COUNSELLING INTERNSHIP REPORT INCLUDING AN EXAMINATION OF THE BODER TEST OF READING-SPELLING PATTERNS

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ABSTRACT

This report describes a thirteen-week internship programme completed at the Diagnostic and Remedial Unit, Memorial University of Newfoundland to fulfil the requirements for the completion of a Master's Degree in Educational Psychology. The purpose of the internship was to gain experiential knowledge in the area of assessment and counselling of children with learning difficulties.

General internship goals, the activities carried out to achieve the goals, and conclusions regarding the effectiveness and limitations of the internship are presented in the first section of the report. The second section contains the report of the research aspect of the internship.

The research component involved an examination of a test commonly used to assess reading disability, The Boder Test of Reading - Spelling Patterns. A concurrent validity study of this test was conducted and a preliminary examination of its construct validity. Thirty-one children referred to the Diagnostic and Remedial Unit during the internship were given the Boder, WRAT-R, and WISC-R. Relationships between these tests were examined.

A correlation coefficient of 0.89 was obtained between the reading grade levels of The Boder Test of Reading Spelling Patterns and the reading subtest of the Wide Range Achievement Test - Revised, thus providing support for the Boder's content validity. However, support for construct validity was limited.

The research findings are discussed with reference to the use of the test in the local school systems. It was concluded that the test is time-consuming to administer and the information it provides to the user may be obtained in less time by using other tests with better psychometric properties.

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CHAPTER ONE

INTERNSHIP

Rationale for the Internship

As part of the requirements for a Master's Degree in Educational Psychology, students may choose to either complete a thesis or do an internship which includes a minor research component. The internship option requires a minimum of thirteen consecutive weeks of placement in a setting appropriate to a student's eventual employment interest.

The value of experiential training for counsellors is underscored in the publication relating to internships formulated by the Faculty of Education's Department of Educational Psychology (1975), "The nature, the scope, and the specialization encompassed in the role of the counsellor require intensive training, a considerable portion of which should be devoted to supervised experiential training" (p.1).

The intern, having a desire to work as an elementary school guidance counsellor, realized the importance for such counsellors to have developed competencies in the area of assessment of children. A study by Purcell (1987) found that elementary school counsellors in Newfoundland rated psychoeducational assessment as their most important function from a list of

eighteen functions counsellors perform. Other functions include, in order of importance: teacher consultation, parent consultation, programming for special needs, and individual counselling. Obviously, the skills needed to competently perform the most important functions of an elementary school counsellor's job would need to be acquired through extensive on-the-job training after theoretical coursework has been completed.

Sattler (1988) outlined the following technical and clinical skills needed to be a competent clinical assessor of children.

1. Evaluate and select an appropriate assessment battery.
2. Establish and maintain rapport with children.
3. Administer and score tests and other assessment tools by following standardized procedures.
4. Observe behaviour.
5. Interview parents, children, and teachers.
6. Perform informal assessments.
7. Interpret assessment results.
8. Translate assessment findings into effective interventions (formulate recommendations).
9. Communicate assessment findings both in writing and orally.

10. Read and interpret research in the field of clinical and psychoeducational assessment.
11. Understand laws and government regulations concerning the assessment and placement of special children (p.7).

In addition, Sattler (1988) suggested that clinicians working with children in school settings would benefit from a study of remedial and educational techniques used to treat and educate special children. Finally, Sattler stresses that students undergoing training in the assessment of children should receive supervision in all phases of assessment, including test administration, scoring, report writing, and consultation.

Considering the level of skills needed to assess children properly and the fact that practical experience is the main avenue for developing these skills, it was therefore felt that a period of internship under the tutelage of professional staff employed in the field of psychoeducational assessment of children would undoubtedly be the best method to increase one's competency levels in the skills needed for effective functioning as an elementary school guidance counsellor.

Setting for the Internship

The Diagnostic and Remedial Unit at Memorial University was chosen as the setting for the internship.

The Diagnostic and Remedial Unit began in 1971 as a centre for educational research in learning disabilities. In 1972, remediation services were offered and in 1973 both the research and remedial services combined to form the Diagnostic and Remedial Unit. It remained a unit of the Faculty of Education until it was closed in 1991 as a result of budget cuts.

The functions of the Diagnostic and Remedial Unit were:

1. It served as a diagnostic centre for children who were referred because of school-related problems.
2. It provided remedial services for a limited number of students.
3. It offered a teaching and practicum setting for special education courses and a supervised training placement site for psychology, social work, special education, educational psychology, and other education students.
4. It served as a research site and data bank.

Children were referred to the Diagnostic Unit for services such as assessment, remediation services, school programming suggestions, home programming suggestions, participation in a university practicum teaching

program, and counselling. Referrals were made by school personnel, medical professionals, social workers, or parents. Records indicated that from 1975 to 1990, 3483 referrals were made to the Diagnostic and Remedial Unit (B. Hopkins, personal communication, January, 1991).

