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AUTHOR Fuller, Gerald B.  
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ABSTRACT

The author reviews attempts to categorize reading disabilities, describes a means of refining testing procedures to classify three diagnostic patterns of reading disorder, and reports results of application of those procedures with 172 children with reading disorders. Studies classifying poor readers by a verbal-performance pattern analysis of the Wechsler Intelligence Scale for Children and multifactorial studies of etiological factors are discussed. Described is a procedure which uses the Minnesota Percepto-Diagnostic Test (MPD) to assess visual perception and visual motor abilities and which classifies children's reading problems as primary, secondary or organic and children with behavioral problems as emotionally disturbed, schizophrenic, or brain damaged. Specific behavioral characteristics (as manifested in performance on five standardized tests of reading and cognitive development) are analyzed for 172 Ss to show that children differentiated into reading disability subgroups by the MPD (on the basis of visual perception). Characteristics noted include the primary group's high average performance IQ, the secondary group's low average scores on the Illinois Test of Psycholinguistic Abilities, and the organic group's low scores on laterality tests. Findings are compared to those of similar studies. (LS)

## THREE DIAGNOSTIC PATTERNS FOR CHILDREN WITH READING DISABILITIES<sup>1</sup>

Gerald B. Fuller  
Central Michigan University

Reading disability is one of the primary problems to be coped with in the educational field today. Because reading is so important in the emotional and educational development of children, there is widespread concern for the child manifesting a reading disability.

For many professionals this concern has been directed toward psychological and educational testing to aid in differential diagnosis and to provide information on the child's performance in a number of different areas. Early identification and differentiation is of central importance, both for successful remediation and to reduce school failure with its concomitant emotional overlay and loss of self-esteem.

Many investigators (Bender, 1957; Harris, 1961; Singer & Pittman, 1965) still consider reading disability as a single diagnostic entity, composed of a variety of physiological and psychological disturbances. These investigators report good or average readers differ from poor or retarded readers as a group on various nonreading signs and symptoms, i. e., perception, directional confusion, motor, laterality, etc. Such studies imply poor readers include children of only one type and have a commonality of associated disturbances.

This singular conceptualization may explain why studies utilizing tests such as the WISC have been unable to identify any substantial difference or patterns between or within poor and average readers. A partial attempt to alleviate this problem has been through the use of verbal-performance pattern analysis of WISC test performance. Smith (1970) conducted a subtest analysis of the WISC profiles of just retarded readers only and identified the following three groups:

- (a) WISC Pattern 1 - strength in subtests relating to spatial ability - similar to the verbal-performance discrepancy in favor of performance.
- (b) WISC Pattern 2 - deficits in subtests of spatial ability and frequent deficits in visual-motor coordination - similar to the verbal-performance discrepancy in favor of verbal.
- (c) WISC Pattern 3 - showed characteristics of both Patterns 1 and 2 - similar to little or no discrepancy in verbal-performance.

Most investigators (Aitcus, 1956; Belmont & Birch, 1966; Robeck, 1960; and Sawyer, 1965) working with the verbal-performance discrepancy of patterns of WISC have only compared good and poor readers and have not attempted to further investigate potential differences among the poor readers or tried to assess the relationship between WISC performance and

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academic learning. An exception to finding relationships was a study by Rourke (1971) who assessed the relationship between verbal IQ - performance IQ discrepancies on the WISC and selected verbal, auditory-perceptual, visual-perceptual, and problem-solving abilities in children with learning disabilities. His study revealed the following:

- (a) High Verbal-Low Performance - Superior on most measures of verbal and auditory-perceptual abilities.
- (b) High Performance-Low Verbal - Superior on tasks involving visual-perceptual skills.
- (c) Verbal-Performance - No significant findings.

A serious flaw with studies noted above is that children without reading problems would also have to obtain one of these verbal-performance patterns on the WISC. In fact, Ackerman, Peters, and Dykman (1971) found that some of their learning and reading disabled children had a 15 or greater discordance between their verbal-performance IQ's. However, so did some of the controls. Similar results were found by Kinsbourne & Warrington (1966).

Other investigators, although in the minority, have considered the heterogeneity of the problem and have reported that multifactorial causation is involved in reading disabilities. Examples of this would include Rabinovitch (1956) who describes three reading disability groups:

- (a) Primary Reading Retardation,
- (b) Secondary Reading Retardation, and
- (c) Reading Retardation Associated with Brain Damage.

