BANNATYNE'S RECATEGORIZATION MODEL UTILIZING WISC-R SCORES OF DISABLED READERS

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BANNATYNE'S RECATEGORIZATION MODEL UTILIZING WISC-R SCORES OF DISABLED READERS

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by

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To the Graduate Council:

I am submitting herewith a research paper written by Lori Koster Carr entitled "Bannatyne's Recategorization Model Utilizing WISC-R Scores of Disabled Readers". I recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Psychology.

Linda Rudolph
Major Professor

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William L. Ellis
Dean of the Graduate School

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CHAPTER I

INTRODUCTION

According to Federal and State laws, a child certified as learning disabled in the area of reading must have a severe discrepancy between achievement in this area and intellectual ability. Other factors which could account for a child's poor achievement must be ruled out, such as emotional disturbance and environmental disadvantage. However, in some children it is difficult to determine which of two or more conditions is the primary disabling condition. Even after discounting other causes for a child's learning difficulty, it is possible that a severe discrepancy alone is insufficient to distinguish between a learning disabled child and a child with learning problems.

Bannatyne (1968) suggested the possible use of the Wechsler Intelligence Scale for Children (WISC) as an aid in diagnosing learning disabled children by recategorizing the subtest scaled scores into three categories: Spatial, Conceptual and Sequential. The Spatial score is obtained by combining the scaled scores of the Picture Completion, Block Design and Object Assembly subtests. The Conceptual score is derived from the scaled scores of the Comprehension, Similarities and Vocabulary subtests. Finally, the Sequential score is the sum of the scaled scores of the Digit Span, Picture Arrangement and Coding subtests. Bannatyne suggested that the Spatial category "requires the ability to manipulate

objects directly or symbolically in multidimensional space" (p. 57). Subtests in the Conceptual category "require abilities more related to language functioning" (p. 57). The Sequential category subtests "require the ability to retain sequences of auditory and visual stimuli in short-term memory" (p.57). He contended that comparison of a child's pattern of scores in this manner would yield more information about a child's deficit area of functioning than merely looking at the discrepancy between the Verbal and Performance scaled scores, which has been used commonly to identify learning disabled children (Ackerman, etal., 1971).

Rugel (1974) reviewed 25 studies involving 27 populations of disabled readers. His criterion for a reading disability was a reading level which was two or more years below the expected reading level as measured by a standardized test. His population was heterogeneous with respect to the type of disabled reader included--culturally deprived, emotionally disturbed, and genetic dyslexia. Rugel reclassified the WISC subtest scaled scores of each individual according to Bannatyne's classification model and ranked them as to their relative strengths in the three categories.

In the 22 populations for which complete recategorization was possible, the Spatial category received the highest rank 18 times, the intermediate rank 4 times and the lowest rank not at all. The Conceptual category received the highest rank 4 times, the intermediate rank 14 times and the

lowest rank 4 times. The Sequential category received the highest rank zero times, the intermediate rank 4 times and the lowest rank 18 times. Thus, disabled readers scored highest in the Spatial category, next highest in the Conceptual category, and lowest in the Sequential category. According to Rugel, the high Spatial score suggests a strength in visual-spatial tasks, and the low score in the Sequential category is due to deficits in short-term memory and attentinonal processes. Rugel's results agree with Bannatyne's findings with gentic dyslexics. Bannatyne (1971) reported that genetic dyslexic readers received their highest scores in the Spatial category, intermediate scores in the Conceptual category and lowest scores in the Sequential category.

Rugel (1974) also studied 13 populations of normal readers and ranked their scores according to Bannatyne's categories. The Spatial category received the highest rank once, the intermediate rank 8 times and the lowest rank 4 times. The Conceptual category received the highest rank 8 times, the intermediate rank 4 times and the lowest rank once. The Sequential category received the highest rank 4 times, the intermediate rank once and the lowest rank 8 times. These results indicated that the majority of normal readers scored highest in the Conceptual category and lowest in the Sequential category. The pattern Rugel found with these populations of normal readers did not reach statistical significance and appeared to be different from the pattern

found with disabled readers.

Bannatyne (1974) decided to substitute the Arithmetic subtest scaled score for the Picture Arrangement score in the Sequential category. Based on Rugel's study and the factor analytic work Rugel cited, Bannatyne concluded that the Arithmetic subtest was a better measure of sequencing. He also added a fourth category, Acquired Knowledge, consisting of the Information, Arithmetic and Vocabulary subtests.

