RECATEGORIZED WISC-R
SCORES OF INCARCERATED
MALE JUVENILE DELINQUENTS

A Thesis
Presented in Partial Fulfillment of the Requirements
for the Degree Master of Arts

by
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Approved by

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CHAPTER ONE

Literature Review

The Nature of Learning Disabilities

A major barrier in the identification of learning disabled students is the lack of valid and reliable instruments to discriminate them from the larger school population (Smith, Coleman, Dokecki, Davis, 1977). By nature, learning disabilities is a broad classification that can include problems ranging from hyperkinesis to perceptual difficulties. While many standardized tests exist which claim utility in identifying learning disabled children, many have dubious validity and no clear criteria for discriminating the learning disabled child from the larger school population.

Further problems in the identification process enter the picture when cultural and emotional factors are considered. By definition, learning disabilities programs exclude children who manifest severe emotional disturbance or a culturally disadvantaged background. At present, children showing these problems are viewed as separate entities and are served by other programs in the schools. Behavioral observations, however, often show these groups to be more alike than they are different (DeBrosse, 1977). All
learning disabled children are not culturally disadvantaged or emotionally disturbed, but some do show one or both of these additional difficulties.

Increasingly age also brings about problems in the identification of learning disabled adolescents. Most of the criteria for learning disabilities programs were designed for young children since, ideally, initial identification should occur during the early school years. Frequently, however, these criteria are not suitable for the learning disabled teenager (DeBrosse, 1977). Some of the characteristic behavioral signs, such as hyperactivity or fine motor difficulties, may be less noticeable or entirely absent. The cumulative effect of inconsistent school attendance, poor motivation and truancy often cast doubt on the validity of the severe discrepancy level as an indication of a specific learning disability.

All of these problems are present in the public schools and must be faced by school psychologists attempting to identify learning disabled students in that setting. Such problems present an even greater amount of difficulty when attempting to assess and identify learning disabled juvenile delinquents in an institutional setting.

Criteria for Identifying Learning Disabled Students

A learning disability is thought of as being, in part, a severe discrepancy between a child's predicted ability and actual academic achievement (Batsman, cited in Helmuth, 1965; Public Law 94-142, Section 121a.541). This
discrepancy is a function of the particular tests used and the mathematical formula used to calculate the learning expectancy, or discrepancy level. No standard assessment battery or formula to calculate the discrepancy level exists, however, since each child, theoretically presents a unique case. Public Law 94-142, the "Education for all Handicapped Children Act of 1975" merely states that non-discriminatory testing will be employed. This is interpreted as meaning that the psychological and academic testing will be appropriate for the cultural and linguistic background of the child, as well as being suited for the type of disability. Well-defined criteria, in behavioral terms, for the identification of learning disabilities obviously do not exist in full form.

One clear criterion, however, for the identification of learning disabilities is intelligence within the average to above-average range, as measured by a standardized instrument (State of Ohio, 1977). One of the best instruments currently in use to measure children's intelligence is the Wechsler Intelligence Scale for Children - Revised (WISC-R) (Smith et al., 1977). The balance between verbal and non-verbal items, along with its structured format, makes the WISC-R the preferred standardized intelligence test of many psychologists (Bannatyne, 1974). With the WISC-R, analysis of the patterns of strengths and weaknesses among the subtests and of any differences between the Verbal
and Performance IQ can provide information on the child's cognitive processes and aid in the identification of specific learning disabilities. In addition, important behavioral observations can be made which often reflect a child's style of problem-solving. Since its publication in 1974, psychologists have come to rely on the subtest scatter and Verbal vs. Performance discrepancy as an aid in the identification of learning disabled children (Berman, 1975; Murray, 1976; Sattler, 1974).

Learning Disabilities and Juvenile Delinquency

Some research has been conducted concerning learning disabilities and juvenile delinquency. Most of the studies reviewed attempted to find a causal link between the two phenomena. In most, a correlation was found, but there was no proof that one caused the other. Frequently, the WISC-R was administered to the subjects and was interpreted by the traditional Verbal vs. Performance discrepancy, a method often felt to be inadequate (Rugel, 1974).

One of the most comprehensive studies conducted was under the Law Enforcement Assistance Administration in 1975, and was summarized by Murray (1976). It included an extensive literature review including ERIC resources, Psychological Abstracts, The National Institute for Mental Health, and the Council for Exceptional Children. Whenever the WISC-R was mentioned as a criteria, it involved the standard
Verbal vs. Performance interpretation, or simply mentioned that the Full Scale IQ should be within the normal range. The only operational definition of the severe discrepancy level was mentioned by Stenger (cited in Murray, 1976), who believed the Full Scale IQ should be at least 10 points above the standard scores received on the Wide Range Achievement Test.

Much of the research was similar to that covered by Berman (1975) to identify learning disabled males incarcerated at a Rhode Island training institution. Both the institutionalized group and a control group of non-delinquent males were administered the WISC-R and several tests from the Halstead-Reitan Battery. After studying the profiles, Berman was correct in identifying 87% of the delinquents and 78% of the control group in his study. Although characteristic profiles are not mentioned, his study indicated unique profiles for delinquent populations existed.

Research into the subtest profiles of incarcerated juvenile delinquents who have been assessed with the Wechsler scales have shown some patterns of scores that indicate significant differences from that of the normative populations (Cook and Selway, 1974; Lewandowski, B., Lewandowski, N. and Sacuzzo, 1977; Solway, Cook and Hayes, 1976). Since some of these patterns often appear in learning disabled populations, school psychologists interpreting WISC-R profiles of incarcerated juvenile delinquents could question
whether the pattern is indicative of a specific learning disability or if it relates to other factors associated with the delinquent behavior.

The research mentioned, and the opinions of many experts in the area of education of incarcerated juvenile delinquents, suggest that learning disabilities criteria based on public school norms may not be entirely appropriate for this unique population. This complication makes proper class placement in such a setting a difficult decision for all involved.

*Unique Wechsler Scale Profiles in Juvenile Delinquents*

An area of research involving the various Wechsler intelligence scales has been to discover any characteristic patterns of subtest scores among juvenile delinquents. Most of the research was conducted before the 1974 publication of the WISC-R, unfortunately, and therefore involved the WISC and the Wechsler Adult Intelligence Scale, or WAIS.

Wechsler himself hypothesized a relationship between the personality of the adolescent sociopath and performance on the WAIS (Lewandowski, D., Lewandowski, N., and Saccuzzo, 1977). Based on a sample of such a group, all of whom had normal intelligence, Wechsler found the following to be true of the WAIS profiles:

1. Performance IQ exceeded Verbal IQ.
2. The sum of the scaled scores of the Object Assembly
and Picture Arrangement subtests exceeded the scaled score sum of the Block Design and Picture Completion subtests.

3. Object Assembly and Picture Arrangement would be among the highest subtests, while Information and Arithmetic would be among the lowest.