At the time of the internship, the Unit staff consisted of four full-time members: a unit director, two specialized teacher-diagnosticians, and a secretary. The Unit Director provided the intern with on-site supervision for the thirteen-week internship.

Internship Goals and Activities

The purpose of the internship, as stated in the Department of Educational Psychology (1975) paper on the internship program[1], is to provide:

1. For the development of competencies for each trainee based on his needs, previous experiences, and future vocational plans.
2. For practical experiences that will bring into focus the theoretical training received during the formal part of the

[1] This paper was the most recently published information about the internship available when the intern completed the internship in 1991.

program.

3. For practical experiences that will enable the trainee and the department to evaluate the trainee's ability to effectively work in his chosen field.
4. Opportunities for the trainee to evaluate his personal behaviour and work toward making any necessary changes.
5. For feedback from the internship setting to the department regarding strengths and weaknesses of its students so that program improvements can be implemented.
6. For the development of research and problem-solving skills appropriate to the needs of the student and the setting, considering the nature of his placement and his vocational plans (p.2).

In devising goals for the internship, the intern was supervised and directed by both the internship site supervisor and the university internship program supervisor. Eight goals were decided and agreed upon. The goals were in keeping with the broad goals presented above and fell under five general categories. The areas in which the intern intended to increase her experiences and knowledge base were: assessment skills (both formal and informal types), counselling and interviewing skills, remediation techniques,

report writing skills, and knowledge of children's clinical syndromes. The general categories, specific goals, and the activities performed to meet the goals are outlined below.

Assessment Skills

GOAL 1: To gain more knowledge about assessment tools such as norm referenced tests and informal assessment which are used to gather information about children with learning disabilities and/or developmental delays.

Norm-referenced tests are tests which have been standardized on a norm group, usually a large,clearly defined group. These tests compare a person's performance to that of other persons the same age or grade. Norm-referenced tests have been developed to assess many areas, including intelligence; reading, arithmetic, and spelling abilities; visual-motor skills; and adaptive behaviour (Sattler, 1988; Lerner, 1988).

Informal assessment includes criterion-referenced tests (which may or may not be standardized and normed) and teacher-made tests. Criterion-referenced tests, in contrast to norm-referenced tests, describe rather than compare performance and measure mastery levels in the area being tested (Sattler, 1988; Lerner, 1988).

The activities performed to meet the goal of gaining experience with norm-referenced tests were:

1. The manuals of standardized tests were studied. A complete list of tests examined is presented in Appendix A.

2. The intern administered, scored and interpreted standardized tests. A list of the tests used and the number of assessments is in Appendix B.

3. The intern observed the Unit Director administering tests such as the McCarthy Scales of Children's Abilities and the Wide Range Achievement Test- Revised.

The activities performed to meet the goal of acquiring more experience with informal assessment techniques were:

1. Observations through a one-way mirror of Unit staff as they used informal assessment techniques to assess children with reading disabilities, general learning disabilities, autism, and communication disorders.

2. The intern viewed videotapes of the Unit Director and former Director as they assessed autistic children.

3. The intern viewed a training videotape of the administration of the Psychoeducational Profile - Revised to assist in preparation for testing.

4. Discussions about informal assessment methods were held with Unit staff members, the Janeway Learning/Behaviour Clinic's neurological paediatrician, and the neuropsychologist from the General Hospital.

5. Extensive reading was done in the area of Informal Assessment.

6. The intern conducted informal reading assessments with 27 children referred to the Unit for assessment and/or remediation.

Counselling and Interviewing Skills

GOAL 2: To gain knowledge and practice in gathering information tactfully and efficiently from parents about their children and the family environment.

The activities performed to meet this goal were:

1. Observation of the Unit's Director as she conducted pre-assessment interviews with parents of children referred to the Unit.

2. The intern used the Background Questionnaire from Sattler (1988) with all ten parents of children seen by the intern for assessment at the Diagnostic Unit.

3. Readings on assessment of behaviour by interview methods were read by the intern.

GOAL 3: To become more familiar with methods of presenting assessment results to parents, of making remediation suggestions, and of counselling parents needing assistance in dealing with the problems they experience with their children.

The activities performed to meet this goal were:

1. The observation of interviews during which the Unit Director presented assessment results and remediation suggestions to parents.

2. The intern conducted ten post-assessment interviews with parents of children who had been assessed earlier by the intern to discuss assessment results and remediation recommendations.

3. Two counselling sessions were conducted with a parent of a child with attention deficit disorder. The sessions focused on discussing the parent's past and present difficulties coping with her child's behaviour problems at school and ideas were formulated which she intended to use in the future management of her child.

4. Readings concerning post-assessment interviews with parents were read by the intern.

GOAL 4: To gain more knowledge about and obtain experience in using interview techniques with children and to conduct individual counselling

sessions with at least one child referred to the Unit.

The activities performed to meet this goal were:

1. The intern observed the Director as she conducted intake interviews with three children who were referred to the Unit for assessment.

2. The intern conducted ten intake interviews with children who were referred to the Unit for assessment and were subsequently assessed by the intern. An interview protocol was used based on the format suggested by Sattler (1988).

