intellectual development.

During development a youngster must learn to handle self by controlling body processes of coordination, directionality, dexterity, emotional balance, etc., learn to relate the organism (including personality) to the world 'out there', and learn to visually manipulate the world 'out there.'

Verbal functioning and resultant language efficiency can be divided developmentally into the following stages:

1. acquisition of meaning 2. comprehension of the spoken word;
3. expression of the spoken word;
4. comprehension of the printed word (reading);
5. expression of the printed word or writing.

"Possibly the most significant relationship between learning and maturation is the fact that the effectiveness of learning is dependent on the necessary physical, sensory, sensory-motor, mental foundations thatmust be present before new abilities can be developed. We must remember that a child cannot learn until he is ready to learn."

B. Psychology's Views

1. Frostig and Maslow

"According to Piaget, as the reader will remember, intelligence develops from early sensory-motor functions. With their help the infant learns about objects and actions; space, time, and causality. Through moving his hand or body in one direction and then back, the child experiences the reversibility of processes. Through the changes his actions bring about in the environment, he experiences the fact that events are linked. The development of sensory-motor functions during infancy influences the development of all mental processes later on because, as already stated, each developmental stage influences the next, and the functions that develop in each stage become fused with those that evolve later."

"The optimum development of the child's total functions is, after all, to a great extent the whole concern of education. The training of the sensory-motor functions must therefore be included in the educational process."

a. Visual Perception and Movement Education

"The child learns to recognize distances and spatial relationships while moving in space, and children who are handicapped in movement or lack experience in playing in open spaces may lag in the development of such visual-perceptual skills as perception of position in space and spatial relations."

The claim is that movement education can help out these problems, giving the child some of the experiences he lacks in, those of spatial aspects and temporal ones. And, "learning to percieve temporal and spatial sequen-

-ces is of subsequent help in academic learning."

b. Auditory Perception and Movement Education

This would probably help the child's sense of temporal order of things, and give him the concept that there exists such a phenomenon.

c. Language and Movement Education

"In regard to language, movement education enhances the ability to follow simple directions, and also teaches a spatial and temporal vocabulary; e.g., such words as 'in between', 'fast', 'sooner'.

d. Movement Education and Association

"During movement education the child learns to follow directions, which requires him to make associations between auditory stimuli and a movement response. He learns to imitate movement sequences, which require him to make associations between visual stimuli and movement.

He also learns to integrate the perceptions of more than one sense modality. All movement requires the association of various kinesthetic perceptions and other sensations emanating from the body (proprioception).

Associating present movement with previous experiences occurs when the child reproduces a movement he has seen, and whenever movement skills are taught in a gradual step-by-step fashion.

e. Movement Education and Imagery

"As already discussed (see Chapter 8), imagery is

indispensable for the formation of associational nets. Bruner, Hebb, and Piaget and Inhelder, among others have discussed the importance of imagery in associative processes. Imagery is also necessary for planning (ability). (Abravanel, 1968)"

f. Movement Education and Thought Processes

"Thought processes can also be developed by movement education. Movement education can help the child learn to keep several ideas in mind simultaneously and help develop his memory for sequences as when he is following ... complicated directions... Concepts of time, space, force and resistance can be taught through providing movement experiences that vary according to these dimensions. Problem-solving is a most important aspect of movement education. Problem-solving through movement education simultaneously involves the child in seeking creative solutions and new avenues for self-expression.

g. Movement Education and Academic Skills

"As movement education influences all psychological functions, it necessarily indirectly affects the learning of academic skills. Movement education can help the child to pay attention, to direct attention, to concentrate, to react promptly to stimuli, to quicken a usually slow tempo of response, to control impulsive reactions, to remember

a sequence, and to follow directions. All these abilities are prerequisite for academic success. But training academic skills through movement education need not necessarily be indirect. Academic skills can also be trained directly, through such activities as keeping score, reading written directions given by the teacher, playing number-line hopscotch, and so on.

So Frostig and Maslow apparently believe in instilling a strong motor foundation for academic learning, and they believe in lacks in motor abilities as being contributors to learning problems.

2. A. Jean Ayres, Ph.D., in "Sensory Integration and Learning Disorders"

a. Role of Primitive Postural Reflexes

"Postural mechanisms are among the more important areas of assessment of children with learning disorders. Skilled professional observation in these areas is indispensable. Foremost in this evaluation is the detection of the degree of residual or poorly integrated tonic neck and tonic labyrinthine reflexes. Abnormal presence of these reflexes is indicative, if found in conjunction with certain other signs, of poor sensory integration that is often associated with learning disorders. While normally overtly present in the very young infant, maturational processes should gradually incorporate the reflexes into the sensorimotor system so that they do not interfere with fur-

-ther maturation of postural mechanisms."

b. Role of Cocontraction of Antagonistic Muscles.

"A decrease in the capacity simultaneously to contract muscles antagonistic to each other so as to immobilize one or more joints frequently is evident among children with learning(disabilities), especially those who also show inadequate maturation of postural mechanisms, including poor standing balance. As with postural mechanisms, there is a relationship of visual space perception."

c. Role of Muscle Tone

"Muscle tone ... reflects certain conditions of the brain stem, especially how the brain stem is processing and directing its afferent input. Similarly, hypotonicity may indicate a paucity of sensory flow upon which normal execution of postural reflexes is dependent. For these reasons the therapist should be familiar with the muscle tone of the child, including variations in tone throughout the body. Sometimes some muscles are hypertonic, and the the--rapist will want to watch the influence of various activities on that tone, possibly avoiding increasing it.

d. Eyes Extraocular Muscle Control

"The extraocular muscles ... should be understood by therapists --directing remedial activity." Possible problems:

"Overshooting or losing the target, difficulty in changing direction, lagging behind, attempting to move the head instead of the eyes, making faces, blinking fre-

quently or squinting, inattentiveness, difficulty in looking away from the visual stimulus or finding it again, inability of the eyes to work together and especially, difficulty in crossing the mid-line are each suggestive of less than perfect integration.

"Failure or difficulty in crossing the mid-line ... with the eyes is of great significance, for it is one of the more reliable signs of the syndrome of disorders in pos- and bilateral integration. Sometimes crossing the mid-line with the eyes can be so difficult for a child that to do so brings more discomfort than he should be expected to endure more than once or twice. Eye exercises are fatiguing. Excessive demands on the child should be avoided. All are actually designed to be indices of central nervous system integration and its neural relation to the muscle and not the actual status of the muscles themselves."

So, Ayres obviously places a high premium on integration, specifically sensory-motor integration, saying basically that clinically visible lacks in it are often signs of learning difficulties.

d. Assessment of Vestibular System Function

"Only suggestive behavioral correlates of vestibular processes can be recommended now," Ayres says before stating the following:

"There is a great variation among learning disabled children as to how they process vestibular sensory input, and it is recommended that the therapist

attempt to assay the manner in which each child's brain is handling those stimuli in order to plan an effective intervention program. In some children it it appears that an insufficient quantity of vestibular stimuli fail to reach their natural destinations and thus do not contribute adequately to the sensory integrative process. This reduced conductance is believed to be reflected in reduced nystagmus following rapid rotation around the longitudinal axis of the body and/or a lack of a normal amount of feeling dizzy after spinning. Both amplitude and duration of (the) nystagmus may be reduced.

On the other hand, some children seem overwhelmed by vestibular stimuli and are unable to force organization upon them well enough to make an adaptive response. They respond with fear and reluctance to activity which places them in a posturally threatening position."

e. Integration of Function of the Two Sides of the Body

"The child who has a tendency to want to use one hand only and that hand only on the ipsilateral side is probably showing a deficiency in crossing the midline of the body."

f. Choreoathetoid Movements

"Some children with learning disabilities evidence a form of motor incoordination that falls more under the category of involuntary motion than clumsiness

due to poor motor planning or inadequately matured postural reflexes. The involuntary aspect is not obvious unless the child is placed in a situation causing mild or greater stress in holding a given posture."

So not only does Ayres place a high premium on Sensory-Motor aspects of learning disabilities, she also trains such functions, or advocates this training extensively, for learning disabled children.

Interestingly, none of the literature reviewed in this study has tried to venture any theories as to which causes which, whether the learning disability causes the motor problems or vice versa.

3. Edith Klasen, Ph.D., in "The Syndrome of Specific Dyslexia"

In a sample of 500 as talked about previously in this paper some 49.2% of these children with learning problems also "displayed motor dysfunctions." (10.6% had only motor disturbances; 38.6% had "various combinations of visuo-motor dysfunction.")