Although Wechsler's results were not strongly conclusive, and not all incarcerated delinquents are clinically diagnosed as sociopathic, these findings should have some implication for school psychologists attempting to identify learning disabled students in a juvenile institutional setting. The Verbal vs. Performance discrepancy and low scores on the Information and Arithmetic subtests are profiles which apparently can be characteristic of both juvenile offenders and learning disabled students. When these profiles appear on the protocol of a delinquent youth being evaluated for a specific learning disability, cautious interpretation may be in order.

Wechsler's original work has led to further research in this area. A series of studies was conducted to determine the generalization of the three WAIS hypotheses previously mentioned to incarcerated juvenile delinquents who were assessed with the 1949 WISC. Sex, race, and intelligence were controlled in all these studies. The delinquents tested were separated into three groups: those in the educable mentally retarded range with Full Scale IQ's of 70 and below (Lewandowski, D., Saccuzzo, 1975), those
within the 70-79 IQ range (Lewandowski, D., Lewandowski, N., and Saccuzzo, 1977), and those within the 80-89 IQ range (Saccuzzo and Lewandowski, D., 1976). Several findings emerged on these studies. The Full Scale IQ was found to be an important variable when attempting to generalize the WAIS hypotheses to the WISC. Little application was found in the 70 and below group, and the Verbal vs. Performance discrepancy did not begin to appear consistently until the 80-90 IQ range was studied. Also in this IQ range, Similarities began to appear as the highest of the Verbal subtest scaled scores.

The overall conclusion of these studies was that there is support for using the WISC to identify delinquent personality types, as proposed by Wechsler. White males seem to conform best to the profile, with Black males conforming slightly less. Several clear signs which were believed to be associated with the delinquency were especially pronounced in the 80-89 IQ range. These were the Verbal vs. Performance discrepancy, relatively high Similarities score, and low score on Information. These results, again, suggest cautious interpretation of WISC-R scaled score scatter when assessing incarcerated delinquents. Since many delinquents being evaluated for a learning disabilities placement could fall within this 80-89 IQ range, these signs could be especially strong within this group.
Further research on the WISC profiles of incarcerated delinquents functioning within the educable mentally retarded range has been conducted. All subjects in these studies had Full Scale IQ's below 70. In a female sample Information appeared as one of the lowest subtests (Solway, Hays and Roberts, 1976). This finding was in agreement with that of Lewandowski and Saccuzzo (1975). However, Solway and associates found Similarities to be among the highest scaled scores received by this population. This contradicts Lewandowski and Saccuzzo, who did not find a relatively high Similarities scaled score until the 70-79 IQ group was researched.

In an educable mentally retarded male sample, Information again appeared as one of the lowest ranking subtests (Cook and Solway, 1974). Unlike the female sample, however, Similarities was not found to rank especially high. Although these studies had small samples, it is inferred that sex differences may be a factor in the different patterns, a variable thought to have been eliminated in the standardization sample.

Additional Research on the Wechsler Scales

Many juvenile institutions categorize delinquents according to their levels of interpersonal maturity, based on a standardized interview designed by Marguerite Q. Warren (cited in Andrew, 1974). This frequently is conducted during the intake process.
Warren's method, called the I-Level system, defines the following six levels of interpersonal maturity:

I-2 Not interested in things outside oneself except as a source of supply.

I-3 Has become aware that one's behavior has something to do with gratification, but sees people only as they can be useful. Perceives rules.

I-4 Has internalized a set of standards of behavior, admires models, feels guilty about not measuring up to one's own ideals.

I-5 Similar to I-4, but can switch roles without great anxiety, and begins to see the complexity of other individuals. Few delinquents here.

I-6, The system provides for these levels, but few individu-als in our society, and virtually no delinquents attain these levels.

Andrew (1974) found the I-Level placement for incarcerated delinquents related inversely to the Verbal vs. Performance discrepancy on the WISC or WAIS. Delinquents showing more advanced levels of interpersonal maturity, designated by a higher I-Level placement, had smaller discrepancies. The discrepancy was greatest for the I-2's in the sample, moderate for I-3's, and absent in the I-4 group. According to Andrew, this factor should be considered in educational interpretation of the WISC or WAIS profiles.

All previous research cited involved incarcerated juvenile delinquents, ignoring institutionalization as a variable. One study attempted to control this factor (Solway, Hays, Roberts, 1975). The WISC profiles of two groups were studied: incarcerated youths, and those on a pretrial status who were still living at home. No significant
differences were found in the Verbal, Performance or Full Scale IQ's between the two groups. Differences were found in the subtest scatter but, unfortunately, not included in the article.

Most research also seemed to have been based on the WISC or the WAIS. While the factor structure of the WISC and WISC-R are considered to be essentially the same, the performance of incarcerated delinquents on the two instruments was compared (Solway, Frue, Hays, Cody, Gryll, 1976). This research found that while the Verbal, Performance, and Full Scale IQ's of the sample were slightly lower on the WISC-R, the scaled scores of five subtests were significantly lower in relation to the other subtests. The lowered scores were received on the Similarities, Picture Completion, Block Design, Object Assembly, and Coding. In contrast, the Arithmetic scaled score was significantly higher on the WISC-R. Further, when applying Wechsler's three original WAIS hypotheses to WISC-R scores, the revised version conforms better than the original WISC, with the exception of the higher Arithmetic score. Although not proven, a slightly different factor structure may be present in the WISC-R for incarcerated juvenile populations.

Bannatyne's Recategorization

One alternate method for interpreting the WISC-R profiles of students being considered for special placement
is that proposed by Alexander Bannatyne (1968, 1974). His original model, or recategorization, was based on the WISC (1968). His study of factor analytic research led him to believe the traditional Verbal vs. Performance discrepancy had little psychological meaning for interpreting the scores of disabled readers. Early research was confined to a specific subset of this population, genetic dyslexics. In his 1968 journal article, Bannatyne defined this group as "those persons, almost always male, who exhibit a syndrome of specific linguistic skill disabilities which restricts their ability to learn to read, spell and write as well as their Full Scale intelligence would indicate. There is a body of evidence which indicates that the condition is inherited."

Bannatyne interpreted the WISC profiles of members of this group using a three-factor model. The Spatial Ability factor included the Picture Completion, Block Design, and Object Assembly subtests. These were all Performance measures which required no sequencing ability. The Verbal Conceptualization factor included three Verbal Scale subtests: Comprehension, Similarities, and Vocabulary. The Sequencing Ability factor included Digit Span, Picture Arrangement, and Coding. This category represents both Verbal and Performance subtests which involve the sequencing of auditory or visual stimuli.

His results found the genetic dyslexics to possess relatively high spatial ability. This was indicated by
adding the scaled scores received on the three Spatial Ability subtests. In contrast, relatively low scores were received in the Sequencing Ability category. Based on his recategorization and additional testing with the Illinois Test of Psycholinguistic Abilities (ITPA), Bannatyne hypothesized that genetic dyslexics suffer from poor sequencing ability and auditory closure.

Separate factor analyses, conducted by Maxwell, Cohen, Bawmeister and Bartlett, and Bortner and Birch (cited in Rugel, 1974) supported the justification of recategorizing the WISC into three categories. All studies found a strong verbal factor related to the subtests in the Verbal Conceptualization category, a spatial factor related subtests in the Spatial Ability category, and a distractibility, or memory factor associated with the Sequencing Ability subtests. The only subtest which seemed to be misplaced was Picture Arrangement, which consistently loaded higher on the Spatial factor than on the Sequencing factor.