3. Background reading in interviewing techniques with children was done by the intern. Examples of such readings were: Sattler's information on "The Initial Interview with Children" (pp.416 - 429) and Chapter Two of Interviewing Strategies for Helpers by Cormier and Cormier (1985) pp.11-18.

4. A counselling relationship was continued with a child who had been seen at the Unit on a weekly basis by the intern for four months before the internship period began. The counselling relationship started when the intern was doing a practicum placement in Guidance at the Diagnostic and Remedial Unit as part of the required coursework for the Master's program in Educational Psychology. The time commitment for that placement involved two days a week for twelve weeks.

The child, an adolescent with attention deficit-hyperactivity disorder, was seen for eleven one-hour sessions during the thirteen-week internship period. Additionally, the intern attended a school conference concerning the child's school progress and promotion and also met with that school board's learning disability resource teachers who were to conduct a learning strategies program with the child. Counselling reports were written and presented to personnel at both meetings and a final report was sent to school officials and parents at the end of the internship period.

Remediation Techniques

GOAL 5: To become familiar with a variety of remediation techniques in use with children who have learning difficulties.

The activities performed to meet this goal were:

1. A Unit staff member was observed by the intern as she conducted reading remediation sessions with children.

2. Remediation sessions were carried out by the intern on a regular basis with two children with whom she had conducted psychoeducational assessments. One child was seen seven times for remediation activities in reading and the other child was seen eleven times for

remediation activities in reading and spelling. The Unit Director and the other two staff members provided supervision and direction in the selection of materials used for the remediation sessions and in giving feedback about the sessions.

3. Information on remediation techniques that were part of the Unit collection were read, copied, and organized into a remediation file resource collection by the intern.

Information from other sources was also researched and copied by the intern. The material was organized into such categories as:

Reading remediation activities

Spelling remediation activities

Mathematics remediation activities

Written language remediation activities

Memory enhancement activities

Classroom management of children with auditory-processing deficits

Language stimulation games and activities

Parental suggestions for child management problems

Report Writing Skills

GOAL 6: To develop skills and obtain experience in the style of writing used in reports of psychoeducational assessments and remediation sessions.

The activities performed to meet this goal were:

1. The intern studied many of the psychoeducational assessment and remediation reports on file at the Unit. The reports had been completed by past and present Unit staff.

2. Readings in the area of report writing were read, an example being the report writing chapter of Sattler's (1988) Assessment of Children (pp.725 - 762).

3. The intern wrote psychoeducational reports about the ten children she had assessed during the internship. An outline of the report format used is included in Appendix C. Consultations were held with the Director during the writing process and revisions made where necessary. Additionally, remediation reports were written about the two children seen regularly for remediation by the intern during the internship period.

Knowledge of Children's Clinical Syndromes

GOAL 7: To expand knowledge of the nature of a variety of clinical syndromes and disorders children experience and to become more aware of

the diagnostic methods used to identify these disorders and the possible learning difficulties which may be associated with such conditions.

The activities performed to meet this goal were:

1. Extensive reading in many areas was the main method used to meet this goal. The topics covered in the readings included the following: attention deficit disorder, autism, general learning disabilities and neurological disorders, obsessive-compulsive disorder, reading disabilities, scotopic sensitivity syndrome, social skills deficits, and tourette syndrome. A complete list of the readings is included in Appendix D.

2. Informal discussions were held between the intern and the Diagnostic and Remedial Unit staff concerning scotopic sensitivity syndrome, reading disabilities, communication disorders, and attention deficit disorder. Topics such as general learning disabilities, attention deficit disorder, and neurological disorders were discussed with personnel at the Janeway Learning/Behaviour Clinic and the neuropsychological staff of the General Hospital.

3. The intern observed the Health Sciences Centre neuropsychologist and his psychological assistant as they interviewed and administered neuropsychological tests to patients. Although the intern had wanted to observe such assessments carried out with children, that was not

possible to arrange as few children were seen for neuropsychological assessment during the period of the internship.

The patients seen were: in-patient with epilepsy resulting from a childhood brain abscess and an out-patient who had sustained a head injury in a motor vehicle accident. The neuropsychologist informed the intern about the nature and purposes of the test battery that was used and discussed various types of interpretive findings.

4. The intern spent a day at the Learning/Behaviour Clinic, a division of the Child Development Program, at the Janeway Hospital, the province's only children's hospital. The Learning/Behaviour Clinic is an assessment service for children with learning and/or behavioral problems. The clinic's paediatric neurologist and the psychologist gave verbal summaries of the case histories of three children who were being seen that day for follow-up appointments. The intern reviewed the medical charts for the three children and sat in on the sessions with the children and their parents. One child was diagnosed with Attention Deficit Disorder and the other two children were diagnosed with mixed developmental delays.

5. The intern attended a day-long seminar sponsored by the Newfoundland Psychological Association. The sessions attended by the intern were on the following topics: excessive dietary concern in female adolescents

and children; and estimating premorbid intelligence using the National Reading Test (NART).

