# THE EFFECTIVENESS OF USING A VARIETY OF TESTS TO GENERATE REFERRALS AND FOR THE IDENTIFICATION OF LEARNING DISABLED READERS

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A thesis submitted to the Faculty of Graduate Studies of the University of Manitoba in partial fulfillment of the requirements of the degree of

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# Chapter 1

## PURPOSE AND SIGNIFICANCE OF THE STUDY

### Purpose

This study compared the effectiveness of the Canadian Tests of Basic Skills (C.T.B.S.) to a variety of tests in identifying for referral, learning disabled (L.D.) students in grades three to six.

The authors of the C.T.B.S. defined the specific purposes which their test was designed to serve as follows:

1. To determine the developmental level of each pupil in order to adapt materials and instructional procedures more precisely to individual needs and abilities;

2. To diagnose specific qualitative strengths and weaknesses in a pupil's educational development;

3. To indicate the extent to which individual pupils have the specific readiness skills and abilities needed to begin instruction or to proceed to the next step in a planned instructional sequence;

4. To provide information useful in making administrative decisions in grouping or programming to accommodate individual differences;

5. To diagnose strengths and weaknesses in group performance (class, building, or system) which have implications for change in curriculum or instructional procedures or emphasis.

The C.T.B.S. was used to assist with program plans and placement decisions for children. Saskatchewan educators attached special significance to the identification of learning disabled students since appropriate identification resulted in provincial funding

which was used to develop special programs for these students.

Other school divisions in Canada also identified learning disability from lack of academic success in school. In a study of L.D. in Ontario, Robert B. MacIntyre (1980) stated, "It appears that learning disability classes and programs are set up along a continuum, based on ... the lack of academic success in school".

The identification of L.D. students in Saskatchewan required the individual administration of specific achievement and intelligence tests. Since these tests were time consuming, it was not possible to administer them to all children. A more time efficient screening procedure was required. Students were screened by teachers who submitted referrals for L.D. assessment. The C.T.B.S. was also used to screen for possible L.D. referrals. The referrals submitted by teachers and C.T.B.S. screening were assessed by applying both the WISC-R and the S.D.R.T. or W.R.M.T. Students who qualified by Department of Education formula were designated L.D.

This study looked at screening two thousand, five hundred and twenty-eight grade three to six students for possible learning disability. The study spanned a three year period of time including 1980, 1981, and 1982. The analysis of the study applied to all three years of the study.

The purpose of the study was to answer the following questions:

A. How did the referral process work?

1. What number of those students who qualified and of those students who failed to qualify as L.D. readers (definition on page 6) were identified by each step of the referral and assessment process?
2. What number of the L.D. readers were successfully identified for referral by teachers or by the C.T.B.S.?
3. What number of L.D. readers were not successfully identified for referral by teachers or by the C.T.B.S.?
4. What number of students from each of the referral sources were successfully identified as L.D. by the Stanford Diagnostic Reading Tests (S.D.R.T.) or the Woodcock Reading Mastery Tests (W.R.M.T.), in conjunction with the Wechsler Intelligence Scale for Children-Revised (WISC-R)?
5. What number of students from each of the referral sources were not successfully identified as L.D. by the S.D.R.T. or the W.R.M.T. in conjunction with the WISC-R?

B. What subtest score patterns existed for the C.T.B.S., the WISC-R, and W.R.M.T. or S.D.R.T.? Which would predict L.D.?

1. For the identified L.D. students, what was the within-test relationship of subtest scores for the C.T.B.S., the WISC-R, the S.D.R.T., and the W.R.M.T.?

2. What subtest score patterns existed for the C.T.B.S., the WISC-R, and the W.R.M.T. or S.D.R.T. for,
   a) teacher-referred students who qualified as L.D.;
   b) teacher-referred students who did not qualify as L.D.;
   c) C.T.B.S.-referred students who qualified as L.D.;
   d) C.T.B.S.-referred students who did not qualify as L.D.?

C. How could we predict children with L.D. from the available measures?
   1. Which subtests of the C.T.B.S., the WISC-R, the S.D.R.T., and the W.R.M.T. were most likely to predict L.D.?
   2. Which method of referral or combination of referral procedures were most likely to identify L.D.?
   3. Which of the tests used or combination of tests used were most likely to identify L.D.?

## Definition of Special Terms

The term learning disabled (L.D.) was based on the Saskatchewan Department of Education Regulations under the Education Act (1980 - Section 31 Interpretation) which stated:

> severely learning disabled: when assessment by qualified personnel affirms that the child, between ages of 5 years 8 months and 16 years 0 months, has an intelligence quotient of 85 or higher, as measured by an approved test, that there is significant discrepancy, one standard deviation or greater, between aptitude and achievement, and the average rate of progress in the skill subjects,

> including reading, is not greater than half that of average students as measured by approved achievement tests.

The Government of Saskatchewan in Special Education: A Manual of Legislation, Regulations, Policies, and Guidelines (1981) indicated four features of the learning disabled category as follows:

i) A learning difficulty, manifesting itself in one or more skill subject deficiencies, exists;

ii) A discrepancy between measured academic aptitude and measured achievement exists;

iii) Organicity is/is not established;

iv) Defined population is limited to children whose learning difficulty can be clearly identified as a communication disorder.

These broad features of learning disability were then translated into measurable characteristics with application criteria. The criteria for application were established using specific measuring instruments which included the W.R.M.T., S.D.R.T. and WISC-R. The W.R.M.T. and S.D.R.T. are merely reading tests and the application process restricted the broader definition of learning disability to one of L.D. readers. The term learning disabled readers was therefore frequently used to indicate a definition of learning disability which was restricted to reading problems.

Details for application with example are included in Appendix A.

## Significance of the Study

This section presents a background rationale for this study and a statement of the problem.

The importance of this study rested in the concern that L.D. students were frequently not appropriately identified as such, but rather, received educational programs suited for lower ability students. The Government of Saskatchewan mandated appropriate screening procedures for the identification of L.D. students ( Special Education: A Manual of Legislation, Regulations, Policies and Guidelines, March, 1981). The C.T.B.S. was widely used to identify low achievers and consequently, was a first step referral source for identifying severely learning disabled students.

A review of the reliability of the C.T.B.S. indicated that lower achieving students could be expected to have the least reliable scores. This was due to the low number of questions which must be correctly answered. For low achieving students, correct responses were similar to the guess factor of this multiple choice test. The C.T.B.S. was thus seen to have the weakest reliability at those levels of achievement at which its accuracy was most depended. This study sought to clarify the adequacy of the C.T.B.S. as a referral source for identifying L.D. students.

The early identification of reading disabled students is important because those students who received appropriate

specialized program assistance did make significant gains in reading achievement. According to an unpublished Swift Current School Board No. 94 Document (1982), the average gain of L.D. students on programs in Swift Current City Schools in a seven month period of the 1981-82 school year was 13.3 months. The average percentile gain was 13.65. It is important to note that the average gain of students prior to the special assistance was one standard deviation or more lower than the mean. In order to qualify for special help, students measured an average of six months growth or less per school year. L.D. children should therefore be given the opportunity of appropriate reading assistance. Children of average ability who did not learn to read adequately were otherwise frequently grouped with lower ability children and then did not receive the academic stimulation of which they would have been capable.

Learning disabled students are difficult to correctly identify. Large variation in the learning skills and performance of L.D. students causes confusion. This uncertainty easily results in an over-reliance on standardized tests such as the C.T.B.S. for the identification of L.D. students.

The implementation of effective screening techniques was for this reason essential. It was important that users of tests recognized the reliability and validity of the tests they use for identifying unique populations. This study was designed to assist in clarifying the effectiveness of the

C.T.B.S. and other tests along with I.Q. scores, in identifying grade three to six L.D. students.

## Limitations

The data for this descriptive study was collected from information made available during a three-year L.D. identification program in the Swift Current City schools. The study looked at screening two thousand, five hundred and twenty-eight students in grades three to six. The study spanned the years 1980, 1981 and 1982.

The subjects were all given the C.T.B.S. in April of the year preceding their identification as L.D. Students who scored $\leq$ the 15th percentile on the composite score of the C.T.B.S. were referred for L.D. assessment. Complete assessment information was not available for 77 of the 140 students referred by the C.T.B.S. This study describes results only for those students for whom all assessment scores were available.

Teachers were informed of the L.D. identification objectives and asked to screen possible L.D. students for follow up L.D. assessment. It is not possible to determine the extent of use teachers made of C.T.B.S. results in looking for L.D. referrals. Complete information was not available for 4 of the 85 students referred by teachers. This study describes results only for those students for whom all assessment scores were available.

# Chapter 2

## REVIEW OF RELATED LITERATURE

### Screening Procedure Generally

The identification of children who failed to perform to expectation has been widely discussed by educators and in the literature. This study looked at some of this literature and compared the effectiveness of the C.T.B.S. to a variety of tests in identifying, for referral, L.D. students.

This chapter begins by reviewing definitions of L.D. and also reviews screening procedure generally used in the following three provinces: Manitoba, Ontario and Saskatchewan.

### Definitions of L.D. Generally

Definitions of L.D. were often vague and controversial. The National Advisory Committee on Handicapped Children (1968) outlined a definition of L.D. which was used as a focus to discuss other definitions. This definition read:

> Children with special learning disabilities exhibit a disorder in one or more of the basic psychological processes involved in understanding or using spoken or written languages. These may be manifested in disorders of listening, thinking, talking, reading, writing, spelling, perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, developmental ashasia, etc. They do not include learning problems which are due primarily to visual, hearing, or motor handicaps, to mental retardation, emotional disturbance, or to environmental disadvantage.

Agreement did not result from the national advisory committee's definition. Coles (1978) evaluated the national advisory committee definition and concluded that this definition remained extraordinarily vague and was primarily a definition of exclusion. Others such as Myers and Hammill (1969) and Kirk and Bateman (1962) insisted that not all children who were delayed or retarded in learning to listen, think, talk, read, write or spell were L.D. They argued that learning problems encountered in everyday school experiences were not identical to L.D. Kirk and Bateman assumed that L.D. were caused by possible cerebral dysfunction and/or emotional or behavioral disturbance. They, consequently excluded from their definition of L.D. those who had mental retardation, sensory deprivation, and cultural or instructional deficits.

The U.S. Office of Education ordered a committee to write a definition which would be more universally acceptable. The following points resulted from this committee's work (Kass & Myklebust, 1969):

> Learning disability refers to one or more significant deficits in essential learning processes requiring special education for remediation.
>
> Children with learning disability generally demonstrate a discrepancy between expected and actual achievement in one or more areas such as spoken, read, or written language, mathematics, or spatial orientation.
>
> The learning disability referred to was not primarily the result of sensory, motor,

> intellectual, or emotional handicap, or lack of opportunity to learn.
>
> Significant deficits were defined in terms of accepted diagnostic procedures in education and psychology.
>
> Essential learning processes were those currently referred to in behavioral sciences as involving perception, integration, and expression of language and meaning, either verbal or nonverbal.
>
> Special education techniques for remediation referred to educational planning based on the diagnostic procedure and results.

The terms "accepted diagnostic procedure" in education and psychology were not useful terms. Hammill (1972) pointed out that since little agreement existed among those who applied "accepted diagnostic procedure", these terms provided very little clarification.

Other terms such as "psychological process" and "perceptual functioning" also lacked concensus among those who applied them to practise. Larsen et al. (1976) referred to both these terms and argued that it would be possible to say that all children with a learning difficulty had processing and/or perceptual deficiencies. These terms had a tendency to be all-encompassing and did not add the needed clarity.

Robert MacIntyre (1980) reviewed the current definitions of L.D. and found three major components in which all definitions were similar. All definitions in use evidenced "a disparity between some measure of potential and some measure of

performance; an assumption of an underlying dysfunctional learning process; and the exclusion of children whose learning pattern could be ascribed to other conditions."

The definition of L.D. used in Saskatchewan as described in Special Education: A Manual of Legislation, Regulations, Policies and Guidelines (March, 1981), required the student to possess average intelligence with a significant discrepancy, one standard deviation or greater, between aptitude and achievement. The L.D. student by definition must also have exhibited a skill subject deficit including reading which was equal or greater than half that of an average student. The skill subject deficit must not be caused by (1) sensory deprivation such as vision or hearing, (2) native language other than the language of instruction, (3) lack of opportunity to learn, (4) motivation or (5) retardation. These five exclusionary conditions were required to ensure a definition of L.D. which was distinct from children delayed for other reasons than L.D.

Identification must flow from the constructs provided in definitions. The Saskatchewan construct of L.D. like all other constructs of L.D. rested on the belief that children who were L.D. were identifiable and, once identified, their conditions were amenable to remediation. Despite the diversity of definition some common principles useful for identification purposes could be developed from these definitions.

The principle of disparity was common to both the

Saskatchewan definition and most other definitions. The principle of disparity held that L.D. children had a significant discrepancy between performance and predicted potential. In order to apply the principle of disparity in the identification of L.D. students, suitable measures of performance and predicted achievement were required. The Saskatchewan Department of Education provided explicit details regarding measuring instruments and other interpretive information on the "particulars" page. (Appendix A, page 80).

Recommended tests of performance included the S.D.R.T. and W.R.M.T. Recommended tests of prediction included the WISC-R tests. Colis (1978) and Noonan (1977) identified the WISC-R as a test commonly used to estimate the intellectual component.

As noted earlier, the exclusion principle was common in definitions of L.D. This exclusion principle provided another level of screening to prevent the identification of children as L.D. when the origin of their problem could be caused by sensory deprivation such as: vision or hearing handicaps; native language other than the language of instruction; lack of opportunity to learn; motivation or retardation. The Saskatchewan definitional construct assumed that children who were excluded should not be identified as L.D. and should receive assistance consistent with the exclusion characteristics which prevented their identification as L.D.

The dysfunctional learning process principle was also included in the Saskatchewan identification process. In Special Education: A Manual of Legislation, Regulations, Policies and Guidelines (1981) (Appendix A, page 80), communication disorders were identified as the prerequisite criteria of the L.D. population.

The general role of a central nervous system dysfunction was recognized in the Saskatchewan model as useful information for developing suitable programs but was not used as a criteria for the identification of L.D. students.

For the purposes of this study the Saskatchewan definition and criteria for identification were followed.

## Screening Procedures in Manitoba

The province of Manitoba, according to its Special Education Review (1978) did not address specifically in definition or policy a prescribed pattern for the identification of L.D. students. Rather, the province provided school divisions with funds to employ resource teachers and other specialists such as coordinators of special education, reading specialists, speech and language specialists and psychologists who assisted school divisions with the identification of L.D. children. The onus for identification and programming remained with the local school divisions. The school staff was therefore the first to identify as low achievers those students who required special

assistance. These low achievers were identified by teacher observation, teacher-made tests or by standardized tests such as the C.T.B.S. These lower-achieving students were then referred for further study to either resource teachers and/or other specialists who completed a professional assessment. Identification of problems and recommendations for adaptive programs were discussed with parents and school personnel.

## Screening Procedures in Ontario

In Ontario schools, Robert MacIntyre (1980) reported that the identification of L.D. students took place at two levels. The first was called the in-school level where assessment consisted of standardized or informal testing. The C.T.B.S. and other standardized tests were routinely used. This in-school level also used other informal tests which were done by the principal, regular classroom teacher, special education or resource teachers. To this point the student had made slow academic progress. If he persisted in showing little progress after the in-school assessment, he was referred to the psychological assessment level. Identification of major learning disabilities took place at this second level of assessment with tests being administered by psychologists, psychometricians, resource teachers, special education consultants, speech therapists or language therapists. Four major categories of tests were used. These were intelligence tests, gross and fine

psychomotor tests and educational diagnostic achievement tests. Intelligence testing leaned heavily on the use of the WISC or WISC-R tests and many boards reported that these tests were the major determinants of a learning disability condition. Criteria for identification as L.D. in Ontario were reported by MacIntyre (1980) to include a deficit as identified in a psychological assessment, an average or above average intelligence and an educational lag of two academic years. Variation of definitional concepts and admission criteria set out by boards however, resulted in similar variations in the identification and program placements of children. MacIntyre (1980) reported that one board considered a low achiever to be L.D. while other boards considered a similar student to be educable mentally retarded, general learning disabled, or a remedial student. These discrepancies in Ontario identification of L.D. students were seen to exist then not because of major differences in screening but because of definitional or construct differences. Greater definitional agreement and operationally consistent procedures to identify L.D. students were required before a consistent identification of L.D. was possible.

## Screening Procedures in Saskatchewan

As reported in Special Education: A Manual of Legislation, Regulations, Policies and Guidelines (1981), the identification of low achievers in Saskatchewan was similar to

other provinces. Students were first identified by school personnel as low achievers based on informal assessment as well as standardized assessment using tests such as the C.T.B.S. Students who maintained low achievement despite in-school assessment were then referred for psychologist assessment, In contrast to the practise of other provinces, identification included specific achievement and ability tests. Specific procedures for screening and identification of L.D. students were documented in Special Education: A Manual of Legislation, Regulations, Policies and Guidelines. Psychologist or psychometrist assessment included specific achievement tests such as the S.D.R.T. and W.R.M.T. as well as intelligence assessment using prescribed tests such as the WISC-R. Specific formula were developed which provided operational criteria of one standard deviation between academic achievement and intelligence. Other criteria included an average or above average ability I.Q. 85 or higher (Appendix A, page 80). While these qualifying criteria were rigorous, they did provide an operational standard which was consistently applied in this study.

Screening for L.D. in Manitoba and Ontario were similar in several ways to the Saskatchewan model upon which this study was based. In all three provinces screening for L.D. began by either teacher observation and/or standardized testing using tests such as the C.T.B.S. Lower achievement was the initial criteria for identification of L.D. students. Reliance on

standardized assessment tools such as the C.T.B.S. for identification of low achieving students raised concerns about the prediction accuracy of these tests for special population such as low achievers and L.D. students.

## Tests Used to Identify L.D. Students

The C.T.B.S., W.R.M.T., S.D.R.T. and WISC-R were the tests used to screen for and identify L.D. students in this descriptive study. The following section reviews the reliability and validity of these tests for identifying L.D. students.

Screening tests such as the C.T.B.S. were often used to determine program and placements for average and below average readers alike. Ray (1965) found reading level to be the best predictor of academic success. He concluded that children beginning junior high school generally could be screened by their reading level. Principals and teachers were concerned about the placement of students who had reading problems. These concerns generated a need for additional information and so scores on standardized reading tests became a critical component especially when making decisions for students who were L.D. and had poorer reading skills.

Compton (1980) reviewed sixty-five tests for use in special education and found that because standardized reading tests were designed to assess "normal" readers, students with identified reading problems were usually excluded from the

norming population. Compton argued that it was a questionable practise to apply the norms of the "normal" population to students with reading problems, but indicated we had no choice. Sattler (1982) evaluated procedures for the identification of L.D. students and concluded that there was no one standard for the assessment of L.D. In an extensive review of validation studies on the most frequently recommended procedures used for diagnosing L.D. students, Gerald S. Coles (1978) concluded that "a standard learning disabilities battery does not exist, the guidelines in handbooks and texts for setting up a battery are all similar, and the inclusion of certain tests is fairly standard." Gerald Coles identified the WISC-R as one of the standard tests used.

Jack Hartstein (1971) like Sattler (1982) concluded that no one characteristic pattern on test scores identified L.D. The most important tool in the assessment of L.D. children was a trained examiner who selected from a wide variety of tests. Sattler (1982) found that the most important tools in the assessment of L.D. children were (a) reliable and valid intelligence test and (b) reliable and valid achievement tests that assessed major content areas such as reading mathematics and spelling. Different instruments were likely to yield different estimates of intelligence and achievement. These differences should consequently be taken into account in arriving at a definition of L.D. The diagnosis of L.D. was therefore arrived

at through a study of clinical and psychoeducational data obtained during the assessment process.

## Reliability and Validity of the C.T.B.S.

Because of the popularity of the C.T.B.S. and the frequent application of this test for reading disabled students, it was important to evaluate the reliability and validity of this test for the identification of L.D. students. The norming sample of the C.T.B.S. did include lower achieving students. The authors of the C.T.B.S. stated the test was suitable for determining developmental level, for diagnosing specific qualitative strengths and weaknesses and indicating specific readiness skills and abilities of "each" "individual" pupil. The emphasis on "each" and "individual" supported the assumption that the C.T.B.S. was a useful measure for L.D. students as well.

A review of the reliability of the C.T.B.S. however, indicated that lower achieving students could be expected to have the least accurate scores. This was due to the low number of questions which must be correctly answered. For low achieving students, correct responses were similar to the guess factor of this multiple choice test. The C.T.B.S. was therefore, seen to have the weakest reliability at those levels of achievement at which its accuracy was most depended.

Many educators who sought a comparative test to isolate

the L.D. readers from the slow learning student, chose a group intelligence test for such comparisons. The addition of the intelligence test, it was widely believed, would enable them to identify the L.D. reader for more intense help and remediation. Traxler and Townsend (1955, p. 65) found a great deal of evidence to show that correlation between mental ability and reading comprehension was high. Stroud (1956) summarized research and stated that the average correlation coefficients fell between .65 and .70. Findings such as these generally strengthened the view that a comparison of group achievement and intelligence tests would identify the L.D. reader. Bond (1938) found that poor readers scored lower on group intelligence tests because intelligence tests depended on reading comprehension and word attack skills. Strang (1942) reported that a bright child having a reading or general language problem could give the impression of having a low mental ability on a verbal subtest of a group intelligence test. She found correlations for .50 to .70 between the Gates Silent Reading Test and the California Mental Maturity Test with elementary school students. Wheeler (1949) similarly reported correlations of .70 between reading ability and language skills. The evidence of high correlation suggested that group intelligence tests and group achievement tests such as the C.T.B.S., in part, measured a similar trait, reading ability. Compton (1980) argued that tests which identified L.D. by comparing intelligence and achievement frequently did not take

into account that student intellectual functioning may be depressed by reading disabilities. A comparative evaluation using intelligence tests which relied on reading and reading achievement tests clearly then was not a useful way of finding reading disabled students.

In reviewing the validity of the C.T.B.S. it was noted that the 1976 edition was more systematically normed than earlier editions but had received no detailed reviews in the evaluation of literature. The 1976 edition however, shared many of the strengths and weaknesses of the older version and of the Iowa Test of Basic Skills on which it was based. Birch (1972) commenting on the earlier edition criticized the use of totally English speaking school population as not reflective of Canadian norms. This criticism held for the 1976 edition and limited the interpretation of scores for second-language children. Birch (1972) criticized the vocabulary, arithmetic, capitalization and punctuation tests as being out of date, but concluded that for the present this was possibly as useful an instrument as existed. MacIntyre (1980) commented on the 1976 revised edition stating that this test did not appear appropriate for children with L.D. The test emphasized reading for mathematical problem-solving, map work and comprehension areas.

The content validity of the C.T.B.S. was at best questionable for slow learning students. Since group intelligence tests were contaminated by requiring reading skills, they were

inadequate for identifying L.D. lower performance readers. As educators in Canada administered the C.T.B.S. and used it in making placement and program decisions for L.D. students, it was useful to re-examine the screening effectiveness of the C.T.B.S. with L.D. students

## Reliability and Validity of the W.R.M.T.

The W.R.M.T. was recognized in Saskatchewan for designation of L.D. students. Haggard and Smith (1973) reviewed this test and found it most useful at the kindergarten to grade six level. In this descriptive study the W.R.M.T. was used to identify low achieving and potentially L.D. grade three to six students.

The reliability for the W.R.M.T. test was documented in the manual at the second and seventh grade levels. Split-half reliabilities for the individual subtests generally fell within an acceptable .90 to .99 range. The major exception was subtest letter identification which yielded .79 and .86 for forms A and B respectively at the grade two level and .02 and .20 at the grade seven level.

The W.R.M.T. was designed to have a 90% student success ratio. The carefully designed and weighted questions made it especially encouraging for discouraged low achieving and potentially L.D. students.

The validity of the W.R.M.T. was open to question

as no defendable effort was made to compare the content of the test with reading achievement. The selection of five subtests were apparently not based on a specific theory of the reading process. Subtest letter identification was of limited value for older students as it measured the child's ability to name common as well as uncommon styles of type. Word identification required the child to name words which are also commonly found in word lists such as the Dalsh Word List. Subtest word attack required the child to identify nonsense words through application of phonetic and structural analysis skills. At best the identification of nonsense words was only a simulation of word attack skills. Word comprehension measured the child's knowledge of word meanings by using an analogy completion format. The word comprehension subtest was biased by inclusion of analogy reasoning skills and did not merely measure word comprehension skills. Passage comprehension required the child to read silently a passage that had a word missing and then provide the appropriate missing word. A total reading index was also obtained based on all four hundred items.

Despite problems with the letter identification and word attack subtests the W.R.M.T. provided useful identifying information when comparing normal and potentially at risk L.D. readers.

## Reliability and Validity of the S.D.R.T.

The Saskatchewan Department of Education recognized the S.D.R.T. for designation of L.D. students. The S.D.R.T. test authors indicate that this test was designed to provide particularly accurate assessments of low achieving pupils. The S.D.R.T. was seen to be particularly useful for the identification of low achieving and potential L.D. students.

The S.D.R.T. was constructed to give reliable scores for students falling below average in reading. The median split-half reliabilities for level 1, grades 3 and 4, are .94 and and .93 respectively. For level 2, grades 5-8, reliabilities were given for total comprehension only and not for the subtests. Split-half reliabilities for grades 5-8 were reported at .87, .88, .90, and .91 respectively. Only comprehension total scores were used in this descriptive study.

The validity of the S.D.R.T. rested on the authors' statement that comprehension is the ultimate goal in reading and other aspects of reading measured by the S.D.R.T. are subordinate to comprehension. In developing their objectives the authors identified instructional objectives common to most reading programs. Comprehension total was the only measure of the S.D.R.T. used in this descriptive study. The S.D.R.T. requires students to do actual reading comprehension type questions. Kasdon (1978) concludes that this test has definite possibilities for use in developing corrective reading classes.

## Reliability and Validity of the WISC-R

The WISC-R was used in this descriptive study to identify L.D. students whose academic achievement was significantly lower than their verbal or full scale I.Q. scores. The WISC-R was adopted in Saskatchewan as an acceptable measure of aptitude useful for the identification of L.D. students. MacIntyre (1980) reported that in Ontario the WISC-R was also frequently used for identification of L.D.

The reliability of the WISC-R was regarded as one of the highest among I.Q. tests. Reliability coefficients as reported in the WISC-R manual were consistently high. Wechsler (1974) assessed the stability of the WISC-R by retesting a group of 303 children from six age groups after a one month interval. For the retest sample the stability coefficients were .95 for the full scale I.Q., .93 for the verbal scale I.Q. and .90 for the performance scale I.Q. Split-half reliability coefficients for the verbal performance and full scale I.Q. scores were reported across the entire age range of the sample and the average coefficients were .94, .99 and .96 respectively. The stability for the twelve subtests ranged from .65 in mazes to .88 in subtest information with a median coefficient of .78.