Based on these findings, Rugel (1974) modified Bannatyne's original recategorization in order to create a more robust factor structure. Picture arrangement was dropped from the scheme entirely and replaced with Arithmetic. A new factor, Acquired Knowledge, was also added. The modified recategorization now consisted of four factors. Spatial Ability was unchanged and included Picture Completion, Block Design, and Object Assembly. The Verbal
Conceptualization category also remained the same, composed of Comprehension, Similarities, and Vocabulary. The Sequencing Ability category now consisted of Digit Span, Arithmetic and Coding. The new Acquired Knowledge grouping included Information, Arithmetic, and Vocabulary. It will be noted that the Vocabulary and Arithmetic subtests appear twice in Rugel's modification.

He next took 22 published and unpublished studies of disabled readers in which WISC subtest scores were reported, and recategorized them using his modified scheme. When compared to normal readers, the disabled samples received significantly lower scaled score totals in Sequencing Ability, slightly lower totals in Verbal Conceptualization, and higher totals in Spatial Ability. Rugel's research demonstrated a much broader applicability for the recategorization than Bannatyne originally proposed. No attempt to restrict the sample to the genetic dyslexics described by Bannatyne was made, and many different types of disabled readers were included in Rugel's research. Like Bannatyne, he felt the results indicated disabled readers had relatively weak sequencing skills, with difficulties in attention and short-term memory. Both researchers felt these skills were crucial for reading. Bannatyne later endorsed Rugel's modification and conclusions (1974).

Since both Bannatyne and Rugel's studies were based on the 1949 WISC, the recategorization was questioned.
with the instrument's revision and publication as the WISC-R in 1974. However, a factor analysis by Kaufman (1975) concluded the factor structure of the revised instrument to be essentially unchanged. The first published attempt to apply the recategorization using the WISC-R was completed by Smith, Coleman, Dokecki, and Davis (1977). They deleted the Digit Span subtest from the Sequencing Ability category, since this subtest is often omitted. The total Sequencing Ability score, therefore, was based on the two remaining subtests, Arithmetic and Coding.

When the recategorization profiles of school-verified learning disabled and educable mentally retarded children were studied, the learning disabled sample showed the characteristic pattern described by Bannatyne; that is, the Spatial Ability score being the highest, the Verbal Conceptualization score the next highest, and the Sequencing Ability being the lowest. No such pattern was present in the educable mentally retarded sample. This research supports the utility of Bannatyne's recategorization with the WISC-R and indicates deletion of the infrequently administered Digit Span does not greatly affect the four-factor structure. Further, the use of the recategorized WISC-R for differentiating between academic groups may be possible.

A recent study of recategorized WISC-R scores of school-verified learning disabled children was conducted by
Vance and Singer (1978). Although the significance of their results was less than that of previous recategorization research, their study gives some support to the model. Of their sample, 39% obtained the same pattern of scores found by Bannatyne (1974) and Smith et al. (1977).

Vance and Singer argued that while Bannatyne's model did not yield the characteristic pattern for even a majority of their sample, the results of other studies which attempted to find identifying WISC-R score profiles for learning disabled children were even less encouraging. The conclusion of this study was that a number of profiles indicative of learning disabilities may exist, none of which can identify all children eligible for services. The role of the school psychologist is to attempt to understand a particular child's pattern of scores from whichever frames of reference supply the most meaningful insight into his or her performance.

Purpose of the Study

The purpose of this study will be to examine the utility of Bannatyne's recategorization of WISC-R scores with a population of incarcerated male juvenile delinquents. Researchers of the Bannatyne recategorization model claim that children who are learning disabled will show a significant pattern of subtest scaled scores (Bannatyne, 1974; Rugel, 1974; Smith et al., 1977). The highest scaled score
total will be in the Spatial Ability category, the second highest total will be in the Verbal Conceptualization category, and the lowest total will be in the Sequencing Ability category.

Most research to date, however, has involved public school samples, with no information available on incarcerated juvenile populations. This study will attempt to determine whether significant Bannatyne patterns exist for different groups of incarcerated delinquents, and whether significant differences exist among the patterns received for these groups.

The specific hypotheses of this study are:

1. Learning disabled delinquents will exhibit a consistent pattern of subtest scaled scores demonstrated by Bannatyne (1974).
2. Delinquents enrolled in both Title I CSIP (Communication Skills Improvement Program) and MIP (Math Improvement Program) units will show a consistent pattern of subtest scaled scores demonstrated by Bannatyne (1974).
3. Educable mentally retarded delinquents will not exhibit a consistent pattern of subtest scaled scores demonstrated by Bannatyne (1974).
4. There will be a statistically significant difference among the pattern of subtest scaled scores for all three groups.
Definition of Terms

1. Juvenile delinquent - This term will refer to any youth incarcerated in an Ohio Youth Commission institution.

2. Learning disabled - This term will refer to those youth placed in learning disabilities units according to the standards of the State of Ohio (1979) and the Ohio Youth Commission (1978).

3. Educable mentally retarded - This term will refer to those youth placed in units for the educable mentally retarded according to the standards of the State of Ohio (1978) and the Ohio Youth Commission (1978).

4. Title I - This term refers to CSIP (Communication Skills Improvement Program) and MIP (Math Improvement Program) units, based on the standards of the Ohio Youth Commission (1978).

Eligibility criteria for the above programs are included in Appendix A.
CHAPTER II

METHOD

Subjects

The subjects used in this study were 150 male juvenile delinquents incarcerated at two Ohio Youth Commission facilities in Columbus. Subjects ranged in age from 13-0 to 16-11, ceiling age for the WISC-R. The dates of psychological testing ranged from March 1977 through June 1980.

The sample was selected on the basis of having been evaluated with the Ohio Youth Commission's multi-factored assessment procedure, which included the Wechsler Intelligence Scale for Children-Revised, or WISC-R (Wechsler, 1974). Based on the completed assessment, 50 of the delinquent subjects each received either full-time or part-time placement in one of the following educational units: learning disabilities (LD), Title I Communication Skills Improvement and Math Improvement Programs, or educable mentally retarded (EMR) services.

The multi-factored assessment procedure is a comprehensive evaluation which involves the following:

A. Norm-Referenced Achievement

Before assignment to specific educational programs,
subjects were tested with:

1. Gates MacGinitie, Level E (Reading)
2. California Achievement Test, Level 4 (Mathematics)

Students functioning at their chronological age grade placement can be assigned to regular school programs. Students functioning more than two years below their chronological age grade placement will proceed to Step B.

B. Criterion-Referenced Achievement

Specific instruments may include:

1. Spache Test (Reading)
2. Key Math (Mathematics)

Students who scored more than two years behind their chronological age grade placement on either the Gates MacGinitie or the California Achievement will take either both the Spache and Key Tests, or whichever one of these tests is appropriate. Students who scored more than two years behind their chronological age grade placement on the norm-referenced and criterion-referenced tests must proceed to complete the multi-factored assessment which consists of the following:

C. Cognitive-Intellectual Development

For the purpose of this study, students will have been assessed with the Wechsler Intelligence Scale for Children-Revised (WISC-R).