The WISC-R was administered to 208 school-verified, learning disabled children in a study designed to assess the usefulness of Bannatyne's recategorization model (Smith, Coleman, Dokecki, Davis, 1977). The results showed that the mean Spatial score was significantly greater than the mean Conceptual score, which, in turn, was greater than the Sequential and Acquired Knowledge scores. The total sample was divided also into high and low IQ groups to determine if intellectual level was a factor. The high IQ group consisted of children with a Full Scale score of 76 or above and either a Verbal or Performance score of 90 or above. The low IQ group consisted of all remaining children. The low group was further subdivided into two groups: children with IQ's above 75 comprised one subgroup, and children with IQ's of 75 or below comprised the other subgroup. Bannatyne's pattern was found to hold true in the high and low groups, but not in the subgroup of children with IQ's of 75 or below. In the high and low IQ groups the Spatial score was higher

than the Conceptual score, which was greater than the Sequential and Acquired Knowledge scores. Bannatyne's pattern was not found in the subgroup of children with IQ's of 75 or below. The pattern suggested by Bannatyne was obtained by 43 percent of the children. The proportion expected by chance was 17 percent. According to the authors, these results suggest "that school-verified LD children are characterized by the same pattern of abilities that Bannatyne (1968, 1971) found for children with genetic dyslexia and that Rugel (1974) reported for disabled readers in general" (p. 442).

A study involving 98 children in 10 LD classrooms in two school systems was performed using all 12 subtests of the WISC-R (Vance and Singer, 1979). The subtests were recategorized according to Bannatyne's model with the exception of the substitution of the Picture Completion subtest for the Arithmetic subtest in the Sequential category. No reason was stated for this substitution. A Distractibility category was also included and was computed by summing the scaled scores of the Digit Span, Mazes, Arithmetic and Coding subtests.

The children were verified as LD by the school system, using the criteria that a child must be achieving two or more grades below grade level. The mean age was 10 years, 4 months and the mean IQ was 95.7. Bannatyne's pattern of scores was obtained by 39 percent of the children. They

scored highest in the Spatial category, next highest in the Conceptual category, and lowest in the Sequential and Acquired Knowledge categories. None scored highest in the Distractibility category. The proportion expected by chance was 20 percent. These results supported to some extent the pattern suggested by Bannatyne.

Gutkin (1979) used 53 Caucasian and 87 Mexican-American, school-verified LD children in a study to determine if Bannatyne's recategorization model for the WISC-R was characteristic of these groups. Gutkin also attempted to determine how large a difference between each of the categorical scores was necessary to reach statistical significance when applied on an individual basis.

When the group data were analyzed, the sample of Caucasian children exhibited Bannatyne's pattern of WISC-R scores; the Mexican-American children did not. However, the recategorization scores obtained by each individual child in both groups indicated that only 30 percent of the Caucasian children and 20 percent of the Mexican-American children exhibited the pattern. Gutkin determined that seven points or more was needed between each category for statistical significance. Only 2 percent of the Caucasian and none of the Mexican-American children demonstrated statistically significant differences in categorical scores at the 5 percent level of confidence.

White (1979) also attempted to determine a guideline

for applying Bannatyne's recategorization model on an individual basis. He determined that the minimum difference between scaled scores of the categories needed for statistical significance at the 5 percent level of confidence was two points. Thus, his conclusions differ from Gutkin's (1979) which suggested a seven point difference.

Very little research has been conducted to support Bannatyne's hypothesized pattern of recategorization for diagnosing LD readers. Conflicting results have been found in some of the studies reviewed. It is the purpose of the present study to investigate further the validity of his recategorization system to determine if it can be a useful indicator of a learning disability in children with reading problems.

CHAPTER II

METHOD

Subjects

The subjects for the present study consisted of 63 children certified by school psychologists as learning disabled (LD) in the area of reading and 63 children who had been referred for testing but were classified as non-learning disabled (NLD) in the area of reading. The children were enrolled in grades one through nine. The mean Full Scale IQ of the LD group was 94 and the mean IQ of the NLD group was 92. The majority of children were Black or Caucasian.

Subjects were randomly selected from the files of the Montgomery County School System. All children had been evaluated during the 1979-80 school year.

Description of the Instrument

The Wechsler Intelligence Scale for Children-Revised (WISC-R) is a test of general intelligence, which is defined by its author, David Wechsler, as "the overall capacity of an individual to understand and cope with the world around him" (Wechsler, 1974, p. 5). He believes it is possible to measure such intelligence objectively and to "obtain a meaningful and useful index of a subject's mental capacity" (p. iii).

The WISC-R is divided into a Verbal section and a Performance section, each of which is comprised of five subtests and one optional subtest. The test yields a Verbal, Perform-

ance and Full Scale IQ score as well as the twelve subtest scaled scores. The test is designed for children ages 6 through 16.

The average split-half reliabilities for the Verbal, Performance and Full Scale IQ scores were .93, .90 and .95, respectively. The average coefficient of correlation obtained between the WISC-R Full Scale IQ and the Stanford-Binet (Form L-M) within homogeneous age groups was .73 (Anastasi, 1976).