The validity of the WISC-R was reviewed with specific reference to the way it was used in this study. The WISC-R manual indicated that the WISC-R lended itself among other things to the identification of learning disabilities. No

adequate way to report scores for this purpose was suggested. The WISC-R manual did provide statisticaal criteria for evaluating the significance of verbal performance I.Q. differences. Miller et al. (1978) evaluated the verbal performance model as well as the patterns proposed by Bannatyne and Keogh and concluding that these patterns were not found to be greatly indicative of learning disability.

In a 1981 Review of WISC-R profiles for L.D. children, Dudley, Marling, et al. found that while as a group L.D. children exhibit a WISC-R L.D. profile, few individual L.D. children actually conformed to this profile. They concluded that WISC-R profiles may not be useful for differential diagnosis of L.D. students. Galvin (1981) reviewed the uses aand abuses of the WISC-R with L.D. concluding that the WISC-R could be an adjunct to L.D. diagnosis. MacIntyre (1980) reviewed current literature regarding the validity of the WISC-R as an instrument for the diagnosis of learning disabilities and concluded that the WISC-R should be administered as a part of a battery of tests, but never be used as the only basis for diagnosis and programming. This descriptive study used the WISC-R as a complement to achievement tests in identifying L.D. students.

## Subtest Analysis

Subtest analysis has gained some acceptance among practitioners who employ these methods of identify target groups such as the L.D. child. Robert Thompson, (1981) reviews the diagnostic utility of Bannatyne's recategorized WISC-R scores with children referred to a developmental evaluation centre. Thompson, (1981) found that results failed to provide support for the diagnostic utility of recategorizing WISC-R scores. Booney, (1979) evaluated the usefulness of using WISC-R subtest score patterns for distinguishing between groups of L.D. and emotionally disturbed students. Booney asserts that no clear cut pattern characteristic of L.D. students is likely to emerge and stresses that intellectual patterning should not be the sole basis for placing children. Stevenson, (1979) reviewed the WISC-R profiles of 55 children to determine if the WISC-R profiles could help identify these children as learning disabled. Results indicated that there were no useful differences which could help define L.D. Similarly Sattler, (1982) reviews work by Lombard and Riedel and Lawrence who found the WISC-R factor structure of learning disabled children to be similar to that of normal children. Sattler, (1982) also concludes that there is no reason to expect all reading-disabled children to show any one pattern on the WISC or other tests because reading disability is symptomatic of many different kinds of underlying difficulties. Harris, (1978) evaluates the Iowa Test of Basic Skills which is

the test from which the Canadian Test of Basic Skills was developed. Harris refutes the claim that the Iowa Test of Basic Skills could be used to diagnose specific strengths and weaknesses of individual pupils. Harris argues that the generally high correlations among subtests and the relatively small number of items measuring any particular skill make the Iowa Test of Basic Skills useless for individual differential diagnosis. The results are useful for making decisions about curriculum emphasis on a district-wide or school-wide level but not useful for making decisions at the level of the individual child. Grant McMurray, (1980) found that many L.D. students exhibited multiple handicaps and so a clear understanding of their multi-faceted behavior was illusive. Algazzie and Ysseldyke, (1983) similarly found no defensible system of subtest analysis for separating L.D. from low achievers. The literature reviewed did not provide evidence of a significant subtest pattern which could be applied in identifying L.D. students.

## Teacher Judgement

Screening for L.D. in Manitoba and Ontario were similar in several ways to the Saskatchewan model upon which this study was based. In all three provinces screening for L.D. began by either teacher observation and/or standardized testing using tests such as the C.T.B.S. Lower achievement was the initial criteria for identification. Reliance on teachers for initial

screening in the process of L.D. identification raises questions about the adequacy of teacher judgement.

Teacher judgement is required to predict and interpret student achievement even when achievement tests are used. Hathaway, (1980) in an article entitled "Testing Teachers to Ensure Competency: The State of the Art." describes problems associated with testing teacher competence and concludes that human judgements are still required. Fisk, (1981) studied the teacher involvement in identifying learning disabled students and concluded that teachers were good at predicting academic achievement but they were less effective at predicting personality and psychologicl variables. This study involved teachers in identifying lower achievement as the initial L.D. criteria. The adequacy of teacher judgement was further supported by Brophy, (1980) who studied teacher planning, thinking and decision making. Brophy, (1980) concludes that most teacher perceptions about students are accurate, most decisions about students are logical and are based on appropriate information sources.

# Chapter 3

# DESIGN AND PROCEDURE

## The Study

This descriptive study looked at the screening effectiveness of the C.T.B.S. and other tests in generating referrals for the identification of L.D. students. Two thousand five hundred and twenty-eight grade three to six students were screened for possible L.D. The study spanned a three year period of time including 1980, 1981 and 1982 with the analysis of the study applied to all three years of the study.

The statistical analysis were completed with the assistance of the Saskatchewan Computer Utility Corporation Program and the University of Manitoba Computer Facilities. The computer program statistical analysis system (SAS) (1982) computed within-test measures indicating mean, standard error of mean, standard deviation and variance. Multiple correlation scores were also computed for comparison of each subtest score. The SAS Stepwise Regression Analysis was done using the Maximum $R^2$ improvement (MAXR) to compute an analysis of variance, the regression coefficients, and related statistics for comparison of the total scores of all test samples. The procedure for collecting the data for this investigation were discussed under the headings of Subject, Instruments and Testing Procedure.

## Subjects

The subjects were students enrolled in grades three to six in the Swift Current City School Divisions. This study looked at forty-two L.D. students identified over a three year period of time. In 1980 twelve students were identified as L.D. and fifteen students were identified in each year 1981 and 1982.

Grade three to six students were selected for this study because this was the age range where the C.T.B.S. was frequently used to assist with screening. The sample represented L.D. students as identified by provincial criteria.

## Instruments

### Canadian Tests of Basic Skills

The C.T.B.S., Forms 3 and 4 used was a group test which was actually the Iowa Tests of Basic Skills, but with Canadian norms. The test was edited by Dr. Ethyl King of the University of Calgary, under the supervision of Linquist and Hieronymus, authors of the Iowa Tests of Basic Skills. In this study we used the subtest scores which included vocabulary, word analysis, reading, spelling, capitalization, punctuation, language usage, maps, graphs, reference, and mathematical concepts and problems. The procedure followed in administering the test was outlined in the Teacher's Guide, King (1977).

The Manual For Administrators, Supervisors, and Counsellors (1976) included the following purposes which the

C.T.B.S. were designed to serve:

1. To determine the developmental level of each pupil in order to adapt materials and instructional procedures more precisely to individual needs and abilities;

2. To diagnose specific qualitative strengths and weaknesses in a pupil's educational development;

3. To indicate the extent to which individual pupils have the specific readiness skills and abilities needed to begin instruction or to proceed to the next step in a planned instructional sequence;

4. To provide information useful in making administrative decisions in grouping or programming to accommodate individual differences.

Repetitive reference to "individual" "weaknesses" of "each pupil" encouraged the assumption that the C.T.B.S. could be used to accurately identify the needs of lower achieving students.

The reliability coefficients for the composite score on the C.T.B.S. was reported at .98 for all levels used.

Woodcock Reading Mastery Tests

The W.R.M.T. was a battery of individually administered reading tests designed for use in grades K-12. Five subtests: letter identification, word identification, word attack, word comprehension, and passage comprehension were included in the test. The two forms, Forms A and B, were packaged in a ring-binder kit which contained all necessary information for

administration and scoring. Total reading score reliabilities were reported at .99.

The province of Saskatchewan recognized the W.R.M.T. for designation of L.D. readers.

Stanford Diagnostic Reading Test

The S.D.R.T. was designed to diagnose reading difficulties of individual pupils. The test was constructed to give most accurate diagnosis for lower achieving students. A teacher manual and student booklet was required for administration. Three levels, red, green, and brown, were applicable for use in identifying L.D. students in Saskatchewan. A description of required test procedure was detailed in Appendix A. The province required the individual administration of subtests word recognition and reading comprehension for the red level, and comprehension total for the green and brown levels.

Reliability coefficients were reported as .98, .89, and .88 for the red, brown, and green levels respectively.

Wechsler Intelligence Scale for Children - Revised

The WISC-R contained six verbal subtests and five performance subtests. Verbal subtests measured general information, similarities, arithmetic, vocabulary, comprehension and digit span. Performance subtests included picture completion, picture arrangement, block design, object assembly, and coding. Subtests coding and digit span were alternate tests

and so were not included in the full scale score used in this study. The WISC-R full scale I.Q. reported the highest reliability coefficient at .96.

The WISC-R was used in this study because it was the measure of individual intelligence being used by most school systems in Canada and was the test of choice in the Swift Current City Schools. The WISC-R was an I.Q. test accepted by the Department of Education in Saskatchewan for designation of L.D. students.

## Testing Procedures

The subjects were all given the C.T.B.S. in April of the year preceding their identification as L.D. Subjects were screened for individual assessment by teachers and principals who were made aware of the identification criteria. Subjects were then administered either the W.R.M.T. or S.D.R.T. Subjects who qualified on the basis of lower achievement on these tests were given the WISC-R. All tests were administered and scored as indicated in the appropriate manuals for administration. The L.D. formula was completed as required by the Saskatchewan Department of Education (Appendix A).

## Research Design

The research design of this study is discussed with specific reference to the three major questions.

A. How did the referral process work? This study

looked at 2528 students enrolled in grades three to six in the Swift Current City Schools. Figure A, a referral flow chart shows how the referral process worked. Students were screened for referral by teacher-referral as well as by C.T.B.S. scores. These referrals were then checked for L.D. by applying both the WISC-R and the S.D.R.T. or W.R.M.T. The flow chart indicates the number of children referred and identified as L.D. at each step of the referral assessment process.

Table 1 describes with greater detail the number of students referred, assessed and also what happened to them at each step of the study. The student number column describes the total number of students included in the study. The number referred columns shows how many students were referred by both the C.T.B.S. and teachers for each achievement and grade level included in the study. The number referred (C.T.B.S.) represents those students who scored $\leq$ the 15th percentile on the composite score of the C.T.B.S. The 15th percentile was selected because this was the level at which 95% of students would have been identified with the S.D.R.T. and W.R.M.T. according to the Department of Education formula. The number referred by teachers indicates the number of L.D.-referrals made by teachers for WISC-R assessment. The heading assessment S.D.R.T., W.R.M.T. describes the numbers of students assessed with each test for both referral populations. Students who qualified as L.D. were identified in a separate column but were

FIGURE A Referral Flow Chart

Showing Number of Students, Screened, Referred and Identified as L.D. from each Referral Source

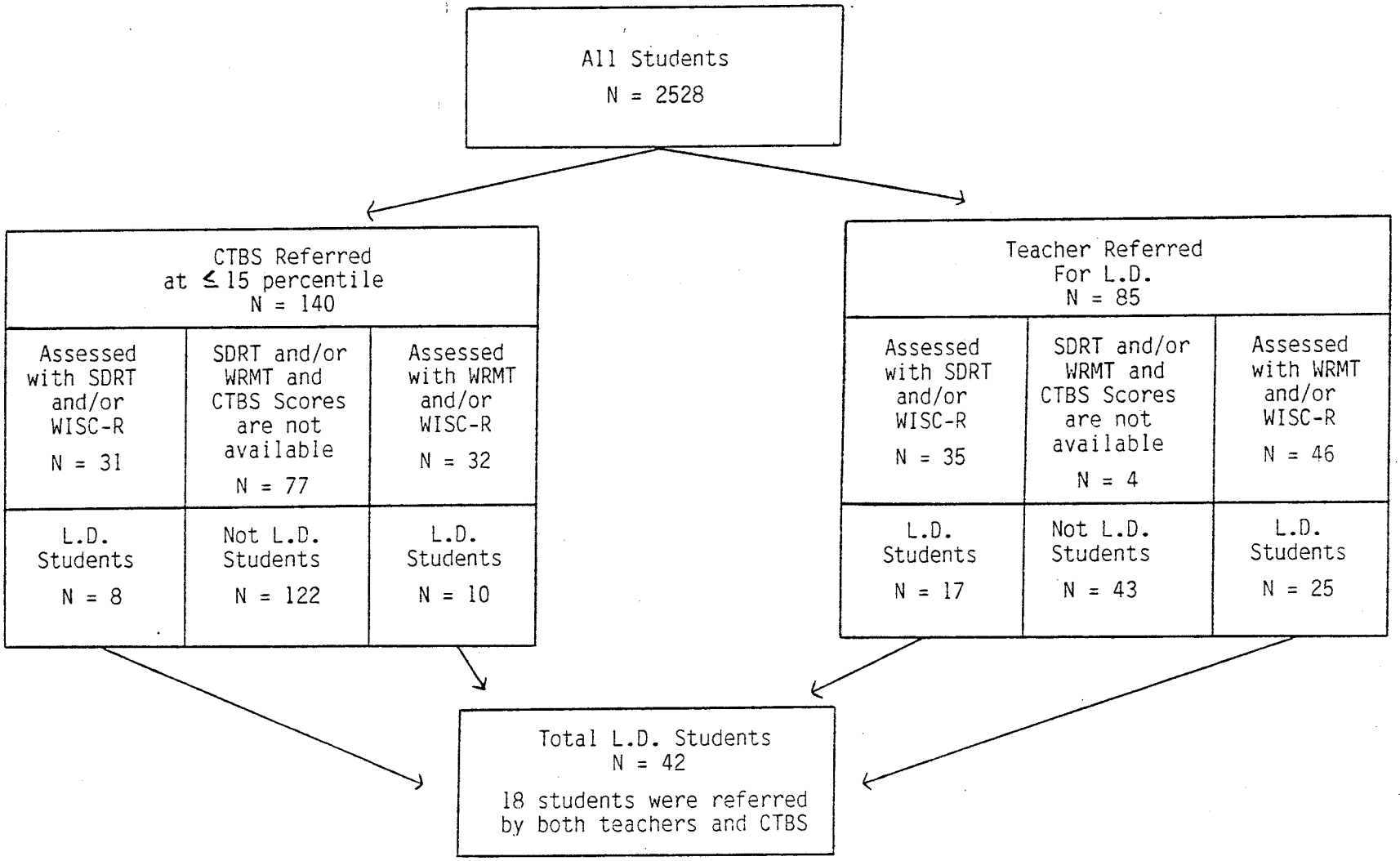


TABLE 1 Referral Assessment And L.D. Students

| | Student Number | CTBS REFERRALS | | | | | | TEACHER REFERRALS | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Number Referred | Assessed SDRT | Assessed WRMT | L.D. | N.A. | TR. | Number Referred | Assessed SDRT | Assessed WRMT | L.D. | N.A. | TR. |
| 1980 Level 9 | 189 | 9 | (0)3 | (0)2 | 0 | 3 | 1 | 4 | (0) 2 | (2)0 | 2 | | |
| 1981 Level 9 | 207 | 6 | (1)0 | (1)3 | 2 | 0 | 1 | 6 | (2) 2 | (1)1 | 3 | | |
| 1982 Level 9 | 177 | 10 | (1)4 | (0)2 | 1 | 2 | 1 | 4 | (2) 0 | (1)1 | 3 | | |
| Total Level 9 | | | | | | | | | | | | | |
| 1980 Level 10 | 228 | 16 | (2)2 | (0)1 | 2 | 10 | 1 | 5 | (2) 2 | (1)0 | 3 | | |
| 1981 Level 10 | 176 | 9 | (1)3 | (0)1 | 1 | 2 | 2 | 7 | (2) 0 | (1)3 | 3 | 1 | |
| 1982 Level 10 | 213 | 5 | (1)0 | (1)3 | 2 | 0 | 0 | 13 | (3) 3 | (2)3 | 5 | 1 | 1 |
| Total Level 10 | | | | | | | | | | | | | |
| 1980 Level 11 | 249 | 9 | (0)0 | (1)0 | 1 | 7 | 1 | 5 | (2) 0 | (1)2 | 3 | | |
| 1981 Level 11 | 213 | 8 | (1)3 | (1)1 | 2 | 1 | 1 | 7 | (1) 2 | (1)3 | 2 | | |
| 1982 Level 11 | 188 | 4 | (0)0 | (0)1 | 0 | 1 | 2 | 9 | (1) 2 | (4)2 | 5 | | |
| Total Level 11 | | | | | | | | | | | | | |
| 1980 Level 12 | 254 | 25 | (0)0 | (2)3 | 2 | 14 | 6 | 6 | (1) 0 | (3)2 | 4 | | |
| 1981 Level 12 | 203 | 16 | (1)0 | (3)4 | 4 | 5 | 3 | 11 | (1) 2 | (6)2 | 7 | | |
| 1982 Level 12 | 231 | 23 | (0)8 | (1)1 | 1 | 10 | 3 | 8 | 3 | (2)2 | 2 | 1 | |
| Total Level 12 | | | | | | | | | | | | | |
| TOTALS | 2528 | 140 | (8) 31 | (10) 32 | (18) | 55 | 22 | 85 | (17) 35 | (25) 46 | (42) | 3 | 1 |

also indicated by the ( ) in the upper part of the assessed S.D.R.T., W.R.M.T. columns. The N.A. column indicates the number of students at each level for whom assessment information of all C.T.B.S. and achievement subtest scores were not available. The TR transfer out and N.A. population could therefore, not be included in the statistical aspect of this study.

Figures B and C demonstrate the application of the Department of Education formula (Appendix A) to the achievement tests used.

The criteria for this study required not greater than 20% under-referral and not more than 100% over-referral. A 20% under-referral rate was accepted because a certain percentage of students were more marginal in the degree of their disability than others. A 20% under-referral rate would accept that 20 out of every 100 identified students would be missed by the screening procedure. (The under-referral formula is: Missed L.D. students/ Total identified x 100 = x). The 20% under-referral rate was considered a realistic under-referral rate despite the concern to identify all L.D. students. A 100% over-referral rate would accept that out of every 200 students identified for L.D. assessment only 100 would qualify as L.D. (The over-referral formula is: Identified for assessment - L.D./L.D. x 100 = x). A 100% over-referral rate was accepted because of testing time and cost restraint.

B. What subtest score pattern exist for the C.T.B.S.,

FIGURE B



| Student Number | Woodcock | | C.T.B.S. | | L.D. Criteria | |
|---|---|---|---|---|---|---|
| 1 | 3.2 | 7 | 3.5 | 39 | 3.2 | 25 |
| 2 | 3.0 | 6 | 3.0 | 18 | 3.0 | 13 |
| 3 | 3.5 | 13 | 4.5 | 40 | 3.5 | 25 |
| 4 | 3.7 | 2 | 5.0 | 25 | 3.9 | 15 |
| 5 | 4.3 | -- | 4.9 | 5 | 4.5 | 9 |
| 6 | 3.8 | 4 | 4.9 | 5 | 4.4 | 18 |
| 7 | 4.5 | 12 | 4.8 | 4 | 4.6 | 15 |
| 8 | 2.4 | 14 | *2.6 | 6 | 2.6 | 6 |
| 9 | 3.3 | 6 | 4.3 | 34 | 3.5 | 13 |
| 10 | 3.5 | 7 | 4.6 | 13 | 3.5 | 27 |
| 11 | 4.8 | 10 | 5.4 | 11 | 5.0 | 10 |
| 12 | 3.9 | 4 | 5.4 | 11 | 4.9 | 15 |
| 13 | 4.5 | 10 | 5.6 | 16 | 4.5 | 14 |
| 14 | 3.3 | 3 | 5.2 | 8 | 4.0 | 4 |
| 15 | 4.7 | 10 | 6.0 | 27 | 4.8 | 14 |
| 16 | 4.2 | 7 | 5.8 | 21 | 4.4 | 42 |
| 17 | 2.9 | 8 | 3.4 | 35 | 2.9 | 27 |
| 18 | 3.4 | 6 | 3.8 | 16 | 3.5 | 6 |
| 19 | 3.6 | 11 | *3.6 | 10 | 3.6 | 13 |
| 20 | 3.5 | 4 | 5.6 | 44 | 3.9 | 45 |
| 21 | 3.8 | 6 | 4.9 | 22 | 4.0 | 29 |
| 22 | 3.8 | 7 | 5.2 | 31 | 3.8 | 9 |
| 23 | 4.0 | 9 | 4.7 | 16 | 4.0 | 13 |
| 24 | 3.3 | 3 | 5.4 | 11 | 4.3 | 7 |
| 25 | 4.0 | 6 | 6.0 | 27 | 4.6 | 37 |

* = students who qualify as learning disabled

FIGURE C



| Student Number | Stanford | | C.T.B.S. | | L.D. Age Criteria | |
|---|---|---|---|---|---|---|
| 26 | 2.5 | 4 | 3.2 | 3 | 3.1 | 18 |
| 27 | 2.4 | 0 | 3.7 | 13 | 3.1 | 6 |
| 28 | 3.2 | 2 | 4.8 | 19 | 4.4 | 15 |
| 29 | 3.1 | 0 | 4.9 | 22 | 3.6 | 6 |
| 30 | 4.4 | 14 | 5.9 | 24 | 4.5 | 18 |
| 31 | 3.1 | 12 | *2.7 | 8 | 3.1 | 23 |
| 32 | 2.6 | 13 | 3.7 | 46 | 2.9 | 13 |
| 33 | 2.5 | 4 | 4.3 | 34 | 3.4 | 45 |
| 34 | 3.3 | 15 | 3.6 | 10 | 3.3 | 55 |
| 35 | 2.5 | 6 | 4.6 | 13 | 3.2 | 25 |
| 36 | 4.4 | 12 | 5.5 | 13 | 4.4 | 71 |
| 37 | 3.4 | 19 | *2.6 | 6 | 3.4 | 19 |
| 38 | 2.7 | 7 | 3.0 | 18 | 2.8 | 37 |
| 39 | 3.1 | 3 | *3.5 | 7 | 3.6 | 23 |
| 40 | 2.7 | 5 | 4.4 | 37 | 3.3 | 14 |
| 41 | 3.3 | 14 | 4.5 | 40 | 3.6 | 25 |
| 42 | 4.0 | 17 | 4.7 | 16 | 4.0 | 18 |

* = students who qualify as learning disabled

the WISC-R, and W.R.M.T. or S.D.R.T. which would predict L.D.? The subtest scores of each of these tests were statistically analysed to find their minimum, maximum, mean, variance and standard deviation scores. These statistical scores were then studied to determine if lower subtest patterns existed which would indicate L.D.

A comparison of the statistical measures were also used to determine relationships between achievement test scores. Comparisons between L.D. and non-L.D. students were made for each test used and between each test used in both C.T.B.S. and teacher referred populations. Correlation of significance are summarized in tables 2-7 showing all $\leq .05$ correlations for comparison of the WISC-R to S.D.R.T. subtests in Table 2, the WISC-R to C.T.B.S. (S) subtests in Table 3, the WISC-R to W.R.M.T. in Table 4 and the WISC-R to C.T.B.S. (W) in Table 5, the C.T.B.S. to S.D.R.T. in Table 6 and the C.T.B.S. to W.R.M.T. in Table 7. All correlations were organized to show the frequency of correlation patterns between subtests for C.T.B.S.-referred L.D. and non L.D. samples as well as teacher-referred L.D. and non L.D. samples.

C. How could we predict children with L.D. from the available measures? This descriptive study looked at the screening effectiveness of the C.T.B.S. and other tests in generating referrals for the identification of L.D. students. Two thousand five hundred and twenty-eight grade three to six students were screened for possible L.D. The Saskatchewan

Table 2 Correlation Coefficients for $P \leq .05$ when Comparing WISC-R to S.D.R.T. Subtest Scores

| | CTBS REFERRED | | TEACHER REFERRED | |
|---|---|---|---|---|
| wISC-R | L.D. (N = 8) | Not L.D. (N = 23) | L.D. (N = 17) | Not L.D. (N = 18) |
| | Variable r | Variable r | Variable r | Variable r |
| SDRT | Performance .78 | None | None | SDRT + Verbal 0.67 |
| | Comprehension 0.71 | | | Perfor 0.60 |
| | | | | F. Scale 0.65 |
| | | | | Infor 0.42 |
| | | | | Simil 0.60 |
| | | | | Arith 0.53 |
| | | | | Object A 0.66 |

Table 3 Highest Three Correlation Coefficients for $P \leq .05$ When Comparing the WISC-R (S.D.R.T.) Full Scale and Verbal I.Q. Scores to the C.T.B.S. Subtest Scores.

| C.T.B.S. Referred | | Teacher Referred | |
|---|---|---|---|
| Variable r | | Variable r | |
| L.D. (n = 8) | not L.D. (n = 23) | L.D. (n = 17) | not L.D. (n = 18) |
| Full Scale I.Q. | | | |
| none | none | none | M.Conc. 0.56 (31%) |
| Verbal I.Q. | | | |
| R. Comp. 0.83 (69%) | none | none | Math. Concp. 0.51 (26%) |
| M. Concp. 0.73 (52%) | | | |
| L. Punt. 0.72 (52%) | | | |

Note: Either Full Score or Verbal I.Q. Scores may be used in the Saskatchewan L.D. formula and therefore both are shown.

Using the formula ($r^2 \times 100$) the ( ) show how much variance is accounted for when taking these coefficients together.

Table 4 Correlation Coefficients for $P \leq .05$ when Comparing WISC-R to W.R.M.T. Subtest Scores

| | CTBS REFERRED | | | | TEACHER REFERRED | | | |
|---|---|---|---|---|---|---|---|---|
| WISC-R | L.D. (N = 10) | | Not L.D. (N = 22) | | L.D. (N = 25) | | Not L.D. (N = 21) | |
| WISC-R (WRMT) | Variable | r | Variable | r | Variable | r | Variable | r |
| W.R.M.T. | P. Comp + P. Comp. | 0.66 | Info. + Word Id | 0.46 | Info. + Word ID | -0.47 | Sim + Word ID | -0.44 |
| | | | Word Comp. | 0.52 | | | | |
| | | | Pass Comp. | 0.59 | P. Arrang + | | Digit Span + | |
| | | | W. Total | 0.54 | Word Att. | -0.45 | Word Id | 0.50 |
| | | | | | Word Comp. | -0.62 | Word Attack | 0.53 |
| | | | Coding + | | W. Total | -0.44 | Pass. Comp. | 0.64 |
| | | | Word Att. | 0.44 | | | W. Total | 0.65 |

Table 5 Highest Three Correlation Coefficients for $P \leq .05$ When Comparing WISC-R (W.R.M.T.) Full Scale and Verbal I.Q. Scores to the C.T.B.S. Subtest Scores.

| C.T.B.S. Referred | | Teacher Referred | |
|---|---|---|---|
| Variable r | | Variable r | |
| L.D. (n = 10) | not L.D. (n = 22) | L.D. (n = 25) | not L.D. (n = 21) |
| Full Scale I.Q. | | | |
| none | none | none | none |
| Verbal I.Q. | | | |
| none | none | none | none |

Note: Either full scale or verbal I.Q. scores may be used in the Saskatchewan L.D. formula and therefore both are shown.