European research:

a. Kobi saw some children with motor disorders in the form of "awkwardness, jerky movements, contracted muscles, poorly coordinated movements, etc. Also: "dysgraphia and lack of dexterity.

b. Biglmaier: This researcher only saw a few slow readers with "difficulties in the motor functions needed for reading, such as eye movements, but more with difficulties in the muscle control needed for the writing and speaking processes.

Other European researchers say much the same thing, but according to Klasen, not a large number of them have studied this aspect yet, certainly not as many as have studied it in the United States.

Klasen spends most of the chapter on this quoting these other authors, but about the only thing she says on her own is:

"Etiological questions concerning motor dysfunctions are still largely open, but diagnostic and therapeutic methods are available and in use."

So that is at least three psychological authorities who appear to believe that learning is motor-influenced to one degree or another, with the additional opinions of several others put into their writings.

III. Role of Sensory-Motor Processes, cont'd

C. Ophthalmology's Views

1. Herman K. Goldberg, M.D.

The only reference Goldberg seems to make concerning sensory-motor aspects of learning disabilities is a list of symptoms of 'cerebral dysfunction', which are:

a. delay in establishment of handedness
b. difficulty doing things like riding a tricycle
c. inability to fasten buttons until 6 or 7 years
d. inability to tie shoelaces at expected ages
e. inability to hop on one foot at 5 years
f. "marked hyperactivity"
g. unpredictable mood swings

The orientation appears to be largely 'biological' (i.e., medical and cause-pathology oriented). No mentions are made about any kind of motor or sensory-motor training, either.

2. J. Hartstein's book, "Current Concepts in Dyslexia"

The only mention of sensory-motor processes made here was by Harvey Cantor, a neurologist. It follows:

"Children with learning problems frequently look on themselves as being inferior to their classmates. Those with the additional handicap of being clumsy have an even more impaired self-image. Effective physical education directed at skills which the child must use on the playground with his peer group, or which allow him to compete successfully in one sport or another, will favorably alter the child's opinion of himself and of his time spent at school. No child enjoys being chosen last con-

-sistently during gym class. If his physical skills increase, the situation changes, and the child, instead of dreading the physical education program and consequently disliking school, will soon look forward to this time. The improved self-image that accompanies new physical abilities may well be the basis of the success claimed for the treatment of children with learning disabilities by certain physical education techniques, and makes at least as much sense as the concept of 'enhancement of visual-motor perception through exercise.'"

Other ophthalmologists in the book refer to psychologists "reading teachers" but do not discuss in detail their actual training methods, some of which may or may not include motor or sensory-motor work.

D. Education's Views

1. Janet W. Lerner, in "Children With Learning Disabilities"

After discussing Getman, Kephart, Barsch, Doman and Delecato, Lerner summarizes these theories and states her own views:

"A number of theories of learning disabilities have focused on sensory-motor and perceptual-motor development of children. Theorists who stress the importance of motor learning conclude that when the various sensory-motor and perceptual-motor systems have been fully developed and integrated, the child is ready for the next stage of development - concept formation. Concept formation depends upon intact perception, which in turn depends upon sound motor development. The authors of the motor theories of learning disabilities caution that a preoccupation with conceptual and cognitive learning may lead to a neglect of the base foundation of motor learning. As a consequence, there may be gaps in the developmental sequence which will affect all future learning by either limiting or distorting it. In this view the study of human movement is inseparable from the study of learning because as man moves, he learns. An understanding of the dynamics of learning thereby necessarily involves the understanding of movement. Movement and learning are reciprocal elements throughout the life of the individual.

"Research with exercises to develop motor skills and thereby improve academic learning is currently in progress, but thus far there is little conclusive evidence to indicate that motor programs result in significant academic gains. As a group, children who have difficulty learning appear also

to have difficulty with motor performance. One hypothesis for this high correlation is that the motor problem is not the direct cause of the learning problem, but rather a concomitant difficulty that children are likely to have. According to this hypothesis, training in motor skills leads to improvement in motor learning, but it does not necessarily lead to improvement in academic ability and learning. A further consideration is that the role of language development in learning is relatively neglected in most motor theories. Finally, the correspondence between motor growth and learning can be questioned by the observation that some children with superior motor skills are unable to learn to read or succeed in other academic areas while some children with excellent academic skills are inferior in motor performance and physical activities."

2. B.R. Gearhart, in "Learning Disabilities - Educational Strategies" After Kephart, Getman, Barsch, and Bryan Cratty were discussed, Gearhart sums up his views as follows:

"The findings presented in these pages must be evaluated carefully, for most of them only infer causality by indirect inference through the discovery of relationships. For example, practice in "slowed-down" motor activities may not aid in causing attention-span lengthening and the resultant intellectual improvement, even though a relationship has been demonstrated. Further research is necessary to elucidate whether various kinds of perceptual-motor training programs and components of these

programs actually result in the improvement of other kinds of desirable behavior."

Since this section of the paper also seeks to find the views concerning perceptual-motor aspects as well as sensory-motor ones, here is more from that same page in the book as the last paragraph -

"One frequently hears about the role of perceptual-motor activities in the education of young children. It is believed that the term 'perceptual-motor' not only indicates a growing awareness on the part of educators and physical educators that the perceptual process, the formation of judgments, is important to the ultimate motor expression which comes out of the child, but at the same time indicates that intellectual growth on the part of the child can be encouraged by manipulating the complexity of the perceptual input in intelligent ways.

A human is a single integrated organism. For convenience, we frequently fragment his behaviours in order to study them in various ways. At the same time, we should remain aware, however, of the manner in which verbal, perceptual, motor, and cognitive behaviors may be interrelated."

So the theorists for these motor theories seem to largely be from the field of psychology, but educators seem to view them (the theories) with guarded optimism, at least these two educational authorities.

E. Psychiatry's Views

Paine, et. al., in Dyslexia and Reading Disabilities , Sol Nichtern the author of the passage 'Reading Disability and the Child Psychiatrist.'

Nichtern talks about sensory-motor processes in terms of refusal to go to school by the child -

"A second type (of school refusal) is rooted in the inability to function. These are children with genetic constitutional impairment who may have intellectual deficits, disturbances in sensory-motor organization, or a disturbance of the central nervous system manifested by failure to integrate function. By the time they reach the third grade these children are usually identified as poor readers by their inability to profit from the formal teaching system and they gravitate into special remedial programs. Many are identified as having congenital or specific dyslexia. It is important to recognize that this group represents only part of the much larger group that has reading disabilities."

Other psychiatric literature elsewhere might have had more detailed writings on this, but not very much was found in the literature surveyed here.

F. Speech-Language-Audition Therapy's Views

Helmer Myklebust, in 'Development and Disorders of Written Language'

Myklebust does not talk about sensory-motor aspects much if at all in this book, talking only about motor aspects of writing for the most part. Here is what he does have to say:

"Many workers in recent years have stressed motor functions in relation to learning. However, this emphasis has not been in terms of either developmental patterns or language acquisition. Another limitation is that few motor tests provide normative data so that maturational levels can be ascertained. (A notable exception is the Oseretsky test; Boyd used items from this test in comparing the motor abilities of deaf and hearing children.)"

After that, comes his discussion of motor aspects of writing, which this paper declines to discuss.

And as one notes the underlined sentence above, one can infer that language acquisition and other aspects of language are this author's main concerns, whereas sensory-motor aspects may be only of minor concern to this authority.

IV. Role of Emotion and Motivation in Learning and its Disorders and the Role of Learning Disorders in Child Maladjustment.

A. Optometry's Views

1. Ray C. Wunderlich

"Psychological problems are very frequent and very real in children who fall behind their peers in achievement. The family of the child who has brain dysfunction regularly has problems of an interpersonal nature."

The cause here seems to be the learning problem, with the emotional problems being the effect(s). Emotional problems fit into his "Bio-Social Decline" flow chart,also.

"(The child's) infectious illnesses (can) occur at times of emotional stress. Life events in the psychological realm may act as triggers in precipitating allergic, infectious, emotional, or visual disorders. It is not uncommon in the author's experience to discover that a child's visual findings will change depending on the setting in which the investigator proceeds and the personality of the visual investigators."

The inference here seems to be that emotional stress can be the cause of myriad difficulties in the whole person, any of which can lead to temporary or longer-lasting problems in learning.

2. Jerome Rosner, in "Helping Children Overcome Learning Difficulties"

"EMOTIONALLY DISTURBED?"

"For a while, most learning difficulties were attributed to "emotional blocks", and with good reason. Most children with learning problems do show signs of emotional disturbance.