Bannatyne (1971) has identified four etiological groupings:

- (a) Primary Emotional Communication,
- (b) Minimal Neurological Dysfunction,
- (c) Social, Cultural, or Educational, and
- (d) Genetic Dyslexia.

In both of these reading disability paradigms and in most multifactorial studies the major emphasis has been on etiology or causative factors.

To date Boder (1968, 1972) has given the most systematic approach at establishing meaningful subtypes of reading disability. She has described three atypical patterns of reading and spelling, revealed through an empirically evolved, rather than causative, diagnostic screening procedure that provide a basis for classifying dyslexic children in the following groups:

- (a) Deficit in ability to auditorize,
- (b) Deficit in ability to visualize, and
- (c) Deficit in both a and b.

Even these attempts at sub-grouping or typing have been general in-behavioral descriptions (often not based on the actual or associative deficits that are commonly found among reading disability children) and have failed for the most part to demonstrate relationships between subgroups and in general and specific academic achievement. Also, such attempts have lacked a systematic approach including inadequate research design when studying reading-disability problems.

One of the most frequently mentioned type of deficit associated with reading disability is impairment of visual-motor functioning. One of the concerns of this paper will be with this impairment.

Due in part, I suspect, to the problems mentioned above as well as a growing negative attitude toward testing there have been rather strong criticisms leveled at the major role that has been attributed to visual-motor problems in reading disabilities. In fact, Kline and Lee (1972) have implied that the whole concept of visual-motor functions seems open to serious doubt. They even go one step further by raising serious questions about testing of reading disability children at all. Their study indicated that a lot of testing did not provide essential diagnostic information. Of course, in an earlier paper Mann (1970) also had implied similar thinking about visual-motor performance.

I am concerned that the reaction to the studies of Mann and Kline will be excessive and exaggerated to the point of eliminating testing altogether which in my opinion would be a grave error. Much information can be obtained from tests, especially in regards to the sensory channels and from this profiles of behavior can be established.

What we need are better testing procedures and analyses to arrive at better diagnostic decisions for intervention when working with children who have reading problems instead of throwing out tests or developing more new ones in the visual-motor and other sensory areas. Refinement of our testing procedures and modifications of our current tests is needed. This will hopefully enable us to explore in more detail what takes place when the performance of a child is or is not satisfactory and to prescribe more meaningful remedial recommendations.

This paper will focus on the performance of children with reading problems. It will stress the need:

- (a) to refine our testing procedures;
- (b) to establish sub-groups or types of behaviors (performance) of reading disabilities with their unique performance, if any, in other sensory areas than visual-motor;
- (c) establish the relationships of the test performance of subgroups with learning-reading performance in the classroom to facilitate recommendations for prescription.

This may put us in a better position to discover which specific teaching strategies actually do remediate various deficits.

#### REFINEMENT OF PROCEDURES

In general, the theoretical rationale behind most visual-motor tests is that perceptual conflict arises in the viewing and reproductions of certain combinations of figures and backgrounds. Although the emphasis has been placed on the fact that errors are primarily due to faulty visual

perception, recognition of the involvement of other sensory (ex., motor) functions in the reproduction is also considered essential. Poor performance on visual-motor tests as reflected in rotation of figures, distortion of figures, and separation of figures are frequently reported behaviors that have been noted in the literature.

It is quite possible that other sensory functions (integration, memory and/or execution) may be impaired while visual perception remains intact. The question is, how was this particular poor performance produced. It is important to establish how the product was produced. The problem is determining or separating the levels of sensory abilities from each other to answer this. The most prevalent answer to date has been that it is due to visual-perceptual problems which to me appears to be a false conclusion without further refinement of procedures than most current visual-motor tests have.

At best, the relationship between visual perception (i. e., interpretation of stimulus input) and execution-motor perception (i. e., motor responses output) is at present ambiguous. Most of the discussions in the literature dealing with visual-motor tests have not tried to account for the integrative, motor, and non-perceptual component. This practice is pursued even though it is widely recognized that many psychological factors other than a stimulus input deficit may be involved in visual-motor task failure.