Table 6 Highest Three Correlation Coefficients for $P \leq$ When Comparing the S.D.R.T. Total Score With the C.T.B.S. Subtest Scores.

| C.T.B.S. Referred | | Teacher Referred | |
|---|---|---|---|
| Variable r | | Variable r | |
| L.D. (n = 8) | not L.D. (n = 23) | L.D. (n = 17) | not L.D. (n = 18) |
| none | W. Refn. 0.83 (69%) | R. Comp. 0.70 (49%) | M. Concp. 0.73 (53%) |
| | R. Comp. 0.82 (67%) | | W. Refn. 0.69 (48%) |
| | L. Spel. 0.80 (64%) | | W. Graph 0.68 (46%) |

Note: The S.D.R.T. total score was the only S.D.R.T. grade score permitted in the Saskatchewan formula.

Using the formula ($r^2$ x 100) the ( ) show how much variance is accounted for when taking these coefficients together.

Table 7 Highest Three Correlation Coefficients for $P \leq .05$ When Comparing the W.R.M.T. Total Score With the C.T.B.S. Subtest Scores.

| C.T.B.S. Referred | | Teacher Referred | |
|---|---|---|---|
| Variable r | | Variable r | |
| L.D. (n = 10) | not L.D. (n = 22) | L.D. (n = 17) | not L.D. (n = 18) |
| none | Vocab. 0.74 (55%) | R. Comp. 0.71 (50%) | M. Concp. 0.56 (31%) |
| | R. Comp. 0.60 (36%) | Vocab. 0.62 (38%) | W. Graph 0.54 (29%) |
| | W. Refn. 0.60 (36%) | W. Maps 0.62 (38%) | L. Caps 0.52 (27%) |

Note: The W.R.M.T. total score was the only W.R.M.T. grade score permitted in the Saskatchewan L.D. formula.

Using the formula ($r^2 \times 100$) the ( ) show how much variance is accounted for when taking these coefficients together.

Table 8 Number of Significant Correlations for $\leq .05$ for all Subtests Used. Numbers of Significant Correlations are also Expressed in Percentages

| Table | Tests Used | Possible Correlation | C.T.B.S. Referred L.D. | C.T.B.S. Referred Non L.D. | Teacher Referred L.D. | Teacher Referred Non L.D. |
|---|---|---|---|---|---|---|
| 2 | WISC-R + S.D.R.T. | 14 | 2(14%) | 0(0%) | 0(0%) | 7(50%) |
| 3 | WISC-R(S) + C.T.B.S. | 210 | 15(7%) | 2(1%) | (-17) (+7) 24(11%) | 21(10%) |
| 4 | WISC-R + W.R.M.T. | 96 | 1(1%) | 5(5%) | (-) 4(4%) | (-1) 5(5%) |
| 5 | WISC-R(W) + C.T.B.S. | 210 | (-) 5(2%) | 1(0.5%) | 4(2%) | 3(1%) |
| 6 | C.T.B.S. + S.D.R.T. | 15 | 0(0%) | 15(100%) | 1(7%) | 15(100%) |
| 7 | C.T.B.S. + W.R.M.T. | 90 | 7(8%) | 44(49%) | 41(46%) | 39(43%) |

formula for identifying L.D. was applied to determine which referral source most accurately identified L.D. students. The study also compared teacher-referral against C.T.B.S.-referral sources to determine over and under referral rates.

The statistical analysis was completed with the assistance of the Saskatchewan Computer Utility Corporation Program. The computer program SAS computed within-test measures indicating mean, standard error of mean, standard deviation and variance. Multiple correlation scores were also computed for comparison of each subtest score.

Multiple correlations were used to study the relative weights of the relationships between tests and subtest scores. Multiple correlation scores were computed for comparison of each subtest score. Multiple correlation was used because it allowed the determination of the relationship between one variable and several others. The predictions based on multiple correlation were seen to be more accurate than those based on single variables because several different factors relevant to the prediction could be considered. The coefficients of multiple correlation, R whose significance levels were $\leq .05$ the levels were then summarized on Tables 2 to 8 and Appendix E. These correlations were then studied for patterns suggesting predictions of L.D. vs. non L.D. Tables 3 and 5 indicate the highest three correlation coefficients for $P \leq .05$ when comparing the WISC-R, Full Scale I.Q. and Verbal I.Q. scores to

the C.T.B.S. subtest scores. The Full Scale and Verbal I.Q. scores were the only WISC-R scores permitted in the Saskatchewan L.D. formula. These I.Q. scores were compared to the C.T.B.S. subtest scores to demonstrate which C.T.B.S. subtests were most likely to predict L.D. students. Tables 6 and 7 indicate the highest three correlation coefficients for $P \leq .05$ when comparing the total scores from the S.D.R.T. and W.R.M.T. to the C.T.B.S. subtest scores. The total scores from the S.D.R.T. and W.R.M.T. are shown because these were the permitted scores for designation of L.D. in the Saskatchewan formula. The achievement total scores are compared to the C.T.B.S. subtest scores to indicate which C.T.B.S. subtest scores are most likely to predict L.D. Tables 2, 4 and supplementary tables 3, 5, 6 and 7 as found in Appendix E list all correlation coefficients for $P \leq .05$ when comparing all subtests of the WISC-R, S.D.R.T., W.R.M.T. and C.T.B.S. A summary of the numbers of significant correlations $\leq .05$ level for all subtest comparisons is listed in table 8. Numbers of significant correlations are also expressed in percentages for easier comparison. The information and statistics from questions A and B were scrutinized to determine which referral sources, subtests, tests or combinations of tests and subtests provided the strongest predictors of L.D.

In addition the SAS stepwise regression analysis was computed using the MAXR to compute an analysis of variance, the F value which was the ratio of the regression mean square to the

error mean square, the significance of the probability of the F value, and other related statistics. The MAXR improvement technique developed by James Goodnight was considered superior to the stepwise technique and almost as good as all possible regressions (SAS Users Guide: Statistics, 1982). Unlike the stepwise method the MAXR evaluates switches on all dependent variables before a choice is made.

The MAXR method began by finding the one variable which produced the highest $R$ . Next the variable that yielded the greatest increase in $R$ was added. F scores were computed not only for the combined independent dependent variables but also showed the intercept strength of each dependent variable added.

The MAXR was computed for total test scores because total scores were seen to have the strongest prediction ability. This study was based on the Saskatchewan L.D. formula which accepted only the total test scores for L.D. designation purposes.

The MAXR was administered for each sample three times so that all three variables would interchange to become dependent and independent variables. The F scores with the significance of each F score was then summarized on Tables 9 and 10 to show the predictive strength of C.T.B.S. referred vs teacher referred scores. Scores were also separated for L.D. vs non L.D. populations. Each F score was ranked according to its strength of prediction from highest to lowest. The intercept contribution

of each independent tests F value was similarly ranked and is displayed on Tables 11 and 12.

Table 9 Regression Analysis of all Test Variables Showing F Score, Prob. of F Scores and Rank of F Scores for L.D. Populations

| Variables | | CTBS Referred | | | Teacher Referred | | | Rank | |
|---|---|---|---|---|---|---|---|---|---|
| Dependent | Independent | F Score | Prob > F | Rank | F Score | Prob > F | Rank | Difference | Average |
| WISC-R | SDRT | 14.52 | 0.0089 | 1 | | | | | |
| WISC-R | CTBS (S) | | | | 0.50 | 0.4910 | 9 | | |
| WISC-R | SDRT + CTBS | 11.84 | 0.0127 | 2 | 0.24 | 0.7902 | 10 | 8 | 5 |
| CTBS | WISC-R | 0.97 | 0.3628 | 6 | | | | | |
| CTBS | SDRT | | | | 4.21 | 0.0582 | 4 | 0 | 1 |
| CTBS | WISC-R + SDRT | 1.70 | 0.2733 | 4 | 2.24 | 0.1433 | 6 | 2 | 5 |
| SDRT | WISC-R | 14.52 | 0.0089 | 1 | | | | | |
| SDRT | CTBS | | | | 4.21 | 0.0582 | 4 | | |
| SDRT | WISC-R + CTBS | 9.86 | 0.0184 | 3 | 1.97 | 0.1761 | 7 | 4 | 5 |
| WISC-R | WRMT | | | | 0.91 | 0.3504 | 8 | | |
| WISC-R | CTBS (W) | 1.02 | 0.3426 | 5 | | | | | |
| WISC-R | WRMT + CTBS | 0.46 | 0.6515 | 8 | 2.54 | 0.1014 | 5 | 3 | 6.5 |
| CTBS | WISC-R | 1.02 | 0.3426 | 5 | | | | | |
| CTBS | WRMT | | | | 18.73 | 0.0002 | 1 | | |
| CTBS | WISC-R + WRMT | 0.52 | 0.6174 | 7 | 12.64 | 0.0002 | 3 | 4 | 5 |
| WRMT | WISC-R | | | | | | | | |
| WRMT | CTBS | 0.21 | 0.6586 | 9 | 18.73 | 0.0002 | 1 | 8 | 5 |
| WRMT | WISC-R | 0.10 | 0.9047 | 10 | 12.97 | 0.0002 | 2 | 8 | 6 |
| | Average | 4.12 | | | 5.7 | | | 5.3 | |

Table 10 Regression Analysis of all Test Variables Showing F Score, Prob. of F Scores and Rank of F Scores for non L.D. Populations

| Variables | | CTBS Referred | | | Teacher Referred | | | Rank | |
|---|---|---|---|---|---|---|---|---|---|
| Dependent | Independent | F Score | Prob > F | Rank | F Score | Prob > F | Rank | Difference | Average |
| WISC-R | SDRT | 0.152 | 0.7049 | 8 | 11.98 | 0.0032 | 2 | 6 | 5 |
| WISC-R | CTBS (S) | | | | | | | | |
| WISC-R | SDRT + CTBS | 0.09 | 0.9112 | 10 | 5.63 | 0.0150 | 8 | 2 | 9 |
| CTBS | WISC-R | | | | | | | | |
| CTBS | SDRT | 57.42 | 0.0001 | 1 | 13.31 | 0.0022 | 1 | 0 | 1 |
| CTBS | WISC-R + SDRT | 27.43 | 0.0001 | 3 | 6.26 | 0.0106 | 7 | 4 | 5 |
| SDRT | WISC-R | | | | | | | | |
| SDRT | CTBS | 57.42 | 0.0001 | 1 | 13.31 | 0.0022 | 1 | 0 | 1 |
| SDRT | WISC-R + CTBS | 27.61 | 0.0001 | 2 | 11.44 | 0.001 | 3 | 1 | 2.5 |
| WISC-R | WRMT | | | | | | | | |
| WISC-R | CTBS (W) | 0.28 | 0.6019 | 7 | | | | | |
| WISC-R | WRMT + CTBS | 0.14 | 0.8744 | 9 | 1.48 | 0.2540 | 9 | 0 | 9 |
| CTBS | WISC-R (W) | | | | | | | | |
| CTBS | WRMT | 14.35 | 0.0012 | 4 | 10.23 | 0.0047 | 4 | 0 | 4 |
| CTBS | WISC-R + WRMT | 6.92 | 0.0055 | 5 | 6.32 | 0.0084 | 6 | 1 | 5.5 |
| WRMT | WISC-R | | | | | | | | |
| WRMT | CTBS | 14.35 | 0.0012 | 4 | 10.23 | 0.0047 | 4 | 0 | 4 |
| WRMT | WISC-R | 6.82 | 0.0059 | 6 | 6.92 | 0.0059 | 5 | 1 | 5.5 |
| | Average | 14.12 | | | 7.46 | | | 1.4 | |

Table 11 Regression Analysis Showing Intercept F Score Contributions, Prob. of Intercept F Scores and Ranked F Scores for each L.D. Independent Test Score Variable

| Variables | | CTBS Referred | | | Teacher Referred | | | Rank | |
|---|---|---|---|---|---|---|---|---|---|
| Dependent | Independent | F Score | Prob > F | Rank | F Score | Prob > F | Rank | Difference | Average |
| WISC-R | SDRT | 19.70 | 0.0068 | 1 | 0.43 | 0.5218 | 5 | 4 | 3 |
| | CTBS | 3.39 | 0.1249 | 2 | 0.01 | 0.9098 | 6 | 4 | 4 |
| CTBS | WISC-R | 3.39 | 0.1249 | 2 | 0.43 | 0.5218 | 5 | 3 | 3.5 |
| | SDRT | 2.23 | 0.1954 | 3 | 3.88 | 0.0689 | 4 | 1 | 3.5 |
| SDRT | WISC-R | 19.70 | 0.0068 | 1 | 0.01 | 0.9098 | 6 | 5 | 3.5 |
| | CTBS | 2.23 | 0.1954 | 3 | 3.88 | 0.0689 | 4 | 1 | 3.5 |
| WISC-R | WRMT | 0.02 | 0.8951 | 6 | 4.42 | 0.0471 | 2 | 4 | 4 |
| | CTBS | 0.83 | 0.3927 | 4 | 4.06 | 0.0563 | 3 | 1 | 3.5 |
| CTBS | WISC-R | 0.13 | 0.7303 | 5 | 4.06 | 0.0563 | 3 | 2 | 4 |
| | WRMT | 0.83 | 0.3927 | 4 | 24.12 | 0.0001 | 1 | 3 | 2.5 |
| WRMT | WISC-R | 0.02 | 0.8951 | 6 | 4.42 | 0.0471 | 2 | 4 | 4 |
| | CTBS | 0.13 | 0.7303 | 5 | 24.12 | 0.0001 | 1 | 4 | 3 |
| | Average | 4.4 | | | 6.2 | | | 5.5 | |

Table 12 Regression Analysis Showing Intercept F Score Contributions, Prob. of Intercept F Scores and Ranked F Scores for each non L.D.Independent Test Score Variable

| Variables | | CTBS Referred | | | Teacher Referred | | | Rank | |
|---|---|---|---|---|---|---|---|---|---|
| Dependent | Independent | F Score | Prob > F | Rank | F Score | Prob > F | Rank | Difference | Average |
| WISC-R | SDRT | 0.14 | 0.7096 | 3 | 5.68 | 0.0309 | 3 | 0 | 3 |
| | CTBS | 0.05 | 0.8322 | 5 | 0.02 | 0.8899 | 6 | 1 | 5.5 |
| CTBS | WISC-R | 0.05 | 0.8322 | 5 | 0.02 | 0.8899 | 6 | 1 | 5.5 |
| | SDRT | 54.70 | 0.0001 | 1 | 6.66 | 0.0209 | 2 | 1 | 1.5 |
| SDRT | WISC-R | 0.14 | 0.7096 | 3 | 5.68 | 0.0309 | 3 | 0 | 3 |
| | CTBS | 54.70 | 0.0001 | 1 | 6.66 | 0.0209 | 2 | 1 | 1 |
| WISC-R | WRMT | 0.00 | 0.9532 | 6 | 2.70 | 0 1175 | 4 | 2 | 5 |
| | CTBS | 0.13 | 0.7259 | 4 | 1.91 | 0.1839 | 5 | 1 | 4.5 |
| CTBS | WISC-R | 0.13 | 0.7259 | 4 | 1.91 | 0.1839 | 5 | 1 | 4.5 |
| | WRMT | 13.39 | 0.0017 | 2 | 12.25 | 0.0026 | 1 | 1 | 1.5 |
| WRMT | WISC-R | 0.00 | 0 9532 | 6 | 2.70 | 0.1175 | 4 | 2 | 5 |
| | CTBS | 13.39 | 0.0017 | 2 | 12.25 | 0.0026 | 1 | 1 | 1.5 |
| | Average | 11.4 | | | 4.9 | | | 1 | |

# Chapter 4

## ANALYSIS AND FINDINGS

The analysis of data and discussion of results followed the format suggested by the questions of this study. This descriptive study looked at the screening effectiveness of the C.T.B.S. and other tests in generating referrals for the identification of L.D. students. Two thousand five hundred and twenty-eight grade three to six students were screened for possible L.D. The study spanned a three year period of time including 1980, 1981, and 1982 with the analysis of the study applied to all three years of the study.

A. How did the referral process work?

1. What number of those students who qualified and of those students who failed to qualify as L.D. readers were identified at each step of the referral and assessment process?

This study looked at 2528 students enrolled in grades three to six in the Swift Current City Schools. Students were screened for referral by teacher-referral sources as well as by the C.T.B.S. (Figure A). Teacher-referrals represented all referrals for possible L.D. students submitted by teachers for further psychologist assessment. C.T.B.S.-referrals represented all students who scored on or below the 15th percentile on the

composite score of the C.T.B.S. Students from both the C.T.B.S. and teacher-referral sources were then assessed by a resource teacher with the S.D.R.T. and W.R.M.T. A psychologist or psychometrican assessed referred students using the WISC-R. The Saskatchewan formula for L.D. was then applied to these scores. Students who qualified by this formula were designated as L.D. Of the 140 students referred by the C.T.B.S., 8 were identified as L.D. by the S.D.R.T. and WISC-R, while 10 were identified by the W.R.M.T. and WISC-R. A total of 18 students were identified as L.D. by the C.T.B.S. referral source. Teacher referral sources identified 85 students for assessment by S.D.R.T. and WISC-R and W.R.M.T. and WISC-R tests. The S.D.R.T. and WISC-R were used to assess 35 students, 17 of which were identified as L.D. The W.R.M.T. and WISC-R was used to assess 46 students, 25 of which were identified by the teacher-referral source. Only 18 of the 42 L.D. students were identified by C.T.B.S. screening.

The screening and referral procedure of this study conformed in most ways to the screening procedures of Ontario and Manitoba as discussed earlier. As identified by Robert MacIntyre (1980) identification of L.D. began with in-school assessment of low achievers. At this point informal teacher assessment as well as standardized assessment instruments such as the C.T.B.S. were used to identify low achieving students. Students who maintained low academic achievements were referred to a second level of assessment. Typical problems resulting from varied definitions

of L.D. were resolved in this study by following the formulas as outlined by the Saskatchewan Department of Education which mandated specific guidelines for definition and identification.

2. What number of L.D. readers were successfully identified for referral, by teachers or by the C.T.B.S.? As indicated by Figure A, 85 students were referred for further testing by teacher-referral and 140 students were referred by C.T.B.S. scores. Of the 85 students referred by teachers, 42 were later identified as L.D. Of the 140 students identified by the C.T.B.S., only 18 were later identified as L.D.

As indicated by Figure D the C.T.B.S.-referred 5.5% of the total students screened while teacher-referrals represented 3.4% of the total students screened. This study found 29% of the C.T.B.S.-referred students for whom all scores were available were found to be L.D., while 52% of the teacher-referred students for whom all scores were available were found to be L.D. Teacher-referrals were seen therefore to most accurately identify L.D. students.

3. What number of L.D. readers were not successfully identified for referral by teachers or by the C.T.B.S.? Figure A shows that of the 85 students referred by teachers, 43 were not successfully identified as L.D. Of the 85 students referred by teachers, S.D.R.T. and/or W.R.M.T. and C.T.B.S. scores were not available for 4 students. Of the 140 students referred by C.T.B.S. scores, 122 were not successfully identified as L.D.

FIGURE D

Percentage of Students Found to be L.D. with the S.D.R.T. and W.R.M.T. for Both the C.T.B.S. and Teacher-Referred Samples

All Students
N = 2528

C.T.B.S.-Referred for L.D.
= 5.5% of all Students
1401 = 5.5% of 2528

Teacher-referred for L.D.
= 3.4% of all students
85 = 3.4% of 2528

| % of students found out of those assessed with S.D.R.T. and WISC-R = 26% | % of students found not to be L.D. out of the 63 students for whom all scores were available = 71% | % of students found L.D. out of those assessed with W.R.M.T. and WISC-R = 31% | % of students found L.D. out of those assessed with S.D.R.T. and WISC-R = 49% | % of students found not to be L.D. out of the 81 students for whom all scores were available = 48% | % of students found L.D. out of those assessed with W.R.M.T. and WISC-R = 54% |
|---|---|---|---|---|---|
| 8/10 x 100 = 26% | 45/63 x 100 = 71% | 10/32 x 100 = 31% | 17/35 x 100 = 49% | 39/81 x 100 = 48% | 25/46 x 100 = 54% |
| | Therefore 29% were found to be L.D. | | | Therefore 52% were found to be L.D. | |

NOTE: In each of the C.T.B.S. and teacher-referred groups of students above, separate samples are identified for the S.D.R.T. and WISC-R, and W.R.M.T. and WISC-R samples.

In the C.T.B.S.-referred group 13% and 16% of the total 29% were identified by the S.D.R.T. and WISC-R, and W.R.M.T. and WISC-R samples respectively. In the teacher-referred groups 21% and 31% of the total 52% were identified by the S.D.R.T. and WISC-R and W.R.M.T. and WISC-R samples respectively.

S.D.R.T. and/or W.R.M.T. and C.T.B.S. scores were not available for 77 of the C.T.B.S.-referred students.

As indicated by Figure D in the C.T.B.S.-referred group 71% of the students were referred incorrectly. The teacher-referral group showed a 48% over-referral rate. C.T.B.S.-referrals were much less accurate than teacher-referrals as demonstrated by a much higher over-referral rate for C.T.B.S.-referred students.

4. What number of students from each of the referral sources were successfully identified as L.D. by the S.D.R.T. or the W.R.M.T., in conjunction with the WISC-R? In the teacher-referred side, Figure A demonstrates that 17 out of the 35 students assessed with the S.D.R.T. and WISC-R were identified as L.D. In the teacher-referred side of Figure A, 25 out of the 46 students assessed with the W.R.M.T. and WISC-R were identified as L.D. In the C.T.B.S.-referred side of the map (Figure A), 8 out of the 31 students assessed with the S.D.R.T. and WISC-R and 10 out of those students assessed with the W.R.M.T. and WISC-R were identified as L.D.

5. What number of students from each of the referral sources were not successfully identified as L.D. by the S.D.R.T. or the S.R.M.T. in conjunction with the WISC-R? As indicated by Table 1 and Figure A, 18 of the 35 students assessed with the S.D.R.T. and WISC-R on the teacher-referral side, did not qualify as L.D. This represents a 93% over-referral rate. Similarly, 21

of the 46 students assessed with the W.R.M.T. and WISC-R on the teacher-referred side of the map did not qualify as L.D. On the C.T.B.S. side of the maps, 23 of the 31 students assessed with the S.D.R.T. and WISC-R did not qualify as L.D. and 22 of the 32 students assessed with the W.R.M.T. and WISC-R did not qualify as L.D. Figure A and Table 1 also identify the 4 students on the teacher-referral side of the map and 77 students on the C.T.B.S.-referral side of the map which were not included in the statistics because all subtest scores necessary were not available.

B. What subtest score patterns existed for the C.T.B.S., the WISC-R, and W.R.M.T. or S.D.R.T. which would predict L.D.?

1. For the identified L.D. students, what was the within test relationship of subtest scores for the C.T.B.S., the WISC-R, the S.D.R.T., and the W.R.M.T.?

Descriptive statistics for the C.T.B.S., the WISC-R, the S.D.R.T., and the W.R.M.T. are provided in Appendix D. The subtest scores of each of the C.T.B.S., WISC-R, and W.R.M.T. or S.D.R.T. were compared.

The coefficients of multiple correlation, $R^2$ with significance levels $\leq .05$ were summarized on tables 2, 4, 8 and supplementary tables 3, 5, 6 and 7 as listed in Appendix E. Table 8 summarizes the number of correlation coefficients $\leq .05$ level for all subtests. Only one subtest correlation $\leq .05$ level is noted when comparing the C.T.B.S. subtests to the

S.D.R.T. for the L.D. populations. The number of C.T.B.S. subtest and W.R.M.T. subtest correlations were 8% for C.T.B.S. referred populations and 46% for teacher referred L.D. populations.

Information from supplementary tables 3, 5, 6 and 7 (Appendix E) were then analyzed to identify the C.T.B.S. subtests which would be the best predictors of L.D. C.T.B.S. subtests which received the three highest $\leq .05$ level correlation coefficients when these subtests were compared to the total scores of the WISC-R (Verbal and Full Scale I.Q.), S.D.R.T. and W.R.M.T. were summarized in tables 3, 5, 6 and 7. As indicated in tables 3 and 5 reading comprehension (0.83) then math concepts (0.73) and language punctuation (0.72) in the C.T.B.S. referred WISC-R (S.D.R.T.) L.D. sample were the only C.T.B.S. subtests which correlated $\leq .05$ level. No other C.T.B.S. or teacher referred WISC-R L.D. samples showed any similar or other $\leq .05$ level correlations when compared with C.T.B.S. subtests. As summarized in tables 6 and 7 no C.T.B.S. subtests correlated $\leq .05$ level with either the S.D.R.T. or W.R.M.T. total scores for the L.D. C.T.B.S. referred samples. In the teacher referred L.D. samples the C.T.B.S. subtest, reading comprehension, correlated $\leq .05$ level for both the S.D.R.T. and W.R.M.T. total test score samples. Other correlation coefficients for $P \leq .05$ are noted for the L.D. C.T.B.S. subtests vocabulary (0.62) and work study maps (0.62) for the teacher referred

comparison with the W.R.M.T. scores only. No L.D. C.T.B.S. subtests correlated $\leq .05$ level for all samples of either of the WISC-R, S.D.R.T. or W.R.M.T. total scores. Subtest reading comprehension was the only C.T.B.S. subtest that correlated more than once for L.D. samples. Statistical scores were studied to see if lower subtest patterns existed which would indicate L.D. No patterns were seen which could be used to identify L.D.

Analysis of mean I.Q.'s for the WISC-R samples (Table 13) show verbal, performance and full scale scores within the normal range for each sample. The largest discrepancy was noted in the L.D. Woodcock samples. In the C.T.B.S.-referred L.D. Woodcock samples the mean verbal performance I.Q. difference was 10. In the teacher-referred L.D. Woodcock sample the mean verbal-performance I.Q. difference was also 10 (Appendix C). WISC-R subtests, digit span, arithmetic, information and coding have typically low mean scores for all samples of both L.D. and non L.D. students (Appendix C). These subtests indicated distractibility factors (Sattler, 1982). Distractibility factors appeared therefore, characteristic of students referred for study by both C.T.B.S. and teacher-referral sources for L.D. as well as non L.D. populations.

W.R.M.T. subtest scores were within a normal range except for subtest letter identification which had a significantly higher mean score for all samples (Appendix D).

2. a) What subtest score patterns existed for the

Table 13 Mean WISC-R Scores for all Samples

| | C.T.B.S. Referred L.D. (S.D.R.T.) WISC-R | C.T.B.S. Referred L.D. (W.R.M.T.) WISC-R | Teacher Referred L.D. (S.D.R.T.) WISC-R | Teacher Referred L.D. (W.R.M.T.) WISC-R |
|---|---|---|---|---|
| Verbal | 103 | 91 | 101 | 96 |
| Performance | 103 | 101 | 103 | 106 |
| F. Scale | 103 | 95 | 102 | 100 |

| | C.T.B.S. Referred Non L.D. (S.D.R.T.) WISC-R | C.T.B.S. Referred Non L.D. (W.R.M.T.) WISC-R | Teacher Referred Non L.D. (S.D.R.T.) WISC-R | Teacher Referred Non L.D. (W.R.M.T.) WISC-R |
|---|---|---|---|---|
| Verbal | 90 | 90 | 90 | 92 |
| Performance | 90 | 93 | 95 | 95 |
| F. Scale | 89 | 91 | 91 | 92 |

The above table displays mean verbal, performance and full scale scores for all samples of the WISC-R.