But then, how long would you remain calm if, no matter how hard you tried, you continued to fail daily in your job and, on top of that, had your failure widely advertised? You would be very upset! You would quit - if, indeed, you were not fired first! Children cannot quit elementary school - at least, not literally. And they do not get fired. They merely get shamed in public, as their failure is made known to their classmates and their parents. Then we urge them to try again and to try harder, and to stop being so lazy.

"Only a fool would simulate the behavior of a squirrel in a wheel cage very long. It should come as no surprise, therefore, when this child starts to act up during class."

Rosner then goes on to say that the process feeds on itself, as the child's "...behavior deteriorates further and, ultimately, there he is - another child who cannot meet the standards of the classroom, becomes frustrated, misbehaves, forces his teacher to a negative conclusion about his long-term prospects as a student, and - in a sense - he <u>is</u> 'fired'; he is referred to someone. (Psychologist or Psychiatrist, usually)

"Although there certainly are some successful psychotherapy cases around, the results of this approach were generally disappointing in terms of effects on the child's classroom performance. Worse yet, with each step of this referral process, the child was removed further from the one place, and the one person, where he could be helped more directly - his classroom and his teacher."

The above needs no paraphrasing as the article is written well within the confines of layman's language.

However, one can see that his views are that the cause and effect relationship is one of the learning problems causing the emotional ones.

B. Psychology's Views

1. From Frostig & Maslow's book, 4 schools of thought of psychology were discussed.

a. behavior modification

The childs interests, needs, and motivations are not accepted but manipulated when this is deemed advantageous; motivation is extrinsic.

b. humanistic psychology

"Satisfaction of needs is necessary for optimum learning ability. The child's need for experience, his wish to be helpful and to communicate with others - in short, social motives and need for experience - are emphasized. Motivation is mainly intrinsic."

c. psychoanalysis

"Satisfaction of needs regarded as the prime source of motivation ("the pleasure principle"). Needs for love, security, and mastery and emotional and social needs must be satisfied before energy and interests are available for learning. Motivation is both extrinsic and intrinsic."

d. cognitive-developmental psychology

"Interests are the expression of a 'drive' toward equilibrium; knowing is a motive in itself; the need for equilibrium is as compelling as physiological needs."

2. Jean Ayres, Ph.D.

"Movement which is not goal-directed usually is not as therapeutic as that which is more purposeful, and purposeful movement becomes therapeutic when a child makes a response which is adaptive, especially if it is more adaptive than any response previously evinced. Promoting a response which represents a more mature or integrated action than previous performance requires special understanding and ability on the part of the therapist. Such competence represents more than technical proficiency; it approaches an art..."

"The most therapeutic situation is that in which the child's inner urge for action and growth drives him toward a response that furthers maturation and integration. Within the domain of a child's sensorimotor function, these responses most frequently are either more effective postural or balancing responses or greater skill in motor planning, such as is required by the manipulation of objects. The latter includes playing with toys and solving visual puzzles...

"When the optimum-for-growth situation is achieved, the child 'turns on' and his obvious zest for experience signifies several things. It tells the therapist that the sensorimotor activity is at a developmental level appropriate to the maturation of the child's nervous system. The therapist can profit from noting this. It indicates that the experience is a self-actualizing one; it is growth-promoting, fulfilling, organizating, and integrating. It is the kind of experience that the average child continually seeks during the first few years of life. The average child finds it and grows from it; the child with poor sensory integration seems unable to

create the situation necessary for normal maturation or to respond to it in a manner fostering maturation. He requires a situation especially tailored to meet his needs."

Ayres then talks less about emotional aspects as possible causes of learning problems and refers to them as aids that can be utilized in the treatment program. This, however, implies that emotions and motivations have a role in the cause of it in the first place, or at least often aggravate the problem and must be dealt with.

C. Ophthalmology's Views

1. Goldberg-Schiffman's book -

This book has a chapter titled 'Psychiatry and Learning Disabilities', so most of the views expressed here will probably mirror those of the psychiatric profession.

On the issue of whether emotional problems cause or result from learning disabilities: was answered in the affirmative for both:

"The child who is already overcome by emotional stresses is one who will not learn adequately in the normal school situation. Bryant and Patterson have pointed out that emotional difficulties are almost universal among reading disability cases. They conclude that most children with reading problems feel different, inadequate, stupid and both frustrated and guilty because of their failures. Conflict and hostility with parents, teachers, and peers often result, along with varied defenses and mechanisms for expressing and controlling these emotions. Thus, in many

cases, the emotional problems seem to be a direct result of the failures and conflicts associated with the learning disability.

Two classifications of psychiatric factors important in learning disability: (quoted)

1. those arising during the preschool years
2. those arising after the early school experiences and after entering school.

"In most cases, the psychiatric factors from the preschool years carry over into the early school years, where new psychiatric factors simply compound the emotional stresses with which the child must try to cope."

Other emotional aspects discussed:

a. parents expectations being too high;
b. family difficulties, especially those that the child feels at fault for;
c. sibling rivalry;
d. anxiety connected with his socioeconomic group;
e. generalized negative feedback from parental anxiety.

Possible child emotional reactions:

a. a 'couldn't care less' attitude;
b. paranoid attitude toward the teacher;
c. feelings of inferiority;
d. tendency to block things out emotionally, and "frank aggressiveness toward others." All of the above could cause the child to "reject the learning situation", according to Goldberg and Schiffman.

IV.

D. Education's Views

1. E.R. Gearhart's book -

In chapter "Characteristics of the Child With Learning Disabilities", Gearheart mentions "lack of motivation", as follows:

"Although this is probably a result of the individual's difficulty in learning, it is recorded as a characteristic on the referral report of many children who are later placed in a special learning disabilities program."

2. Janet W. Lerner's book, "Children With Learning Disabilities"

Lerner discusses the psychodynamic view of the role of emotional status in learning disorders, then has the following summary views:

"For the learning-disabled child, then, the feelings within himself and the feedback from the outside environment mold a concept of an insecure and threatening world and a concept of himself as sn inept person without identity. Such a child does not receive the normal satisfaction of recognition, achievement, or affection.

"The battering of the child's developing personality continues and increases when the child enters school. Giffin (1968) suspects that the pupil who manifests learning problems when beginning academic word in school probably has been handicapped by learning disabilities in his preschool life. The school may be a place where he is to face a situation that makes no allowances for his shortcomings and where those directing the learning are unable to comprehend his difficulties.

"Ironically, the characteristic inconsistency and unpredictability of the child with learning disabilities may

account for an occasional academic breakthrough when he performs well, and such random moments of achievement may serve to make matters worse for the child. Now the school may be convinced that 'he could do it if he just tried harder.' His failure now may be viewed purely on terms of his behavior and poor attitude. Eisenberg (1967) notes that increased impatience and an attitude of blame on the part of the teacher intensifies the child's anxiety, frustration, and confusion, which brings disastrous consequences to the ego.

"There appears to be no common characteristic of personality development for children with learning disabilities. Each child has his own unique way of handling his feelings, his deficiencies, and his environment. As Eisenberg (1967-p. 171) puts it: "The patient is a psychobiological entity subject both to biological and to social influences in manifesting a psychological continuity of his own." Gardner's 'The Child's Book About Brain Injury' (1966) is designed to help a child understand himself.

"In summary, the child's feelings must be taken into consideration in an analysis of the child with learning disabilities. The psychological and emotional status of the child has an impact on thelearning process. The important question from the psychological and emotional point of view are: "How does the child feel?" Another: "Are the child's needs being satisfied?" and "What is the child's emotional status?" Emotional well-being and a favorable attitude are essential prerequisites before effective learning can take place."

Then Lerner discusses the additional factor of the emotional status of the parent or parents of the child with the problem, along with that of the rest of the family, stating that:

"Help of a psychiatric or psychological nature is often needed by the parents of children with learning disabilities.

"Giffin has found that the reaction of the parents is often one of denial, followed by anger, then by a search for other diagnoses. Sometimes parents also need help of a psychotherapeutic nature in accepting the problem, in developing empathy for their child, and in providing a beneficial home environment. Guidance counselors and social workers play important roles in providing such help."

So, much as education people may very well be ill-equipped to handle emotional problems of these children, they do appear to acknowledge the presence of the emotional factors in learning disorders, whether the former is a cause or a result of the latter.

E. Psychiatry's Views

1. Berlin and Szurek's book, "Learning and its Disorders"

The psychiatrists in the book speak about the role of emotion and motivation in learning disabilities extensively.

"Aspects of Creativity and the Learning Process" chapter:

"I'm sure all teachers have experienced feelings of frustration as promising students give one glimpses of creativity that never mature or are never fully realized."