Research Project

GOAL 8: To complete a project which would meet the research requirement for completion of the internship and which would be relevant and useful to the intern in possible future career roles of elementary guidance counsellor or educational psychologist.

After consultation with the Diagnostic Unit Director and the Faculty Supervisor, the intern undertook a research project which had the following purposes:

1. To conduct a concurrent validity study between The Boder Test of Reading-Spelling Patterns, a screening test for reading disabilities, and the Reading subtest of the Wide Range Achievement Test-Revised, a widely used screening measure of achievement in Reading, Spelling, and Arithmetic.

2. To compare the reading disability subtypes identified by The Boder Test of Reading-Spelling Patterns with the WISC-R verbal intelligence quotients, and Kaufman's three factor scores and categorizations of information processing subtests from the Wechsler Intelligence Scale for

Children-Revised. The purpose was to see if the various factors would vary in the same way as described by the validation research presented in the manual for The Boder Test of Reading-Spelling Patterns.

Details of the research component of the internship are presented in the second chapter of this report.

Conclusion

This chapter outlined the eight goals the intern had set out to accomplish in the thirteen-week internship period. The main focus of the goals was to engage in a variety of activities designed to further the intern's competence in the skills that are considered to be essential to effective functioning in the role of elementary school guidance counsellor.

Activities designed to enhance skills in the areas of psychoeducational assessment, programming for special needs, individual counselling and parent consultation were performed throughout the internship. Teacher consultation, however, which is considered to be an important technical and clinical skill needed to be a competent clinical assessor of children, could not be addressed in a satisfactory manner. The timing of the internship, which was from May to August, left little time when the Unit and the schools were operating

concurrently. As a result, the intern was not able to engage in as much teacher consultation as she would have liked nor was she able to observe children in the school setting, another important facet of assessment of children.

Since completing the internship the intern has had experience working as an elementary school guidance counsellor and would like to make a comparison between internships in the school system and in a university diagnostic and remedial clinic. There seem to be advantages and disadvantages to both.

As might be expected from a special unit within a university setting such as the Diagnostic Unit it had the advantage of having more staff resources from which the intern could draw upon. A school usually has the services of only one guidance counsellor.

Secondly, the Unit's access to a large number of children, referred from all parts of the province and with their myriad difficulties provided a rich training ground for interns wishing to develop their skills in the psychoeducational assessment of children. Such a population base allowed the intern exposure to a broad range of disabilities that can affect children. For example, children were seen who had autism, communication delays,

developmental delays, learning disabilities, epilepsy, attention deficit hyperactivity disorder, etc.

Thirdly, the Unit's stress on parental involvement in the child's assessment is in direct contrast to the focus that many schools take - which is, that teacher information is the more important aspect of the assessment data gathering process. Having parents view their children through one-way mirrors and reporting typical and untypical behaviour patterns is an invaluable contribution to the validity of the assessment outcome.

While parental observation is impossible to achieve at the present time in the school setting, at least in the work settings to which the intern has been exposed, the experience has made the intern more aware of the limitations of putting children in unfamiliar situations for short periods and hoping that an adequate sample of their capabilities has been made. As a result, the intern realizes the importance of the parent interview when assessing children. While assessing children since the internship experience, the intern has often discussed with parents how their children have reacted to the testing situation and this has helped in the assessment process.

An internship in a diagnostic centre had a number of advantages; however, there were limitations on such an internship setting for a school counsellor. Although psychoeducational assessment is a major function of an

elementary school guidance counsellor's job, there are other functions such as crisis intervention, teacher consultation, group counselling, preventative guidance, etc. At the time of this internship, experience in these areas could have been more adequately obtained in the school setting as the Diagnostic Unit had a limited mandate to assess and provide remediation services for children.

The school setting also would have allowed the intern to better understand the excessive demands placed upon a guidance counsellor in the elementary school setting. Assessment is such a time-consuming aspect of the job but the other types of demands mentioned previously, such as crisis counselling, teacher consultation, social services liaison, etc. compete for the counsellor's time and thus put added pressure on the counsellor. The Diagnostic Unit staff had more narrowly defined job functions and did not have the same type of job stresses.

Finally, the school setting obviously is very different from the setting in a university diagnostic clinic and provides much information that is invaluable to a counsellor in assessing children's learning difficulties and in planning intervention or remediation. For example, information concerning teachers' personalities, discipline methods, class achievement levels, school spirit, etc. can be important to know when diagnosing children's learning and

behavioral difficulties. Not being a member of the school staff makes it more difficult to find out about these aspects of school functioning.

In retrospect, both the University Clinic setting and the school setting appear to have mutually exclusive and some similar advantages as internship placements for students desiring experience in the assessment of children. Ideally, the student counsellor would be best prepared by spending time in both kinds of settings. The school placement, however, was not available at the time in the Master's program when internships were usually scheduled - that is, in the Spring semester after the Program's coursework has been completed.