C.T.B.S., the WISC-R, and the W.R.M.T. or S.D.R.T. for teacher-referred students who qualified as L.D.?

Tables 2 to 7 show correlations between the achievement tests. C.T.B.S. subtests which received the three highest $\leq$.05 level correlation coefficients when these three subtests were compared to the total scores of the WISC-R (verbal and full scale), S.D.R.T. and W.R.M.T. are summarized in tables 3, 5, 6 and 7. As indicated in tables 3 and 5 no C.T.B.S. subtests correlated $\leq$.05 level with the WISC-R teacher referred L.D. samples. In the teacher referred L.D. samples the C.T.B.S. subtests reading comprehension, correlated $\leq$ the .05 level for both the S.D.R.T. (0.70) and W.R.M.T. (0.71) samples. Other correlation coefficients for P $\leq$.05 are noted for the L.D. C.T.B.S. subtests, vocabulary (0.62) and work study maps (0.62) for the teacher referred comparison with the W.R.M.T. only but not with the S.D.R.T. sample. Subtest reading comprehension was the only C.T.B.S. subtest that correlated more than once for the L.D. teacher referred samples. More frequent correlations (41) were noted between subtests of the W.R.M.T. and C.T.B.S. (Table 7). Table E (Appendix D) shows correlations $\leq$ .05 level for the WISC-R and achievement tests. While no significant correlations $\leq$.05 level were noted for the S.D.R.T. and the WISC-R, seventeen significant but negative correlations were shown between the C.T.B.S. subtests and the WISC-R subtests. These negative correlations would be expected as the definition

of L.D. suggested a one standard deviation variation between achievement and ability testing. The W.R.M.T. subtests also showed four negative but significant correlations with the WISC-R subtests. The C.T.B.S. and W.R.M.T. when compared to the WISC-R were more uniform in their measurement of L.D. than was the S.D.R.T. As also described on Table 8, the C.T.B.S. and W.R.M.T. had forty-one significant correlations between them. This demonstrates how in the teacher-referred L.D. group, 46% of all subtests scored between the C.T.B.S. and W.R.M.T. correlated $\leq$ level. In the teacher-referred L.D. group the C.T.B.S. and W.R.M.T. were seen to be most uniform in their measurement of L.D.

Mean I.Q.'s for the (S.D.R.T.) WISC-R samples were uniform and higher for L.D. than for non-L.D. populations (Appendix D).

2. b) What subtest score patterns existed for the C.T.B.S., the WISC-R, and the W.R.M.T. or S.D.R.T. for teacher-referred students who did not qualify as L.D.?

C.T.B.S. subtests which received the three highest $\leq$.05 level correlations coefficients when these subtests were compared to the total scores of the WISC-R (verbal and full scale), S.D.R.T. and W.R.M.T. are summarized in tables 3, 5, 6 and 7. As indicated in tables 3 and 5 only one C.T.B.S. subtest math concepts correlated with the non L.D. teacher referred. WISC-R (S.D.R.T.) total scores verbal (0.51) and full scale

(0.56). WISC-R (W.R.M.T.) samples did not show a $\leq$.05 correlation with C.T.B.S. subtest math concepts. No other $\leq$.05 correlation between any C.T.B.S. subtests and WISC-R (full scale and verbal) total scores appeared for teacher referred non L.D. samples. In the teacher referred non L.D. samples the C.T.B.S. subtests math concepts (0.73 and 0.56) and work study graphs (0.68 and 0.54) both correlated $\leq$.05 level for both teacher referred non L.D. S.D.R.T. and W.R.M.T. samples respectively (Tables 6 and 7). Work study references (0.69) and language capitals (0.52) are also reported among the highest three C.T.B.S. subtest $\leq$.05 level coefficient but are indicated for either W.R.M.T. or S.D.R.T. non L.D. teacher referred samples but not for both. In the teacher referred non L.D. samples C.T.B.S. subtests, math concepts and work study graphs are therefore seen to most consistently identify non L.D. students.

As indicated by Table 8, teacher-referred non-L.D. students had the highest average number of subtests which correlated $\leq$ the .05 level. In the C.T.B.S. and S.D.R.T. comparisons all fifteen subtests were correlated $\leq$ the .05 level. In the WISC-R and S.D.R.T. comparison seven subtests which represented 50% of the possible subtests correlated $\leq$ the .05 level. The C.T.B.S. and W.R.M.T. showed thirty-nine correlations $\leq$ the .05 level and this represents 43% of the subtests.

For the non-L.D. teacher-referred samples the S.D.R.T. showed highest percentages of $\leq .05$ level correlations with both the C.T.B.S. and WISC-R subtests. As indicated in Table 8 the S.D.R.T. and C.T.B.S. showed high uniformity of measurement for both C.T.B.S. and teacher-referred samples.

2. c) What subtest score patterns existed for the C.T.B.S., the WISC-R, and the W.R.M.T. or S.D.R.T. for C.T.B.S.-referred students who qualified as L.D.?

For the C.T.B.S. referred L.D. WISC-R S.D.R.T. sample C.T.B.S. subtests reading comprehension (0.83) math concepts (0.73) then language punctuation (0.72) were shown to have $\leq .05$ level correlation coefficients when compared to the WISC-R verbal total score. No other WISC-R (full scale or verbal) scores identified $\leq .05$ level correlations for any other samples.

No significant correlations were noted between subtests of the C.T.B.S. and the S.D.R.T. for the C.T.B.S.-referred L.D. group. A few significant correlations were noted for subtests of the C.T.B.S. and W.R.M.T. No significant correlations were noted for both samples of the WISC-R and C.T.B.S. and for the C.T.B.S.-referred L.D. group. While the samples were small they were also quite different as evidenced by the fact that correlations existed for each sample but no common correlations existed in both samples of the C.T.B.S.-referred L.D. populations. WISC-R and W.R.M.T. and S.D.R.T. correlations were few. Table 8 shows

that not more than 14% of the C.T.B.S.-referred samples correlated $\leq$ the .05 level for any test comparisons. These statistics suggest that C.T.B.S. as an L.D. referral source is of doubtful value.

2. d) What subtest score patterns existed for the C.T.B.S., the WISC-R, and the W.R.M.T. or S.D.R.T. for C.T.B.S.-referred students who did not qualify as L.D.?

WISC-R (full scale and verbal) tables (3 and 5) show no $\leq$.05 correlations for C.T.B.S. referred not L.D. C.T.B.S. subtests. Tables 6 and 7 indicate that more consistent P $\leq$.05 level correlations exist between the C.T.B.S. subtests and W.R.M.T. and S.D.R.T. total scores for the C.T.B.S. non L.D. samples. C.T.B.S. subtests reading comprehsnion (0.8 and 0.6) and work study references (0.83 and 0.60) are among the top three P $\leq$.05 correlations when compared with the C.T.B.S. referred non L.D. S.D.R.T. and W.R.M.T. total scores (tables 6 and 7).

C.T.B.S.-referred non-L.D. populations showed fewer consistent correlation pattern than did teacher-referred groups (Table 8). All subtests of the C.T.B.S. correlated at the .05 level or higher when compared to the S.D.R.T. for the C.T.B.S.-referred non-L.D. group. The S.D.R.T. in both the C.T.B.S.-referred and in the teacher-referred samples were seen to have more frequent $\leq$ .05 level correlations for non-L.D. samples. The C.T.B.S.-referred non-L.D. correlations were less consistent however than the teacher-referred non-L.D. correlations. No

significant correlation was noted between the WISC-R and S.D.R.T. No significant correlations existed for both groups of the C.T.B.S. and WISC-R for the C.T.B.S.-referred non L.D. groups. The C.T.B.S. and W.R.M.T. showed 49% significant $\leq .05$ level or greater correlation relationships between them (Table 8), but in spite of this C.T.B.S.-referred samples still showed fewer $\leq .05$ level correlations than did teacher referral samples.

C. How could we predict children with L.D. from the available measures?

1. Which subtests of the C.T.B.S., the WISC-R, the S.D.R.T., and the W.R.M.T. were most likely to predict L.D.?

No single subtest scores correlated consistently with any other subtest for all samples. In the C.T.B.S., subtests composite, reading comprehension, math concepts and math total, showed the most frequent significant correlation with the W.R.M.T. subtests. Correlations were not frequent or consistent enough to develop predictable patterns for identifying L.D.

Table 9 summarizes the F score and F score significance levels for the L.D. test comparisons. No consistently significant $\leq .05$ probabilities were noted for any tests for both C.T.B.S. and teacher-referred samples. Significant F score relationships were noted for the WISC-R and S.D.R.T. in the C.T.B.S.-referred samples but a very low F score 0.49 was indicated in the teacher-referred samples of the same tests.

Similarly a F score $\leq$.05 level of significance was noted between the W.R.M.T. and the C.T.B.S. for the teacher-referred samples but not for the C.T.B.S.-referred samples. This suggests that the relationship of prediction among the tests for the identified L.D. populations are accidental or random.

WISC-R subtest digit span, arithmetic, information and coding had typically low mean scores for all samples of both L.D. and non L.D. students. The W.R.M.T. WISC-R sample shows low verbal scores for both L.D. and non L.D. students alike, but higher mean performance scores for the L.D. populations (Appendix D). A significant variation between verbal and performance I.Q.'s therefore was an indicator of L.D. for this sample. (S.D.R.T.) WISC-R samples showed a generally lower I.Q. for non L.D. then for L.D. students (Appendix D). Mean achievement scores for the S.D.R.T. samples showed lower achievement levels than for the W.R.M.T. samples.

The S.D.R.T. scores when compared to the C.T.B.S. subtest scores showed consistently high $\leq$.05 levels of correlation for non L.D. students but only 1 out of 30 correlations for L.D. students. One exception was noted in subtest reading comprehension for the S.D.R.T. teacher-referred L.D. students. The S.D.R.T. when correlated with the WISC-R similarly showed 1 out of 28 correlations for L.D. samples but 7 out of 28 correlations for non L.D. students (Table 2). This suggested that the S.D.R.T. identified non L.D. students in ways similar to

the WISC-R but L.D. student scores remained random. The increased random scores of the L.D. population were in part accounted for in that these tests were normed on normal populations.

2. Which method of referral or combination of referral procedures were most likely to identify L.D.?

As discussed in chapters 2 and 3 the identification of L.D. depended on definitions used and criteria procedures employed to identify students who conform to the prescribed definition. The criteria for identification of L.D. were applied after a referral was made by school personnel. This referral process involved referral by teachers as well as referral by C.T.B.S. scores lower than the 15th percentile. Figure A demonstrates that of the 85 students referred by teachers, 42 were identified as L.D. by further testing and application of the Saskatchewan Department of Education criteria. Complete test results were available for 81 of the 85 students referred by teachers. As indicated in Figure D this represented a 93% over-referral rate. Teacher-referrals identified all 42 L.D. students 18 of which were also identified by the C.T.B.S.-referral source. The C.T.B.S. test was also used to screen for possible L.D. referrals. Using the criteria $\leq$ 15% on the composite score of the C.T.B.S., 140 students were identified for referral. From this source, 18 students were identified as L.D. by application of the Department of Education formulas. Test results were available for 63 of the 140 students referred by the C.T.B.S.

After applying the formula, 18 of the 63 students qualified as L.D. This represented less than one third of students assessed. Figure D demonstrated that: 8 out of 31 students referred by the C.T.B.S. and assessed with the S.D.R.T. qualified as L.D.; 10 out of 32 students referred by the C.T.B.S. and assessed with the W.R.M.T. qualified as L.D. C.T.B.S.-referrals represented an approximate 350% over-referral rate and a 60% under-referral rate. Teacher-referrals represented an approximate 93% over-referral and no under-referral was measured. Teacher-referral was therefore most likely to identify L.D.

Results from the MAXR regression analysis as documented in Table 9 indicates that for the L.D. populations the C.T.B.S.-referral F scores are lower than the teacher-referral F scores. The average F scores from the C.T.B.S.-referral sources was 4.2 The average F scores from the teacher-referral sources was 5.7. This supports the assumption that teacher-referred L.D. samples had greater predictive strength than C.T.B.S.-referred L.D. population samples. Teacher-referral was demonstrated to be the most accurate form of referral measured.

3. Which of the tests used or combination of tests used were most likely to identify L.D.?

As noted in Chapter 2, the criteria for applying the definition of L.D. was mandated in Saskatchewan to include a one standard deviation range between WISC-R and achievement test scores. In applying S.D.R.T. scores it was noted that the

S.D.R.T. identified lower achievement students than did the W.R.M.T. The W.R.M.T. tended to identify students who had lower verbal than performance scores on the WISC-R. No other consistently predictable patterns emerged from subtest analysis.

Distractibility factors noted by lower WISC-R scores in subtests information, arithmetic digit span and coding were consistent with the findings of Sattler (1982). Lower subtest scores were noticed for both L.D. and non L.D. students, and therefore were seen to be a characteristic common to lower reading achievement rather than a unique characteristic of L.D.

The definition of L.D. and prerequisite application criteria were based on assessment instruments which were normed on normal populations. The tests used showed greater consistency for the non L.D. populations than they did for the L.D. populations.

Table 11 summarizes the F score intercept contributions made by each test for all samples of the L.D. population. The F score contributions for each test were averaged with the S.D.R.T. having an average F score of 6.6, the W.R.M.T. an average F score of 7.3 and the C.T.B.S. an average F score of 4.96. The average F score summary suggests that the W.R.M.T. and next S.D.R.T. have the strongest prediction value among L.D. students.

# Chapter 5

# SUMMARY AND CONCLUSIONS

## The Study

This descriptive study looked at the screening effectiveness of the C.T.B.S. and other tests in generating referrals for the identification of L.D. students. Two thousand, five hundred and twenty-eight grade three to six students were screened for possible L.D. The province of Saskatchewan as outlined in Special Education: A Manual of Legislation, Regulations, Policies and Guidelines (1981) recognized the W.R.M.T., S.D.R.T. and WISC-R as suitable tests for the identification of L.D. students. The C.T.B.S. was used to generate referrals for possible L.D. students. The W.R.M.T., S.D.R.T. and WISC-R were used to identify the L.D. students. The study spanned a three year period of time including 1980, 1981 and 1982 with the analysis of the study applied to all three years of the study.

The statistical analysis was completed with the assistance of the Saskatchewan Computer Utility Corporation Program. The computer program SAS computed within-test measures indicating mean, standard error of mean, standard deviation and variance. Multiple correlation scores were also computed for comparison of each subtest score. Regression analysis was

computed for the composite scores of all tests in each sample. The summary and conclusion section of this paper is discussed with specific reference to the three major questions of the study:

## Study Questions

### A. How Did The Referral Process Work?

The purpose of this research was to study the effectiveness of using a variety of tests to generate referrals and to identify L.D. students. The study looked at 2528 grade three to six students who were screened for possible L.D. Students were screened by teachers who submitted referrals for L.D. assessment. The C.T.B.S. was also used to screen for possible L.D.-referrals.

The identification of L.D. students was based on definitions and criteria provided by the Saskatchewan Department of Education. The referrals submitted by teachers and C.T.B.S. screening were assessed by applying both the WISC-R and the S.D.R.T. or W.R.M.T. Students who qualified by Department formula were designated L.D.

From the 85 students referred by teachers, complete test scores were available for 81 and 42 were identified as L.D. This represented a 93% over-referral and no under-referral was measured (Figure D).

From the 140 students identified for referral by C.T.B.S.

sources, 18 students were identified as L.D. Test results were available for 63 of the 140 students referred by the C.T.B.S. After applying the formulas, 18 of the 63 students qualified as L.D. C.T.B.S.-referrals represented an approximate 350% over-referral and an approximate 60% under-referral rate. The criteria for this study (Chapter 3) required no greater than 20% under-referral and not more than 100% over-referral. The C.T.B.S. did not meet the accepted standards as a source of L.D.-referral.

B. What Subtest Score Patterns Existed for the C.T.B.S., the WISC-R, and W.R.M.T. or S.D.R.T. Which Would Predict L.D.?

The subtest scores of each of the C.T.B.S., WISC-R and W.R.M.T. or S.D.R.T. were compared. Statistical scores were studied to see if subtest patterns existed which would indicate L.D. No patterns were seen which could be used to identify L.D.

Patterns were seen, however, which raised questions regarding the adequacy of using norm referenced tests standardized on normal populations for identifying L.D. students. Significant correlations at the .05 level were much fewer between achievement tests for L.D. students than for non-L.D. students. This was especially noted when comparing subtests of the C.T.B.S. to the S.D.R.T. Only one significant correlation (S.D.R.T. and reading comprehension) was noted between either L.D. group studied (Table 6, Appendix E). For the non-L.D.

groups all S.D.R.T. and C.T.B.S. subtests correlated at the .05 level or higher. The S.D.R.T. correlated $\leq$ the .05 level with 100% of the C.T.B.S. subtests for non L.D. populations but correlated $\leq$ the .05 level with less than 1% of the L.D. populations. The S.D.R.T. and C.T.B.S. showed questionable consistency when measuring L.D. students but great consistency when measuring non L.D. students. Compton (1980) stated that it was a questionable practise to apply the norms of the "normal" population to students with reading problems. No evidence of a significant subtest pattern useful for identifying L.D. students was found.

Patterns were noticed which suggested a discrimination against lower ability students who may benefit from similar assistance as did L.D. students. WISC-R subtest analysis showed that distractibility subtests information, arithmetic, digit span and coding were significantly lower for both L.D. and non L.D. groups (Appendix F). Distractibility figures demonstrate larger average variation for L.D. than for non-L.D. populations. Yet, (S.D.R.T.) WISC-R I.Q. mean scores were significantly lower for non L.D. groups than for L.D. groups. Sattler (1982) indicated lower reading achievement for students who had lower distractibility subtest scores. Since lower ability non L.D. students and higher ability L.D. students had similar distractibility needs, they may both benefit from similar program supports.

C. How Could We Predict Children With L.D. From the Available Measures?

The contrast of much fewer significant correlations for questions. Definitions discussed (Chapter 1) included the definition upon which this study was based which held that children who were L.D. were identifiable. Since the characteristics of L.D. students identified by the W.R.M.T. varied from those identified by the S.D.R.T. it was possible that inconsistencies existed. It appeared that tests measured different qualities of learning problems. Hammill (1972) pointed out that since little agreement existed among those who applied "accepted diagnostic procedure" these terms provide very little use in definitions. It may well be more useful to identify learning problems for each individual student rather than referring to an umbrella term such as L.D.

The C.T.B.S. subtest analysis did not provide a consistency which would be useful for prediction of L.D. In the C.T.B.S.-referred and S.D.R.T. assessed groups, mean scores were generally lower for L.D. than non L.D. students. Similarly, while a strong level of correlation existed between the S.D.R.T. and C.T.B.S. for non L.D. students, fewer correlations were noted between the L.D. student groups. Inconsistencies between tests as predictors of L.D. were noted. In the W.R.M.T. assessed

groups, the C.T.B.S. mean subtest scores were generally higher for L.D. than for non L.D. students. This contradicted the criteria of L.D. established with the W.R.M.T. Higher mean performance I.Q. scores were noted for the W.R.M.T. identified L.D. groups and indicated a greater potential. For the W.R.M.T. identified groups, while frequent significant correlations were noted between the C.T.B.S. and W.R.M.T., no obvious patterns emerged which would permit predictions of L.D. Tests such as the C.T.B.S. were seen to have little value in screening for L.D. The development of alternate screening procedures was suggested. These procedures should be based on individual needs of each student rather than by comparison to a construct such as L.D. which was not seen to be measurable in this study.

Results from the MAXR regression analysis (Table 9) indicated that for the L.D. populations the C.T.B.S. F scores were lower than the teacher-referred F scores. This indicates a less predictive strength among C.T.B.S.-referrals than among teacher-referrals. Table 10 summarizes the ranked F score intercept contributions by each test for all L.D. samples. Despite a pattern of random scores the W.R.M.T. and next S.D.R.T. and last C.T.B.S. had the strongest prediction value among L.D. students.

The criteria for this study (Chapter 3) required not greater than 20% under-referral and not more than 100% over-referral. Teacher-referrals represented a 93% over-referral

and no under-referral was measured. C.T.B.S.-referrals represented a 350% over-referral and an approximate 60% under-referral rate. Teacher-referrals but not C.T.B.S.-referrals met the standards set by this study. This study suggested that teacher-referrals were the most accurate referral source. Predictive patterns were not seen which could substitute for individual study of each student's needs.

## Implications for Educational Practise

Tests such as the C.T.B.S. were commonly used to group students who required program alternations to accommodate individual differences. Such purposes were advocated by the authors of the C.T.B.S., as legitimate uses of the C.T.B.S. Since L.D. students were among those students who required program alterations, the C.T.B.S. was frequently used to identify L.D. students. The criteria for this study as indicated in Chapter 3 required not greater than 20% under-referral and not more than 100% over-referral. C.T.B.S.-referral however, represented a 350% over-referral rate and a 60% under-referral rate. C.T.B.S.-referrals did not meet the standards set by this study.

Larry Harris (1978) reviews the Iowa Test of Basis Skills concluding that the claim that this battery can be used to diagnose specific strengths and weaknesses of individual pupils was a bit presumtuous in view of the generally high correlations

among subtests and the relative small number of items measuring any particular skill. Harris (1978) claims the results are useful for making decisions about curriculum emphasis on a district-wide or school-wide level, but not useful for making decisions at the level of the individual child. This study found that the C.T.B.S. had much less predictable correlation among L.D. than non-L.D. students. It is suggested therefore that the C.T.B.S. not be used to identify for grouping or program placement L.D. students. Since L.D. students are lower achieving students the accuracy of the C.T.B.S. is suspect and should be used only with great caution.

This study raised serious questions about the adequacy of the current practise of identifying L.D. students in Saskatchewan. As noted earlier the identification of L.D. students was based on definition and criteria provided by the Saskatchewan Department of Education. WISC-R subtest analyses showed that distractibility subtest information, arithmetic, digit span and coding were significantly lower for both L.D. and non L.D. groups. Yet, WISC-R I.Q mean scores were significantly lower for the S.D.R.T. non L.D. groups than for L.D. groups. Sattler (1982) indicated lower reading achievement for students who had lower distractibility subtest scores. Since lower ability non-L.D. students and higher ability L.D. students had similar distractibility needs, they may both benefit from similar program supports. The Saskatchewan formula discriminates against

the identification of lower ability students despite similar distractibility factors.

The Saskatchewan formula also assumed that L.D. students had broad essential features which were identifiable with the prescribed tests. The characteristics of the W.R.M.T. L.D. samples varied from those of the S.D.R.T. L.D. samples in that the W.R.M.T. samples had significantly higher performance than verbal abilities as measured by the WISC-R. The S.D.R.T. L.D. samples showed lower mean reading achievement than the W.R.M.T. samples. Since the characteristics of L.D. students identified by the W.R.M.T. varied from those identified by the S.D.R.T. it seemed possible that these tests did not identify similar features. The definitions and application criteria used in Saskatchewan should therefore be re-examined.

## Implications for Future Research and Development

The authors of tests such as the C.T.B.S. should norm these tests on specialized populations including samples of L.D. or lower achieving populations as well as normal populations before recommendations for use are stated. C.T.B.S. stated purposes such as "to provide information useful in making administrative decisions in grouping or programming ..." are not supported by this study. The C.T.B.S. did not provide the consistency which would be useful for identifying individual needs of L.D. students. While a strong level of correlation

existed between the S.D.R.T. and C.T.B.S. for non-L.D. students, fewer were noted between the L.D. student groups. Inconsistencies between tests as predictors of L.D. were noted. In the W.R.M.T. assessed groups, the C.T.B.S. mean subtests scores were generally higher for L.D. than for non-L.D. students. This contradicted the criteria of L.D. established with the W.R.M.T. Higher mean performance I.Q. scores were noted for the W.R.M.T. identified L.D. groups and indicated a greater potential. For the W.R.M.T. identified groups, while frequent significant correlations were noted between the C.T.B.S. and W.R.M.T., no obvious patterns emerged which would permit predictions of L.D. Tests such as the C.T.B.S. were seen to have little value in screening for L.D. or in defining special program needs of L.D. students.

This study suggests that more useful definitions and identifying criteria are required. It may be more useful to identify student needs individually rather than to refer to umbrella categories of L.D. The Saskatchewan definition discussed (Chapter 1) indicated that children who were L.D. were identifiable. The contrast of much fewer significant correlations for L.D. than for non L.D. students raised questions regarding appropriate assessment. Since characteristics of L.D. students identified by the W.R.M.T. varied from those identified by the S.D.R.T., it is possible that existing measures do not consistently identify categories of L.D. More accurate

definitions of what was meant by L.D. seem necessary. Sattler (1982) evaluated procedures for the identification of L.D. students and concluded that there was no one standard for the assessment of L.D. Jack Hartstein (1971) like Sattler (1982) and Coles (1978) concluded that a standard learning disability battery did not exist. Most identification strategies like the Saskatchewan model relied on the diagnostic competence of examiners who usually administered tests of both achievement and ability. Hammill (1972) pointed out that since little agreement existed among those who applied accepted diagnostic procedure, current definitions were of little use. Compton (1980) argued that it was a questionable practise to apply the norms of the normal population to a small reading disabled population, but there was no present alternative. Clearly then we need to question the current criteria for identifying L.D. students.

Significant concerns regarding the current definitions of and criteria for identifying L.D. children is shared by a growing number of researchers. Grant McMurray (1980) reported on the attitudes of principals toward L.D. programs. He found that 75% of the elementary principals regarded their remedial programs to be effective. However, many students exhibited multiple handicaps and a clear understanding of their multi-faceted behavior was illusive. Martin Kravitz identified some of these multi-faceted causes of learning disability in his 1980 article "Learning Disability - A Changing Perspective". He argued that

too many anomolies in the measurement of intelligence existed and these anomolies were especially noted with L.D. children. He stated that capacity tests should be considered irrelevant in definition of L.D. Rather a child's ability to respond to the teaching technology should be used to determine whether or not learning disability existed. Dr. William Cruickshank (1978) agreed, stating that "learning disabled students are to be found in every intellectual level." L.D. identification in Saskatchewan required ability assessment with I.Q. scores 85 or higher and discrepancies between achievement and ability of at least one standard deviation. Current use of intelligence assessment in L.D. definition is therefore discouraged.