Failure on visual-motor tasks may result from the following: 1) misperception or distortion (faulty interpretation of stimulus input); 2) integrative or memory dysfunction; 3) execution difficulty (faulty motor response output); 4) any combination of these components.

Fuller (1969) and Buktenica (1967) have introduced procedures into their tests to help determine if the child's problem is a result of input, integration, or output. Bortner and Birch (1960, 1962) have suggested procedures that could be used with the Block Design subtest of the WISC. However, these procedures are not being stressed or used in the literature. Friedrich, Fuller, and Hawkins (1969) also discuss some of the problems inherent in attempting to do this. Before presenting the results of our present findings a brief introduction to the Minnesota Percepto-Diagnostic Test (Fuller, 1969) (MPD) will be given.

The MPD test is a clinical and research instrument designed to assess visual perception and visual motor abilities. It consists of six Gestalt designs which the subject copies and is scored for:

- (a) Rotation
- (b) Separation
- (c) Distortion

The scores have been adjusted for both IQ and age.

The test provides a rapid and objective method which helps:

- (a) classify reading disorders among children into three subgroups: primary, secondary, or organic;
- (b) classify children who have behavioral problems on the basis of their perceptual performance as being normal emotionally disturbed or schizophrenic;

- (c) measure the maturational level of normal and retarded children with IQ adjustment in the visual perceptual Gestalt and their reproductions; and
- (d) classifies adults as having organic brain damage, personality disturbance, or normal.

#### ADMINISTRATION

- (a) One sheet of white paper, 8 1/2" by 11" is placed before the subject in a vertical position.
- (b) The cards are presented one at a time in sequence 1 through 6, each card being placed about one inch above the top of the sheet and centered.
- (c) There is no time limit.

#### SCORING

- (a) Rotation - degrees of rotation that a figure deviates from its original axis.
- (b) Separation of Circle - Diamond.
- (c) Distortion of Circle-Diamond and Dots.

#### RECORDING ROTATION SCORE

- (a) Record actual degrees of rotation for each card.
- (b) If less than 25°, record actual measurement. If more than 25°, the score is always recorded as 25.
- (c) Total scores of the six cards (cannot exceed 150).
- (d) Total raw score then is transformed to a corrected T-score which has been adjusted for both IQ and age by entering the proper tables in the manual.

#### SCORING OF DISTORTIONS AND SEPARATIONS

Detailed scoring directions are given in the manual for these scoring variables along with developmental norms.

#### NORMS

- (a) 4,000 students ranging in age from five to 20.
- (b) 480 had IQ's less than 87. Classified as limited in IQ (LIQ).

- (c) No age differences after 14.
- (d) Conversion tables for ages five through 14.
- (e) In limited IQ range there are conversion tables for following age groups: ~~five to nine;~~ 10 to 15; and 16 and over.
- (f) 1,552 children in different diagnostic categories.

Behavioral

Reading

Emotional disturbed  
Schizophrenic  
Brain damage

Secondary Reader  
Primary  
Organic

**Clinical Interpretation. Two-fold approach:**

- (a) If referred because a behavior problem rather than having primarily a learning or reading problem, can be classified as normal, emotional disturbance, schizophrenia, or brain damage.
- (b) If referred primarily because of a reading or learning problem, can be classified as primary reading retardation, secondary reading retardation, or brain damage.

After a subject has copied a standard such as the six Gestalt designs on the Minnesota Percepto-Diagnostic Test or any other visual-motor test and his reproduction is incorrect (rotation, separation, or distortion), at least three approaches can be taken:

1. The subject can be presented with each MPD card in the order they were drawn one at a time along with his own reproductions. The subject is then asked, "Are both of these designs going the same way?" (when rotation is present) and/or "Do they look the same or different?" (when separation or distortion is present). If the subject is able to say that they are the "same" or "different" correctly, it is assumed that he does not have a visual-perceptual problem (input or discrimination), but an integrative or execution problem. If he cannot see any difference, a visual perceptual problem may be present.
2. He can be presented with a multiple choice procedure which would be given after the last MPD design was drawn. The subject is presented with each MPD card representing the stimulus model of each incorrect drawing together with three cards and asked to indicate which design was a correct reproduction of the stimulus model. Of the three cards presented, one was a duplicate of the actual stimulus model and the other two were incorrect. The two incorrect designs consist of the faulty reproduction by subject and another incorrect reproduction containing a systematic error. To date this procedure has only been used with rotation and separation errors.