Procedure

The scaled scores from ten of the subtests for each subject were grouped according to Bannatyne's categories in the following manner:

Spatial	Conceptual
Block Design	Comprehension
Object Assembly	Similarities
Picture Completion	Vocabulary
Sequential	**Acquired Knowledge**
Arithmetic	Information
Digit Span	Arithmetic
Coding	Vocabulary

For each subject, the scaled scores of the three subtests under each category were summed and the mean computed. For subjects for whom the Digit Span subtest was not administered, the mean Sequential score was computed using the other two subtests. According to Smith, et al. (1977), this is an acceptable method for deriving the Sequential score.

CHAPTER III

RESULTS

A repeated measures analysis of variance was performed to compare the pattern of scores in the four categories of the two groups.

Table I summarizes the mean scores for the two groups in each of the four categories.

TABLE I

MEAN SCORES

	Spatial	Conceptual	Sequential	Acquired Knowledge
LD	9.8730	9.0794	8.3994	8.3280
NLD	9.2222	8.9683	8.6032	8.4603

Table II summarizes the results of the analysis of variance.

TABLE II

ANALYSIS OF VARIANCE

Source				
Between subjects	915.914	125		
Between groups	1.426	1	1.426	.193
Error-between	914.488	124	7.374	
Within subjects	951.125	378		
Categories	106.492	3	35.497	15.901*
Interaction	14.164	3	4.721	2.115
Error-within	830.469	372	2.232	
Total	3734.078	503		

*$p < .001$

The mean Spatial score for the total group (LD and NLD) was greater than the mean Conceptual score, which in turn, was greater than the mean Sequential score and the Acquired Knowledge score for both groups. This pattern was highly significant ($p < .001$) for both the LD and the NLD groups. The between groups analysis yielded a non-significant F-ratio ($p > .05$), indicating there was no significant difference in the LD and NLD groups in their pattern of scores. Thus, Bannatyne's proposed pattern of recategorized scores was found in both the LD and the NLD groups and did not differentiate LD from NLD readers.

CHAPTER IV

DISCUSSION

The purpose of the present study was to determine if Bannatyne's recategorization model could be used as a reliable indicator in diagnosing reading disabled children.

An overview of the literature revealed that Bannatyne's proposed model was found in the majority of groups studied. However, the pattern was not exhibited in Mexican-American LD children or for a group of LD children with IQ's of 75 or below. Only one study (Rugel, 1974) used a control group with results indicating that Bannatyne's pattern differentiated LD and NLD children. The lack of a control group for comparison purposes seems to be the major problem with generalizing the results of these studies.

The results of the present research indicate that Bannatyne's pattern of recategorized scores does not differentiate reading disabled and non-reading disabled children in grades one through nine with average intelligence. However, the present study involved only children referred for evaluation due to learning difficulties in some area; therefore, generalization of the results is quite limited. The limitations of the present study and those reviewed in the literature plus the conflicting results of the research on Bannatyne's recategorization system suggest that diagnosis of LD by this method must be used with great caution. Further

research in the area would seem essential before this method can be utilized effectively.

REFERENCES

Ackerman, P.T., Peters, J.E., and Dykman, R.A. Children with specific LD: WISC profiles. Journal of Learning Disabilities, 1971, 4, 3, 150-166, (a).

Anastasi, Anne, 1976, Psychological Testing. Macmillan Publishing Co., New York, N.Y.

Bannatyne, A. Diagnosing LD and writing remedial prescriptions. Journal of Learning Disabilities, 1968, 1, 242-249.

Bannatyne, A. Language, Reading, and Learning Disabilities, Springfield, Il. Charles C. Thomas, 1971.

Bannatyne, A. Diagnosis: A note on recategorization of the WISC scaled scores. Journal of Learning Disabilities, 1974, 7, 272-273.

Gutkin, T.B. Bannatyne patterns of Caucasian and Mexican-American learning disabled children, Psychology in the Schools, 1979, 16 (2), 178-188.

Rugel, R.P. WISC subtest scores of disabled readers: A review with respect to Bannatyne's recategorization. Journal of Learning Disabilities, 1974, 7, 57-64.

Smith, M.D., Coleman, J.M., Dokecki, P.R., and Davis, E.E. Recategorized WISC-R subtest scores of school-verified learning disabled children. Journal of Learning Disabilities, 1977, 10, 437-443.

Vance, H.B., Singer, M.G. Recategorization of the WISC-R subtest scaled scores for learning disabled children. Journal of Learning Disabilities, 1979, 12, 487-491.

Wechsler, D. Manual for the Wechsler Intelligence Scale for Children - Revised. New York: The Psychological Corporation, 1974.

White, W.G. Evaluating scaled score differences for the Bannatyne recategorization of the Wechsler subtests. Psychology in the Schools, 1979, 16 (2), 174-177.