Bob Algazzie and James Ysseldyke (1983) questioned the usefulness of the term "learning disabled". In their study they compared two samples of school-aged children. Some of these children were identified as L.D. by their local school district, while others were called low achievers. The WISC-R and Peabody Individual Achievement Test were administered to each child and the discrepancy learning disability formulas were applied. Algazzie and Ysseldyke found little difference between the L.D. and non L.D. groups. They concluded that the current reliance on unspecified discrepancy between ability and achievement was deceiving and may be ill-founded as a basis for a separate category of children to receive special education services. Since I.Q. testing has already been found to be subject to large

variation, more narrowly defined I.Q. discrepancy as adopted in the Saskatchewan formula are also subject to a large range of error. Algazzie and Ysseldyke (1983) state that no defensible system of separating L.D. from low achievers exists.

Future research should concentrate on developing definitions and identification tools which are more student-oriented and less identification formula bound. The rational for these definitions would be better developed by studying low achieving students and their unique instructional needs. It may well be that by this process, criteria for funding and program delivery would evolve which could match the individual instruction need of each student, rather than maintain restrictive programs for inaccurately identified populations only.

NOTE: Where an individual test cannot be given due to the subject's developmental level, adaptive behaviour rating may be used to serve as an alternative to evaluating the child's degree of intellectual handicap.

4.2.4 Learning Disabled (See Appendix F and Forms 101, 102, 103)

There is general agreement of four features of the learning disabled category of educational handicap:

i) A learning difficulty, manifesting itself in one or more skill subject deficiencies, exists;

ii) A discrepancy between measured academic aptitude and measured achievement exists;

iii) Organicity is/is not established;

iv) Defined population is limited to children whose learning difficulty can be clearly identified as a communication disorder.

Learning disabilities is an inclusive term which encompasses a family of intrinsic hindrances to learning. Such hindrances may vary in etiology; they may manifest themselves in differing learning weaknesses; they vary in the degree of handicap they impose.

Painstaking diagnostic procedures are necessary to develop a profile of a child's specific strengths and weaknesses for instructional purposes. Either prior to, or simultaneously with, the application of such procedures, certain classification techniques must be applied in order to permit candidacy for a given learning disabilities program and to allow application of funding to such a program.

It becomes necessary then to translate the broad essential features of the disability into measureable characteristics and to impose arbitrary psychometric parameters that establish both involvement and degree of involvement.

Such characteristics and parameters are included in the Regulations Under The Education Act, 1978. Explicit details regarding measuring instruments and other matters are listed on a "particulars" page. These details are subject to periodic review and superintendents/directors should ensure that the data on which their designations are based conform to the instructions of the latest revision. Worksheets and tables that simplify calculations are also available from the Department.

There is no other category of handicap where, perforce, the process of elimination plays such a critical role. The postulation of a dysfunction of mediating processes probably accounts for this fact. Be that as it may, much of our data and many of our observations are more useful for exclusion.

In screening a school population, preliminary investigation will often uncover a group exhibiting the common characteristics of reduced progress. Expectations built into the system are operative here. Over the years school systems have evolved and curricula have been developed that conform to an average progress rate of one grade per year.

While reduced progress is an essential condition of a learning disability it is not exclusive to that category.

Screens need to be applied in order to separate and then to treat appropriately groups that exhibit reduced progress for the following reasons:

1. Sensory deprivation: vision, hearing.
2. Native language other than language of instruction.
3. Lack of opportunity to learn: attendance, quality of instruction.
4. Motivation.
5. Retardation.
6. Learning disability.

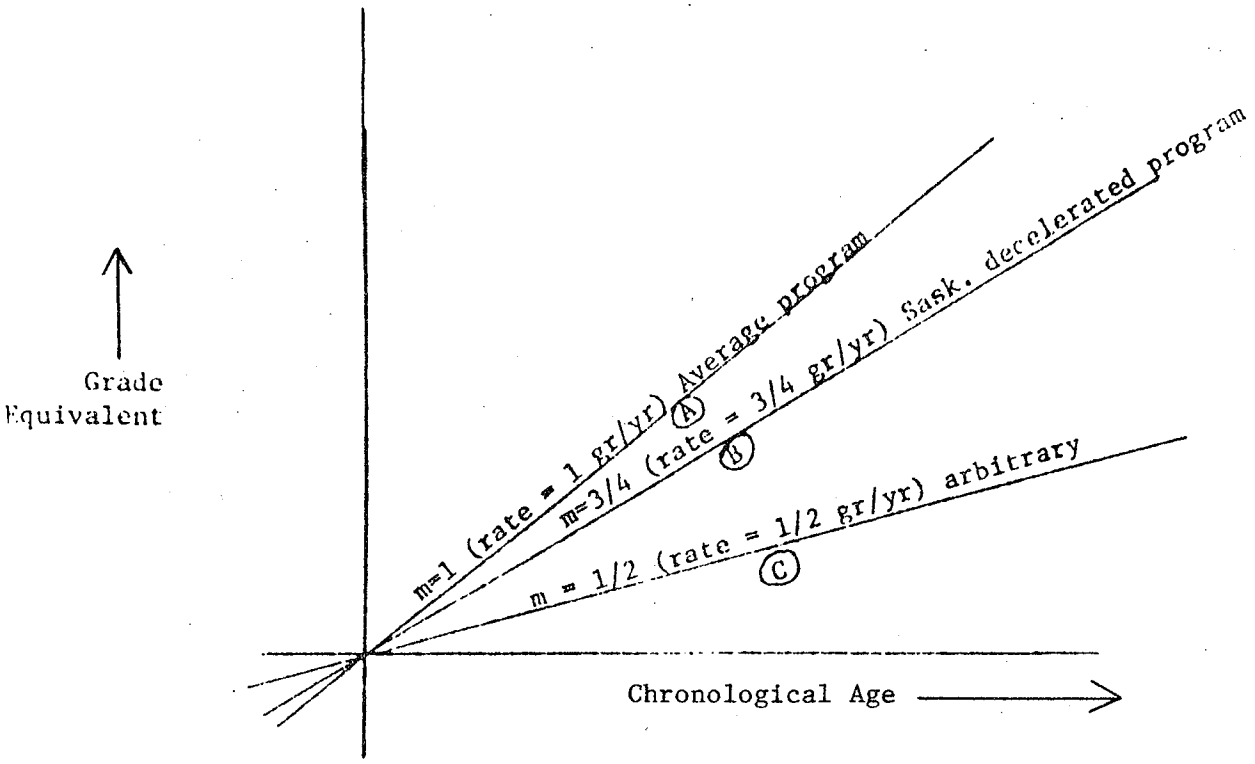
Once the first four factors have been eliminated, children evincing reduced progress resulting from either degrees of retardation or degrees of specific learning disability remain.

A second essential feature of the learning disabled population is the disparity between measured academic aptitude and measured achievement. Expectations of a child with a given academic aptitude are operative here. Despite inadequacies, academic aptitude tests are generally good predictors of school achievement.

Therefore, if a child manifests reduced progress and there is no significant discrepancy between academic aptitude and actual achievement, some reduction in academic aptitude exists. If, on the other hand, there is a significant discrepancy between predicted achievement and actual achievement some degree of learning disability is postulated.

The following diagram illustrates the more important applications used to place apart the learning disabled set of children.

IDENTIFICATION OF LD CHILDREN FOR PURPOSES OF CLASSIFICATION AND FUNDING




(m = slope of line)

Set A: Slow learners and mild LD, mainstream education
Set B: EMH and moderate LD, low-cost programs
Set C: TMH and severe LD, high-cost programs

Each of sets A, B, and C, can contain at least two subsets:

(i) Children with reduced general academic aptitude achieving at ability level and
(ii) children displaying a discrepancy between measured aptitude and measured achievement.

At this point the existence of a significant discrepancy becomes the factor that determines the children belonging to the learning disability subset. The "particulars" page, tables and work sheets will facilitate the specific calculations.

Particulars Regarding the Application of the L D Discrepancy Criteria

(Note: Children that are designated as High-cost Learning Disabled must be reviewed annually and data must be submitted annually including that for children who have been recognized for the preceding school year.)

The following particulars will be effective from date of mailing until further notice and will supersede previous directives.

1. Academic Aptitude:

(i) Determined by means of the latest revisions of the Stanford-Binet (L-M) or Wechsler-R scales;

(ii) If the Wechsler scale is used, either the Verbal or the Full Scale score may be used. In either case the score that is used must $\geq 85$. Scores must be based on the administration of five subtests of each of the Verbal and Performance Scales.

(iii) Scores used must be derived from tests administered within the last two years.

(iv) A copy of the test profile shall be included with the designation forms.

2. Achievement:

A. General Considerations

(i) Determined by means of the individual adminstration of the latest revisions of the following standardized achievement tests:

a) Peabody Individual Achievement Test (1970);
b) Stanford Diagnostic Reading Test (1978);
c) Wide Range Achievement Test (1978);
d) Woodcock Reading Mastery Test (1973).

(ii) If the Peabody Individual Achievement Test, the Wide Range Achievement Test or the Woodcock Reading Mastery Test are used, the entire battery must be administered and scores must be derived from total test.

(iii) Scores used must be derived from tests administered within six months of designation.

(iv) A copy of the test profile shall be included with the designation forms.

(v) Chronological age of child: When CA is calculated, add one month if 16 or more days remain:

Examples:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Date of admin: | a. | 81 - 6 - 6 | b. | 81 - 6 - 6 | c. | 81 - 6 - 6 |
| Date of birth: | | 73 - 5 - 20 | | 73 - 5 - 6 | | 73 - 5 - 22 |
| | | 8 - 0 - 16 | | 8 - 1 - 0 | | 8 - 0 - 14 |
| CA: | | 8 - 1 | | 8 - 1 | | 8 - 1 |

| Achievement Test | Earliest Administration | | | |
|---|---|---|---|---|
| | 5-8 | 6-8 | 7-8 | 16-0 |
| A. Batteries | | | | |
| Entire battery must be administered and scores must be derived from total test. | | | | |
| 1. Wide Range Achievement Test (WRAT) | | CA=5-8 | | |
| 2. Peabody Individual Achievement Test (PIAT) | | | CA=6-8 | |
| B. Reading Tests | | | | |
| 1. Woodcock Reading Mastery Test (WRMT) | | | | CA=7-8 |
| 2. Stanford Diagnostic Reading Test (May be administered from September 1 to October 31 only for designation purposes). | | | CA=6-8 | |

B. Specific Instructions Concerning Particular Achievement Tests

(i) Wide Range Achievement Test:

- The total test shall be administered.
- The standard scores for the three subtests shall be averaged; this average standard score shall be converted to a percentile. The average Grade Score shall be used for $GE_B$.

Example:

Student age in (12-0) to (12-5) range:

| | Grade Score | Standard Score |
|---|---|---|
| Reading | 4.8 | 83 |
| Spelling | 5.2 | 86 |
| Arithmetic | 4.6 | 81 |
| $GE_B$ = | 4.9 | Average = 83 |

Corresponding percentile = 13

- Figures shall be rounded to the nearest half: Thus, (4.85 - 4.9) becomes 4.9 whereas (4.80 - 4.84) would be 4.8.

(ii) Peabody Individual Achievement Test:

- The total test shall be administered.
- Percentile scores must be derived from Table 18.
- Grade equivalents must be derived from Table 15.
- The test may not be used with children, CA < 6-8.

(iii) Woodcock Reading Mastery Test:

- The test may not be used with children, CA < 7-8.
- The total reading score and the total percentile must be used.
- Percentile scores must be derived from Table III, Total Reading, Page 109. For decelerates use a grade placement equal to child's age minus 5.2 (five years, two months).

- Example:

| | |
|---|---|
| CA = | 8 - 1 |
| minus | 5 - 2 |
| Grade placement = | 2 - 9 |

(NOTE: Assume 10 teaching/learning months in a school year.)

- In establishing the basal and ceiling levels, follow instructions on page 14 of Manual. In calculating the child's raw score, all errors are counted as errors even if two basal ages are established. (Notes from Woodcock speech, April 1979.)

(iv) Stanford Diagnostic Reading Test:

- The test provides only grade scores. It should be used age-grade appropriate assessments only. Alternate tests should be administered to decelerates.
- The test must be administered from September 1 to October 31 due to nature of standardization.

a) Red Level:

- This level shall be used for students in Year/Grade 2 or Year/Grade 3.
- The total Grade Score from Test 4 (Word Recognition) and Test 5 (Reading Comprehension) shall be used for designation.
- (Tests 1, 2, and 3 should be administered for further diagnostic information.)

b) Green Level:

- This level shall be used for students in Year/Grade 4 or Year/Grade 5.
- Test 5 (Comprehension Total) which is based on two subtests (Literal and Inferential Comprehension) shall be used for designation.
- (Tests 1, 2, 3, and 4 should be administered for further diagnostic information.)

c) Brown Level:

- This level should be used for students in Year/Grade 6 and to age sixteen years, zero months.
- Test 2 (Comprehension Total) based on two subtests (Literal and Inferential Comprehension) shall be used for designation.
- (Tests 1, 3, 4, and 5 should be administered for further diagnostic information.)

FORM 102 - 1/9/80

AGE - GRADE EQUIVALENTS: Formula: $GE = \frac{age}{2} - 2$

| | | | |
|---|---|---|---|
| 5 - 8 = 0.9 | - 9 = 2.5 | -10 = 4.0 | -11 = 5.5 |
| - 9 = 1.0 | -10 = 2.5 | -11 = 4.0 | -12 = 5.5 |
| -10 = 1.0 | -11 = 2.5 | -12 = 4.0 | 15 - 1 = 5.6 |
| -11 = 1.0 | -12 = 2.5 | 12 - 1 = 4.1 | - 2 = 5.6 |
| -12 = 1.0 | 9 - 1 = 2.6 | - 2 = 4.1 | - 3 = 5.7 |
| 6 - 1 = 1.1 | - 2 = 2.6 | - 3 = 4.2 | - 4 = 5.7 |
| - 2 = 1.1 | - 3 = 2.7 | - 4 = 4.2 | - 5 = 5.8 |
| - 3 = 1.2 | - 4 = 2.7 | - 5 = 4.3 | - 6 = 5.8 |
| - 4 = 1.2 | - 5 = 2.8 | - 6 = 4.3 | - 7 = 5.9 |
| - 5 = 1.3 | - 6 = 2.8 | - 7 = 4.4 | - 8 = 5.9 |
| - 6 = 1.3 | - 7 = 2.9 | - 8 = 4.4 | - 9 = 6.0 |
| - 7 = 1.4 | - 8 = 2.9 | - 9 = 4.5 | -10 = 6.0 |
| - 8 = 1.4 | - 9 = 3.0 | -10 = 4.5 | -11 = 6.0 |
| - 9 = 1.5 | -10 = 3.0 | -11 = 4.5 | -12 = 6.0 |
| -10 = 1.5 | -11 = 3.0 | -12 = 4.5 | |
| -11 = 1.5 | -12 = 3.0 | 13 - 1 = 4.6 | |
| -12 = 1.5 | 10 - 1 = 3.1 | - 2 = 4.6 | |
| 7 - 1 = 1.6 | - 2 = 3.1 | - 3 = 4.7 | |
| - 2 = 1.6 | - 3 = 3.2 | - 4 = 4.7 | |
| - 3 = 1.7 | - 4 = 3.2 | - 5 = 4.8 | |
| - 4 = 1.7 | - 5 = 3.3 | - 6 = 4.8 | |
| - 5 = 1.8 | - 6 = 3.3 | - 7 = 4.9 | |
| - 6 = 1.8 | - 7 = 3.4 | - 8 = 4.9 | |
| - 7 = 1.9 | - 8 = 3.4 | - 9 = 5.0 | |
| - 8 = 1.9 | - 9 = 3.5 | -10 = 5.0 | |
| - 9 = 2.0 | -10 = 3.5 | -11 = 5.0 | |
| -10 = 2.0 | -11 = 3.5 | -12 = 5.0 | |
| -11 = 2.0 | -12 = 3.5 | 14 - 1 = 5.1 | |
| -12 = 2.0 | 11 - 1 = 3.6 | - 2 = 5.1 | |
| 8 - 1 = 2.1 | - 2 = 3.6 | - 3 = 5.2 | |
| - 2 = 2.1 | - 3 = 3.7 | - 4 = 5.2 | |
| - 3 = 2.2 | - 4 = 3.7 | - 5 = 5.3 | |
| - 4 = 2.2 | - 5 = 3.8 | - 6 = 5.3 | |
| - 5 = 2.3 | - 6 = 3.8 | - 7 = 5.4 | |
| - 6 = 2.3 | - 7 = 3.9 | - 8 = 5.4 | |
| - 7 = 2.4 | - 8 = 3.9 | - 9 = 5.5 | |
| - 8 = 2.4 | - 9 = 4.0 | -10 = 5.5 | |

FORM 103 - 1/9/80

DISCREPANCY TABLES ---LEARNING DISABLED

1. Stanford-Binet IQ; 2. WISC IQ; 3. %ile corresponding to point 1 SD below IQ

| S-B | W | %ile | S-B | W | %ile | S-B | W | %ile |
|---|---|---|---|---|---|---|---|---|
| | 85 | 2 | | 101 | 18 | 117 | | 51 |
| 85 | | 2 | 102 | 102 | 19 | | 116 | 53 |
| | 86 | 2 | 103 | | 20 | 118 | 117 | 55 |
| 86 | 87 | 3 | | 103 | 21 | 119 | 118 | 56 |
| 87 | 88 | 3 | 104 | | 22 | 120 | | 57 |
| 88 | | 3 | | 104 | 23 | 121 | 119 | 61 |
| 89 | 89 | 4 | 105 | | 24 | 122 | 120 | 63 |
| | 90 | 4 | | 105 | 25 | 123 | 121 | 66 |
| 90 | | 5 | 106 | 106 | 27 | 124 | 122 | 68 |
| | 91 | 5 | 107 | | 28 | 125 | 123 | 71 |
| 91 | | 6 | | 107 | 29 | 126 | 124 | 71 |
| 92 | 92 | 6 | 108 | | 30 | 127 | 125 | 74 |
| 93 | 93 | 7 | 109 | 108 | 31 | 128 | 126 | 74 |
| 94 | 94 | 8 | 110 | 109 | 35 | 129 | 127 | 77 |
| 95 | 95 | 9 | 111 | 110 | 37 | 130 | 128 | 77 |
| 96 | 96 | 10 | 112 | 111 | 39 | 131 | 129 | 81 |
| 97 | 97 | 11 | 113 | 112 | 42 | 132 | | 81 |
| 98 | 98 | 13 | 114 | | 43 | 133 | 130 | 81 |
| 99 | 99 | 14 | | 113 | 45 | 134 | 131 | 85 |
| 100 | 100 | 15 | 115 | 114 | 47 | 135 | 132 | 85 |
| 101 | | 17 | 116 | 115 | 49 | 136+ | 133+ | 91 |

Saskatchewan Education

# Special Education
## Designation of Student as Handicapped

99

A. **Education Region Number:** TWO  B. **School Jurisdiction:** Swift Current no. 94

C. **Student's Name:** _____ **School:** _____

| | | | | |
|---|---|---|---|---|
| 1. Date of Designation | 82 | 09 | 09 | = Date of achievement test |
| 2. D.O.B. | 75 | 02 | 05 | |
| 3. Present Age | 7 | 6 | 28 | = 7 years 8 months |

D. **Parent's/Guardian's Name:** _____

**Address:** _____

E. **Handicapped Condition(s):**

(*Check* appropriate box and provide information pertaining to that section)

(a) *Visually Impaired (VI)* ☐

Visual acuity (with correction): Right eye _____ Left eye _____

Source of Information: _____

(b) *Hearing Impaired (HI)* ☐

Hearing loss: Right ear _____ Left ear _____

Source of Information _____

(c) *Trainable Mentally Retarded (TMR)* ☐

Name of Individual IQ Test: _____ Date Administered: _____

Test results (full scale I.Q.): _____

Name of adaptive behaviour scale: _____ Date Administered: _____

Test results (social age score): _____

(d) *Severe Learning Disabled (L.D.)* (Attach Test Profiles) ☑

(i) IQ $\leqq$ 85 Date Administered: 82-09-09

(ii) Discrepancy:

(1) IQ = 100 %ile corresponding to point 1 s.d. below IQ (See Form 103) = X = 15:

(2) Achievement score: $GE_B$ = 1.1: Date Administered: 82-09-09

%ile corresponding to $GE_B$ = Y = 4:

X - Y = 15 − 4 = 11 (zero or positive value):

(iii) Rate of progress: Grade equivalent $\geqq$ grade equivalent corresponding to half the rate of average student:

$GE_A = \frac{\text{Age (in months)}}{2} - 2$ = (See Form 102)

$GE_A - GE_B$ = 1.9 − 1.1 = .8 (zero or positive value)

# WISC-R RECORD FORM

Wechsler Intelligence Scale for Children—Revised

ADDRESS 100

PARENT'S NAME

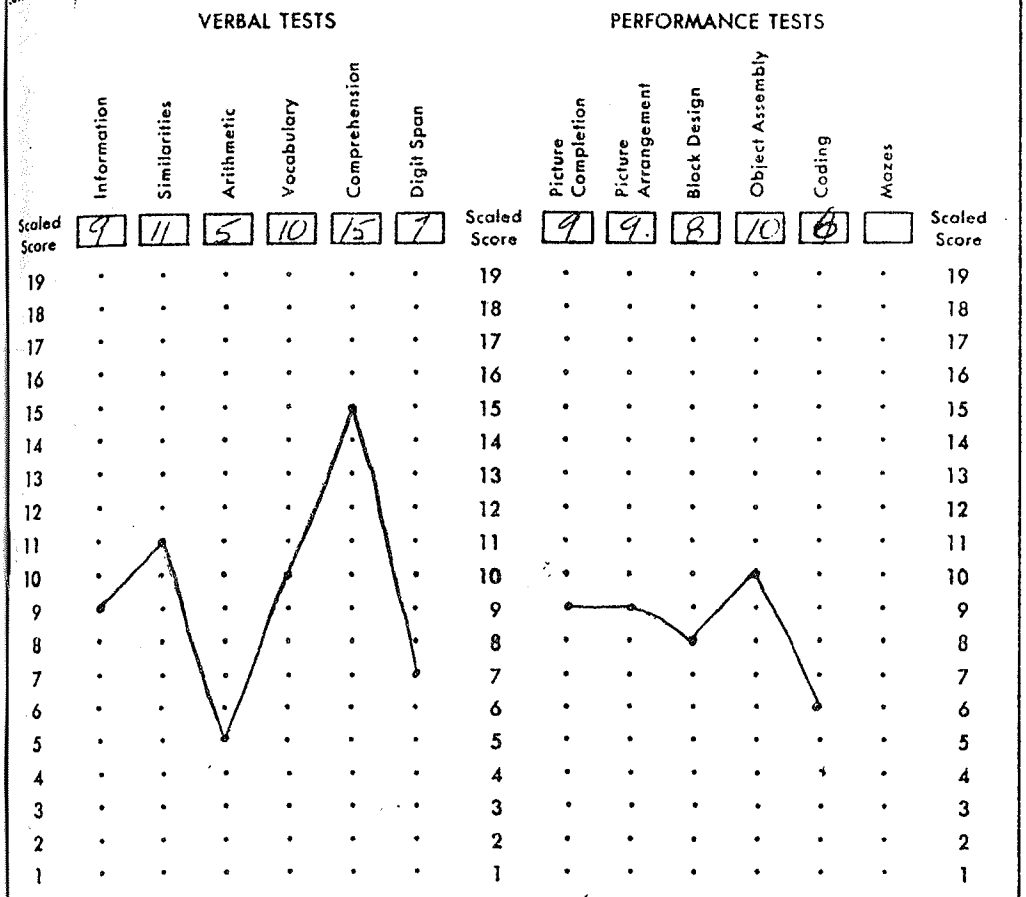
SCHOOL GRADE

PLACE OF TESTING TESTED BY P. Brososky

REFERRED BY

## WISC-R PROFILE

Clinicians who wish to draw a profile should first transfer the child's *scaled scores* to the row of boxes below. Then mark an X on the dot corresponding to the scaled score for each test, and draw a line connecting the X's.*




*See Chapter 4 in the manual for a discussion of the significance of differences between scores on the tests.

| | Year | Month | Day |
|---|---|---|---|
| Date Tested | 82 | 9 | 9 |
| Date of Birth | 75 | 2 | 12 |
| Age | 7 | 6 | 20 |

| | Raw Score | Scaled Score |
|---|---|---|
| **VERBAL TESTS** | | |
| Information | 7 | 9 |
| Similarities | 9 | 11 |
| Arithmetic | 5 | 5 |
| Vocabulary | 20 | 10 |
| Comprehension | 16 | 15 |
| (Digit Span) | (6) | (7) |
| Verbal Score | | 50 |
| **PERFORMANCE TESTS** | | |
| Picture Completion | 12 | 9 |
| Picture Arrangement | 13 | 9 |
| Block Design | 6 | 8 |
| Object Assembly | 15 | 10 |
| Coding | 26 | 6 |
| (Mazes) | ( ) | ( ) |
| Performance Score | | 42 |

| | Scaled Score | IQ |
|---|---|---|
| Verbal Score | 50 | 100 |
| Performance Score | 42 | 88 |
| Full Scale Score | 92 | 92 |

*Prorated from 4 tests, if necessary.

NOTES



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74-103AS 9-990334

# Stanford Diagnostic Reading Test

**Red Level** **Form B**

101

| | TEST 2 | TEST 3 | TEST 1 | TEST 4 | TEST 5 | TESTS 4 + 5 |
|---|---|---|---|---|---|---|
| | Auditory Discrimination | Phonetic Analysis (Parts A + B) | Auditory Vocabulary | Word Reading | Reading Comprehension (Parts A + B) | Comprehension Total |
| Raw Score | | | | 10 K | 14 K | 24 1.1 |
| STANINE | 9 | 9 | 9 | 5%ile 9 | 8%ile 9 | 4%ile 9 |
| | 8 | 8 | 8 | 8 | 8 | 8 |
| | 7 | 7 | 7 | 7 | 7 | 7 |
| | 6 | 6 | 6 | 6 | 6 | 6 |
| | 5 | 5 | 5 | 5 | 5 | 5 |
| | 4 | 4 | 4 | 4 | 4 | 4 |
| | 3 | 3 | 3 | 3 | 3 | 3 |
| | 2 | 2 | 2 | (2) | (2) | (2) |
| | 1 | 1 | 1 | 1 | 1 | 1 |

Pupil Information Box

Name

Teacher Grade 1 (2nd year)

Schoc

City Swift Current State Sask.

Today's Date Sept. (month) 9 (day) 1982 (year)

Date of Birth Feb. (month) 12 (day) 1975 (year)

C.A. 7-7

WISC-R Verb. 100

F.S. 92



7 8 9 10 11 12 BCDE

CORRELATION OF STANFORD WITH C.T.B.S 17:13 WEDNESDAY, JUNE 1, 1983 1

TYPE=C.T.B.S REFERRED (L.D.)