Berlin points to "unconsciously present conflicts" as blockers of the learning process, with the extreme being that of schizophrenia.

"Obviously there are many other aspects of conflict that inhibit creativity and were evidenced in these children and their parents. (A study Berlin had known about)

Another aspect of the conflicts that resulted in the massive inhibition of feeling were those conflicts that centered around learning. In the child learning such things as self-care and later learning in school often were markedly inhibited. All aspects of learning at every developmental stage can be viewed as preparation for the fullest living and learning in the next stage of development."

There is the implication, then, that any time there's an interruption or blockage at any stage, even if it is simply emotional, it will definitely increase the difficulty of learning and/or defeat motivation to learn.

Berlin implied also that the energy is taken up from the learning process if it is needed for repression of conflict feelings, as will any energy that can otherwise be used for creative purposes.

Berlin defines the word 'conflicts' as those related to or resulting from 'early life experiences with conflictful parents." (Parents communicating attitudes of belief that it is wrong or dangerous to express emotions of anger, hate, need, disappointment, and anxiety, and the other ones that often make the parents uncomfortable; also to unrelieved or unresolved Oedipal conflicts.)

It is apparent from this and other psychological/psychiatric literature that emotional problems can indeed preclude the possibility of learning taking place at normal rates and in normal ways in the classroom, and this appears to be the largest area of interest of the authors in this book. However, there is also recognition of the converse, that learning problems of other origins can and often do cause moderate or severe emotional difficulties.

F. Speech-Language-Auditory Therapy's Views

Helmer R. Myklebust, in Development and Disorders of Written Language.

"Emotional disturbance often is considered a primary factor in reading disabilities; only meager attention has been given to psychoneurological involvements, such as dyslexia. Moreover, written language rarely has been studied in conjunction with reading disabilities.

In comparing the socially-emotionally disturbed and those with deficits in reading, a major question was whether emotional factors were primary to both groups, the difference being in the pervasiveness of the involvement - one group showing only poor reading ability and the other poor reading and social-emotional maladjustment. The previous analysis, however, suggests that to regard either group only in terms of emotional factors might be a serious oversimplification...

Direct comparison of these types of exceptional children was made to gain further insights into the ways language disorders might be influential in both. The results are given...

Total Words

"All the groups of exceptional children were limited in output of written language, especially as measured by story length. This is shown again by these results. Both the reading-disability and the disturbed children were inferior in total words, but the socially-emotionally disturbed children had the greatest deficiency; this difference was most marked at 11 years of age. The developmental pattern for both groups indicated progression, the poor readers making most increment between 9 and 11 years. The disturbed children, in contrast

achieved their greatest advance between 11 and 13 years of age; they disclosed a pattern of developmental delay compared with the other group. By 13 years of age the groups were equivalent."

Other aspects discussed were:

total sentences, words per sentence, syntax, abstract-concrete;

Summary

"The reading-disability and socially-emotionally disturbed children differed with respect to acquisition of written language. The greatest variation was for story length and number of sentences, but the reading disability group was superior on all aspects. These differences occurred largely because of variations in developmental pattern. The poor readers reached a plateau at 11 to 13 years, but the disturbed group attained maximum performance between 13 and 15 years and for syntax and abstract-concrete had not yet reached a plateau at 15 years. Their pattern thus varied from the pattern of the reading-disability children.

"Both groups were markedly deficient in written language, but they varied from each other in a manner suggesting that they were not homogeneous populations. Though both groups were inferior in reading (input), their use of written language (output) indicated that the basis of their disability was not identical. The reading-disability children seemed deficient in the written word because they were unable to learn to read; they were more characteristic of those with language disorders, having greater integrity in other respects. The socially-emotionally disturbed presented a pattern of generalized developmental re-

tardation. That these groups are parallel in type, both being unable to learn because of emotional conflicts, is not indicated. Social-emotional maladjustment occurs with and without effects on acquisition of language, and reading disabilities occur with and without social-emotional maladjustment. A principal implication of this comparative analysis is that to consider either group only in terms of emotional factors is to overlook basic disturbances in their patterns of learning. If these disturbances are recognized, and if remediation is provided specifically in relation to the type of disability present in each group, the outlook is favorable. If the similarities between these types of exceptional children are stressed unduly, their idiosyncratic needs will not be provided for and their ultimate potential will be minimized."

So, obviously this author has taken an extra-critical look at the possible role of emotional factors, cautioning the reader not to stress the wrong, or what could be, the wrong target.

I. Treatment Plans and Strategies

A. Optometry's Views.

1. Richard J. Apell, "The Role of Lenses in Development of Visual Perceptual Skills", Greenstein's book.

Five categories of lenses were discussed:

1. compensatory 2. remedial 3. developmental
4. preventative 5. training

Apell qualifies his views on this by saying:

"Where lenses can be used effectively, it is often possible to reduce or eliminate the need for other types of therapy and medication. However, where lenses may perform miracles in one case, they might be useless in another. Therefore it is imperative for the optometrist to differentiate those cases where lenses will be effective from those where they will not." But "it is our opinion that lenses should be the first consideration in any optometric vision therapy program for the learning-disabled child."

The kinds of lenses used most often by functional optometrists are remedial and compensatory-remedial ones.

Criteria for their use:

better near visual acuity with the lenses on;
optimization of reading distance (to 15-16")
reduction of found bell retinoscopy lag;
disappearance of small amounts of anisometropia and astigmatism;
increased speed and fluidity of reading;
increase in both gross and fine stereopsis;
better accuracy at saccades and pursuits;
improvement of general asthenopia symptoms.

Another finding reported was that these lenses also make or can make training an easier task.

(Perceptual training)

So, Apell's message seems to be that some of these can be helped tremendously in his school learning tasks if some of his visual stress is reduced through the application of lenses and/or visual or visual-perceptual training, thereby being freed to concentrate on the work at hand.

Streff Syndrome children were referred to, and it is said that these children are often mistaken or taken for learning disability children.

(Characteristics: no refractive error, reduced acuity at distance and especially near, reduced stereopsis, large accommodative lag in bell and book retinoscopy, along with monocular diplopia, reduced form fields, past pointing, and even distortions in color discrimination.)

Apell pointed out that many such children rapidly improve in school performance upon lens treatment for this condition, which commonly entails low-plus spheres for at least near work or even full time.

2. Lawrence McDonald, O.D., 'Optometric Visual Training: Its Role In Learning'

Skills McDonald advocates training for, as listed by Hendrickson:

a. the ability to follow a moving object smoothly.

b. the ability to fix eyes on a series of stationary objects.

c. the ability to focus quickly

d. the ability to team the two eyes together.

e. the ability to see over a large area (in the periphery) while pointing the eyes straight ahead.

f. the ability to see and know (recognize) in a short look.

g. the ability to see depth.

h. interaction between and among these skills.

"Programs for individuals primarily deriving their orientation through their muscle sense include the development of body awareness through the development of gross and fine motor control. This is integrated with other looking skills such as simultaneous visual integration and visual scanning."

"Programs for the simultaneous visual integrator include the development of recognition of similar visual patterns. These are then integrated with the individual's muscle sense and visual scanning abilities."

"Programs for the visual scanner include the development of rhythmic activities, a sense of rhythm and rhythmic eye movements etc. These are integrated with simultaneous visual integration and the muscle sense of the individual."

"These three aspects, in principle, represent the developmental phase of optometric visual training. Experience tells us that these skills should be developed before the fourth grade if the child is to be an efficient self-learner without limiting his visual performance and learning ability.

"The optometrist realizes however that he must help his patients surpass the developmental phase if they are to develop appropriate visual skills that will allow them to achieve optimum potential. This aspect of visual training represents the enhancement phase and is involved with developing sustaining skills, searching skills and manipulatory skills. These sophisticated visual

skills represent a higher conceptual level than the elementary skills of the developmental phase and are perfected to enable the individual to develop those degrees of freedom within the visual system which are necessary for adequate interchange of information between reality and symbology. This is essential if one is to learn to read with comprehension.

"Through optometric visual training, one can enhance his visual skills to process more and more bits of information, both real and symbolic, in least time and with least effort. The difference between little thoughts and big thoughts is the number of bits of information that have been integrated into a common response. Optometric visual training does not teach content; that is a task for education. However optometric visual training does develop the skills necessary to process information (or content), which is an integral part of the education or learning process. The individual is then free to apply these visual skills in any area of endeavor he so chooses."

3. Jerome Rosner, O.D., in "Helping Children Overcome Learning Disabilities"

Rosner breaks his training chapter into sections.