The intern's skills in assessing, counselling, and consultation were improved by her experiences during the internship. The choice of an internship at this site supplemented to a large degree the practical experience that was obtained through the pre-practicum and practicum periods that were required by the Educational Psychology Master's Program. The required pre-practicum period was half a day for twelve weeks and the intern chose to spend this pre-practicum period with an Employee Assistance Program coordinator employed by a local utility company. As mentioned previously, the required practicum period was two days a week for twelve weeks and the intern chose the Diagnostic Unit as the site for this experience.

The experience of the practicum led the intern to develop an interest in doing her internship research in the area of reading disabilities, with specific focus on The Boder Test of Reading-Spelling Patterns which was then being used by some educational psychologists and elementary school counsellors in our provincial school system to diagnose reading disabilities. This research allowed the intern to delve into the area of reading disabilities and obtain knowledge which has proved to be very helpful in her subsequent employment as an elementary school guidance counsellor. Prior to doing this research, the intern had only completed two undergraduate courses in reading.

The supervision the intern received from the Diagnostic Unit's Director was invaluable in providing insight into the assessment process with children. The Director observed the intern assessing children, made suggestions as to the choice of assessment and remediation materials, provided constructive criticism about reports and assessment techniques, was always available to answer questions posed by the intern, and made available to the intern her extensive reading and audiovisual materials.

At the halfway mark of the thirteen-week internship period the Director, the Faculty Supervisor, and the intern met to assess the intern's progress in accomplishing the goals that had been set. At the end of the thirteen-week period the Director and the intern met again to decide how

well the goals had been met. The interr's Faculty Supervisor was unable to attend because he had left the province on a two-year work contract shortly after the intern had finished half the internship.

CHAPTER TWO

RESEARCH PROJECT

Introduction

In order to fulfil the requirements of the internship option offered by the graduate program in Educational Psychology, a research project must be completed by the intern. As the main focus of the thirteen-week internship is to gain practical experience, the research expectation is not as extensive as that expected when a student takes the thesis option. The research should take up a minor part of the time spent doing the internship and must deal with a problem of the type usually confronted by a practising counsellor in the setting the intern is working (Department of Educational Psychology, 1975).

Rationale for Research

Illiteracy is a serious problem for many Canadians. The province of Newfoundland is estimated to have one of the highest illiteracy rates in Canada. Depending on the measures used, Newfoundland's illiteracy rate has been estimated to be from a quarter to nearly a half of the population (Statistics Canada, 1991; Southam Newspaper Group, 1987). Some of the

implications of illiteracy for people are poorer employment prospects, lower standards of living, lower self-esteem, and inability to take part in many leisure-oriented and work activities that require reading. While lack of opportunities for schooling might be a contributor to the province's high illiteracy rates, many children leave school not having learned to read.

Reading difficulty is the most common reason for students being referred for special education services. Good tests to diagnose reading difficulties are an important part of the assessment tools used by special educators, guidance counsellors, and educational psychologists. Considering the caseloads carried by these practitioners in psychology and education, tests that provide useful information and are also quick to administer and score are among the most valued tests in an assessment battery.

It was with the intention of investigating a test which was being used by counsellors and educational psychologists in our provincial school systems that the intern decided to do research involving The Boder Test of Reading-Spelling Patterns (Boder & Jarrico, 1982). This test purports to diagnose three types of reading disabilities and prescribes remediation techniques for each subtype, yet the test is not norm-referenced. Because of the claims made by Boder & Jarrico as to the test's purpose and use and because it

appears to be used locally as a reading disability diagnostic tool, the intern decided that the test merited a critical review of its psychometric properties and an evaluation of its usefulness.

Purpose of the Research

The purpose of the research was three-fold: to conduct a concurrent validity study of The Boder Test of Reading-Spelling Patterns; to attempt to replicate some of the construct validity findings that have been presented in support of The Boder Test; and to examine the variability of Kaufman's (1975) intelligence test factor scores and categorizations of information processing styles among groups of dyslexic and non-dyslexic readers, subtyped using Boder's reading disability classification system.

Limitations of the Study

This study is limited by the number of subjects available to the intern. A maximum number of 31 children did not provide numbers necessary for statistical procedures appropriate to the hypotheses generated from the critical review of related research. In spite of this limitation, this exploratory study represents a promising area for theoretical reasons as well as for its practical implications.

Strength of the Study

To date there has been no published study of the concurrent validity of the Boder using the WRAT-R.

The Boder Test of Reading-Spelling Patterns

The Boder Test of Reading-Spelling Patterns: A Diagnostic Screening Test for Subtypes of Reading Disability (Boder & Jarrico, 1982) purports to differentiate developmental dyslexia from nonspecific reading disorders and identify reading disability subtypes with differing remedial implications. The diagnostic concepts and procedures that led to the development of the Boder Test evolved from the clinical experience of Dr. Elena Boder in her position as a paediatric neurologist in Neurology clinics in the school system and the Cedars-Sinai Medical Centre of Los Angeles, California. Although the children seen in her clinics were referred because of behaviour problems, most of them had reading problems that referral sources felt were secondary to the behaviour problems. Dr. Boder wondered whether some of the behaviour problems were secondary to an underlying specific reading disability. She felt that making such a distinction was crucial to the type of therapy and remediation that would work best with the child.