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 8

| | V_VOCB | R_COMP | L_SPEL | L_CAPS | L_PNCT | L_USGE | L_TOTL | W_MAPS | W_GRAF | W_REFN | W_TOTL | M_CONCP | M_PROB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SDRT | -0.08877 | 0.36377 | 0.04134 | 0.41205 | 0.04984 | -0.11316 | 0.08029 | 0.05865 | -0.30271 | 0.05295 | -0.07924 | 0.03352 | -0.17530 |
| STANFORD | 0.8344 | 0.3757 | 0.9226 | 0.3104 | 0.9067 | 0.7896 | 0.8501 | 0.8903 | 0.4661 | 0.9009 | 0.8520 | 0.9372 | 0.6780 |

| | M_TOTL | COMPST |
|---|---|---|
| SDRT | -0.06706 | 0.03497 |
| STANFORD | 0.8746 | 0.9345 |

CORRELATION OF STANFORD WITH C.T.B.S 17:13 WEDNESDAY, JUNE 1, 1983 2

TYPE=C.T.B.S REFERRED (NON L.D.)

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 23

| | V_VOCB | R_COMP | L_SPEL | L_CAPS | L_PNCT | L_USGE | L_TOTL | W_MAPS | W_GRAF | W_REFN | W_TOTL | M_CONCP | M_PROB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SDRT | 0.73562 | 0.81616 | 0.79951 | 0.73952 | 0.71979 | 0.47557 | 0.76598 | 0.72206 | 0.49800 | 0.83231 | 0.81583 | 0.75432 | 0.64526 |
| STANFORD | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0218 | 0.0001 | 0.0001 | 0.0156 | 0.0001 | 0.0001 | 0.0001 | 0.0009 |

| | M_TOTL | COMPST |
|---|---|---|
| [illegible] | [illegible] | 0.65570 |

TYPE=TEACHER REFERRED (L.D.)

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 17

| | V_VOCB | R_COMP | L_SPEL | L_CAPS | L_PNCT | L_USGE | L_TOTL | W_MAPS | W_GRAF | W_REEN | W_TOTL | M_CONCP | M_PROB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SORT | 0.38308 | 0.70353 | 0.13698 | 0.45241 | -0.06664 | 0.20592 | 0.22159 | 0.44718 | 0.25865 | 0.39530 | 0.39276 | 0.42610 | 0.23369 |
| STANFORD | 0.1291 | 0.0016 | 0.6001 | 0.0682 | 0.7994 | 0.4278 | 0.3927 | 0.0719 | 0.3162 | 0.1163 | 0.1189 | 0.0881 | 0.3667 |

| | M_TOTL | COMPST |
|---|---|---|
| SORT | 0.33784 | 0.46796 |
| STANFORD | 0.1848 | 0.0582 |



TYPE=TEACHER REFERRED (NON L.D.)

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 18

| | V_VOCB | R_COMP | L_SPEL | L_CAPS | L_PNCT | L_USGE | L_TOTL | W_MAPS | W_GRAF | W_REEN | W_TOTL | M_CONCP | M_PROB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SORT | 0.51231 | 0.57249 | 0.55343 | 0.46619 | 0.56757 | 0.52177 | 0.63952 | 0.56137 | 0.67701 | 0.69144 | 0.69334 | 0.73245 | 0.63999 |
| STANFORD | 0.0297 | 0.0130 | 0.0172 | 0.0512 | 0.0140 | 0.0264 | 0.0043 | 0.0153 | 0.0020 | 0.0015 | 0.0014 | 0.0005 | 0.0042 |

| | M_TOTL | COMPST |
|---|---|---|
| SORT | 0.72301 | 0.67385 |
| STANFORD | 0.0007 | 0.0022 |

TYPE=TEACHER REFERRED (L.D.)

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 25

| | V_VOCB | R_COMP | L_SPEL | L_CAPS | L_PNCT | L_USGE | L_TOTL | W_MAPS | W_GRAF | W_REFN | W_TOTL | M_CONCP | M_PROB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WD1 | 0.41290 | 0.31529 | 0.03664 | 0.07476 | 0.21347 | 0.39631 | 0.21135 | 0.49324 | 0.44993 | 0.38047 | 0.51822 | 0.34690 | 0.55794 |
| LETTER ID | 0.0402 | 0.1247 | 0.8620 | 0.7225 | 0.3056 | 0.0498 | 0.3105 | 0.0122 | 0.0240 | 0.0606 | 0.0080 | 0.0893 | 0.0038 |
| WD2 | 0.62243 | 0.73969 | 0.18325 | 0.47417 | 0.34219 | 0.77746 | 0.54191 | 0.62603 | 0.38782 | 0.48726 | 0.58512 | 0.49630 | 0.35675 |
| WORD ID | 0.0009 | 0.0001 | 0.3806 | 0.0166 | 0.0941 | 0.0001 | 0.0052 | 0.0008 | 0.0554 | 0.0135 | 0.0021 | 0.0116 | 0.0800 |
| WD3 | 0.21106 | 0.35753 | -0.16651 | 0.16390 | 0.10405 | 0.40659 | 0.13926 | 0.20195 | 0.03607 | 0.26219 | 0.19906 | 0.05914 | 0.08354 |
| WORD ATT | 0.3112 | 0.0793 | 0.4263 | 0.4337 | 0.6206 | 0.0437 | 0.5068 | 0.3330 | 0.8641 | 0.2055 | 0.3401 | 0.7788 | 0.6914 |
| WD4 | 0.28788 | 0.36928 | -0.18874 | 0.39486 | 0.46425 | 0.37932 | 0.33253 | 0.35233 | -0.11982 | 0.33318 | 0.21957 | 0.35313 | 0.15493 |
| WORD COMP | 0.1629 | 0.0693 | 0.3662 | 0.0508 | 0.0194 | 0.0615 | 0.1044 | 0.0841 | 0.5683 | 0.1036 | 0.2916 | 0.0834 | 0.4596 |
| WD5 | 0.48697 | 0.59614 | 0.17260 | 0.16304 | 0.18510 | 0.54517 | 0.31356 | 0.45381 | 0.50344 | 0.28592 | 0.49034 | 0.41296 | 0.26602 |
| PASS COMP | 0.0136 | 0.0017 | 0.4094 | 0.4362 | 0.3757 | 0.0048 | 0.1269 | 0.0227 | 0.0103 | 0.1659 | 0.0128 | 0.0402 | 0.1987 |
| WD6 | 0.61667 | 0.70543 | 0.03336 | 0.44980 | 0.44049 | 0.77592 | 0.51370 | 0.62288 | 0.37366 | 0.53382 | 0.59912 | 0.50524 | 0.40753 |
| WDCK TOTAL | 0.0010 | 0.0001 | 0.8742 | 0.0241 | 0.0275 | 0.0001 | 0.0086 | 0.0009 | 0.0658 | 0.0060 | 0.0016 | 0.0100 | 0.0432 |

| | M_TOTL | COMPST |
|---|---|---|
| WD1 | 0.49500 | 0.45640 |
| LETTER ID | 0.0119 | 0.0218 |
| WD2 | 0.47356 | 0.67363 |
| WORD ID | 0.0168 | 0.0002 |
| WD3 | 0.08216 | 0.21552 |
| WORD ATT | 0.6962 | 0.3008 |
| WD4 | 0.27554 | 0.33629 |
| WORD COMP | 0.1825 | 0.1002 |
| WD5 | 0.38160 | 0.51855 |
| PASS COMP | 0.0598 | 0.0079 |
| WD6 | 0.50620 | 0.66997 |
| WDCK TOTAL | 0.0098 | 0.0002 |

TYPE=TEACHER REFERRED (NON L.D.)

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 21

| | V_VOCB | R_COMP | L_SPEL | L_CAPS | L_PNCT | L_USGE | L_TOTL | W_MAPS | W_GRAF | W_REEN | W_TOTL | M_CONCP | M_PROB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WD1 | 0.24054 | 0.01889 | 0.49234 | 0.11837 | 0.06511 | -0.06217 | 0.20811 | 0.03145 | 0.18481 | 0.18710 | 0.14880 | 0.20154 | -0.01305 |
| LETTER ID | 0.2936 | 0.9352 | 0.0234 | 0.6093 | 0.7792 | 0.7889 | 0.3653 | 0.8923 | 0.4226 | 0.4167 | 0.5198 | 0.3810 | 0.9552 |
| WD2 | 0.48645 | 0.57000 | 0.46867 | 0.39900 | 0.23395 | 0.39618 | 0.53803 | 0.43894 | 0.35143 | 0.56077 | 0.50455 | 0.40650 | 0.27393 |
| WORD ID | 0.0253 | 0.0070 | 0.0321 | 0.0732 | 0.3074 | 0.0754 | 0.0119 | 0.0465 | 0.1183 | 0.0082 | 0.0197 | 0.0675 | 0.2295 |
| WD3 | 0.34055 | 0.37449 | 0.52650 | 0.37110 | 0.24014 | 0.31117 | 0.51513 | 0.22717 | 0.27012 | 0.30636 | 0.30023 | 0.28146 | 0.15927 |
| WORD ATT | 0.1309 | 0.0944 | 0.0142 | 0.0977 | 0.2944 | 0.1697 | 0.0169 | 0.3220 | 0.2363 | 0.1768 | 0.1861 | 0.2165 | 0.4905 |
| WD4 | 0.57364 | 0.45072 | 0.07536 | 0.27799 | -0.14755 | 0.41562 | 0.21869 | 0.53042 | 0.49759 | 0.34839 | 0.54673 | 0.58393 | 0.38809 |
| WORD COMP | 0.0066 | 0.0403 | 0.7454 | 0.2224 | 0.5233 | 0.0610 | 0.3409 | 0.0134 | 0.0217 | 0.1217 | 0.0103 | 0.0054 | 0.0821 |
| WD5 | 0.24800 | 0.63457 | 0.11491 | 0.50302 | 0.32679 | 0.40669 | 0.50032 | 0.52391 | 0.50288 | 0.51393 | 0.59180 | 0.56533 | 0.34716 |
| PASS COMP | 0.2784 | 0.0020 | 0.6199 | 0.0201 | 0.1482 | 0.0673 | 0.0209 | 0.0148 | 0.0201 | 0.0172 | 0.0047 | 0.0076 | 0.1231 |
| WD6 | 0.38617 | 0.50487 | 0.28479 | 0.52248 | 0.23112 | 0.36205 | 0.50503 | 0.48167 | 0.53507 | 0.45158 | 0.56857 | 0.56089 | 0.29169 |
| WDCK TOTAL | 0.0838 | 0.0196 | 0.2108 | 0.0151 | 0.3135 | 0.1068 | 0.0195 | 0.0270 | 0.0124 | 0.0399 | 0.0072 | 0.0082 | 0.1995 |

| | M_TOTL | COMPST |
|---|---|---|
| WD1 | 0.10376 | 0.15962 |
| LETTER ID | 0.6544 | 0.4895 |
| WD2 | 0.34786 | 0.59905 |
| WORD ID | 0.1223 | 0.0041 |
| WD3 | 0.22667 | 0.41768 |
| WORD ATT | 0.3231 | 0.0596 |
| WD4 | 0.51855 | 0.58585 |
| WORD COMP | 0.0160 | 0.0053 |
| WD5 | 0.47338 | 0.60733 |
| PASS COMP | 0.0302 | 0.0035 |
| WD6 | 0.44753 | 0.59112 |
| WDCK TOTAL | 0.0419 | 0.0048 |

CORRELATION OF WOODCOCK WITH C.T.B.S 16:41 WEDNESDAY, JUNE 1, 1983 1

TYPE=C.T.B.S PREFERRED (L.O.)

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 10

| | V_VOCB | R_COMP | L_SPEL | L_CAPS | L_PNCT | L_USGE | L_TOTL | W_MAPS | W_GRAF | W_REFN | W_TOTL | M_CONCP | M_PROB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WD1 | 0.39716 | 0.14835 | 0.08913 | 0.45780 | 0.31065 | 0.42060 | 0.36382 | 0.51657 | 0.20643 | 0.70131 | 0.57759 | 0.51507 | 0.72681 |
| LETTER ID | 0.2558 | 0.6825 | 0.8066 | 0.1834 | 0.3823 | 0.2262 | 0.3014 | 0.1263 | 0.5672 | 0.0238 | 0.0804 | 0.1276 | 0.0173 |
| WD2 | 0.63961 | 0.48545 | 0.01150 | 0.35876 | 0.30854 | 0.83454 | 0.39912 | 0.71332 | 0.58457 | 0.20575 | 0.63032 | 0.66227 | 0.16375 |
| WORD ID | 0.0464 | 0.1549 | 0.9748 | 0.3087 | 0.3857 | 0.0027 | 0.2532 | 0.0205 | 0.0759 | 0.5685 | 0.0508 | 0.0369 | 0.6512 |
| WD3 | -0.00760 | 0.09851 | -0.46758 | -0.27586 | -0.12821 | 0.29902 | -0.23795 | 0.09689 | 0.06125 | 0.12308 | 0.11915 | -0.22565 | -0.09900 |
| WORD ATT | 0.9834 | 0.7866 | 0.1730 | 0.4404 | 0.7241 | 0.4013 | 0.5080 | 0.7900 | 0.8665 | 0.7348 | 0.7430 | 0.5308 | 0.7855 |
| WD4 | -0.07434 | 0.27978 | -0.40210 | 0.31081 | 0.41701 | 0.12206 | 0.09322 | 0.30647 | -0.16566 | 0.29263 | 0.17937 | 0.12231 | 0.16964 |
| WORD COMP | 0.8383 | 0.4337 | 0.2494 | 0.3821 | 0.2306 | 0.7369 | 0.7978 | 0.3891 | 0.6474 | 0.4119 | 0.6200 | 0.7364 | 0.6394 |
| WD5 | 0.07542 | 0.37354 | -0.18899 | -0.08247 | 0.06434 | 0.32886 | -0.00967 | 0.14049 | 0.37323 | -0.05009 | 0.18871 | -0.05398 | -0.29206 |
| PASS COMP | 0.8359 | 0.2877 | 0.6010 | 0.8208 | 0.8598 | 0.3535 | 0.9789 | 0.6987 | 0.2881 | 0.8907 | 0.6016 | 0.8823 | 0.4129 |
| WD6 | 0.05478 | 0.29923 | -0.37380 | 0.04075 | 0.14013 | 0.41495 | 0.00245 | 0.32714 | 0.24408 | 0.26640 | 0.34200 | 0.03982 | 0.01946 |
| WDCK TOTAL | 0.8805 | 0.4010 | 0.2873 | 0.9110 | 0.6994 | 0.2331 | 0.9946 | 0.3562 | 0.4968 | 0.4569 | 0.3334 | 0.9130 | 0.9575 |

| | M_TOTL | COMPST |
|---|---|---|
| WD1 | 0.68020 | 0.49649 |
| LETTER ID | 0.0304 | 0.1444 |
| WD2 | 0.51523 | 0.60655 |
| WORD ID | 0.1275 | 0.0630 |
| WD3 | -0.17486 | -0.06298 |
| WORD ATT | 0.6290 | 0.8628 |
| WD4 | 0.14921 | 0.14446 |
| WORD COMP | 0.6808 | 0.6905 |
| WD5 | -0.17513 | 0.09643 |
| PASS COMP | 0.6284 | 0.7910 |
| WD6 | 0.03886 | 0.16009 |
| WDCK TOTAL | 0.9151 | 0.6586 |

CORRELATION OF WOODCOCK WITH C.T.B.S 16:41 WEDNESDAY, JUNE 1, 1983

TYPE=C.T.B.S REFERRED (NON L.D.)

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 22

| | V_VOCB | R_COMP | L_SPEL | L_CAPS | L_PNCT | L_USGE | L_TOTL | W_MAPS | W_GRAF | W_REFN | W_TOTL | M_CONCP | M_PROB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WD1 | 0.25810 | -0.02537 | 0.46391 | 0.04830 | 0.26681 | 0.03009 | 0.22344 | 0.05452 | 0.07942 | 0.34110 | 0.17467 | 0.21890 | 0.15372 |
| LETTER ID | 0.2462 | 0.9108 | 0.0296 | 0.8310 | 0.2300 | 0.8943 | 0.3175 | 0.8096 | 0.7254 | 0.1203 | 0.4369 | 0.3277 | 0.4946 |
| WD2 | 0.71758 | 0.55701 | 0.59028 | 0.28104 | 0.26894 | 0.40969 | 0.47549 | 0.34095 | 0.34571 | 0.50907 | 0.44899 | 0.43371 | 0.35808 |
| WORD ID | 0.0002 | 0.0071 | 0.0038 | 0.2052 | 0.2262 | 0.0583 | 0.0253 | 0.1205 | 0.1150 | 0.0155 | 0.0361 | 0.0437 | 0.1018 |
| WD3 | 0.20945 | 0.04685 | 0.32902 | -0.12585 | -0.11227 | -0.04461 | 0.00133 | -0.10578 | -0.17776 | 0.07561 | -0.07860 | -0.02377 | 0.03161 |
| WORD ATT | 0.3495 | 0.8360 | 0.1349 | 0.5768 | 0.6189 | 0.8437 | 0.9953 | 0.6394 | 0.4287 | 0.7381 | 0.7281 | 0.9164 | 0.8889 |
| WD4 | 0.58065 | 0.53991 | 0.39560 | 0.50639 | 0.28340 | 0.45183 | 0.49309 | 0.46463 | 0.64893 | 0.53429 | 0.61855 | 0.50921 | 0.38284 |
| WORD COMP | 0.0046 | 0.0095 | 0.0684 | 0.0162 | 0.2012 | 0.0348 | 0.0197 | 0.0294 | 0.0011 | 0.0104 | 0.0022 | 0.0155 | 0.0786 |
| WD5 | 0.69899 | 0.72410 | 0.19752 | 0.45605 | 0.24421 | 0.50040 | 0.43979 | 0.51867 | 0.47061 | 0.55501 | 0.58566 | 0.61040 | 0.55772 |
| PASS COMP | 0.0003 | 0.0001 | 0.3783 | 0.0329 | 0.2734 | 0.0177 | 0.0405 | 0.0134 | 0.0271 | 0.0073 | 0.0042 | 0.0026 | 0.0070 |
| WD6 | 0.73997 | 0.59490 | 0.51703 | 0.39584 | 0.27147 | 0.43262 | 0.49103 | 0.39854 | 0.46549 | 0.60476 | 0.55106 | 0.57625 | 0.44305 |
| WDCK TOTAL | 0.0001 | 0.0035 | 0.0137 | 0.0682 | 0.2217 | 0.0443 | 0.0203 | 0.0662 | 0.0290 | 0.0029 | 0.0079 | 0.0050 | 0.0389 |

| | M_TOTL | COMPST |
|---|---|---|
| WD1 | 0.19755 | 0.17458 |
| LETTER ID | 0.3782 | 0.4371 |
| WD2 | 0.41260 | 0.57913 |
| WORD ID | 0.0564 | 0.0047 |
| WD3 | -0.00885 | 0.03464 |
| WORD ATT | 0.9688 | 0.8784 |
| WD4 | 0.48388 | 0.60918 |
| WORD COMP | 0.0225 | 0.0026 |
| WD5 | 0.61125 | 0.68137 |
| PASS COMP | 0.0025 | 0.0005 |
| WD6 | 0.53405 | 0.64633 |
| WDCK TOTAL | 0.0105 | 0.0012 |

Appendix C

## WISC-R Lowest Subtest Scale Scores

| Subtest Scores | CTBS Referred | | | | Teacher Referred | | | |
|---|---|---|---|---|---|---|---|---|
| | L.D. | | Not L.D. | | L.D. | | Not L.D. | |
| Stanford Samples | Coding | 7.625 | Arithmetic | 7.0 | Coding | 7.647 | Digit Span | 7.143 |
| | Digit Span | 9.000 | Digit Span | 7.167 | Digit Span | 7.700 | Arithmetic | 7.556 |
| | Information | 9.125 | Information | 7.522 | Information | 9.294 | Information | 7.944 |
| | Block Design | 9.875 | P. Arrangement | 8.043 | Arithmetic | 9.765 | Coding | 8.667 |
| Woodcock Sample | Digit Span | 6.714 | Digit Span | 6.882 | Digit Span | 6.889 | Arithmetic | 7.571 |
| | Information | 6.800 | Information | 7.273 | Arithmetic | 8.200 | Digit Span | 7.647 |
| | Arithmetic | 7.900 | Arithmetic | 7.727 | Information | 8.480 | Information | 8.190 |
| | Similarities | 9.100 | Similarities | 8.455 | Coding | 9.400 | Similarities | 8.714 |

## WISC-R Lowest To Highest I.Q. Scores

| I.Q. Scores | CTBS Referred | | | | Teacher Referred | | | |
|---|---|---|---|---|---|---|---|---|
| | L.D. | | Not L.D. | | L.D. | | Not L.D. | |
| Stanford Samples | Verbal | 103 | Full Scale | 89 | Verbal | 101 | Verbal | 90 |
| | Performance | 103 | Verbal | 90 | Full Scale | 102 | Full Scale | 91 |
| | Full Scale | 103 | Performance | 90 | Performance | 103 | Performance | 95 |
| Woodcock Samples | Verbal | 91 | Verbal | 90 | Verbal | 96 | Verbal | 92 |
| | Full Scale | 95 | Full Scale | 91 | Full Scale | 100 | Full Scale | 92 |
| | Performance | 101 | Performance | 93 | Performance | 106 | Performance | 95 |

Table E1 DESCRIPTIVE STATISTICS FOR WISC-R(WOODCOCK)

| VARIABLE | N | MINIMUM VALUE | MAXIMUM VALUE | RANGE | MEAN | STD ERROR OF MEAN | STANDARD DEVIATION | VARIANCE | C.V. |
|---|---|---|---|---|---|---|---|---|---|
| TYPE=C.T.B.S REFERRED (L.D.) | | | | | | | | | |
| VERBL | 10 | 78.00000 | 103.00000 | 25.00000 | 90.70000 | 2.37136 | 7.49889 | 56.23333 | 8.268 |
| PERFRM | 10 | 88.00000 | 114.00000 | 26.00000 | 101.10000 | 2.83804 | 8.97466 | 80.54444 | 8.877 |
| FSCALE | 10 | 84.00000 | 106.00000 | 22.00000 | 95.00000 | 2.15510 | 6.81502 | 46.44444 | 7.174 |
| INFO | 10 | 4.00000 | 11.00000 | 7.00000 | 6.80000 | 0.64636 | 2.04396 | 4.17778 | 30.058 |
| SIMIL | 10 | 7.00000 | 11.00000 | 4.00000 | 9.10000 | 0.40689 | 1.28668 | 1.65556 | 14.139 |
| ARITH | 10 | 4.00000 | 11.00000 | 7.00000 | 7.90000 | 0.70632 | 2.23358 | 4.98889 | 28.273 |
| VOCAB | 10 | 7.00000 | 11.00000 | 4.00000 | 9.20000 | 0.41633 | 1.31656 | 1.73333 | 14.310 |
| COMP | 10 | 6.00000 | 12.00000 | 6.00000 | 9.70000 | 0.57831 | 1.82878 | 3.34444 | 18.852 |
| DIGTS | 7 | 5.00000 | 10.00000 | 5.00000 | 6.71429 | 0.74688 | 1.97605 | 3.90476 | 29.430 |
| PCOMP | 10 | 8.00000 | 15.00000 | 7.00000 | 10.90000 | 0.56667 | 1.79196 | 3.21111 | 16.440 |
| PARRAN | 10 | 2.00000 | 15.00000 | 13.00000 | 9.30000 | 1.22066 | 3.86005 | 14.90000 | 41.506 |
| BLOCKD | 10 | 7.00000 | 13.00000 | 6.00000 | 10.10000 | 0.65744 | 2.07900 | 4.32222 | 20.584 |
| OBJCTA | 10 | 6.00000 | 15.00000 | 9.00000 | 11.80000 | 0.84063 | 2.65832 | 7.06667 | 22.528 |
| CODING | 10 | 6.00000 | 12.00000 | 6.00000 | 9.20000 | 0.66332 | 2.09762 | 4.40000 | 22.800 |
| TYPE=C.T.B.S REFERRED (NON L.D.) | | | | | | | | | |
| VERBL | 22 | 67.00000 | 109.00000 | 42.00000 | 90.13636 | 1.62008 | 7.59884 | 57.74242 | 8.430 |
| PERFRM | 22 | 68.00000 | 128.00000 | 60.00000 | 93.36364 | 3.32285 | 15.58554 | 242.90909 | 16.693 |
| FSCALE | 22 | 65.00000 | 109.00000 | 44.00000 | 90.68182 | 2.19344 | 10.28816 | 105.84632 | 11.345 |
| INFO | 22 | 1.00000 | 13.00000 | 12.00000 | 7.27273 | 0.50616 | 2.37410 | 5.63636 | 32.644 |
| SIMIL | 22 | 1.00000 | 12.00000 | 11.00000 | 8.45455 | 0.49555 | 2.32435 | 5.40260 | 27.492 |
| ARITH | 22 | 4.00000 | 12.00000 | 8.00000 | 7.72727 | 0.44713 | 2.09720 | 4.39827 | 27.140 |
| VOCAB | 22 | 7.00000 | 16.00000 | 9.00000 | 9.36364 | 0.41895 | 1.96506 | 3.86147 | 20.986 |
| COMP | 22 | 5.00000 | 13.00000 | 8.00000 | 9.31818 | 0.47165 | 2.21222 | 4.89394 | 23.741 |
| DIGTS | 17 | 3.00000 | 10.00000 | 7.00000 | 6.88235 | 0.47653 | 1.96476 | 3.86029 | 28.548 |
| PCOMP | 22 | 6.00000 | 14.00000 | 8.00000 | 9.86364 | 0.47580 | 2.23171 | 4.98052 | 22.626 |
| PARRAN | 22 | 3.00000 | 14.00000 | 11.00000 | 8.81818 | 0.68892 | 3.23134 | 10.44156 | 36.644 |
| BLOCKD | 22 | 1.00000 | 15.00000 | 14.00000 | 8.63636 | 0.79104 | 3.71029 | 13.76623 | 42.961 |
| OBJCTA | 22 | 2.00000 | 17.00000 | 15.00000 | 9.22727 | 0.75573 | 3.54471 | 12.56494 | 38.416 |
| CODING | 22 | 3.00000 | 14.00000 | 11.00000 | 8.59091 | 0.64351 | 3.01834 | 9.11039 | 35.134 |