When presented with the three models (actual stimulus card, systematic incorrect card, and the faulty reproduction) simultaneously, the subject is asked, "Which one of these card designs looks exactly (or just) like the design on the card?" (Actual stimulus card.) Again, if the subject is correctly able to match a duplicate of the stimulus card on the multiple

choice task, then the subject has an integrative or execution problem and not a visual-perceptual one. In contrast, if the subject was unable to discriminate the multiple choice situation (i. e., match his incorrect reproduction to the multiple choice array to the stimulus design), then he has a visual-perceptual problem.

3. He can be presented with the stimulus cards along with tracing paper that were incorrectly reproduced and have him trace over the stimulus card. If he can trace the same form he was asked to copy, the motor element per se may be ruled out.

Regardless of which one of the procedures is used, the subject also should be required to re-draw each of his incorrect reproductions to see to what degree he can correct them. His performance here can be very helpful when making a diagnostic decision. If the subject upon a second attempt corrects his faulty reproduction, clinical experience has demonstrated that an emotional problem may be present. However, if a subject after being told that he has drawn a faulty design still copies it the same way on a second attempt, one would favor a brain damage interpretation. This suggests that a number of children with emotional problems experience a temporary breakdown in perception but can often correct their error when it is brought to their attention, i. e., several cues are provided. The brain-damaged child is often unable to correct his errors even when more cues are supplied.

### SUBGROUPS

Initially using Rabinovitch's three reading groups it was decided to attempt to see if they could be differentiated on their performances on a visual-motor test such as the MPD. It became quite evident that the three groups did vary when scored on rotation, distortions, and separations (Fuller, 1973). However, if we were to stop here, the contribution would be the same as for the criticisms levied at the prior studies (verbal-performance discrepancy).

It now remains to show how the following discussion is being established utilizing the MPD test to initially set up subgroups following Rabinovitch's three groups.

The first step was to administer the MPD. On the basis of the child's performance, the child would be placed on one of the three groups. These subgroups were then studied in regards to their performance on other tests in the hope of establishing distinct, unique behavioral patterns or profiles. The total number in each group was as follows:

- Group I - 62 (Primary Reading Retardation)
- Group II - 55 (Secondary Reading Retardation)
- Group III - 55 (Reading Retardation Associated with Brain Damage)

The following tests were then administered to all the children:

- (a) Wechsler Intelligence Scale for Children
- (b) Illinois Test of Psycholinguistic Abilities
- (c) Hawthorne Concepts Symbolization Test
- (d) Wide Range Achievement Test
- (e) Durrell Analysis of Reading Difficulty

The results clearly supported the concept that the three subgroups of readers do have a number of unique behavioral characteristics. On initial inspection it appeared that Group I was



basically deficient in the auditory channel, Group II in the visual channel, and Group III showed a mixed sensory channel problem. The behavioral patterns that emerged for the three groups were as follows:

I. Group I--Primary Reading Disability (Auditory Deficit)

The children's visual-motor test profiles show none or only minor problems. Input-Association-Output intact. They do not rotate (T-score on MPD 45 or above), separate, or distort designs. If the children make mistakes or errors in reproduction, they are aware of it and can correct it.

- B. Intelligence - Verbal IQ in low average range; Performance IQ in high average range. Children show large discrepancy between verbal-performance IQ in favor of performance (14 points or more). The relationship suggests a general verbal incapacity and supports the finding of a lack of visual-motor problems. The best subtest scores were on Picture Completion, Picture Arrangement, Block Design, and Object Assembly. The poorest scores were on Information, Comprehension, Digit Span, Arithmetic, ( $\bar{x}=3$ ). The children scored average on the similarities verbal subtest. Using Bannatyne's re-categorization scheme these children scored lower on conceptual, followed by sequential. These children scored high on spatial.
- C. Psycholinguistic - Very good performance (ITPA, Visual-Reception, Visual-Motor, Visual closure;  $\bar{x}=38+$ ). High performance was also found on Manual Expression ( $\bar{x}=40$ ). The children were weak on Auditory Reception, Auditory Closure, Auditory Memory, and Verbal Expression ( $\bar{x}=31-$ ). Auditory Association was 33.30 and Visual Association was 34.05. Composite scores of these children were as follows: Auditory-Vocal was lowest ( $\bar{x}=31.88$ ) followed by Association ( $\bar{x}=33.67$ ). The children were high on Visual-Motor ( $\bar{x}=37.73$ ) and average on representation and automatic.
- D. Concepts - Above average performance on number concepts. All other subtest performance was within average range.
- E. Achievement (WRAT) - Children scored highest on reading recognition, followed by arithmetic and spelling. On the Durrell - children scored lowest on silent reading, followed by oral reading. Their scores were highest on flash words and word analysis. Children in Group 1 scored lower on listening than the other two groups.