Dr. Boder wanted to develop a definitive direct diagnosis approach to the diagnosis of 'developmental dyslexia' as a better alternative to the 'diagnosis by exclusion' that she claimed was most widely used by physicians to diagnose dyslexia. She accepted the direct diagnosis method advocated by several researchers (Critchley, 1970; Orton, 1937; Thompson, 1966), that of identifying dyslexic errors of cognitive dysfunction in the reading and spelling performances of good and poor readers, hoping to elicit definitive signs of developmental dyslexia.

Extensive use in her neurology clinics of another informal reading inventory and her own two-part spelling test led Boder to observe that the spelling of most poor readers lagged considerably behind their reading. She found that good readers could spell correctly between 70 and 100 percent of words in their sight vocabularies, at grade level, whereas poor readers could rarely spell as many as 50 percent of the words in their sight vocabularies correctly at their own reading level. She thus postulated that this marked reading-spelling discrepancy was the single most consistent single indicator of developmental dyslexia.

Three dyslexic reading-spelling patterns emerged from Boder's analysis of the spelling records of children identified as dyslexic by the exclusion

method. Boder went on to relate these reading-spelling patterns to cognitive components of the reading process. She adopted the premise that reading is essentially a two-channel function, requiring the automatic integration of intact visual and auditory processes, both peripheral and central. From there she likened the reading performances in her reading test to these visual and auditory processes. She described the ability to recognize words in the sight vocabulary as a global process whereby words are processed as an instantaneous visual gestalt and the ability to decode unfamiliar words phonetically as being an auditory analytic process.

The test, then, is based on the premise that the dyslexic reader has a characteristic pattern of cognitive strengths and weaknesses in two distinct components of the reading process: the visual gestalt function and the auditory analytic function. The visual gestalt function underlies the ability to develop a sight vocabulary through visual perception and memory for whole words; the auditory analytic function underlies the ability to develop phonic word-analysis skills. Reading and spelling performances are analyzed to determine a child's pattern of cognitive strengths and weaknesses.

The two basic components of the reading-spelling process assessed by the Boder Test, Boder claims, are the two cognitive functions that are basic

to the two standard methods of initial reading instruction: the whole-word method and the phonics method. Boder contends that these two reading process cognitive components correspond to the gestalt-simultaneous processing and the analytic-sequential processing that, according to neuropsychological research evidence she cites, are mediated by the right and left cerebral hemispheres, respectively.

Boder & Jarrico (1982) provide an operational definition of 'developmental dyslexia' as "a reading disability in which the reading and spelling performance gives evidence of cognitive deficits in either the visual gestalt function or auditory analytic function, or both" (p.5). They give a corollary of this definition as "when the reading and spelling pattern of poor readers gives no evidence of such cognitive deficits, the reading disability is regarded as nonspecific rather than dyslexic" (Boder & Jarrico, 1982, p.5).

The Boder test consists of a reading and a spelling test. The reading test material includes 13 graded word lists, graded from Pre-primer to Adult. Each list contains 20 words, half of which are phonetic and half of which are nonphonetic. The odd numbered words in each list are the phonetic words and the even numbered words are the non-phonetic words. Boder & Jarrico (1982) describe 'phonetic' words as words that look like they sound or words

in which all of the letter-sound correspondences are standard and pervasive in English spelling. 'Nonphonetic' words, then, are those in which one or more of the letter-sound correspondences is unusual, including words with silent letters that are not sounded in the spoken word. A copy of the Examiner's Recording Form for the Reading test is in Appendix E.

The main objective of the Reading test is to identify the child's sight vocabulary so the word lists are presented in two ways: flash and untimed. If the child does not read the word within one second it is not considered in his sight vocabulary as these words are supposedly words a child can read instantly as whole-word configurations, or gestalts. If the child correctly identifies the word within ten seconds then the word is considered to have been identified by the child's use of phonic word-analysis skills and indicates a child's ability to read words not in his sight vocabulary. The examiner is asked to record all misreadings of words the child makes. The starting point for the test is at the pre-primer word list if a reading problem is suspected, regardless of the child's age. If there is no suspicion of a reading problem, the starting point is two grades below the student's actual grade level. In any case, the starting point should never be higher than the fifth grade. A reading level is determined when the student reads six or fewer words from a list at

flash presentation. Specific information on administration and scoring is contained in Appendix F.

The Spelling test follows the administration of the reading test. The examiner is asked to prepare two individualized spelling lists on the basis of the student's reading performance. Ten known words are selected from the Flash column at the child's reading level or actual grade level, whichever is lower, and one grade below if required (ten words which the child could not identify are also chosen). An equal number of phonetic and nonphonetic words are chosen. It is suggested that a special effort be made by the examiner to include a number of multisyllabic words in the spelling list. The purpose of the known words spelling list is to determine if the child is able to spell words that are in his sight vocabulary and thereby determine whether the reading-spelling discrepancy is in the normal or dyslexic range. The purpose of the unknown words list is to assess the child's ability to use sound/symbol correspondences in spelling words not in his sight vocabulary. Scoring procedures for the spelling tests are included in Appendix F.