D. Language and Communication

Specific instruments may include:
1. An evaluation of written language
2. Carrow Test for Auditory Comprehension of Language
3. Goldman-Fristoe-Woodcock Auditory Tests
4. Illinois Test of Psycholinguistic Abilities (ITPA)
5. Wepman Auditory Discrimination Test
6. Wepman Auditory Memory Test

E. Sensorimotor

Specific instruments may include:
1. Bender Motor Gestalt Test
2. Psychological Associates, Inc. Modality Assessment

F. Adaptive Behavior

Specific instruments may include the following:
1. AAMD Adaptive Behavior Scale
2. Vineland Social Maturity Scale

G. Personal/Social/Emotional

Specific instruments may include the following:
1. Draw-A-Person
2. Incomplete Sentences
3. Mooney Problem Checklist
4. Psychosocial history of the youth and his family

H. Medical History

I. Vocational Assessment

J. Speech, Language, Hearing Screening, Vision, Medical Screening

Procedure

Permission for the study and a waiver of implied consent was granted from the Human Subjects Review Board of
The Ohio State University. Consent to examine records of subjects was received from the Ohio Youth Commission's Research Department.

Psychological reports or WISC-R protocols of the subjects were then examined. The data recorded included the Verbal, Performance, and Full Scale IQ scores as well as the individual subtest scaled scores, including Digit Span. The subtest scaled scores were recategorized according to the model suggested by Rugel (1974), and later confirmed by Bammatne (1974).

Each subject's Block Design, Picture Completion, and Object Assembly scaled scores were added, and their mean served as the Spatial Ability recategorized score. For the Verbal Conceptualization score, the mean of the Similarities, Vocabulary, and Comprehension subtests was likewise calculated. The Sequencing Ability recategorized score was composed of the mean of the Arithmetic, Digit Span, and Coding subtests. The mean of the Information, Arithmetic and Vocabulary subtests served as the recategorized Acquired Knowledge score.

The mean Spatial Ability, Verbal Conceptualization, Sequencing Ability, and Acquired Knowledge score for each of the three educational groups was next calculated. The resulting group profiles were then analyzed in order to determine whether a statistically significant pattern existed for each, and if significant differences could be found among them.
Methodology

The four hypotheses of the study were tested by first performing a 3 x 4 analysis of variance with repeated measures, followed with appropriate post hoc tests. This was done in order to determine the significance of main effects for both group and test, as well as the interaction between the two. This was followed by a simple main effects analysis with post hoc testing in order to determine between which pairs of recategorized scores significant differences could be found for each group, and whether significant differences existed among the three group profile.
CHAPTER III
RESULTS

It will be recalled from Chapter II that the WISC-R patterns of three educational groups were analyzed in this study.

The chronological age (CA) means and standard deviations for each group are presented in Table 1. The Verbal, Performance, and Full Scale IQ scores, along with the recategorized scaled scores and their standard deviations for all three groups are presented in Table 2.

The first three hypotheses of this study dealt with the question as to whether significant patterns existed in the profiles for the three groups. Specifically, these hypotheses are:

1. Learning disabled delinquents will exhibit a consistent pattern of subtest scaled scores demonstrated by Bannatyne (1974).

2. Delinquents enrolled in both Title I CSIP (Communication Skills Improvement Program) and MIP (Math Improvement Program) units will show a consistent pattern of subtest scaled scores demonstrated by Bannatyne (1974).

3. Educable mentally retarded delinquents will not exhibit a consistent pattern of subtest scaled scores.
### TABLE 1

Chronological Age (CA) Means and Standard Deviations for Groups, in Months

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<td>LD</td>
<td>195.39</td>
<td>6.63</td>
</tr>
<tr>
<td>Title I</td>
<td>197.49</td>
<td>4.61</td>
</tr>
<tr>
<td>EMR</td>
<td>190.10</td>
<td>12.77</td>
</tr>
</tbody>
</table>

\[ n = 50 \]
<table>
<thead>
<tr>
<th>Scores</th>
<th>LD Mean</th>
<th>S.D.</th>
<th>Title I Mean</th>
<th>S.D.</th>
<th>EMR Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbal IQ</td>
<td>88.420</td>
<td>7.066</td>
<td>89.300</td>
<td>9.926</td>
<td>72.860</td>
<td>5.834</td>
</tr>
<tr>
<td>Performance IQ</td>
<td>94.960</td>
<td>10.896</td>
<td>92.760</td>
<td>9.919</td>
<td>73.800</td>
<td>6.824</td>
</tr>
<tr>
<td>Full Scale IQ</td>
<td>90.640</td>
<td>8.027</td>
<td>90.180</td>
<td>8.771</td>
<td>71.540</td>
<td>5.414</td>
</tr>
<tr>
<td>Spatial Ability</td>
<td>9.840</td>
<td>1.936</td>
<td>9.146</td>
<td>1.761</td>
<td>6.073</td>
<td>1.370</td>
</tr>
<tr>
<td>Verbal Conceptualization</td>
<td>8.732</td>
<td>1.287</td>
<td>8.600</td>
<td>1.860</td>
<td>5.599</td>
<td>1.030</td>
</tr>
<tr>
<td>Sequencing Ability</td>
<td>7.079</td>
<td>1.781</td>
<td>7.792</td>
<td>1.559</td>
<td>5.551</td>
<td>1.258</td>
</tr>
<tr>
<td>Acquired Knowledge</td>
<td>6.727</td>
<td>1.238</td>
<td>7.200</td>
<td>1.201</td>
<td>4.640</td>
<td>1.117</td>
</tr>
</tbody>
</table>

*N = 50*
demonstrated by Bannatyne (1974).

To test these hypotheses, a $3 \times 4$ analysis of variance with repeated measures was performed. The results are reported in Table 3 and reveal that both main effects for group ($F = 102.85; \text{df} = 2$) and test ($F = 97.81; \text{df} = 3$) are significant at the $p < .0001$ level. Moreover, a significant interaction between group and test was revealed ($F = 9.51; \text{df} = 6; p < .0001$). This effect is presented visually in Figure 1.

Because of the significant interaction, a simple main effects analysis was performed, and is presented in Table 4. This revealed significant differences among the scaled score means for each of the three groups. A Multiple Range Test involving the Tukey-HSD Procedure was next performed on each group profile in order to determine between which pairs of recategorized scores significant differences could be found. For the following discussion of these results, the reader is asked to refer back to Table 2 for the values of the recategorized scaled scores and to Figure 1.