First section:

"<u>The visual perceptual skills program</u>"

Rosner is famous for his TVAS, or Test of Visual Analysis Skills. This is the task in which the child is to reproduce various patterns drawn on a board with any number of connecting dots. (This includes the geoboard, used with elastic bands to make the pattern the child is to reproduce.) The child can reproduce up to 200 such patterns from a book of pictures of the patterns.

This activity is supposed to train visual memory, visualization (many times the child is asked to redo a pattern as if it were rotated 90 degerees) and other visual perceptual skills.

Auditory perceptual skills:

Trained by a series of skill tests in much the same way as the TVAS test does. It is the TAAS, a direct relative of the TVAS. The child is asked to repeat words, then to repeat only parts of words, such as 'say cowboy, but don't say the boy part of the word.' Like the visual one, a rank is given for grade level shown, and it is also like the other one a training device as well as a testing device. It also is supposed to show transfer of training in other areas, visual or auditory, depending on which is being trained. And of course, gradations of difficulty exist for both.

Other visual work includes work with articles like pegboards and parquetry blocks, another way to train any of the visual perception functions, and card games are also recommended, if that is all the parents have access to.

General Motor Skills :

Training activities include:

a. Balance and movement skills -

walking like any kind of footed animal;

rolling across a room, training proper direction for it;

hopscotch, ball games, obstacle courses, and various ways of balance rail walking.

b. Finger Skills -

moving a designated finger;

paper folding, crochet;

identifying objects with hands;

cutting, painting, pasting, coloring

buttoning buttons, zipping zippers, tying bows, and tying laces--to the point of having the child dress himself as much as possible, feed himself, etc, construction toys, drawing games, etc.

c. oculomotor skills -

1. following a smoothly moving target -

having him follow a swinging, hanging ball;

having him bat or bunt such a ball with a broomstick;

having him cup his hands around that ball as it swings, without touching it;

having him follow it with a stringless tennis racket;

2. making the eyes "hop" - saccadic motions (as they do reading)

having him look at a given object in the room, then having him redirect his gaze immediately to another one, then another one, etc. "Keep the pace somewhat irregular, but reasonable"

d. vocomotor skills

having him whistle through puckered lips;

having him inflate balloons;

having him play tabletop soccer with small ball and some straws;

producing odd noises with vocal cords, tongue, teeth, etc.

saying rapidly such sayings as 'seashells, seashells over by the seashore'

(not intended as a substitute for speech

or auditory therapy)

e. rhythmic skills

tapping the fingers at certain rhythms as dictated by the therapist or parent.

These (a-e) are helpful in perceptual training and can be done at home with the help of the parent or in school with the teacher.

Rosner admits that these perceptual training activities may not be enough to help the child in school, especially the older student in 6th, 9th or other advanced grade.

Some of Rosner's suggestions on helping reading problems:

For stage I readers, who can just recognize the letters -

a. see what his visual skills are capable of, as by testing him with the TVAS previously mentioned; train if deficient.

b. see what letters he already knows, and teach him those he does not; capitals first; try to teach groups that are written with the same starting motion, like c, e, d, o, then h, m, n; or k, l, p, etc; have him say what a letter is when you point to it, or when you flash it on a card; after extended teaching see if he can write them from dictation, first on a chalkboard, then on a piece of paper; as for the 'b vs. d' confusion, Rosner advocates the teaching of these similarly, but in different groups, one very thoroughly before starting the other, so he has what Rosner calls an 'established frame of reference'. If necessary, have him underline every 'b' in a reader,

after giving him a model, such as on a blackboard, again as a frame of reference. Or have him trace a confused letter with his fingers, all the while pointing out the distinctive features of it.

Finally, have him try to read billboards and signs, or help him to learn how, at least by counting out specific letters, making a game out of it for him.

-Stage II, where he knows letters but has difficulty decoding:

"Make absolutely certain that he knows that letters stand for sounds, that words contain strings of sounds, and that clusters of letters stand for spoken words."

Have him say a word like 'dear', then have him delete the 'd' to make the word 'ear', asking him what letter was deleted, or what sound was. Then have him do a task where he has substitute one letter for another, like exchanging 'mat' for 'fat', and so on. A blackboard is a help because of erasability. Then move up to training sight word vocabulary, which can be helped by having him look carefully at the middle letters of all his words, as Rosner says it is common for a poor reader to say the first sound of a word correctly, only to then have to end up guessing the rest of the sounds in the word.

And, "periodically have him print single words and short sentences from dictation. Start off with easy words, then move up to sentences." Rosner admits that some memorization is necessary for the child to learn the times when letter pronunciations vary, as they do so commonly in English.

Other hints on stage II readers:

Allowing vocalization, using colors to signal certain sounds, especially vowel sounds, teaching him words that help him keep the 'short' vowel sounds straight, such as 'apple, umbrella', etc, drawing slashes through unpronounced letters, such as the 'e' in take.

For stage III readers, who can decode, but have difficulty comprehending what they read:

a. provide material that acutely interests him;

b. discuss both themes and details of such stories;

c. have him see how much he can copy in two minutes, how many words - this is supposed to help him learn to read in chunks, rather than in single words. (Graph the number of words copied, and the errors and omissions as well after counting them.) (Over a period of days, if possible.)

d. show how the story's information can be categorized and classified, to help his sense of organization. Have him practice by using boxes or other visual aids, with key concepts grouped accordingly.

Again, all these activities are things that the parent, teacher, or even the optometrist can have the child do, especially in the event the event that a skilled reading therapist is unavailable.

V. Treatment Plans and Stragegies

B. Some of Psychology's Views

1. Frostig & Maslow, in "Learning Problems in the Classroom"

Movement Education

a. Manipulation -

Child manipulates objects a lot in kindergarten and preschool situations, and Frostig says that it is not to be neglected, as "it is in handling objects that the child learns to differentiate between textures, forms, and sizes, and discovers that a thing looks quite different when seen in different positions and from different angles. He also acquires skill in fine motor coordination.

b. Body Awareness -

This can be trained by having the child lie on the floor and move any part of the body the teacher says to, and the teacher can give tactile feedback by touching the part in question lightly when the child performs the task correctly.

"Practice also needs to be given in perceiving the body in relation to space. For example, the child might be told: "See how far you can reach out in each direction from where you are standing. First, reach out with your arms. Good. Now with one leg and both arms, standing on the other leg." "

"Exercises should be given frequently to promote perception of the body in relation to others, and to promote interaction with others."

Visual Perception and Movement Education

Visual Perception and Movement Education

"Movement education can ameliorate these problems (in visual perception) by providing motor and tactile experiences that guide visual perception during such activities as climbing, throwing and catching balls, rolling hoops, and so on. Movement education also provides the child with experiences of the temporal and spatial aspects of the world and of his own actions within it. The example of learning to run a relay race, given above, illustrates this. Learning to perceive temporal and spatial sequences is of subsequent help in academic learning."

Auditory Perception and Movement Education

"Auditory perception is trained when the child attends to verbal directions, translates music into movements, or responds to rhythms played on percussion instruments.

"The use of music and of percussion instruments is useful in stimulating and sustaining movement. But music should not be used excessively, because it is important for children to become aware of their own body rhythms. If the child's own rhythm occasionally directs the beat of the instrument, rather than vice verse, his awareness of it is enhanced.

"Children can be made aware of various aspects of sound, such as pitch and volume, by adapting movements to them. For instance, children may move low to the floor when a deep note is sounded and as high as possible (on tiptoes with uplifted arms) when a high note is sounded. Attention to sound can also be enhanced by using a change in tone or loudness or rhythm as a signal for shifting the direction, kind, or tempo of movement. For example, 'when the music

is soft and low, lie on your back.' Such activities also help promote intersensory integration; kinesthetic, auditory, and visual channels are used simultaneously."

Language and Movement Education

Movement education is supposed to help enhance the ability to follow directions and to teach a spatial and temporal vocabulary; e.g., such words as 'in between,...', etc.

"Expressive language can also be developed by having the child describe the movements he plans and those he has completed. The verbal expression of an activity heightens awareness of it. For example, a young child may explain a movement sequence that he has planned as follows: "I will run in a circle, and when I pass the window, I will jump, pulling my knees up as high as possible." ... In having the children verbalize their activities routinely, the teacher promotes expressive language, sequential thinking, and motor planning.

"These abilities are also promoted when children become involved in planning and evaluating movement education sessions, and when they take turns in giving directions and being teacher."

Movement Education and Association

"Associating present movement with previous experiences occurs when the child reproduces a movement he has seen, and whenever movement skills are all taught in a gradual step-by-step fashion.