The Primary group has basically an auditory deficit or defect with an additional weakness in the association level which deals with ability to related concepts presented auditorily and visually. The auditory deficit and association difficulty are reflected in a weakness of verbal (vocal) expression channels rather than in manual expression. This finding is supported by the Primary group's performance on the WISC. The performance IQ is usually considerably higher and what the child sees and hears can be transmitted manually or performance-wise. When the child has to deal with symbols and associate them and express them meaningfully through the verbal channel, he cannot do it.

II. Group 2 - Secondary Reading Disability (Visual Deficit)

- A. Visual Motor Tests - These children indicate association or memory problems (poor ability to translate-associate or remember what they see into a correct motor act). This is seen in rotation of designs from their original axis. Like the Primary group they had few separations and distortions. Group 2 children were able to match their product with the correct model or see their faulty reproduction and for the most part were able to correct their error on a second attempt. Their T-score on MPD was between 31 to 44.
- B. Intelligence - Both the verbal and performance IQ's of these children were in the average range ( $\bar{x}$ =98.86, 99.61). Usually little or no discrepancy was found between the verbal-performance IQ's (1 point or less). This group performed best on Comprehension and Similarities on verbal and Picture Completion and Coding on performance. Their lowest score was on Digit Span ( $\bar{x}$ =8.91.). Group 2 Composite scores were average (on all three categories). The lowest category was sequential followed by spatial and conceptual.
- C. Psycholinguistics - The Secondary group indicated low average to average scores on all subtests of the ITPA, with lowest scores being on Grammatical Closure, ( $\bar{x}$ =32.04), Auditory Association ( $\bar{x}$ =33.20), Verbal Expression ( $\bar{x}$ =33.10), and Auditory Closure ( $\bar{x}$ =33.10). Group 2 Composite scores were average, indicating no deficits in this area.
- D. Concepts - The best performance of these children was on number concepts and poorest performance on quantity and dimension and writing (these scores were, however, average.).
- E. Achievement - Children performed equally low on all three WRAT subtests. On the Durrell Group 2 performed better than the Primary group on all subtests. Group 2 performed best on listening, flash words, and word analysis. They were lowest on silent reading and oral reading with oral reading performance the highest of the two.

The Secondary group showed less deficits and severity of function than the other two groups on most of the variables. The Secondary group appeared to be highly prone to anxiety, tension, and frustration which was noted in a general distractibility or attention span problem. On verbal expression they were lower than average ( $\bar{x}$ =33.10). This does not seem to be due to a reception or memory (association) problem but rather to anxiety in having to give an oral or verbal response. However, when finer motor movements are needed such as using a pencil (on the MPD), their performance was poorer and often resulted in spatial orientation problems (rotations). Because of anxiety, they have less cues available to utilize which lends itself to misinterpretation and distortion of what is seen and heard and translated into a response. However, when given cues or structure, they were able to often see their mistakes and then to correct them. How often could this type of child have a correct response if he would check his work (which seldom happens) or the teacher supplied him with the structure? Carelessness and lack of attention to details are a hallmark of these children. This was noted and reflected on Auditory Closure and Digit Span.

### III. Group 3 - (Organic Reading Disability) (Mixed Deficit)

- A. Visual-Motor Tests - These children indicated associative and/or motor problems per se and sometimes input difficulties as well. These children in Group

3 could match the multiple choice task; however, some were even unable to do this. They were usually unable to correct or improve their reproduction on a second attempt. The T-score mean for Group 3 on MPD was 30 or below.