A significant pattern of recategorized scaled scores was found for the LD group ($F = 76.73; \text{df} = 3; p < .0001$). The Spatial Ability mean score was the highest received, and was significantly greater than the Verbal Conceptualization mean. This was, in turn, significantly higher than the Sequencing Ability mean score. The Sequencing
TABLE 3
3 x 4 Analysis of Variance with Repeated Measures for Group and Test

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>ss</th>
<th>ms</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Between</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Groups</td>
<td>2</td>
<td>954.12576</td>
<td>477.06288</td>
<td>102.85*</td>
</tr>
<tr>
<td>Error</td>
<td>147</td>
<td>681.81914</td>
<td>4.63823</td>
<td></td>
</tr>
<tr>
<td><strong>Within</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test</td>
<td>3</td>
<td>403.96029</td>
<td>134.65343</td>
<td>97.81*</td>
</tr>
<tr>
<td>Test x Group</td>
<td>6</td>
<td>78.53602</td>
<td>13.08934</td>
<td>9.51*</td>
</tr>
<tr>
<td>Error</td>
<td>441</td>
<td>607.14739</td>
<td>1.37675</td>
<td></td>
</tr>
</tbody>
</table>

* p < .00001
Figure 1

Recategorized WISC-R Mean Scores for Groups

LD

Title I

EMR
<table>
<thead>
<tr>
<th>Source</th>
<th>ss</th>
<th>df</th>
<th>ms</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Between Groups</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Groups x Spatial</td>
<td>401.99</td>
<td>2</td>
<td>201.00</td>
<td>91.78*</td>
</tr>
<tr>
<td>Groups x Verbal Con.</td>
<td>314.00</td>
<td>2</td>
<td>157.00</td>
<td>71.69*</td>
</tr>
<tr>
<td>Groups X Sequencing</td>
<td>131.10</td>
<td>2</td>
<td>65.55</td>
<td>29.93*</td>
</tr>
<tr>
<td>Groups x Acq. Know.</td>
<td>185.55</td>
<td>2</td>
<td>92.78</td>
<td>42.36*</td>
</tr>
<tr>
<td><strong>Within Cell</strong></td>
<td>1288.97</td>
<td>588</td>
<td>2.19</td>
<td></td>
</tr>
<tr>
<td><strong>Within Subjects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Categories x LD</td>
<td>317.67</td>
<td>3</td>
<td>105.89</td>
<td>76.73*</td>
</tr>
<tr>
<td>Between Categories x Title I</td>
<td>110.99</td>
<td>3</td>
<td>37.00</td>
<td>16.81*</td>
</tr>
<tr>
<td>Between Categories x EMR</td>
<td>38.95</td>
<td>3</td>
<td>12.99</td>
<td>9.41*</td>
</tr>
<tr>
<td>Categories x Subjects Within Groups</td>
<td>667.15</td>
<td>441</td>
<td>1.38</td>
<td></td>
</tr>
</tbody>
</table>

* p < .0001
mean was significantly higher than the Acquired Knowledge mean score, which was the lowest score received for this group. The differences between means are reported in Table 5.

For the Title I group, the pattern of scaled scores received was also found to be significant ($F = 26.81; df + 3; p < .0001$). The highest mean score received was in Spatial Ability. It was significantly higher than the Verbal Conceptualization mean which was, again, significantly higher than the Sequencing Ability mean. As with the LD group, this mean was significantly higher than the Acquired Knowledge mean. Pair-wise comparisons are presented in Table 6.

A significant pattern of recategorized scores likewise appeared for the EMR group ($F = 9.41; df = 3; p < .0001$). The pattern was different from those received by the LD and Title I groups. The Spatial Ability category, again, ranked highest and was significantly greater than the Verbal Conceptualization mean. This score, however, was not significantly different from the Sequencing Ability mean. Both the Verbal Conceptualization and Sequencing Ability scores were significantly greater than the Acquired Knowledge mean. These pair-wise comparisons are presented in Table 7.

The remainder of this chapter will deal with the testing of the fourth hypothesis, namely:

4. There will be a statistically significant difference
### TABLE 5

**Difference Between Means of Recategorized Scores for LD Group**

<table>
<thead>
<tr>
<th>Category a</th>
<th>Spatial</th>
<th>Verbal Con.</th>
<th>Sequencing</th>
<th>Acq. Know.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spatial</td>
<td>-</td>
<td>1.108*</td>
<td>2.761*</td>
<td>3.115*</td>
</tr>
<tr>
<td>Verbal Con.</td>
<td>-</td>
<td>-</td>
<td>1.653*</td>
<td>2.005*</td>
</tr>
<tr>
<td>Sequencing</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>.352*</td>
</tr>
<tr>
<td>Acq. Know.</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

*a* Ordered by Means  
*b* Differences between Means  
*p < .01*
<table>
<thead>
<tr>
<th>Category&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Spatial</th>
<th>Verbal Con</th>
<th>Sequencing</th>
<th>Acq. Know.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spatial</td>
<td>-</td>
<td>.546&lt;sup&gt;*&lt;/sup&gt;</td>
<td>1.354&lt;sup&gt;*&lt;/sup&gt;</td>
<td>1.947&lt;sup&gt;*&lt;/sup&gt;</td>
</tr>
<tr>
<td>Verbal Con</td>
<td>-</td>
<td>-</td>
<td>.808&lt;sup&gt;*&lt;/sup&gt;</td>
<td>1.401&lt;sup&gt;*&lt;/sup&gt;</td>
</tr>
<tr>
<td>Sequencing</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>.593&lt;sup&gt;*&lt;/sup&gt;</td>
</tr>
<tr>
<td>Acq. Know.</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<sup>a</sup>Ordered by Means

<sup>b</sup>Difference Between Means

<sup>*</sup>p < .01
### TABLE 7
Difference Between Means of Recategorized Scores for EMR Group

<table>
<thead>
<tr>
<th>Category&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Spatial</th>
<th>Verbal Con</th>
<th>Sequencing</th>
<th>Acq. Know.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spatial</td>
<td>-</td>
<td>.474*</td>
<td>.521</td>
<td>1.432*</td>
</tr>
<tr>
<td>Verbal Con</td>
<td>-</td>
<td>-</td>
<td>.048*</td>
<td>.919*</td>
</tr>
<tr>
<td>Sequencing</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>.911*</td>
</tr>
<tr>
<td>Ack. Know.</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<sup>a</sup>Ordered by Means

<sup>b</sup>Difference Between Means

* p < .01
among the pattern of subtest scaled scores for all three groups.

It will be recalled that the 3 x 4 analysis of variance with repeated measures initially performed, and reported in Table 4, revealed a significant interaction for group and test (F = 9.51; df = 6, p < .0001). A simple main effects analysis followed by a Multiple Range Test involving the Scheffé Procedure was next performed on each of the four subtest categories. This was done in order to determine which categories were differentiating among groups.

Differences between group means at the p < .01 level of significance were found when comparing the scores of the LD and Title I groups with those of the EMR group for the Spatial Ability and Verbal Conceptualization categories. In both cases, the EMR group received the lower score. No significant differences were found between the scores of the LD and Title I groups, however. The differences between group means for these two categories are summarized in Tables 8 and 9, respectively.