Explanations of the subtypes of developmental dyslexia that Boder devised are as follows:

1. Dysphonetic reader: The reading-spelling pattern of this group indicates cognitive deficit in integrating letters with their sounds, with resulting disability in developing phonetic word-analysis or decoding skills. This group has no gross deficit in visual gestalt function.

2. Dyseidetic reader: The reading-spelling pattern of this group indicates cognitive deficit in visual memory and perception for letters and whole-word configurations or gestalts, with resulting disability in developing a sight vocabulary. This group has no gross deficit in analytic function, that is, no disability in developing phonic skills.

3. Mixed Dysphonetic-Dyseidetic reader: The reading-spelling pattern of this group indicates a combination of the cognitive deficits of the dysphonetic and dyseidetic subtypes, with resulting disability in developing both sight vocabulary and phonic skills. This group may be virtually alexic, that is, nonreaders and nonspellers.

Boder's test also classifies readers into the following categories: normal reader, readers with a nonspecific reading disability and readers with an undetermined pattern. Boder describes the normal reader as one whose reading-spelling pattern reflects strengths in both the visual gestalt and auditory analytic functions of reading and an automatic integration of those functions. Readers with nonspecific reading retardation typically possess a

reading level that is less than two years below grade level but the reading retardation is not considered to be due to cognitive deficits so their reading-spelling pattern would be similar to the normal group. Finally, the undetermined category includes individuals whose reading-spelling pattern is essentially that of a dyseidetic but whose reading levels are higher than that group. More detailed information pertaining to the administration and scoring of the test, including a copy of a Diagnostic Summary Form is contained in Appendix F.

In addition to the reading and spelling tests, Boder and Jarrico (1982) suggest that a number of supplementary tasks may be given. Alphabet tasks are used as diagnostic aids with children whose sight vocabularies are below the preprimer level or who are not reading at all. Syllabicating tasks and drawing the face of a clock from memory are other tasks suggested as means of providing additional information about the severity of a reading disability, of corroborating the reader subtype, or offering more information with which to develop remedial strategies. A description of supplementary tasks is presented in Appendix G.

Review of the Literature

Reviews of the Boder Test of Reading-Spelling Patterns

Extensive review of the literature resulted in eight reviews of the Boder, six of which were critical of the test's psychometric properties (Reynolds, 1984, 1986; Schrank, 1985; Shanahan, 1985; Bing, 1985; and Hynd, 1984). Particular criticisms regarding psychometrics from these reviews were: the test has no normative data, no standard scores, grade equivalents are used (usage of which has been condemned by the International Reading Association since 1981), reading quotients which are based on mental age are used (mental age being an outdated concept in psychoeducational assessment), and the spelling lists used are not the same for every child.

Alexander (1984) critiqued the test using a reading theory and reading diagnosis framework. She claims the test views reading as a "text-driven" process as opposed to the view of reading as an "interactive" process. She says the test has no ecological validity as a reading diagnostic tool; it is a timed, oral reading task of words in isolation which is not at all like the real reading situation.

In her critical review of The Boder Test of Reading-Spelling Patterns, Smith (1983) claims that the evidence for the validity of Boder's reading disability classifications is indirect. Smith also states that the correlational construct validity studies done (i.e., electrical brain activity, performance on tests of speech perception, and comparison of performances on the Boder with performances on the WISC-R subtests) mainly show that only the "dysphonetic" subgroup exhibit deviant patterns in their neurology or behaviour. Hynd (1984) also expresses this view.

In addition to her criticism that the Boder test has no ecological validity, Alexander (1984) also thinks that the test is not sensitive to specific reading disabilities of students who have a sight vocabulary below the preprimer level and is not suitable for individuals whose reading problems are not stemming from problems with the auditory analytic or visual gestalt aspects of reading decoding. Alexander says the test is only useful in screening individuals who have problems decoding words, which would leave out many children who have difficulty with the comprehension aspect of reading.

Schrank (1985) and Bing (1985) suggest that the administration directions accompanying the test are convoluted and complex. Schrank (1985), Shanahan (1985), and Hynd (1984) question the validation information

outlined in the test manual because most of the work originated from unpublished studies or unpublished doctoral dissertations.

The author of one of two reviews contained in the Ninth Mental Measurements Yearbook, Shanahan (1985) describes the strength of the test as its ability to differentiate between children having sight vocabulary and phonics problems in reading. He says as a quick screening device the Boder is probably no better or worse than tests like the Slosson Oral Reading Test, the Peabody Individual Achievement Test, or the Wide Range Achievement Test although the Boder, in comparison to the others, has not been standardized and is therefore lacking their psychometric properties.