- B. Intelligence - Group 3 verbal and performance IQ's were low average ( $\bar{x}$ =93.21 and 89.22). The verbal-performance discrepancy was usually four to six points in favor of the verbal. They scored the lowest on Arithmetic, Digit Span, and Vocabulary (less than 8), followed by Block Design, Picture Arrangement, and Comprehension. The best scores of Group 3 were on Picture Completion and Coding ( $\bar{x}$ =9.50 and 10.01). The Composite scores: lowest on conceptual ( $\bar{x}$ =7.96) followed by spacial; highest composite scores was sequential. This group was extremely concrete in their responses and also showed motor coordination problems.
- C. Psycholinguistics - Group 3 was low on most of the subtests of the ITPA with lowest scores on Grammatical Closure ( $\bar{x}$ =28.42), Auditory Reception ( $\bar{x}$ =30.10), Verbal Expression ( $\bar{x}$ =30.39), Auditory Association ( $\bar{x}$ =31.22), and Manual Expression ( $\bar{x}$ =22.22). They score highest on Visual Reception and Auditory Memory. Group 3 was significantly lower than the other two groups on Manual Expression. The Composite score on the ITPA indicated that Group 3 was low on Automatic and Representational.
- D. Concepts - Group 3 children scored very low on laterality (knowledge of right-left on self and on others) with poor performance on all other subtests but directionality (which was within the average range). Group 3 children scored significantly lower than the other two groups on number concepts, time concepts, and laterality.
- E. Achievement - Group 3 children in comparison with children in groups 1 and 2 scored the lowest on all three subtests of the WRAT. On the Durrell Group 3 children indicated the poorest scores being on Silent Reading and Oral Reading (Silent Reading lower). They scored best on Word Analysis and Flash Words.

The Organics in general were more pervasive and encompassing in their deficits. They showed both Auditory and Visual problems and at different levels (Reception, Association, Expression). They were significantly different from the other two groups on Manual Expression (poorer score). The motor element seems to be impaired much more in this group. They produced distortions and separations of figures and were low on the visual-motor and automatic channel scores of ITPA. Verbal Expression was also low for this group. In fact, the Expressive channel score was very low, indicating impairment at both levels (Verbal Expression and Manual Expression).

The problems and deficits of this group seem to stretch across many more areas of functioning than in the other two groups. Group 3 children have laterality problems: confusion and/or lack of knowledge of right and left in oneself and in other people, and objects relative to oneself. Time concepts were poor as were number concepts. On the WISC they demonstrated a very poor performance on Digit Span, Arithmetic, and Information which reflects inadequate concentration and attention span as well as distractibility.

The need to study learning and reading disabled children as composed of at least three subgroups is reflected in what has been done to date in the literature. For example, several

studies (Kass, 1966; Macience, 1969; McLeod, 1965) have been made on the relationship of the ITPA or some of its subtests to reading disabilities. These studies indicate that the deficits of these children are primarily at the automatic level. These studies further imply that the automatic abilities of children are more related to reading disability than are abilities at the more symbolic or representational level.

The present research, however, does not support the above findings in total. The Secondary group had both average automatic and representational level performances ( $\bar{x}=34.56$  and  $35.32$ ). They did not show a deficit in either category. The Primary group also had average automatic channel scores ( $\bar{x}=34.45$ ) while the Organics were poorer on this channel ( $\bar{x}=32.23$ ). As noted above, the Primary group had basically an auditory-vocal and associated channel problem.

Rugel (1974), reviewing WISC subtest scores of disabled readers with Bannatyne's (1971) recategorization system, found that disabled readers as a whole showed the same profile of abilities that Bannatyne (1971) found for genetic dyslexics; i. e., highest scores in the spatial category, intermediate scores in the conceptual category, and lowest scores in the sequential category. Bannatyne's re-categorization of the WISC subtests are as follows:

<u>Spatial</u>	<u>Conceptual</u>	<u>Sequential</u>
Picture Completion	Comprehensive	Digit Span
Block Design	Similarities	Picture Arrangement
Object Assembly	Vocabulary	Coding

Huelsman (1970) reviewed 23 studies that attempted to establish differential WISC patterns in diagnosis of reading disability. He concluded that disabled readers were characterized on their WISC performance as follows:

<u>Low Score</u>	<u>High Score</u>
Information	Picture Completion
Arithmetic	Block Design
Digit Span	Picture Arrangement
Coding	

This finding was supported by Heiniche (1972), who listed over 40 studies which substantiated that the above subtests of the WISC differentiated good and poor readers. In comparing the current findings with Rugel's review, the Primary Group showed above average performance ( $\bar{x}=11.10$ ) on the spatial category suggesting that they were visuo-spatial oriented. This finding would concur with Rugel's studies that some disabled readers have profiles similar to Bannatyne's genetic dyslexics and could be equaled to Rabinovitch's primary category. There were disabled readers, the brain-damage group, who did poorly on the spatial category ( $\bar{x}=8.01$ ) with the Secondary group falling in between.

The Organics were the lowest on conceptual ( $\bar{x}=7.91$ ) and equal on sequential and spatial ( $\bar{x}=8.94$ ). The Primary children were lowest on conceptual ( $\bar{x}=9.20$ ), intermediate on sequential ( $\bar{x}=8.94$ ), and highest on spatial ( $\bar{x}=11.09$ ). The Secondary children were lowest on sequential ( $\bar{x}=9.57$ ), intermediate on spatial ( $\bar{x}=9.95$ ), and highest on conceptual ( $\bar{x}=10.28$ ). A comparison of the present findings with Bannatyne's categories is summarized as follows:

<u>Pannatyne's Categories</u> (Rugel Study)	<u>Primary</u>	<u>Secondary</u> (Fuller's Research)	<u>Organic</u>
High - Spatial	Spatial	Conceptual	Sequential
Intermediate - Conceptual	Sequential	Spatial	Spatial
Low - Sequential	Conceptual	Sequential	Conceptual

The deficit in the sequential category is only true of the Secondary's indicating poor short-term memory and attentional processes. They do appear to have deficits in their ability to retain short-term memory sequences of non-meaningful auditory and visual stimuli which are skills at the automatic level on the ITPA. However, this was not true for the other two groups.

Huelsman (1970) reviewed 23 studies that attempted to establish differential WISC patterns in diagnosis of reading disability. He concluded that disabled readers were characterized by low scores on Information, Arithmetic, Digit Span, and Coding with high scores on Picture Completion, Block Design, and Picture Arrangement. A comparison of Fuller and Friedrich's groups with Huelsman's WISC patterns of disabled readers is summarized as follows:

	<u>Huelsman</u>	<u>Primary</u>	<u>Secondary</u>	<u>Organic</u>
<u>Low</u>	Information Arithmetic Digit Span Code -----	Information Comprehension Arithmetic Digit Span -----	Digit Span -----	Comprehension Arithmetic Vocabulary Information Picture Arrangement Block Design Digit Span -----
<u>High</u>	Picture Completion Block Design Picture Arrangement	Picture Completion Picture Arrangement Object Assembly	Similarities Comprehension Picture Completion	Code -----

It becomes quite evident that we cannot study and treat disabled readers as a heterogenous category and instead must attempt to separate disabled readers into various subgroups as in the present study.

The establishment of subgroups of poor readers with unique behavioral profiles or patterns on tests leads to finding the relationship between test performance by subgroup with academic performance. When a child demonstrates poor performance on psychological and educational tests, we must seriously ask ourselves the question, so what?

For many years there has been a concern when a child draws a distorted figure or reproduces a block design incorrectly. What is needed now is to show that such behaviors have correlates related to the child's academic achievement, especially in regard to the reading process. If a child separates figures when drawing them or puts "rabbit ears" or "nodes" on a diamond, how does this effect his reading, spelling, etc.? The answers to these kind of questions will enable us to better prescribe correct remedial procedures. The research just cited above has just begun to explore the correlates of the three groups combined and separately. Some interesting trends not discussed above were noted with

sex. On all of the subtests the girls in Group 1 had the poorest scores, followed by Group 3 girls, with Group 2 girls having the best performance. Within groups it was noted that girls were higher than boys in Groups 1 and 3 while girls were lower than boys in Group 2 on all the Durrell subtests. Further support that lends to the validity of classifying reading deficits into subgroups was established by Levine & Fuller (1972 a and b). The need to investigate age and sex differences more systematically and in detail was also emphasized.

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