Significant differences between group means at the p < .05 level of confidence were found between groups for the remaining categories, Sequencing Ability and Acquired Knowledge. Again, the EMR group received the lower score when compared with either the LD or Title I groups, and no significant differences were found between the scores of the LD and Title I groups. The comparison between
**TABLE 9**

Difference Between Means of Groups for the Spatial Ability Category

<table>
<thead>
<tr>
<th>Group ^a</th>
<th>LD</th>
<th>Group ^b Title I</th>
<th>EMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD</td>
<td>-</td>
<td>0.694</td>
<td>3.767^a</td>
</tr>
<tr>
<td>Title I</td>
<td>-</td>
<td>-</td>
<td>3.073^a</td>
</tr>
<tr>
<td>EMR</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

\^aOrdered by Means

\^bDifferences between Means

\^p < .02
<table>
<thead>
<tr>
<th>Group&lt;sup&gt;a&lt;/sup&gt;</th>
<th>LD</th>
<th>Group&lt;sup&gt;b&lt;/sup&gt; Title I</th>
<th>EMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD</td>
<td>-</td>
<td>0.132</td>
<td>3.133&lt;sup&gt;*&lt;/sup&gt;</td>
</tr>
<tr>
<td>Title I</td>
<td>-</td>
<td>-</td>
<td>3.001&lt;sup&gt;*&lt;/sup&gt;</td>
</tr>
<tr>
<td>EMR</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<sup>a</sup>Ordered by Means

<sup>b</sup>Differences Between Means

<sup>*</sup>P < .01
group means for these two categories are reported in Tables 10 and 11.

In summary, significant patterns of recategorized scores, as proposed by Bannatyne, were found for both the LD and Title I groups. While significant pair-wise comparisons were found in the EMR group profile, it did not conform to Bannatyne's hypothesis. Finally, while no significant differences were found between the profiles of the LD and Title I groups, both were different from that received by the EMR group with the latter being lower in both cases.
## TABLE 10

Differences Between Means of Groups for the Sequencing Ability Category

<table>
<thead>
<tr>
<th>Group&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Title I</th>
<th>Group&lt;sup&gt;b&lt;/sup&gt;</th>
<th>LD</th>
<th>EMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title I</td>
<td></td>
<td>.713</td>
<td></td>
<td>2.241*</td>
</tr>
<tr>
<td>LD</td>
<td></td>
<td>-</td>
<td></td>
<td>1.528*</td>
</tr>
<tr>
<td>EMR</td>
<td></td>
<td>-</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>Ordered by Means

<sup>b</sup>Differences Between Means

*<sup>p</sup> < .05
TABLE 11
Differences Between Means for the Acquired Knowledge Category

<table>
<thead>
<tr>
<th>Group a</th>
<th>Title I</th>
<th>Group b</th>
<th>LD</th>
<th>Effk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title I</td>
<td>-</td>
<td>.473</td>
<td>2.56*</td>
<td></td>
</tr>
<tr>
<td>LD</td>
<td>-</td>
<td>-</td>
<td>2.087*</td>
<td></td>
</tr>
<tr>
<td>EMR</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

a Ordered by Means

b Differences Between Means

* P < .05
CHAPTER IV
DISCUSSION

The purpose of this study was to examine the utility of Bannatyne's recategorization of WISC-R scores with a population of incarcerated male juvenile delinquents enrolled in three academic units: those for learning disabilities (LD), Title I Communication Skills Improvement Program (CSIP) and Math Improvement Program (MIF), and educable mentally retarded (EMR). Research of the Bannatyne model claims that children who are learning disabled will show a specific pattern of subtest scaled scores (Bannatyne, 1968, 1974). According to their hypothesis, these children will receive their highest mean score in the Spatial Ability Category, which is composed of the Picture Completion, Block Design, and Object Assembly subtests. The next highest score received will be that of Verbal Conceptualization which includes the Similarities, Vocabulary, and Comprehensive subtests. The third highest ranking score would be received in the Sequencing Ability category, which is composed of the Arithmetic, Digit Span, and Coding subtests. Although not mentioned in the original research, the fourth category, Acquired Knowledge, was later investigated and found to be the lowest ranking subtest category (Smith et al., 1977).
This is composed of the Information, Arithmetic and Vocabulary subtests.

The usefulness of the recategorization model in understanding the profiles of culturally disadvantaged children has also been investigated (Kaufman, 1979; Rugel, 1974). By comparing areas of relative strengths and weaknesses, the effects of environmental deprivation may be evaluated and appropriate recommendations can be made.

The rationale for selecting incarcerated juvenile delinquents for this study was partially based on the fact that previous research into the Bannatyne model has involved public school samples, usually at the elementary level. Little information exists on junior and senior high school age populations. In addition, the difficulty in understanding the WISC-R profiles of incarcerated subjects was discussed in Chapter I. Public school norms may not be entirely appropriate for this population, as much of the research seems to indicate. This study will serve as an early step in the collection of normative data, based on an incarcerated juvenile population, for the Bannatyne model.

The second rationale for selecting this target population was to gain further information on which to determine class placement in juvenile institutions. By selecting the sample based on class placement (LD, Title I, or
EMR), the possibility of using the recategorization to understand differences among the groups may be possible. Difficult class placement decisions could be facilitated by evaluating individual recategorized profiles.

The Hypotheses

As recalled from previous chapters, the first two hypotheses of this study were:

1. Learning disabled delinquents will exhibit a consistent pattern of subtest scaled scores proposed by Bannatyne (1974).

2. Delinquents enrolled in both Title I CSIP (Communication Skills Improvement Program) and MIP (Math Improvement Program) units will show a consistent pattern of subtest scaled scores demonstrated by Bannatyne (1974).

The results of this study, presented in Chapter III, confirm both of these hypotheses. For both groups (LD and Title I), significant patterns appeared among the recategorized scores. The Spatial Ability Category ranked highest in both cases. The second highest ranking score was in the Verbal Conceptualization Category. The third highest ranking score was for the Sequencing Ability Category, and the lowest score was received in the Acquired Knowledge category.

The third hypothesis of the study was:

3. Educable mentally retarded delinquents will not exhibit
a consistent pattern of subtest scores demonstrated by Bannatyne (1974).

This hypothesis was also confirmed. Although the rankings of the four categories were the same as those received by the LD and Title I groups, the difference between the Verbal Conceptualization and Sequencing Ability means was not significant for this group. The profile received by this EMR group was similar to the one received in the study by Smith et al., (1977). For their EMR group, the Verbal Conceptualization mean was not significantly higher than the Sequencing Ability Mean.

The final hypothesis of the study was:

4. There will be a statistically significant difference among the patterns of subtest scaled scores for each group.

This hypothesis was not confirmed. Although the pattern received by the EMR group was significantly different from those of the LD or Title I groups, no differences which reached significance were found between the latter two groups.

Since the profiles of the LD and Title I groups were essentially the same, they will be discussed together. It will be noted from Table 2 that both groups received their highest score in Spatial Ability.

Proponents of the recategorization believe these subtests are the best measure of nonverbal intelligence on the scale. However, correlations between this category and
academic success are less than for the categories composed
of the Verbal subtests (Verbal Conceptualization and Ac-
quired Knowledge). A high score in this area, when compared
to lower rankings for the other three, can serve to indi-
cate a form of intelligence that is less significant for
traditional academic tasks. The high Spatial scores re-
ceived for the LD and Title I groups indicate that an opti-
mistic prognosis is possible for these groups in spite of
low previous achievement if proper channeling of this abil-
ity is utilized.