Other aspects of movement education include:

Movement education and imagery, thought processes, and

and creative movement, along with movement education and academic skills. (Number line games-arithmetic hopscotch, hop a number, find your number, find your neighbor, and find the one before you.)

"A well-rounded program of movement education can influence all the child's psychological abilities, and is particularly effective in helping him focus attention, achieve self-control, and develop creativity."

There is supposed to be a transfer of control and attention onto the classroom and home, "particularly if the teacher helps the child become aware of the ways he has achieved success - planning, visualizing, keeping the goal in mind, concentrating, inhibiting disruptions, and self-evaluating his performance."

Early Visual-Perceptual Training

Visual-Motor Coordination

Training tasks include: (quote)

free pasting, placing and pasting, finger tracing, finger games, activities with construction and manipulative toys, bead stringing, tracing and coloring, and self-help activities.

Results sought:

sorting, alternating, following a pattern, remembering motor sequences, form sense, fine muscle coordination, shape and color discrimination, memorization of sequences, and other aspects of visual-motor coordination.

Figure-ground activities

discrimination activities:

asking child to point out different categories of objects, then asking him to pick out specific objects, which should become progressively less conspicuous.

every-day activities -

asking the child if he sees a bird in the grass, or a white house far off, etc, or if he can pick out a certain color crayon out of the crayon box, and so on.

sorting -

by shape, color, other parameters -

'Sorting is perhaps the most useful exercise in developing figure-ground perception.'

perceptual constancy activities -

these include handling objects, taking them apart, drawing their forms on paper, recognizing names of planes and solids such as circles, triangles, etc; picture recognition activities and finding-sorting activities,learning words that denote size; all these stimulate the child to pay attention to variations of the concept of size constancy, Frostig implies.

Position-in-space activities -

body-object relationship activities: (Quoted)

these include climbing ON a chair, jumping OVER a block, crawling UNDER a table, going AROUND a desk, and so on.

directionality -

having child sing songs with a lot of the words 'right' and 'left' in them; showing illustrations of hands, having child identify each as right or left; having child put right hand over left, and vice versa; hav-

ing him touch certain hand to certain body part, as right hand to left knee; having him say which side of of an object is right or left, then doing the same from other angles.

A fair amount of demonstration and corrective feedback is involved, and much the same things can be done with geometric patterns such as squares, diamonds, triangles, rectangles and block patterns - reversing, turning by 90 degrees, etc.

- Blocks -

these are helpful in building spatial relationships perception.

tasks:

putting a block of color A on top of one of color B, reversing the order, putting one of color C between them, etc.

Paper and pencil activities -

these need not be postponed - they can be done concurrently with three-dimensional perceptual training.

Again, a large amount of feedback is supplied to the child during the training., and the teacher is directed to point out similarities between training tasks and certain aspects of everyday classroom experiences.

Auditory Perception Training

a. Auditory figure-ground perception -

train by making an amount of background noise, while requiring the child to pay attention to a specific sound;

Other ways to train auditory figure-ground perception:

having child pay attention to a sentence while a rhythmic sound is being played; having the child clap his hands whenever the teacher says a certain word when lecturing.

- Discrimination of sounds:

"Exercises to help a child develop auditory-perceptual constancy may include training in recognizing a musical note as being the same, although played by different instruments or in the context of different melodies. But training with nonspeech sounds will very probably have little or no effect on the child's ability to differentiate and recognize speech sounds in isolation or in context."

Frostig notes that discrimination of speech sounds is of high importance for reading and spelling, and if it is below normal, training for a long period of time will probably be necessary.

- Sound localization -

Exercises:

"Games in which the child is blindfolded and has to locate the source of a sound provide excellent training for younger children." Frostig says that this is usually intact in children, and that if anything there would be a problem in identifying the position of a sound in a sequence of sounds.

- Recognition of auditory sequences -

"It is ...(important) and often necessary to begin with

training in reproducing nonverbal rhythms produced by clapping, stamping, ringing a bell, and so on. The child is first asked to count the number of sounds he hears, then to imitate short sequences of sounds; for example, two claps and then one stamp. (Movement is of great assistance in making the child aware of the temporal sequence of sounds.) The sequences can then be extended." Frostig made the point that the child should be made aware of the amounts and numbers of separate elements in words and then sentences, and that a good task for the training of this awareness is to have the child count the number of such elements of sound, in words and then in sentences.

Other word and sound recognition activities:

Having child identify 'same' or 'different' pairs of words of same sounds occurring in a different order, like 'left-felt', 'ports-sport', and so on;

doing the same task with nonsense syllables;

selecting words the teacher says out loud in a story from a list on the blackblard;

doing each with nonsense syllables.

And as for the time involved,

"Auditory training usually takes a long time, and auditory skills are often only acquired after a great effort. When remedial work is necessary, it consists mainly of an emphasis on the methods described in this chapter...

"The periods of training should not be lengthy, stressful, or boring. They should last for from five to ten minutes and take place in the spirit, if not the form, of play and enjoyment.

2. Alan O. Ross, in "Learning Disability - The Unrealized Potential"

Ross mentions the two main approaches in psychology in treating or otherwise helping children with learning disorders, the behavioral approach and the cognitive approach.

- Behaviorists:

  Avoid talk of internal processes;
  Look at situation in which the child is placed;
  Look at the material presented; positive reinforcement;
  Look at answers given and consequences of those answers;
  Talk in terms of 'stimulus-response', and 'reinforcement'.

- Cognitive School:

  Say 'stop, look, listen, and think';
  Have the child verbalize those same words to himself during a learning task;
  Focus on processes that are often other than outward or observable, such as thought processes;

Ross says that the two schools of thought need not be competitive and indeed can do very much better being complementary, as both approaches have helped to find methods that are helpful in aiding children with the problem.

Ross does not seem to offer specific tasks for the child to do, instead concentrating on general principles, such as those outlined above, giving the parent and the teacher these general guidelines for working with these and any children in a learning situation.

V. Treatment Plans and Strategies

C. Ophthalmology's Views

1. Goldberg and Schiffman's "Dyslexia-Problems of Reading Disabilities"

"For those individuals with specific reading disabilities, special methods are necessary. Many are able, however, to develop good reading abilities. To do this they must use, for word learning, techniques which allow them to use tactile and/or kinesthetic clues as well as visual and auditory. VAKT, as this technique is called, involves visual, auditory, kinesthetic, and tactile stimulation in the learning process. Visual stimulation is that which the individual receives through the eye. Auditory stimulation is that received through the ear. Kinesthetic stimulation is that which arises in the musculature, in the tendons, and so on, as the result of body movements or tensions within the body. Tactile stimulation is that which arises in the skin from contact with outside objects.

"Two special pedagogical techniques, the Fernald and the Gillingham, are often considered in the remediation of the severely retarded reader. Both approaches involve the use of as many kinds of stimulation as necessary for acquiring and retaining the ability to recognize words. Teachers employing the Fernald approach usually begin with a tracing step. At this stage the learner listens as the teacher writes the word. The learner observes the writing, says the word as he traces (continuing until he can write the word), and says it as he writes it. As he progresses, he no longer needs the tracing, but otherwise follows the same type of procedure. Throughout the stages, words are learned as wholes, being pronounced naturally and in syllables as they are traced, studied or written.

This tracing technique is an attempt to achieve maximum stimulation for word learning.

"In contrast, the Gillingham technique advocates teaching the sounds of the letters and then building these letter sounds into words, like bricks into a wall. Many educators associate this method with the familiar 'phonetic' or 'sound' technique. The difference lies in the fact that the Gillingham approach is based on the close association of visual, auditory, and kinesthetic elements."

The authors go on to mention that many schools propose to work with these children with one particular technique, and say that there are several pitfalls in using this outlook, so apparently they follow an 'individual child' approach.

(No further detailed techniques are mentioned.)

2. Hartstein's book, "Current Concepts in Dyslexia"

The only other ophthalmological report of treatment plans is discussed by a learning disabilities specialist, Dr. Eleanore T. Kenney, Ph.D., St. Louis, Missouri, Director of Miriam School for Treatment of Learning Disabilities.

"The Miriam staff does not believe that students, whether they have learning disabilities or emotionally derived problems, or both, can benefit from a laissez-faire or nonplanned environment. This holds true, in our experience, for children of school age as well as for those of preschool age." There is further mention of the need of structure in any learning task or environment, especially for what they called the 'disordered Child', whether that disorder is intellectual or or emotional or both.

The classes are of a membership number of six to eight.