Table E1 continued

TYPE = TEACHER REFERRED (L.D.)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| VERBL | 25 | 78.00000 | 109.00000 | 31.00000 | 95.68000 | 1.42679 | 7.13396 | 50.89333 | 7.45 |
| PERFRM | 25 | 88.00000 | 126.00000 | 38.00000 | 106.20000 | 2.15484 | 10.77420 | 116.08333 | 10.145 |
| FSCALE | 25 | 89.00000 | 113.00000 | 24.00000 | 100.28000 | 1.55726 | 7.78631 | 60.62667 | 7.765 |
| INFO | 25 | 3.00000 | 12.00000 | 9.00000 | 8.48000 | 0.53579 | 2.67893 | 7.17667 | 31.591 |
| SIMIL | 25 | 6.00000 | 14.00000 | 8.00000 | 9.52000 | 0.34215 | 1.71075 | 2.92667 | 17.970 |
| ARITH | 25 | 4.00000 | 12.00000 | 8.00000 | 8.20000 | 0.44347 | 2.21736 | 4.91667 | 27.041 |
| VOCAB | 25 | 7.00000 | 12.00000 | 5.00000 | 9.72000 | 0.27398 | 1.36991 | 1.87667 | 14.094 |
| COMP | 25 | 6.00000 | 15.00000 | 9.00000 | 10.80000 | 0.38730 | 1.93649 | 3.75000 | 17.930 |
| DIGTS | 18 | 5.00000 | 10.00000 | 5.00000 | 6.88889 | 0.35136 | 1.49071 | 2.22222 | 21.639 |
| PCOMP | 25 | 8.00000 | 17.00000 | 9.00000 | 11.60000 | 0.44347 | 2.21736 | 4.91667 | 19.115 |
| PARRAN | 25 | 2.00000 | 16.00000 | 14.00000 | 11.84000 | 0.75428 | 3.77138 | 14.22333 | 31.853 |
| BLOCKD | 25 | 7.00000 | 15.00000 | 8.00000 | 10.80000 | 0.43205 | 2.16025 | 4.66667 | 20.002 |
| OBJCTA | 25 | 6.00000 | 15.00000 | 9.00000 | 12.36000 | 0.46861 | 2.34307 | 5.49000 | 18.957 |
| CODING | 25 | 5.00000 | 15.00000 | 10.00000 | 9.40000 | 0.46188 | 2.30940 | 5.33333 | 24.568 |

TYPE=TEACHER REFERRED (NON L.D.)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| VERBL | 21 | 79.00000 | 108.00000 | 29.00000 | 91.71429 | 1.78371 | 8.17400 | 66.81429 | 8.912 |
| PERFRM | 21 | 69.00000 | 128.00000 | 59.00000 | 94.90476 | 3.10599 | 14.23343 | 202.59048 | 14.998 |
| FSCALE | 21 | 80.00000 | 109.00000 | 29.00000 | 92.47619 | 2.12202 | 9.72429 | 94.56190 | 10.515 |
| INFO | 21 | 4.00000 | 12.00000 | 8.00000 | 8.19048 | 0.34928 | 1.60060 | 2.56190 | 19.542 |
| SIMIL | 21 | 6.00000 | 12.00000 | 6.00000 | 8.71429 | 0.43173 | 1.97846 | 3.91429 | 22.704 |
| ARITH | 21 | 4.00000 | 12.00000 | 8.00000 | 7.57143 | 0.57143 | 2.61861 | 6.85714 | 34.585 |
| VOCAB | 21 | 7.00000 | 12.00000 | 5.00000 | 9.71429 | 0.30192 | 1.38358 | 1.91429 | 14.243 |
| COMP | 21 | 5.00000 | 12.00000 | 7.00000 | 9.33333 | 0.41019 | 1.87972 | 3.53333 | 20.140 |
| DIGTS | 17 | 4.00000 | 12.00000 | 8.00000 | 7.64706 | 0.53510 | 2.20627 | 4.86765 | 28.851 |
| PCOMP | 21 | 6.00000 | 16.00000 | 10.00000 | 9.85714 | 0.48934 | 2.24245 | 5.02857 | 22.749 |
| PARRAN | 21 | 4.00000 | 14.00000 | 10.00000 | 9.42857 | 0.64576 | 2.95925 | 8.75714 | 31.386 |
| BLOCKD | 21 | 1.00000 | 15.00000 | 14.00000 | 8.76190 | 0.86439 | 3.96112 | 15.69048 | 45.208 |
| OBJCTA | 21 | 2.00000 | 15.00000 | 13.00000 | 9.38095 | 0.69171 | 3.16980 | 10.04762 | 33.790 |
| CODING | 21 | 3.00000 | 14.00000 | 11.00000 | 9.04762 | 0.73833 | 3.38343 | 11.44762 | 37.396 |

Table E2 DESCRIPTIVE STATISTICS FOR WISC-R(STANFORD)

| VARIABLE | N | MINIMUM VALUE | MAXIMUM VALUE | RANGE | MEAN | STD ERROR OF MEAN | STANDARD DEVIATION | VARIANCE | C.V. |
|---|---|---|---|---|---|---|---|---|---|
| TYPE=C.T.B.S REFERRED (L.D.) | | | | | | | | | |
| VERBL | 8 | 90.00000 | 123.00000 | 33.00000 | 102.75000 | 3.62900 | 10.26436 | 105.35714 | 9.990 |
| PERFRM | 8 | 83.00000 | 120.00000 | 37.00000 | 102.75000 | 4.39460 | 12.42980 | 154.50000 | 12.097 |
| FSCALE | 8 | 91.00000 | 117.00000 | 26.00000 | 103.12500 | 3.40398 | 9.62790 | 92.69643 | 9.336 |
| INFO | 8 | 7.00000 | 12.00000 | 5.00000 | 9.12500 | 0.58056 | 1.64208 | 2.69643 | 17.995 |
| SIMIL | 8 | 8.00000 | 15.00000 | 7.00000 | 10.62500 | 0.92461 | 2.61520 | 6.83929 | 24.614 |
| ARITH | 8 | 7.00000 | 12.00000 | 5.00000 | 10.00000 | 0.65465 | 1.85164 | 3.42857 | 18.516 |
| VOCAB | 8 | 8.00000 | 12.00000 | 4.00000 | 10.25000 | 0.59010 | 1.66905 | 2.78571 | 16.283 |
| COMP | 8 | 8.00000 | 14.00000 | 6.00000 | 12.12500 | 0.69276 | 1.95941 | 3.83929 | 16.160 |
| DIGTS | 4 | 7.00000 | 11.00000 | 4.00000 | 9.00000 | 0.81650 | 1.63299 | 2.66667 | 18.144 |
| PCOMP | 8 | 9.00000 | 14.00000 | 5.00000 | 11.50000 | 0.62678 | 1.77281 | 3.14286 | 15.416 |
| PARRAN | 8 | 8.00000 | 15.00000 | 7.00000 | 12.37500 | 0.99888 | 2.82527 | 7.98214 | 22.830 |
| BLOCKD | 8 | 6.00000 | 13.00000 | 7.00000 | 9.87500 | 0.93422 | 2.64237 | 6.98214 | 26.758 |
| OBJCTA | 8 | 7.00000 | 16.00000 | 9.00000 | 10.87500 | 0.97170 | 2.74838 | 7.55357 | 25.272 |
| CODING | 8 | 6.00000 | 11.00000 | 5.00000 | 7.62500 | 0.70553 | 1.99553 | 3.98214 | 26.171 |
| TYPE=C.T.B.S REFERRED (NON L.D.) | | | | | | | | | |
| VERBL | 23 | 70.00000 | 114.00000 | 44.00000 | 90.00000 | 2.27636 | 10.91704 | 119.18182 | 12.130 |
| PERFRM | 23 | 71.00000 | 112.00000 | 41.00000 | 90.00000 | 2.45996 | 11.79753 | 139.18182 | 13.108 |
| FSCALE | 23 | 69.00000 | 112.00000 | 43.00000 | 89.21739 | 2.25627 | 10.82067 | 117.08696 | 12.128 |
| INFO | 23 | 4.00000 | 10.00000 | 6.00000 | 7.52174 | 0.39697 | 1.90381 | 3.62451 | 25.311 |
| SIMIL | 23 | 3.00000 | 15.00000 | 12.00000 | 8.73913 | 0.60045 | 2.87967 | 8.29249 | 32.951 |
| ARITH | 23 | 4.00000 | 12.00000 | 8.00000 | 7.00000 | 0.46625 | 2.23607 | 5.00000 | 31.944 |
| VOCAB | 23 | 7.00000 | 15.00000 | 8.00000 | 9.43478 | 0.39676 | 1.90278 | 3.62055 | 20.168 |
| COMP | 23 | 6.00000 | 13.00000 | 7.00000 | 9.86957 | 0.47175 | 2.26243 | 5.11858 | 22.923 |
| DIGTS | 12 | 4.00000 | 13.00000 | 9.00000 | 7.16667 | 0.67232 | 2.32900 | 5.42424 | 32.498 |
| PCOMP | 23 | 2.00000 | 14.00000 | 12.00000 | 9.34783 | 0.62113 | 2.97885 | 8.87352 | 31.867 |
| PARRAN | 23 | 2.00000 | 15.00000 | 13.00000 | 8.04348 | 0.72089 | 3.45725 | 11.95257 | 42.982 |
| BLOCKD | 23 | 6.00000 | 14.00000 | 8.00000 | 8.43478 | 0.45695 | 2.19143 | 4.80237 | 25.981 |
| OBJCTA | 23 | 7.00000 | 15.00000 | 8.00000 | 9.82609 | 0.44744 | 2.14587 | 4.60474 | 21.838 |
| CODING | 23 | 3.00000 | 13.00000 | 10.00000 | 8.13043 | 0.47175 | 2.26243 | 5.11858 | 27.827 |

Table E2 continued

TYPE=TEACHER REFERRED (L.D.)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| VERBL | 17 | 90.00000 | 123.00000 | 33.00000 | 100.64706 | 2.01454 | 8.30618 | 68.99265 | 8.253 |
| PERFRM | 17 | 73.00000 | 121.00000 | 48.00000 | 102.58824 | 3.14953 | 12.98585 | 168.63235 | 12.658 |
| FSCALE | 17 | 86.00000 | 117.00000 | 31.00000 | 101.58824 | 2.12489 | 8.76113 | 76.75735 | 8.624 |
| INFO | 17 | 7.00000 | 13.00000 | 6.00000 | 9.29412 | 0.45183 | 1.86295 | 3.47059 | 20.044 |
| SIMIL | 17 | 8.00000 | 15.00000 | 7.00000 | 10.35294 | 0.46921 | 1.93459 | 3.74265 | 18.686 |
| ARITH | 17 | 7.00000 | 14.00000 | 7.00000 | 9.76471 | 0.48149 | 1.98524 | 3.94118 | 20.331 |
| VOCAB | 17 | 8.00000 | 12.00000 | 4.00000 | 10.23529 | 0.34863 | 1.43742 | 2.06618 | 14.044 |
| COMP | 16 | 6.00000 | 14.00000 | 8.00000 | 10.93750 | 0.55878 | 2.23514 | 4.99583 | 20.436 |
| DIGTS | 10 | 5.00000 | 11.00000 | 6.00000 | 7.70000 | 0.61554 | 1.94651 | 3.78889 | 25.279 |
| PCOMP | 17 | 6.00000 | 14.00000 | 8.00000 | 10.94118 | 0.56536 | 2.33106 | 5.43382 | 21.305 |
| PARRAN | 17 | 8.00000 | 15.00000 | 7.00000 | 11.76471 | 0.58492 | 2.41168 | 5.81618 | 20.499 |
| BLOCKD | 17 | 5.00000 | 15.00000 | 10.00000 | 10.64706 | 0.69632 | 2.87100 | 8.24265 | 26.965 |
| OBJCTA | 17 | 7.00000 | 16.00000 | 9.00000 | 11.17647 | 0.60776 | 2.50588 | 6.27941 | 22.421 |
| CODING | 17 | 3.00000 | 12.00000 | 9.00000 | 7.64706 | 0.61202 | 2.52342 | 6.36765 | 32.999 |

TYPE=TEACHER REFERRED (NON L.D.)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| VERBL | 18 | 72.00000 | 106.00000 | 34.00000 | 90.11111 | 1.98999 | 8.44281 | 71.28105 | 9.369 |
| PERFRM | 18 | 73.00000 | 120.00000 | 47.00000 | 94.61111 | 2.59605 | 11.01410 | 121.31046 | 11.641 |
| FSCALE | 18 | 76.00000 | 113.00000 | 37.00000 | 91.27778 | 2.27059 | 9.63331 | 92.80065 | 10.554 |
| INFO | 18 | 5.00000 | 11.00000 | 6.00000 | 7.94444 | 0.40803 | 1.73111 | 2.99673 | 21.790 |
| SIMIL | 18 | 6.00000 | 13.00000 | 7.00000 | 8.66667 | 0.45013 | 1.90973 | 3.64706 | 22.035 |
| ARITH | 18 | 4.00000 | 13.00000 | 9.00000 | 7.55556 | 0.54366 | 2.30657 | 5.32026 | 30.528 |
| VOCAB | 18 | 5.00000 | 14.00000 | 9.00000 | 9.00000 | 0.49836 | 2.11438 | 4.47059 | 23.493 |
| COMP | 18 | 5.00000 | 12.00000 | 7.00000 | 9.27778 | 0.47005 | 1.99427 | 3.97712 | 21.495 |
| DIGTS | 14 | 4.00000 | 13.00000 | 9.00000 | 7.14286 | 0.59167 | 2.21384 | 4.90110 | 30.994 |
| PCOMP | 18 | 2.00000 | 15.00000 | 13.00000 | 9.61111 | 0.65748 | 2.78945 | 7.78105 | 29.023 |
| PARRAN | 18 | 3.00000 | 14.00000 | 11.00000 | 9.11111 | 0.67586 | 2.86744 | 8.22222 | 31.472 |
| BLOCKD | 18 | 6.00000 | 16.00000 | 10.00000 | 8.83333 | 0.58995 | 2.50294 | 6.26471 | 28.335 |
| OBJCTA | 18 | 4.00000 | 19.00000 | 15.00000 | 10.22222 | 0.78197 | 3.31761 | 11.00654 | 32.455 |
| CODING | 18 | 6.00000 | 12.00000 | 6.00000 | 8.66667 | 0.37920 | 1.60880 | 2.58824 | 18.563 |

Table E3

DESCRIPTIVE STATISTICS FOR STANFORD

| VARIABLE | LABEL | N | MINIMUM VALUE | MAXIMUM VALUE | RANGE | MEAN | STD ERROR OF MEAN | STANDARD DEVIATION | VARIANCE | C.V. |
|---|---|---|---|---|---|---|---|---|---|---|
| TYPE=C.T.B.S REFERRED (L.D.) | | | | | | | | | | |
| SORT | STANFORD | 8 | 2.40000 | 3.50000 | 1.10000 | 2.97500 | 0.15670 | 0.44320 | 0.19643 | 14.898 |
| TYPE=C.T.B.S REFERRED (NON L.D.) | | | | | | | | | | |
| SORT | STANFORD | 23 | 1.60000 | 5.90000 | 4.30000 | 3.74348 | 0.26110 | 1.25221 | 1.56802 | 33.450 |
| TYPE=TEACHER REFERRED (L.D.) | | | | | | | | | | |
| SORT | STANFORD | 17 | 2.40000 | 4.40000 | 2.00000 | 3.07647 | 0.13518 | 0.55737 | 0.31066 | 18.117 |
| TYPE=TEACHER REFERRED (NON L.D.) | | | | | | | | | | |
| SORT | STANFORD | 18 | 2.30000 | 7.90000 | 5.60000 | 4.15556 | 0.35839 | 1.52053 | 2.31203 | 36.590 |

Table E4 DESCRIPTIVE STATISTICS FOR WOODCOCK

| VARIABLE | LABEL | N | MINIMUM VALUE | MAXIMUM VALUE | RANGE | MEAN | STD ERROR OF MEAN | STANDARD DEVIATION | VARIANCE | C.V. |
|---|---|---|---|---|---|---|---|---|---|---|
| TYPE=C.T.B.S REFERRED (L.D.) | | | | | | | | | | |
| WD1 | LETTER ID | 10 | 3.40000 | 6.20000 | 2.80000 | 5.26000 | 0.39531 | 1.25007 | 1.56267 | 23.766 |
| WD2 | WORD ID | 10 | 2.50000 | 4.80000 | 2.30000 | 3.81000 | 0.25493 | 0.80616 | 0.64989 | 21.159 |
| WD3 | WORD ATT | 10 | 1.70000 | 7.00000 | 5.30000 | 3.95000 | 0.54798 | 1.73285 | 3.00278 | 43.870 |
| WD4 | WORD COMP | 10 | 2.50000 | 9.70000 | 7.20000 | 4.45000 | 0.64657 | 2.04464 | 4.18056 | 45.947 |
| WD5 | PASS COMP | 10 | 2.30000 | 5.90000 | 3.60000 | 4.16000 | 0.37035 | 1.17113 | 1.37156 | 28.152 |
| WD6 | WDCK TOTAL | 10 | 2.80000 | 4.80000 | 2.00000 | 4.04000 | 0.24322 | 0.76913 | 0.59156 | 19.038 |
| TYPE=C.T.B.S REFERRED (NON L.D.) | | | | | | | | | | |
| WD1 | LETTER ID | 22 | 3.40000 | 12.90000 | 9.50000 | 6.27273 | 0.71829 | 3.36907 | 11.35065 | 53.710 |
| WD2 | WORD ID | 22 | 2.40000 | 6.10000 | 3.70000 | 3.84545 | 0.20605 | 0.96645 | 0.93403 | 25.132 |
| WD3 | WORD ATT | 22 | 1.40000 | 12.90000 | 11.50000 | 4.09545 | 0.52387 | 2.45715 | 6.03760 | 59.997 |
| WD4 | WORD COMP | 22 | 2.00000 | 9.30000 | 7.30000 | 3.78636 | 0.37215 | 1.74555 | 3.04695 | 46.101 |
| WD5 | PASS COMP | 22 | 2.50000 | 6.90000 | 4.40000 | 4.30909 | 0.26847 | 1.25922 | 1.58563 | 29.222 |
| WD6 | WDCK TOTAL | 22 | 2.90000 | 5.20000 | 2.30000 | 3.89545 | 0.15797 | 0.74096 | 0.54903 | 19.021 |
| TYPE=TEACHER REFERRED (L.D.) | | | | | | | | | | |
| WD1 | LETTER ID | 25 | 2.30000 | 12.90000 | 10.60000 | 5.80000 | 0.59178 | 2.95888 | 8.75500 | 51.015 |
| WD2 | WORD ID | 25 | 1.70000 | 4.80000 | 3.10000 | 3.67200 | 0.15848 | 0.79242 | 0.62793 | 21.580 |
| WD3 | WORD ATT | 25 | 1.70000 | 7.00000 | 5.30000 | 3.17600 | 0.25660 | 1.28299 | 1.64607 | 40.396 |
| WD4 | WORD COMP | 25 | 1.60000 | 9.70000 | 8.10000 | 3.89600 | 0.33058 | 1.65290 | 2.73207 | 42.425 |
| WD5 | PASS COMP | 25 | 2.00000 | 6.50000 | 4.50000 | 4.07600 | 0.23175 | 1.15876 | 1.34273 | 28.429 |
| WD6 | WDCK TOTAL | 25 | 1.70000 | 4.80000 | 3.10000 | 3.70000 | 0.14000 | 0.70000 | 0.49000 | 18.919 |
| TYPE=TEACHER REFERRED (NON L.D.) | | | | | | | | | | |
| WD1 | LETTER ID | 21 | 3.20000 | 12.90000 | 9.70000 | 7.06667 | 0.85019 | 3.89607 | 15.17933 | 55.133 |
| WD2 | WORD ID | 21 | 2.50000 | 6.70000 | 4.20000 | 4.41905 | 0.24944 | 1.14307 | 1.30662 | 25.867 |
| WD3 | WORD ATT | 21 | 2.00000 | 12.90000 | 10.90000 | 5.52857 | 0.84174 | 3.85735 | 14.87914 | 69.771 |
| WD4 | WORD COMP | 21 | 2.00000 | 11.20000 | 9.20000 | 4.23810 | 0.47467 | 2.17520 | 4.73148 | 51.325 |
| WD5 | PASS COMP | 21 | 2.30000 | 11.60000 | 9.30000 | 4.95714 | 0.42898 | 1.96585 | 3.86457 | 39.657 |
| WD6 | WDCK TOTAL | 21 | 2.50000 | 10.00000 | 7.50000 | 4.50000 | 0.34935 | 1.60094 | 2.56300 | 35.576 |

Table E5 DESCRIPTIVE STATISTICS FOR C.T.B.S.(STANFORD) 

| VARIABLE | N | MINIMUM VALUE | MAXIMUM VALUE | RANGE | MEAN | STD ERROR OF MEAN | STANDARD DEVIATION | VARIANCE | C.V. |
|---|---|---|---|---|---|---|---|---|---|
| TYPE=C.T.B.S REFERRED (L.D.) | | | | | | | | | |
| V_VOCB | 8 | 2.40000 | 5.60000 | 3.20000 | 4.01250 | 0.36909 | 1.04395 | 1.08982 | 26.017 |
| R_COMP | 8 | 2.30000 | 5.80000 | 3.50000 | 3.32500 | 0.40256 | 1.13861 | 1.29643 | 34.244 |
| L_SPEL | 8 | 2.20000 | 6.50000 | 4.30000 | 3.67500 | 0.48246 | 1.36460 | 1.86214 | 37.132 |
| L_CAPS | 8 | 2.50000 | 4.30000 | 1.80000 | 3.31250 | 0.23025 | 0.65124 | 0.42411 | 19.660 |
| L_PNCT | 8 | 2.80000 | 4.60000 | 1.80000 | 3.52500 | 0.19434 | 0.54968 | 0.30214 | 15.594 |
| L_USGE | 8 | 1.90000 | 4.50000 | 2.60000 | 3.36250 | 0.34997 | 0.98986 | 0.97982 | 29.438 |
| L_TOTL | 8 | 2.40000 | 4.80000 | 2.40000 | 3.47500 | 0.24839 | 0.70255 | 0.49357 | 20.217 |
| W_MAPS | 8 | 2.30000 | 6.60000 | 4.30000 | 3.88750 | 0.51977 | 1.47012 | 2.16125 | 37.817 |
| W_GRAF | 8 | 1.50000 | 6.00000 | 4.50000 | 3.21250 | 0.49224 | 1.39226 | 1.93839 | 43.339 |
| W_REFN | 8 | 2.30000 | 5.50000 | 3.20000 | 3.70000 | 0.34434 | 0.97395 | 0.94857 | 26.323 |
| W_TOTL | 8 | 2.20000 | 5.40000 | 3.20000 | 3.60000 | 0.40267 | 1.13892 | 1.29714 | 31.637 |
| M_CONCP | 8 | 2.50000 | 7.00000 | 4.50000 | 4.12500 | 0.52704 | 1.49069 | 2.22214 | 36.138 |
| M_PROB | 8 | 2.30000 | 6.00000 | 3.70000 | 3.83750 | 0.47620 | 1.34689 | 1.81411 | 35.098 |
| M_TOTL | 8 | 2.40000 | 6.50000 | 4.10000 | 3.97500 | 0.50134 | 1.41800 | 2.01071 | 35.673 |
| COMPST | 8 | 2.60000 | 5.50000 | 2.90000 | 3.67500 | 0.34213 | 0.96769 | 0.93643 | 26.332 |
| TYPE=C.T.B.S REFERRED (NON L.D.) | | | | | | | | | |
| V_VOCB | 23 | 1.30000 | 6.40000 | 5.10000 | 3.99130 | 0.29333 | 1.40677 | 1.97901 | 35.246 |
| R_COMP | 23 | 1.70000 | 5.50000 | 3.80000 | 3.76522 | 0.27075 | 1.29846 | 1.68601 | 34.486 |
| L_SPEL | 23 | 1.30000 | 6.90000 | 5.60000 | 4.00870 | 0.32842 | 1.57507 | 2.48083 | 39.291 |
| L_CAPS | 23 | 1.10000 | 8.20000 | 7.10000 | 3.65217 | 0.31951 | 1.53234 | 2.34806 | 41.957 |
| L_PNCT | 23 | 1.50000 | 7.60000 | 6.10000 | 4.00000 | 0.33345 | 1.59915 | 2.55727 | 39.979 |
| L_USGE | 23 | 1.50000 | 5.70000 | 4.20000 | 3.46957 | 0.21837 | 1.04726 | 1.09676 | 30.184 |
| L_TOTL | 23 | 1.60000 | 7.10000 | 5.50000 | 3.78261 | 0.27329 | 1.31067 | 1.71787 | 34.650 |
| W_MAPS | 23 | 1.70000 | 6.50000 | 4.80000 | 4.03478 | 0.31558 | 1.51346 | 2.29055 | 37.510 |
| W_GRAF | 23 | 2.00000 | 5.80000 | 3.80000 | 3.66522 | 0.20571 | 0.98655 | 0.97328 | 26.917 |
| W_REFN | 23 | 1.60000 | 6.80000 | 5.20000 | 4.04348 | 0.31225 | 1.49752 | 2.24257 | 37.035 |
| W_TOTL | 23 | 2.40000 | 6.20000 | 3.80000 | 3.92174 | 0.23666 | 1.13496 | 1.28814 | 28.940 |
| M_CONCP | 23 | 2.60000 | 6.20000 | 3.60000 | 3.76957 | 0.21664 | 1.03898 | 1.07949 | 27.562 |
| M_PROB | 23 | 2.00000 | 6.50000 | 4.50000 | 3.71739 | 0.27170 | 1.30302 | 1.69787 | 35.052 |
| M_TOTL | 23 | 2.40000 | 6.40000 | 4.00000 | 3.73478 | 0.23335 | 1.11909 | 1.25237 | 29.964 |
| COMPST | 23 | 2.00000 | 5.50000 | 3.50000 | 3.83913 | 0.23830 | 1.14286 | 1.30613 | 29.769 |