In addition to being essentially nonverbal, the Spatial
subtests are felt by many researchers to have a minimum de-
pendence on specific educational and cultural opportunities.
The category is believed by Wechsler to provide the fairest
assessment of the intellectual abilities of children from
disadvantaged backgrounds, since the verbal and social skills
involved in the other subtests are influenced by previous
experiences in the home and school. Given the deprived
background of most incarcerated youth in Ohio Youth Commis-
sion facilities, this category could provide an important
non-biased prediction of their potential skills.

The significantly lower score received in the Verbal
Conceptualization category by both groups indicates more
difficulty is experienced when dealing with language oriented
material. The subtests in this category often involve ab-
stract verbal reasoning and concept formation, and expres-
sive skills. The effects of cultural experiences and social
judgment can influence scores received in this area, which could explain in part the lower score received by both delinquent groups.

The most accurate insights into the verbal intelligence of both groups may be seen by comparing the scores received in this category with those from the Acquired Knowledge grouping, the other purely verbal domain. In contrast to the wide range of acceptable responses and abstract nature of the Verbal Conceptualization items, those of the Acquired Knowledge category include many concrete, factual questions in which memory of previously stored information must be exercised. The skills required for successful performance in this category seem to involve more practical applications of verbal activities, similar to those required for classroom oriented success.

Since both the LD and Title I subjects received significantly lower scores in the Acquired Knowledge category when compared to Verbal Conceptualization, difficulty in applying their relatively well-developed verbal skills to specific classroom tasks is indicated. This contrast can also serve to illustrate the assumed effects of their disadvantaged backgrounds and past education deficiencies. Less success in acquiring the information and skills necessary for satisfactory performance in this area has caused them to fall significantly below what is expected of their same-age peers, based on WISC-R standardization norms.

Both groups receiving their third-ranking score in the
Sequencing Ability category. It will be noted that the sub-tests in this grouping (Arithmetic, Digit Span, and Coding) are identical to those of the Freedom from Distractibility factor. The low score received by both groups in this area cannot support the notion that deficiency in sequencing skills exist, although Brumatine (1968) believes this skill is necessary for reading. Kaufman (1979) advises that only a careful study of the errors received in this area, along with observations and supplementary assessment, can add support to this hypothesis. If neither anxiety nor difficulty with concentration is noted during these subtests, the sequencing deficiency inference is strengthened, since these factors can also serve to depress the scores received in this area.

In the samples, all alternatives must be considered and the overall lower score for both groups on this factor may include both explanations. The fact that the assessment with the WISC-R occurs soon after incarceration, an anxiety producing event in itself, could lend support to a behavioral explanation for this category rather than a cognitive one.

The profile received from the EMR group has several similarities to the LD and Title I profile. Again, the highest score received was in the Spatial Ability category. It can be assumed the same factors which explained the relative strengths of the first two groups also apply with the EMR subjects; namely, relatively well-developed skills in non-verbal reasoning situations influenced minimally by cultural factors.
As with the other incarcerated subjects, weaker performance in the Verbal Conceptualization domain indicates difficulty in dealing with language-oriented tasks involving abstractions and social judgment. The effects of cultural and past educational deprivation may also be assumed to have depressed this score. Although the score in this category is significantly higher than that received for the Acquired Knowledge, less difference between the two scores can be noted for the EMR group. This most likely indicates that this group is lacking the verbal potential predicted for the LD and Title I groups, and presents a less optimistic prognosis for future achievement.

The Sequencing Ability category ranked third-highest for the EMR group. The same argument for a behavioral versus cognitive interpretation also applies to this group. In addition, much research has been done which indicates the Arithmetic subtest included in this category is frequently among the lowest ranking for educable mentally retarded individuals (Kaufman, 1979; Sattler, 1974).

Of all three groups of students, the only pair-wise comparison of recategorized scores which lacked significant difference was the Verbal Conceptualization-Sequencing ability comparison for the EMR group. This same lack of significance was reported in the research of Smith et al., (1977), and was assumed to be due to the overall deficiency in cognitive ability which is characteristic of this group.
Comparison of Group Profiles

Both the LD and Title I groups received essentially the same pattern of recategorized scores. Possible reasons for the lack of significant differences could lie with the current criteria for class placement (see Appendix A). Both groups are defined, in part, as being within the average range of intelligence and as having at least a two-year discrepancy between chronological age and achievement, as based on the same instruments. One operational criteria which seems to determine eligibility for the LD groups is the learning expectancy level. For subjects being considered for learning disabilities placement, a two-year discrepancy between ability and achievement must exist. This criteria is not necessary for Title I placement. Examination of current criteria indicates a broad area of overlap, since many students may qualify for both types of placement.

State standards for LD placement (1979) which require that academic deficiencies not be primarily due to cultural disadvantage would appear to make placement decisions difficult with this incarcerated population. If strictly applied, most students would probably not qualify for LD placement. Placement for students who qualify for both programs can be a difficult decision, and may then rest on factors such as the results of the modality assessment, availability of space within the various class units, and future goals of
the student in question. In light of these non-cognitive and non-academic criteria which would not appear systematically in WISC-R subtest scores, similar profiles between the two groups can be explained. Title I and LD appear to represent relatively homogeneous populations, based on WISC-R recategorizations.

Examination of the two group profiles in Figure I reveals a more steeply descending slope of scores for the LD group. It was surprising that this did not reach significance, since this group would seem to possess greater difficulty with sequencing or distractibility and have a greater discrepancy between verbal potential and its application to academic areas.

The difference between the EMR group, when compared with either of the other two, is based on the relatively poorer performance by this group on all four recategorized scores. Lower intelligence, as measured by the WISC-R, seems to be a strongly differentiating factor in separating this group from the other two. Although the pattern itself was somewhat different, its similarities to the other two must also be noted. Like the LD and Title I groups, the Spatial Ability category ranked highest, the Verbal Conceptualization and Sequencing Ability categories received middle rankings, and Acquired Knowledge was the lowest score received.
Diagnostic Implications

The results of this study seem to indicate that recategorization of WISC-R scores has some diagnostic utility for all three groups studied, although it failed to differentiate between the LD and Title I groups. For all three groups, a relatively high Spatial Ability and low Acquired Knowledge recategorized score was received. This seems to support the hypothesis that this pattern is associated with different types of learning difficulties, regardless of their assumed origin.

In the cases of the Title I and LD groups, the high Spatial and Verbal Conceptualization scores can be indicative of potential future achievement. The lower scores in these areas for the EMR group would seem to predict less aptitude for school-related success. The low Acquired Knowledge score seems to be particularly indicative of learning difficulties. Many studies of WISC-R profiles of children with various learning difficulties have been compiled, and indicate that two subtests included in this category (Arithmetic and Information) consistently appear among the lowest-ranking subtests received (Sattler, 1974). Some believe low scores within this area suggest difficulty with the phases of long-term memory (encoding, storage, or retrieval), and therefore can predict future academic difficulty. Others, however, propose that these subtests merely reflect past school-related learning, much like any academic achievement measure.
Less fluctuation in the profile of the EMR group, when compared to the LD or Title I groups, appears to be a characteristic of this population. While many generally believe a flat profile of subtest scaled scores is normally associated with educable mental retardation, the significant differences found among categories in this study refutes this hypothesis. Although the magnitudes were considerably less than for the other groups, differential abilities which can translate into important recommendations exist for the EMR group.