A therapy technique often used at the institute is that of having children of one behavior type help children of of another, such as having an aggressive, outgoing child help to stimulate a withdrawn, passive one, or having a child strong in auditory aspects of learning but weak in visual aspects help one weak in auditory and strong in visual, and vice versa.

- Specific Programs Used:

1. Perceptual-Motor Systems

Fine and gross motor development programs, as outlined by such writers as Frostig, Kephart, Getman, and Kane.

"Of the authors listed, Frostig and Kephart are the only two who have structured their theories and procedures around a series of tests used for diagnostic and evaluative purposes." "The assumption is made that when the child has achieved visual-motor skills expected at his age level, he can then move ahead and learn to read by the usual methods."

2. A Neurological System

Delacato has developed and written about a theory (his) of nervous system disorganization, saying it is the underlying cause of learning disabilities.

"He perceives his visual-motor development procedures as being a method of treating the nervous system in such a way that the child moves developmentally through missed stages of neurological development. These procedures and his claims of diagnosing specific neurological impairments in relation to specific academic skill deficits have resulted in wide controversy and discussion. The controversy revolves

around his as umption that it is possible to reorganize a child's nervous system by putting the child through specific motor training. Educators are in no position to make such statements." The author continues that it does help education people to know his position (Delacato) in order to dispel the ostensibly over-optimistic attitudes of many parents who come in inquiring about it.

3. Language Development Systems

Mention is made of Myklebust, Johnson, and McGinnis.

These all advocate an auditorially-centered remediation program, and the author of this passage advocates both visual and auditory work with these children.

4. Multisensory Systems

Names and methods are:

Fernald, alluded to in the pages just before this;

Ayres, Cruikshank, Strauss, and Lehtinen.

The author cautions against trying to follow all specific directions of any of these programs at the expense of losing sight of the child himself, although there is much to be gained by use of some of the methods of these workers.

D. Education's Views

1. Janet W. Lerner, in "Children With Learning Disabilities"

Gross Motor Activities

These are intended to train "smoother, more effective body movements and also to add to the child's sense of spatial orientation and body consciousness.

a. walking activities -

forward walking - straight or curved path;

backward walking - same courses

sideways walking - eventually with feet crossing one another;

variations - as with arms carrying things during the the activities, throwing balls into containers, etc.

animal walks; steppingstones;

moon-walk; cross-pattern walking;

line walking; ladder-walking;

b. floor activities -

angels in the snow; crawling;

obstacle crawl;

c. balance beam activities -

walking forward, backward, sideways, and variations as above.

d. other gross motor activities:

skateboarding; stand-ups; jumping jacks; hopping; bouncing; galloping steps; skipping; hopscotch games; hoop games; rope skills (putting ropes around various body parts, for example).

Body awareness activities -

pointing to body parts; 'the robot man' game; 'Simon says'; puzzles of human or animal body parts; 'what is missing?'; lifesized drawings; awareness of body parts through touch; games; pantomime; instruction-following; twister; estimating numbers of steps to places in the room; facial expressions; water activities, as in a pool or lake.

Fine Motor activities -

a. throwing activities and catching activities -

throwing-catching, ball games, tire tube games;

b. eye-hand coordination activities -

tracing, water control (pouring to specified levels in containers), cutting with scissors, drawing with stencils; lacing; rolling pin games; primary toy games; paper and pencil activities; jacks; clipping; (clothespins) copying designs; paper folding;

all of these are supposed to be able to help in developing better fine-motor coordination.

Chalkboard activities -

Kephart advocates a large amount of this, before pencil and paper work.

Activities:

dot-to-dot tasks; circles on blackboard, one or both hands; geometric shapes on blackboards; letters and numbers on same.

Eye Movement Activities -

Eye Movement Activities

Ocular pursuits, finger and penlight following, moving ball following, quick focus work (distance-near accommodative rock?), and visual tracking.

Visual Perception Training Activities

Pegboard designs, parquetry blocks, block designs, finding shapes in pictures, bead designs, puzzles, classification tasks, matching geometric shapes, dominoes, letter and number recognition, letter bingo, finding missing parts, visual perception of words, rate of perception, as by tachistoscope; far-point discrimination on projector slides.

Auditory perception--

Listening for environmental sounds; recognizing recorded sounds; identifying objects by the sound they make when shaken inside a container; these must stimulate auditory attention at the very least, evidently being able to begin the process of development of better auditory perception.

Other activities that are good at stimulating auditory attention include:

Attending for sound patterns. (Making given noises behind the child being worked with, having him identify these sounds.)

Sound patterns on two objects. (A variation of the above, using objects like cup-against-book noise.)

Discrimination of Sounds

Having the child tell where in the room a sound is coming from, far or near to him; high and low sound discrimination; 'find the sound'; blindman's bluff; auditory figure-background games;

again anything that forces auditory attention.

Awareness of phonemes or letter sounds -

Initial consonants, as in 'what words sound like the first sound in the word 'fast'?'; similar activities involving diphthongs, digraphs, consonant blends, vowels, endings; rhyming words, riddle rhymes.

Haptic Perception: Tactile and Kinesthetic Skills

Feeling various textures and telling what the objects in question are; feeling shapes, temperatures, weights; smelling; stereognosis (tracing numbers and designs on the child's palm and asking him to identify them;); identifying letters by feel; grab bag games; arranging sizes by feel; 'feeling and matching'; again a seeming matter of forcing attention to some kind of sensory detail in order to stimulate the possibility of enhanced perception in that sensory modality.

Cross-Modal Perception

Visual-to-auditory -

'looking at a pattern of dots and dashes and repeating it in a rhythmical form on a drum (or other instrument)';

Auditory-to-visual -

doing the same thing in reverse;

Auditory to motor-visual -

Have the child listen to a rhythmical beat and select the matching visual form by-writing out matching dots and dashes;

Auditory-verbal to motor -

Simon says games are good here;

Tactile to visual-motor -

Tactile to visual-motor -

tasks involving feeling a hidden object and then drawing it;

Auditory to visual -

asking the child to match the sounds of common objects with the associated pictures;

Visual to auditory-verbal -

When having the child look at pictures, ask him what in the picture begins with a given letter;

Auditory-verbal to visual -

After describing a photo to the child, having him pick it out from a group of pictures.

Memory

Auditory Memory -

'Do this' - having child do a task with a large number of instructions, working up in that number of instructions in successive such drills;

Direction following; having child learn rhymes such as nursery rhymes; helping him retain lists of numbers or words, asking him to repeat them after two in the beginning, working up later on.

Having him do something like write the nth number in a series of spoken numbers;

Having him remember certain number of details of a favorite television show of that night;

Having one child say 'I took a trip to the moon and took my space suit', and having the next child say all that and add 'helmet' to what is taken in the imaginary adventure.

Visual Memory

Exposing collection of objects, then covering them again and reexposing all save one, and having him say which one is missing;

Exposing a series of geometrical designs, numbers, etc, and having child draw it or them after covering up again;

Exposing series of objects, then asking child to reproduce the same series as it was exposed;

Tachistoscopic exposure or flash cards -

obviously these require the use of much visual memory.

So, many educational techniques for helping children with learning problems or disabilities can be practiced right at home and in the classroom, and are almost all feasible by the parent or teacher without too much difficulty. (At least these discussed by Lerner.)

E. Some of Psychiatry's Views

1. Paine, et.al., passage titled 'A Psychotherapeutic Approach to Reading Retardation' (Keith Akins, M.D.)

The author says that Rabinovitch has defined the following classes of reading disabilities:

Brain injury with reading retardation:

'where the capacity to learn to read is impaired by frank brain damage manifested by clearcut neurological deficits.

Primary reading disability or retardation:

'Where the capacity to learn to read is impaired without definite brain damage being suggested in the case history or upon neurological examination.'

Secondary reading retardation:

'Where the capacity to learn to read is intact but is insufficiently used for the child to achieve a reading level appropriate to his intelligence.'

And the definition here of psychotherapy:

'For the purpose of this paper (it) is defined as a form of treatment for problems of an emotional nature, in which a trained person establishes a professional relationship with a patient with the object of removing, modifying or retarding existing symptoms, of mediating disturbed patterns of behavior, and of promoting positive personality growth and development.'

Akins states that 'diagnosis is complicated by the fact that the majority of children with severe reading retardation also suffer from an emotional disturbance.'

Gates: 75% of children with severe reading retardation have emotional disturbances. 25% of these: emo-

tional disturbances caused the reading retardation while in 75% of those the emotional problems were secondary to the reading problems.