Table E5 continued

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| TYPE=TEACHER REFERRED (L.D.) | | | | | | | | | |
| V_VOCB | 17 | 2.40000 | 6.00000 | 3.60000 | 4.30588 | 0.21599 | 0.89056 | 0.79309 | 20.682 |
| R_COMP | 17 | 2.30000 | 6.30000 | 4.00000 | 3.86471 | 0.30678 | 1.26488 | 1.59993 | 32.729 |
| L_SPEL | 17 | 1.70000 | 6.50000 | 4.80000 | 3.75882 | 0.27866 | 1.14894 | 1.32007 | 30.567 |
| L_CAPS | 17 | 2.50000 | 4.70000 | 2.20000 | 3.68824 | 0.18066 | 0.74488 | 0.55485 | 20.196 |
| L_PNCT | 17 | 2.80000 | 6.30000 | 3.50000 | 4.14706 | 0.23719 | 0.97796 | 0.95640 | 23.582 |
| L_USGE | 17 | 1.90000 | 6.10000 | 4.20000 | 3.68235 | 0.26586 | 1.09615 | 1.20154 | 29.768 |
| L_TOTL | 17 | 2.40000 | 4.90000 | 2.50000 | 3.82941 | 0.18064 | 0.74479 | 0.55471 | 19.449 |
| W_MAPS | 17 | 2.30000 | 7.30000 | 5.00000 | 4.44118 | 0.33793 | 1.39331 | 1.94132 | 31.373 |
| W_GRAF | 17 | 1.50000 | 6.40000 | 4.90000 | 3.95882 | 0.35893 | 1.47989 | 2.19007 | 37.382 |
| W_REFN | 17 | 2.30000 | 5.50000 | 3.20000 | 4.07647 | 0.22777 | 0.93910 | 0.88191 | 23.037 |
| W_TOTL | 17 | 2.20000 | 6.40000 | 4.20000 | 4.15294 | 0.28814 | 1.18802 | 1.41140 | 28.607 |
| M_CONCP | 17 | 2.50000 | 7.00000 | 4.50000 | 4.38824 | 0.31117 | 1.28301 | 1.64610 | 29.237 |
| M_PROB | 17 | 1.90000 | 6.10000 | 4.20000 | 4.23529 | 0.31703 | 1.30716 | 1.70868 | 30.864 |
| M_TOTL | 17 | 2.40000 | 6.50000 | 4.10000 | 4.32353 | 0.30505 | 1.25774 | 1.58191 | 29.091 |
| COMPST | 17 | 2.60000 | 5.90000 | 3.30000 | 4.09412 | 0.23000 | 0.94833 | 0.89934 | 23.163 |
| TYPE=TEACHER REFERRED (NON L.D.) | | | | | | | | | |
| V_VOCB | 18 | 2.90000 | 6.40000 | 3.50000 | 4.61667 | 0.26829 | 1.13824 | 1.29559 | 24.655 |
| R_COMP | 18 | 2.50000 | 6.40000 | 3.90000 | 4.54444 | 0.29140 | 1.23632 | 1.52850 | 27.205 |
| L_SPEL | 18 | 2.00000 | 7.60000 | 5.60000 | 4.68889 | 0.32559 | 1.38134 | 1.90810 | 29.460 |
| L_CAPS | 18 | 2.00000 | 6.00000 | 4.00000 | 4.34444 | 0.29937 | 1.27012 | 1.61320 | 29.235 |
| L_PNCT | 18 | 2.00000 | 7.10000 | 5.10000 | 4.38333 | 0.30841 | 1.30846 | 1.71206 | 29.851 |
| L_USGE | 18 | 1.50000 | 6.10000 | 4.60000 | 4.10556 | 0.29874 | 1.26745 | 1.60644 | 30.872 |
| L_TOTL | 18 | 2.20000 | 5.80000 | 3.60000 | 4.37778 | 0.25611 | 1.08658 | 1.18065 | 24.820 |
| W_MAPS | 18 | 2.30000 | 6.70000 | 4.40000 | 4.71111 | 0.36415 | 1.54497 | 2.38693 | 32.794 |
| W_GRAF | 18 | 2.00000 | 6.70000 | 4.70000 | 4.31667 | 0.36935 | 1.56703 | 2.45559 | 36.302 |
| W_REFN | 18 | 2.80000 | 6.90000 | 4.10000 | 4.51667 | 0.29729 | 1.26130 | 1.59088 | 27.926 |
| W_TOTL | 18 | 2.50000 | 6.30000 | 3.80000 | 4.52778 | 0.31579 | 1.33980 | 1.79507 | 29.591 |
| M_CONCP | 18 | 2.90000 | 7.40000 | 4.50000 | 4.43889 | 0.33452 | 1.41925 | 2.01428 | 31.973 |
| M_PROB | 18 | 2.00000 | 6.50000 | 4.50000 | 4.26111 | 0.30175 | 1.28023 | 1.63899 | 30.044 |
| M_TOTL | 18 | 2.60000 | 6.60000 | 4.00000 | 4.35000 | 0.30596 | 1.29808 | 1.68500 | 29.841 |
| COMPST | 18 | 2.90000 | 6.10000 | 3.20000 | 4.53333 | 0.25476 | 1.08085 | 1.16824 | 23.842 |

Table E6 DESCRIPTIVE STATISTICS FOR C.T.B.S.(WOODCOCK)

| VARIABLE | N | MINIMUM VALUE | MAXIMUM VALUE | RANGE | MEAN | STD ERROR OF MEAN | STANDARD DEVIATION | VARIANCE | C.V. |
|---|---|---|---|---|---|---|---|---|---|
| TYPE=C.T.B.S REFERRED (L.D.) | | | | | | | | | |
| V_VOCB | 10 | 2.60000 | 5.50000 | 2.90000 | 4.02000 | 0.29356 | 0.92832 | 0.86178 | 23.093 |
| R_COMP | 10 | 2.90000 | 6.30000 | 3.40000 | 4.85000 | 0.36946 | 1.16833 | 1.36500 | 24.098 |
| L_SPEL | 10 | 2.30000 | 7.90000 | 5.60000 | 4.12000 | 0.56071 | 1.77313 | 3.14400 | 43.037 |
| L_CAPS | 10 | 2.20000 | 7.20000 | 5.00000 | 5.23000 | 0.46858 | 1.48178 | 2.19567 | 28.332 |
| L_PNCT | 10 | 2.80000 | 8.00000 | 5.20000 | 5.46000 | 0.46814 | 1.48039 | 2.19156 | 27.113 |
| L_USGE | 10 | 1.70000 | 5.30000 | 3.60000 | 3.58000 | 0.33226 | 1.05071 | 1.10400 | 29.350 |
| L_TOTL | 10 | 2.40000 | 6.70000 | 4.30000 | 4.60000 | 0.37238 | 1.17757 | 1.38667 | 25.599 |
| W_MAPS | 10 | 2.10000 | 6.80000 | 4.70000 | 5.22000 | 0.43737 | 1.38307 | 1.91289 | 26.496 |
| W_GRAF | 10 | 2.00000 | 5.80000 | 3.80000 | 4.44000 | 0.38070 | 1.20388 | 1.44933 | 27.114 |
| W_REFN | 10 | 2.10000 | 6.10000 | 4.00000 | 4.83000 | 0.40608 | 1.28413 | 1.64900 | 26.587 |
| W_TOTL | 10 | 2.10000 | 5.80000 | 3.70000 | 4.83000 | 0.33101 | 1.04674 | 1.09567 | 21.672 |
| M_CONCP | 10 | 2.50000 | 7.00000 | 4.50000 | 4.96000 | 0.43133 | 1.36398 | 1.86044 | 27.500 |
| M_PROB | 10 | 2.50000 | 6.00000 | 3.50000 | 4.45000 | 0.32872 | 1.03950 | 1.08056 | 23.359 |
| M_TOTL | 10 | 2.50000 | 5.90000 | 3.40000 | 4.70000 | 0.34091 | 1.07806 | 1.16222 | 22.938 |
| COMPST | 10 | 2.60000 | 5.40000 | 2.80000 | 4.58000 | 0.29620 | 0.93666 | 0.87733 | 20.451 |
| TYPE=C.T.B.S REFERRED (NON L.D.) | | | | | | | | | |
| V_VOCB | 22 | 1.10000 | 6.30000 | 5.20000 | 4.02727 | 0.31390 | 1.47234 | 2.16779 | 36.559 |
| R_COMP | 22 | 1.60000 | 5.90000 | 4.30000 | 4.01364 | 0.28056 | 1.31594 | 1.73171 | 32.787 |
| L_SPEL | 22 | 1.80000 | 5.90000 | 4.10000 | 3.95000 | 0.21267 | 0.99750 | 0.99500 | 25.253 |
| L_CAPS | 22 | 1.80000 | 6.00000 | 4.20000 | 3.71818 | 0.25275 | 1.18548 | 1.40537 | 31.883 |
| L_PNCT | 22 | 1.70000 | 6.50000 | 4.80000 | 4.00909 | 0.26604 | 1.24782 | 1.55706 | 31.125 |
| L_USGE | 22 | 1.20000 | 5.90000 | 4.70000 | 3.60455 | 0.31578 | 1.48114 | 2.19379 | 41.091 |
| L_TOTL | 22 | 2.00000 | 5.40000 | 3.40000 | 3.80455 | 0.21906 | 1.02747 | 1.05569 | 27.006 |
| W_MAPS | 22 | 1.90000 | 7.40000 | 5.50000 | 4.17727 | 0.34578 | 1.62185 | 2.63041 | 38.826 |
| W_GRAF | 22 | 1.10000 | 6.10000 | 5.00000 | 3.66818 | 0.28690 | 1.34568 | 1.81084 | 36.685 |
| W_REFN | 22 | 1.20000 | 6.10000 | 4.90000 | 3.89545 | 0.30653 | 1.43775 | 2.06712 | 36.908 |
| W_TOTL | 22 | 1.90000 | 6.40000 | 4.50000 | 3.90909 | 0.27751 | 1.30161 | 1.69420 | 33.297 |
| M_CONCP | 22 | 2.30000 | 5.70000 | 3.40000 | 3.89091 | 0.22087 | 1.03598 | 1.07325 | 26.626 |
| M_PROB | 22 | 2.30000 | 5.90000 | 3.60000 | 3.63182 | 0.23699 | 1.11158 | 1.23561 | 30.607 |
| M_TOTL | 22 | 2.30000 | 5.70000 | 3.40000 | 3.75909 | 0.21669 | 1.01637 | 1.03301 | 27.038 |
| COMPST | 22 | 2.10000 | 5.60000 | 3.50000 | 3.91818 | 0.23874 | 1.11979 | 1.25394 | 28.579 |

Table E6 continued

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| TYPE=TEACHER REFERRED (L.D.) | | | | | | | | | |
| V_VOCB | 25 | 2.10000 | 6.10000 | 4.00000 | 4.51200 | 0.22857 | 1.14285 | 1.30610 | 25.329 |
| R_COMP | 25 | 2.90000 | 6.30000 | 3.40000 | 4.93200 | 0.19964 | 0.99822 | 0.99643 | 20.240 |
| L_SPEL | 25 | 2.50000 | 7.90000 | 5.40000 | 4.17600 | 0.24982 | 1.24909 | 1.56023 | 29.911 |
| L_CAPS | 25 | 2.00000 | 7.20000 | 5.20000 | 4.54400 | 0.28479 | 1.42393 | 2.02757 | 31.336 |
| L_PNCT | 25 | 2.60000 | 8.00000 | 5.40000 | 4.92400 | 0.25621 | 1.28104 | 1.64107 | 26.016 |
| L_USGE | 25 | 1.70000 | 5.30000 | 3.60000 | 3.80400 | 0.19685 | 0.98424 | 0.96873 | 25.874 |
| L_TOTL | 25 | 2.40000 | 6.70000 | 4.30000 | 4.36400 | 0.19629 | 0.98144 | 0.96323 | 22.490 |
| W_MAPS | 25 | 2.10000 | 7.30000 | 5.20000 | 5.52800 | 0.24273 | 1.21364 | 1.47293 | 21.954 |
| W_GRAF | 25 | 2.00000 | 6.10000 | 4.10000 | 4.64800 | 0.24468 | 1.22342 | 1.49677 | 26.322 |
| W_REFN | 25 | 1.90000 | 6.40000 | 4.50000 | 4.60400 | 0.26315 | 1.31576 | 1.73123 | 28.579 |
| W_TOTL | 25 | 2.10000 | 6.60000 | 4.50000 | 4.93200 | 0.21500 | 1.07499 | 1.15560 | 21.796 |
| M_CONCP | 25 | 2.50000 | 7.00000 | 4.50000 | 4.96800 | 0.26037 | 1.30183 | 1.69477 | 26.204 |
| M_PROB | 25 | 2.50000 | 7.00000 | 4.50000 | 4.86000 | 0.25239 | 1.26194 | 1.59250 | 25.966 |
| M_TOTL | 25 | 2.50000 | 7.00000 | 4.50000 | 4.92000 | 0.23259 | 1.16297 | 1.35250 | 23.638 |
| COMPST | 25 | 2.60000 | 6.00000 | 3.40000 | 4.72400 | 0.18729 | 0.93643 | 0.87690 | 19.823 |
| TYPE=TEACHER REFERRED (NON L.D.) | | | | | | | | | |
| V_VOCB | 21 | 2.30000 | 6.30000 | 4.00000 | 4.66190 | 0.23243 | 1.06512 | 1.13448 | 22.847 |
| R_COMP | 21 | 1.60000 | 6.00000 | 4.40000 | 4.41905 | 0.25257 | 1.15742 | 1.33962 | 26.192 |
| L_SPEL | 21 | 2.30000 | 6.00000 | 3.70000 | 4.48571 | 0.22639 | 1.03744 | 1.07629 | 23.128 |
| L_CAPS | 21 | 2.70000 | 7.20000 | 4.50000 | 4.40476 | 0.24732 | 1.13335 | 1.28448 | 25.730 |
| L_PNCT | 21 | 2.70000 | 7.60000 | 4.90000 | 4.55238 | 0.27985 | 1.28243 | 1.64462 | 28.170 |
| L_USGE | 21 | 2.20000 | 5.90000 | 3.70000 | 3.96667 | 0.26052 | 1.19387 | 1.42533 | 30.098 |
| L_TOTL | 21 | 3.00000 | 6.70000 | 3.70000 | 4.36667 | 0.17516 | 0.80270 | 0.64433 | 18.383 |
| W_MAPS | 21 | 2.50000 | 6.90000 | 4.40000 | 4.62381 | 0.27662 | 1.26764 | 1.60690 | 27.415 |
| W_GRAF | 21 | 2.80000 | 7.00000 | 4.20000 | 4.53333 | 0.27614 | 1.26544 | 1.60133 | 27.914 |
| W_REFN | 21 | 3.00000 | 6.10000 | 3.10000 | 4.69048 | 0.20586 | 0.94335 | 0.88990 | 20.112 |
| W_TOTL | 21 | 2.90000 | 6.70000 | 3.80000 | 4.61905 | 0.22271 | 1.02060 | 1.04162 | 22.095 |
| M_CONCP | 21 | 2.90000 | 6.80000 | 3.90000 | 4.61905 | 0.24168 | 1.10753 | 1.22662 | 23.977 |
| M_PROB | 21 | 2.80000 | 6.30000 | 3.50000 | 4.31905 | 0.23529 | 1.07825 | 1.16262 | 24.965 |
| M_TOTL | 21 | 2.80000 | 6.20000 | 3.40000 | 4.47619 | 0.22005 | 1.00842 | 1.01690 | 22.528 |
| COMPST | 21 | 2.90000 | 6.40000 | 3.50000 | 4.52381 | 0.17767 | 0.81419 | 0.66290 | 17.998 |

APPENDIX E.

## Supplimentary Tables 3, 5, 6 and 7 Correlation Coefficients for P $\leq$.05 When Comparing WISC-R, W.R.M.T. and S.D.R.T. Total Scores to the C.T.B.S. Subtest Scores

Table 3 Correlation Coefficients for P $\leq$ .05 when Comparing WISC-R (S.D.R.T.) to C.T.B.S. Subtest Scores

| WISC-R (S.D.R.T.) + C.T.B.S. | CTBS REFERRED | | | | TEACHER REFERRED | | | |
|---|---|---|---|---|---|---|---|---|
| | L.D. (N = 8) | | Not L.D. (N = 23) | | L.D. (N = 17) | | Not L.D. (N = 18) | |
| | Variable | r | Variable | r | Variable | r | Variable | r |
| | Verbal + R. Comp. | 0.83 | Info + Vocab | 0.52 | Info + W. Graph | 0.51 | Arith + R. Comp. | 0.54 |
| | Verbal + L. Punt. | 0.72 | + M Concepts | 0.42 | W. Total | 0.54 | L. Punt. | 0.59 |
| | L. Total | 0.74 | | | M. Concp. | 0.56 | L. Total | 0.47 |
| | M. Concp. | 0.73 | | | M. Prob. | 0.53 | W. Maps | 0.51 |
| | Compst. | 0.73 | | | V. Vocab. | 0.56 | W. Graph | 0.56 |
| | Info + Spell. | 0.77 | | | Comp. + L. Punt. | 0.70 | W. Ref. | 0.53 |
| | R. Comp | 0.72 | | | Digits + V. Vocab. | 0.67 | W. Total | 0.58 |
| | L. Punt. | 0.95 | | | | | M. Prob. | 0.68 |
| | L. Total | 0.86 | | | R. Comp. | -0.66 | M. Conc. | 0.63 |
| | M. Concp. | 0.73 | | | L. Cap. | -0.80 | M. Total | 0.69 |
| | M. Total | 0.72 | | | L. Total | -0.37 | Compst. | 0.62 |
| | Compst. | 0.74 | | | W. Maps | -0.78 | | |
| | Simil. R. Comp. | 0.87 | | | W. Graphs | -0.91 | Verbal + M. Conc. | 0.51 |
| | Arith. + Vocab. | 0.79 | | | W. REFN | -0.71 | M. Total | 0.47 |
| | Coding + L. Cap. | 0.86 | | | W. Total | -0.86 | | |
| | | | | | M. Conc. | -0.65 | Perf + M. Conc. | 0.55 |
| | | | | | M. Prob. | -0.76 | M. Total | 0.50 |
| | | | | | M. Total | -0.73 | | |
| | | | | | Compst. | -0.78 | F Scale + M. Conc. | 0.56 |
| | | | | | P. Comp + L. Usage | -0.61 | M. Total | 0.51 |
| | | | | | P. Arrang + | | Sim + M. Concepts | 0.50 |
| | | | | | V. Vocab. | -0.54 | | |
| | | | | | R. Comp. | -0.50 | P. Arrang M. Total | 0.49 |
| | | | | | L. Total | -0.49 | M. Conc. | 0.48 |
| | | | | | W. Graph | -0.49 | M. Prob. | 0.47 |
| | | | | | Compst. | -0.54 | | |

Table 5 Correlation Coefficients for $P \leq .05$ when Comparing WISC-R (WRMT) to C.T.B.S. Subtest Scores

| | CTBS REFERRED | | TEACHER REFERRED | |
|---|---|---|---|---|
| | L.D. (N = 10) | Not L.D. (N = 22) | L.D. (N = 25) | Not L.D. (N = 21) |
| | Variable r | Variable r | Variable r | Variable r |
| WISC-R (WRMT) + C.T.B.S. | Comp + | Comp. + | Perform. + | Digits + |
| | L. Caps. -0.72 | R. Comp. 0.47 | W. Maps 0.42 | L. Cap. 0.49 |
| | L. Punct. -0.84 | | M. Probl. 0.47 | |
| | L. Total -0.72 | | | Comp. + |
| | | | Block D. + | M. Concp. 0.44 |
| | Digits + | | M. Prob. 0.56 | M. Total 0.45 |
| | M. Total -0.79 | | M. Total 0.52 | |
| | Compst. -0.83 | | | |

Table 6 Correlation Coefficients for $P \leq .05$ when Comparing C.T.B.S. and S.D.R.T. Subtest Scores

| | CTBS REFERRED | | | | TEACHER REFERRED | | | |
|---|---|---|---|---|---|---|---|---|
| | L.D. N = 8 | | Not L.D. N = 23 | | L.D. N = 17 | | Not L.D. N = 18 | |
| C.T.B.S. + S.D.R.T. | Variable | r | Variable | r | Variable | r | Variable | r |
| | None | | S.D.R.T. + | | S.D.R.T. + | | S.D.R.T. + | |
| | | | V. Vocab. | 0.74 | R. Comp. | 0.70 | V. Vocab. | 0.51 |
| | | | R. Comp. | 0.82 | | | R. Comp. | 0.57 |
| | | | L. Spel. | 0.80 | | | L. Spell. | 0.55 |
| | | | L. Cap. | 0.74 | | | L. Cap. | 0.47 |
| | | | L. Punct. | 0.72 | | | L. Punc. | 0.57 |
| | | | L. Usage | 0.48 | | | L. Usage | 0.52 |
| | | | L. Total | 0.77 | | | L. Total | 0.64 |
| | | | W. Maps | 0.72 | | | W. Maps | 0.56 |
| | | | W. Graph | 0.50 | | | W. Graph | 0.68 |
| | | | W. REFN | 0.83 | | | W. REFN | 0.69 |
| | | | W. Total | 0.82 | | | W. Total | 0.69 |
| | | | M Concp. | 0.75 | | | M. Concp. | 0.73 |
| | | | M. Prob. | 0.65 | | | M. Prob. | 0.64 |
| | | | M. Total | 0.72 | | | M. Total | 0.72 |
| | | | Compst. | 0.86 | | | Compst. | 0.67 |

Table 7 Correlation Coefficients for $P \leq .05$ when Comparing C.T.B.S. and W.R.M.T. Subtest Scores

| C.T.B.S. + W.R.M.T. | CTBS REFERRED L.D. (N = 10) Variable | r | Not L.D. (N = 22) Variable | r | TEACHER REFERRED L.D. (N = 17) Variable | r | Not L.D. (N = 18) Variable | r |
|---|---|---|---|---|---|---|---|---|
| | Letter ID + W. Refn | 0.70 | Word ID + Vocab. | 0.72 | Letter ID + Vocab. | 0.41 | Letter ID + L. Spell. | 0.49 |
| | Letter ID + M. Prob. | 0.73 | R. Comp. | 0.56 | L. Usage | 0.40 | Word ID + Vocab. | 0.49 |
| | Letter ID + M. Total | 0.68 | L. Spell. | 0.59 | W. Graph | 0.45 | R. Comp. | 0.57 |
| | Word ID + Vocab. | 0.64 | L. Total | 0.48 | W. Total | 0.52 | L. Spell. | 0.47 |
| | Word ID + L. Usage | 0.83 | W. Refn | 0.50 | M. Prob. | 0.56 | L. Total | 0.54 |
| | W. Maps | 0.71 | W. Total | 0.49 | M. Total | 0.50 | W. Maps | 0.44 |
| | M. Concepts | 0.66 | M. Conc. | 0.43 | Comp. | 0.46 | W. Refn | 0.56 |
| | | | Comp. | 0.58 | W. Maps | 0.50 | W. Total | 0.50 |
| | | | Word Comp + Vocab. | 0.58 | Word ID + Vocab. | 0.62 | Comp. | 0.60 |
| | | | R. Comp. | 0.54 | R. Comp. | 0.74 | Word Att + L. Spell | 0.53 |
| | | | L. Caps. | 0.50 | L. Caps | 0.47 | L. Total | 0.52 |
| | | | L. Usage | 0.45 | L. Usage | 0.78 | Word Comp. + Vocab. | 0.57 |
| | | | L. Total | 0.49 | L. Total | 0.54 | R. Comp. | 0.45 |
| | | | W. Maps | 0.46 | W. Maps | 0.63 | W. Maps | 0.53 |
| | | | W. Graph | 0.65 | W. Graph | 0.39 | W. Graph | 0.50 |
| | | | W. Refn | 0.53 | W. Refn | 0.48 | W. Total | 0.55 |
| | | | W. Total | 0.62 | W. Total | 0.59 | M. Concp. | 0.58 |
| | | | M. Concp. | 0.51 | M. Concp. | 0.50 | M. Total | 0.52 |
| | | | M. Total | 0.48 | M. Total | 0.47 | Composite | 0.59 |
| | | | Comp. | 0.61 | Comp. | 0.67 | | |
| | | | Pass Comp + Vocab. | 0.70 | Word Comp + L. Caps | 0.40 | Pass Comp + R. Comp. | 0.64 |
| | | | R. Comp | 0.70 | Pass Comp + Vocab. | 0.49 | L. Caps. | 0.50 |
| | | | L. Caps. | 0.46 | R. Comp. | 0.60 | L. Total | 0.50 |
| | | | L. Usage | 0.50 | L. Usage | 0.55 | W. Maps | 0.52 |
| | | | L. Total | 0.44 | W. Maps | 0.45 | W. Graph | 0.50 |
| | | | W. Maps | 0.52 | W. Graph | 0.50 | W. Refn | 0.51 |
| | | | W. Graph | 0.47 | W. Total | 0.49 | W. Total | 0.59 |
| | | | W. Refn | 0.56 | M. Concp. | 0.41 | M. Concp. | 0.56 |
| | | | M. Concp. | 0.61 | Composite | 0.52 | M. Total | 0.47 |
| | | | M. Prob. | 0.56 | WDCK Total + Vocab. | 0.62 | Composite | 0.61 |
| | | | M. Total | 0.61 | R. Comp. | 0.71 | WDCK Total + R. Comp. | 0.51 |
| | | | Composite | 0.68 | L. Caps. | 0.45 | L. Caps | 0.52 |
| | | | WDCK Total + Vocab. | 0.74 | L. Pnct. | 0.44 | L. Total | 0.51 |
| | | | R. Comp. | 0.60 | L. Usage | 0.78 | W. Maps | 0.48 |
| | | | L. Spell. | 0.52 | L. Total | 0.51 | W. Graph | 0.54 |
| | | | L. Usage | 0.40 | W. Maps | 0.62 | W. Refn | 0.45 |
| | | | L. Total | 0.50 | W. Refn | 0.53 | W. Total | 0.57 |
| | | | W. Graph | 0.47 | W. Total | 0.60 | M. Concp. | 0.56 |
| | | | W. Refn | 0.60 | M. Concp. | 0.51 | M. Total | 0.45 |
| | | | W. Total | 0.55 | M. Prob. | 0.41 | Composite | 0.59 |
| | | | M. Concp. | 0.58 | Composite | 0.67 | | |
| | | | M. Prob. | 0.44 | | | | |
| | | | M. Total | 0.53 | | | | |
| | | | Composite | 0.65 | | | | |

Appendix F Distractibility Formulas Applied to All WISC-R Samples.

| Samples | N | I.Q. Scores Arithmetic | Digit Span | Coding | Information | Distractibility Quotient | Mean I.Q. | Difference |
|---|---|---|---|---|---|---|---|---|
| WISC-R(W) C.T.B.S.-Referred L.D. | 10 | 7.9 | 6.71 | 9.2 | 6.8 | 86.38 | 95 | -8.62 |
| C.T.B.S.-Referred non-L.D. | 22 | 7.72 | 6.88 | 8.59 | 7.27 | 85.01 | 90.68 | -5.67 |
| Teacher-Referred L.D. | 25 | 8.2 | 6.88 | 9.4 | 8.48 | 87.85 | 100.28 | -12.43 |
| Teacher-Referred non-L.D. | 21 | 7.57 | 7.64 | 9.04 | 8.19 | 87.35 | 92.47 | -5.12 |
| WISC-R(S) C.T.B.S.-Referred L.D. | 8 | 10 | 9 | 7.62 | 9.12 | 92.56 | 103.12 | -10.44 |
| C.T.B.S.-Referred non-L.D. | 23 | 7 | 7.16 | 8.13 | 7.52 | 83.03 | 89.21 | -6.18 |
| Teacher-Referred L.D. | 17 | 9.76 | 7.7 | 7.64 | 9.29 | 89.22 | 101.58 | -12.36 |
| Teacher-Referred non-L.D. | 18 | 7.55 | 7.14 | 8.66 | 7.94 | 85.37 | 91.27 | -5.9 |

L.D. = 43.85/4 = 10.96 Difference

non-L.D. = 22.87/4 = 5.71 Difference

L.D. - non-L.D. = 5.24 Difference

Note: Formula for distractibility as reported by Sattler (1982).
(arithmetic + digit span + coding) x (2.2) + 34 = Distractibility Quotient
Samples sizes for subtest digit span varies as this test was not administered to all students.

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