The effects of cultural and educational disadvantage can possibly be evaluated from a recategorized profile. As mentioned earlier, the relatively high Spatial Ability scores may provide the best estimate of ability for deprived children. The higher Verbal Conceptualization score, when compared with the Acquired Knowledge subtests suggests a potentially intact form of verbal intelligence when dealing with novel problems or tasks. The strength of these subtests, considering the background histories of the subjects suggests verbal strengths which, if properly channeled, may lead to academic improvement. The impact of the environment is more clearly seen in the Acquired Knowledge grouping, whose questions are strongly contingent on past experiences.

The similarity of the LD and Title I groups has important implications for the labeling processes, not
only within the Ohio Youth Commission, but for schools in general. By its definition, a child labeled as "learning disabled" is assumed to possess an underlying physical condition which hinders academic performance (Hobbs, 1975; Public Law 94-142, Section 121a.5). Synonyms, such as "minimal brain dysfunction" or "perceptually handicapped" illustrate this point. In contrast, students receiving Title I services are assumed to have learning difficulties due to external factors such as poor cultural experiences.

Since the same external factors can be seen the backgrounds of many learning disabled incarcerated youth, the consequences of being labeled seems to fall rather heavily upon this group. This is occurring in spite of the fact that current placement criteria appears unable to differentiate the groups. Although the stigma of being labeled as "learning disabled" is considerably less than that of "mentally retarded", the effects of labels on role expectations seems to be an important issue (Hobbs, 1975). Teachers, classmates, curricula, family, and community expectations all can serve to affect a labeled child's self-perceptions.

Educational Implications

Although the WISC-R is a diagnostic instrument, some research has been conducted on applying prescriptive functions to the profiles of scaled scores (Baras and Will, 1977; Wallbrown, Vance and Blaha, 1979). Several
recommendations have been formulated from a Bannatyne model. While any specific educational suggestions should be based on the results of the full multi-factorized assessment, these research findings could be considered.

According to these researchers, a high Spatial Ability score can be associated with students who tend to talk their way out of problems and make excuses to explain their difficulties. Specific academic difficulties may include scrambling the internal details of words during reading and spelling, and similar difficulties with lengthy mathematics problems. A high Verbal Conceptualization score usually indicates a child with well-developed oral skills who is a good conversationalist. A low Sequence Ability score usually indicates a child who has poor recall of previously learned material. Specific instructional methods and remediation suggestions are made for children conforming to the above descriptions.

Limitations

While the group profiles based on the four Bannatyne categories may supply information concerning the three academic groups of delinquents (LD, Title I or EMR) at large, they probably provide minimal insight into the processes of specific individuals within these groups. While all subjects within each group meet certain criteria for placement, their past experiences, educational background, and specific academic difficulties will vary.
This, in turn, can yield extremely different WISC-R sub-
test profiles for the subjects within each educational
classification.

Clearly, the group profile can serve to mask all the
individual differences among members of the sample.
Vance and Singer (1978) found a significant Bannatyne
profile for a group of learning disabled children which
actually covered at least five subprofiles. Trends in
individual profiles can be thought of as a starting point
for hypothesis formation, but no characteristic profile
should be used in isolation for diagnosis and placement.

The second point to be made is that the only data
collected were the three IQ scores and subtest scaled
scores. Accurate interpretation of the WISC-R involves
integrating background information, behavioral observations,
responses to specific items, and supplementary test infor-
mation with the subtest scores and IQ's in order to test
hypotheses and arrive at conclusions. This study assumes
that every subject's pattern of subtest scores can best be
understood from a Bannatyne perspective. For many, alter-
nate models of interpretation may have been more useful.
Factors other than those outlined by Bannatyne could very
well have contributed to the scores received in each of
his four categories. Since supplementary information was
not collected, however, it will be assumed that Bannatyne's
recategorization offers the most valid interpretive frame-
work for all subjects in the incarcerated sample.
Implications for Research

Being refined into its present form in 1974, Bannatyne's recategorization is a relatively recent model of interpretation. While most of the research cited seems to support his hypothesis, less promising studies of its utility have also been published (Vance and Singer, 1979). Most of the research has involved small samples of previously identified learning-disabled children, and has been restricted in the age-range and geographic locations involved. Normative data of recategorized scores needs to be collected, with appropriate controls for age, sex, race, and socioeconomic class.

The various Bannatyne categories have also been identified with alternate interpretations. The relationships between Spatial Ability and cognitive styles has been questioned. Kaufman (1979) questions whether relatively high scores in the Spatial category are associated with a field-independent cognitive style. Studies into this could be a promising line of research.

The discrepancy between the Spatial Ability and Acquired Knowledge categories has also been proposed to reflect differences between fluid and crystallized intelligence. While these categories are not purely measures of these traits, some face validity for the distinction appears to exist. Correlational studies of these two categories with purer measures of fluid and crystallized abilities needs to be conducted.
Conclusions

In conclusion, Bannatyne's recategorization of WISC-R scores offers important understanding to the profiles of incarcerated students. Many psychologists familiar with the WISC-R believe the Full Scale IQ, and even the Verbal and Performance IQ scores, offer minimal insights into the abilities of students tested with this instrument. Conversely, always reporting strengths and weaknesses sub-test by sub-test with no integration of findings often gives a fragmented view of children's abilities. Whenever possible, developing hypotheses based on several subtests should be attempted in order to most clearly understand a child's cognitive processes. In all cases, these tentative findings need to be supported by behavioral observations, both in and out of the testing situation, and supplementary testing.
Placement Criteria

(Ohio Department of Education, 1979; Ohio Youth Commission, 1978)

Learning Disabled
This group will be defined by the following criteria:
1. Functioning within the normal range of intelligence
   (WISC-R Full Scale IQ of above 80)
2. Severe discrepancy of at least two years between his
   achievement and ability, as defined by his learning
   expectancy level in at least one of the following
   areas:
   a. listening comprehension
   b. oral expression
   c. written expression
   d. basic reading skills
   e. reading comprehension
   f. mathematics calculation
   g. mathematics reasoning
3. The above-mentioned discrepancies cannot be primarily
   due to:
   a. visual, hearing or motor handicap
   b. mental retardation
   c. emotional disturbance
   d. environmental, cultural or economic disadvantage
Educable Mentally Retarded

This group will be defined by the following criteria:
1. Significant subaverage intelligence (WISC-R Full Scale IQ below 80)
2. Significant deficits in adaptive behavior
3. Significant deficits in academic achievement (three years below chronological grade placement, but not necessarily learning expectancy level).

Title I

This group will be defined by the following criteria:
1. Functioning within the normal range of intelligence (WISC-R Full Scale IQ of above 80)
2. No significant deficits in adaptive behavior
3. Significant deficits in achievement (two years below chronological grade placement, but not necessarily learning expectancy level)
BIBLIOGRAPHY