Blanchard:

20% of children with reading retardation requir - ed psychotherapy followed with remedial teaching, while 80% of the problems were 'non-neurotic' in nature. (Able to respond with only the remediation program.)

For that 20% above, the usual psychological or psychiatric treatment is 'traditional psychotherapy'. (As defined above) Of course, it is said that it is necessary still to 'catch the child up' if he was that far behind before treatment, and it is cautioned that it (the potential of psychotherapy) must not be overestimated. Concurrent remedial therapy is also necessary in most cases. (No details on that program; the author appears to delegate this to other professionals.)

"This paper proposes a psychotherapeutic approach that incorporates elements derived from psychoanalytic ego psychology." The premise is that of the person's self-esteem being able to be shaped in good and bad fashion by the opinions of others, such as classmates, teachers, parents, brothers and sisters and peers. It proposes to build up this self-image in the probable event that it is poor as a result of negative feedback as above. And as a result of this process, the person is said to be emotionally free to attack the process of learning tasks, more efficiently than before because of the removal of emotional blocks connected with learning.

"Healthy ego defenses are encouraged and elaborated upon. For

example, a boy may continue to invest effort in school but he augments his self-esteem by competition in other areas. Maladaptive defenses are discouraged."

And not only the child in question must be treated, but also the family of the child if the emotional associations with the child's problem have a grip on the family structure, and also even the emotional attitudes of the school and teacher in many cases. The teacher especially must provide a favorable climate emotionally in the classroom, and must be sensitive to any discouragements suffered by the child in the learning situation. The teacher must also be able to convey his or her faith in the student despite the slow-seeming progress.

"Psychotherapy in the office begins with the terminal phase of the diagnostic interview. The child with primary reading retardation experiances considerable guilt, differentiating him from the children with secondary reading problems where the ego syntonic nature of the symptom reduces anxiety. A statement that the doctor knows how hard the child has tried to read often does much to relieve the guilt and consolidate a therapeutic relationship. Psychotherapy is directed towards conscious and preconscious attitudes since it is assumed that unconscious conflicts have not caused the reading retardation. The child's feelings about his disability and his relationships at home are explored (along with those at school), together with his attitudes towards himself. A positive relationship is used to convince the boy that he is considered worthwhile, and also to remotivate him and tide him over inevitable frustrations. Every opportunity is taken to reinforce the fact

that the boy is intelligent. Boys are encouraged to hear of the successes of adults who suffered from reading disability as children. They are surprised that some 10% of boys have similar problems since they imagine that they are the only children in the world with such a disability. Model building may help perceptual problems, develop a prestige building peer skill and allow for comfortable silences when the child does not want to talk."

Treatment strategies concerning parents:

These include assuring the parents that the child is of normal intelligence and emotional makeup, and is just responding normally to a very stressful situation that need not be so stressful anymore as long as there is new knowledge and awareness of and about his condition. The stress on a good emotional climate being necessary in the home is stated to the parents and other family members. The author says also that the hostile feelings between the parents and the school people must also be similarly resolved.

However, "in cases where a period of superficial therapy fails to alter negative parental attitudes, it may be that the child is playing a significant role in the parents' unconscious. Deeply seated parental attitudes are a complicating factor that may retard the child's progress but they are usually not responsible for his reading retardation. More typically, such a pattern is seen in parents of children with generalized learning inhibitions or under-achievement. Treatment involves more formal and intensive psychotherapy. Cases of reading retardation

where the symptom represents a symbolic conflict, for example voyeuristic impulses, are relatively rare."

So, as stated many times before in this paper, psychiatry's views on causes and treatments of learning disabilities appear to concentrate heavily on the role of emotions and emotional development.

F. Speech-Language-Auditory Therapy's Views

Helmer R. Myklebust, in "Development and Disorders of Written Language"

Myklebust mentions a study done to investigate the developmental sequence of language learning. A sample of 500 children between 8 and 9 years of age was used. "The learning quotient technique (Myklebust, 1968 and 1973) was used in comparing acquisition of written language with other types of school achievement. The results disclosed a hierarchy of developmental relations."

This pilot study made clear that developmental hierarchies must be taken into consideration. Substantially more maturation is required for acquisition of written than of read language. This finding was confirmed by the data for normal children. Reading scores were considerably above writing scores; the redundancy phenomenon was operative. (No definition of that phenomenon was given.) Educational programming and management must consider the significance of these ontogenetic aspects.

The studies of exceptional children showed that these aspects vary by type of disability. Ignoring these variations, and the developmental sequences that are disturbed leads to remediation that is ineffective or even detrimental to the child's well-being."

No specific training techniques are mentioned in this passage or the whole book, but there are processes and abilities present in the normal reader that it is implied, must be trained in order to bring deficient reading skills up to par. Some of these include:

Auditory memory -

word span, sentence span; recall of syllable sequence and of nonsense syllables; McGrady in 1964 showed that there are differences in the latter in normal and aphasic and speech-defective children,...

Syllable blending -

"Studies of the disorders of written language suggest that a child who cannot retain syllables sequentially and blend them into words cannot use the written word normally, even though he has average ability to read. Children are unable to learn to read unless they can reauditorize and revisualize letters simultaneously. However, these functions seem unrelated to ability to synthesize expressively. Therefore, facility with reading may be attained but facility with the written word is not." The supposition is that it is spelling which will be deficient, not written language, and that unless the child can synthesize at least three syllables to form a word, he lacks the necessary prerequisite for

writing and spelling words. (Spencer) Auditory cognitive disturbances of this type are predominant in learning-disability children, say Myklebust, et.al., 1971. So, apparently training these functions is of value in helping learning disability cases, but again there is no mention of specific training techniques.

Other auditory abilities and processes deemed important to reading are as follows:

Auditory discrimination, direction following, auditory association with rhyming, ability to unscramble scrambled sentences, ability to transduce auditory equivalents of stimuli of other sensory modalities, all of the above ostensibly being trainable.

Visual Processes

Of these, only the developmental aspects are considered since such functions as acuity, fusion, stereopsis and other such functions are "frequently unrelated to learning disabilities" (Myklebust, 1973).

Processes include:

Orientation-scanning -

'a child is born with the basic ability to see, but must learn to look'.

Visual Perception -

Discrimination, recognition, gaining meaning from any visual stimuli, but especially written ones; the fact that much literature has been written on the perception subject, with different definitions being used.

Visual Imagery -

Processes such as visualization and revisualization are part and parcel of this function.

Motor Processes

It is said here that gross motor processes, if they are are abnormal, can give indications of neurological correlates of learning problems, but what is more thoroughly discussed is fine motor coordination and ability, as it relates to the act of writing, and it is implied that normally the fine motor abilities are adequate by 10 or 12 years of age and that it does not present any 'further obstacle to writing after 10 to 12 years of age..."

The 'mirror writer' was discussed also, and it was implied that laterality should be at least appraised, if not trained.

However, it is important to note that Myklebust is very neurologically oriented, and the implication that any of these functions are trainable in his view is open to debate.

Conclusions

-Obviuosly, the different professions have different views concerning the discussed aspects of learning disabilities, and probably in many more such aspects of the problem.

-However, many different professional groups have simisarities in views, too numerous to mention here, which are included in the body of this writing in various places. Many of the same assessment tests are used by the different professions, and there are similarities in training techniques used, for example, by psychology and optometry, the latter of which seems to have borrowed many important concepts from the former.

Another observation worth mentioning is that the professions are probably converging upon common ground in many basic attitudes about the problem, such as making sure to alert the readers of the literature of more recent times that there is no one cause or treatment of learning disabilities, and that a multidisciplinary approach may as well be used in attacking the problem, since there are so many possible causes and coexisting factors, numerously and frequently mentioned in this paper.

An interesting observation is that, among all the words and terms used in the literature that have all the different shades of meaning and all the different definitions, the word dyslexia is less frequently used than it used to be, even less now than it was used in the early part of this decade of the 1970's, with the expressions such as "learning disability, learning disorder, reading disability,' and a plethora of others like these. However, there still exilts the problem of many other terms having different definitions by different professions, and as a result, it is implied that any interprofessional discussion of the phenomenon would be hampered without adequate agreement in this area of definitions.

Of course, each specialty in this literature survey concentrated on its own area of expertise; optometry concentrating on visual aspects, psychiatry concentrating on emotional aspects, and language-speech-auditory people concentrating on those aspects of the problem, as examples.

This is by no means intended to be a complete summary of the views of the different professions, as there are many other aspects that could be similarly reviewed in such a thesis. It is simply hoped that the reader becomes informed as to the many similarities and differences of viewpoints among the concerned professions concerning this topic.

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