With such serious limitations reported in the reviews, it is queried whether users of the tests are aware of the test's faults but use it to serve a minor purpose such as differentiating whether a child has a sight vocabulary or phonics difficulty or whether they believe the test's claims and use it to diagnose different subtypes of reading disabilities.

Reading Disability Subtype Research

Subtyping studies have been carried out in one of two ways: by administering a battery of tests to a large sample of subjects and using

statistical procedures, such as factor analysis, to determine whether coherent groupings can be identified or, by constructing cognitive descriptions of individual cases and then considering to what extent the descriptions may be said to be the same or different from one another. In other words, the subgroups are either empirically or clinically derived.

Boder and Jarrico (1982) in the test manual state that Boder developed her reading disability subtypes clinically after analyzing and synthesizing much of the empirically derived subtyping research done in the 1960's and 1970's (Bannatyne, 1966; Bateman, 1968; Denckla, 1977; Doehring & Hoshko, 1979; Friedman, Guyer, & Tymchuk, 1976; Kinsbourne & Warrington, 1963; Mattis, French, & Rapin, 1975; Myklebust, 1960,1965; Petrauskas & Rourke, 1979; Pirozzolo, 1979). Boder claimed that, although different test batteries and different criteria have been used, basically the subtypes identified mainly tended to be of two types, giving evidence of cognitive disabilities in either visual or auditory channel functions. As mentioned previously, her subtypes were dysphonetic, dyseidetic, and mixed dysphonetic-dyseidetic.

A clinical approach which has features similar to Boder's clinically derived classification system is that of Seymour (1986). Based on a three component information processing model he developed, Seymour described three dyslexic subtypes that he claimed were not distinct but were more a

reflection of the most severely affected processing system. These subtypes were: developmental phonological dyslexics, or readers who had the most difficulties processing words phonologically; visual processor dyslexics, those who had difficulties registering and parsing printed words; and developmental morphemic dyslexics, those who had impairments in semantic analysis of words.

Bakker (1979, 1992) proposed that at least two subtypes of dyslexia exist. His clinically derived classification system stems from what he calls the Balance Model of learning to read. He says that learning to read requires a developmentally changing balance of perceptual and linguistic processes which at the cerebral level is paralleled by a changing balance of right and left hemisphere subservience. He describes one dyslexic subgroup as the P-type dyslexic. This subgroup is characterized by an overreliance on right-hemisphere process involving perceptual synthesis, which leads to slow reading marked by many fragmentation errors. (Fragmentation errors are words read as fragments rather than as one continuous word, e.g., Amsterdam read as Am-ster-dam, and hesitations). The L-type dyslexic is characterized by an overreliance on left-hemisphere processes such as syntactic-semantic processing and suppression of right hemisphere strategies which result in a

disregard for the perceptual features of the text; this group reads quickly and makes many omission errors.

Watson, Goldgar and Ryschon (1983) used cluster analysis and found three subgroups in an empirical study involving 23 measures of reading, language, auditory and visual processing, memory, perceptual organization, and visual-motor coordination for 65 reading-disabled children. The clusters were characterized by the following: (1) a visual processing deficit; (2) a generalized language disorder; and (3) a minimal deficit subtype. However, further analysis of the subtype clusters revealed that they were relatively heterogeneous and thus had limited clinical utility.

Two researchers attempted to validate the "genetic dyslexic" sybtype postulated by Bannatyne (1971). Bannatyne proposed a three-dimensional regrouping system for subtests of the Wechsler Intelligence Test for Children which would supposedly enhance the diagnostic utility of the intelligence test results. The system reclassifies nine of the subtests into three composite measures thought to assess conceptual, spatial, and sequential abilities. Bannatyne discovered that 30% of the reading disabled children exhibited a distinctively ordered profile of the composite scores and that within this group there was a high incidence of reading problems reported among biological relatives. He thus proposed that a "genetic dyslexic" subtype of reading

disability might be recognized by a distinctive profile of composite scores. Decker & Corley (1984) examined Wechsler Intelligence Scale for Children - Revised data obtained from 280 children (140 disabled readers and their matched controls) and were unable to provide support for Bannatyne's subtype. They did, however, confirm Bannatyne's observations that disabled readers, as a group, demonstrate a unique and statistically reliable Spatial > Conceptual > Sequential profile of intelligence test composite scores.

Two similar studies also produced numerous reading disability subgroupings. Lyon and Watson (1981) reported identifying six subtypes after cluster analysis of results of a battery of auditory receptive language, auditory expressive language, and visual perceptual, memory, and integration tasks administered to 100 reading disabled children and 50 normal readers. Cluster analysis results carried out by Lyon, Stewart, & Freedman (1982) in a similar subtype identification study involving younger reading disabled children revealed the presence of five reading disability subtypes. In a 1985 review of his own subtyping research and that of others, Lyon cautions that many subtype studies have not been able to be replicated because of the wide variety of theoretical assumptions and measurement batteries that are used in the research.

In a review of 31 studies that provide various subclassifications of

dyslexia, Malatesha and Dougan (1982) found that 7 studies describe two subtypes, 21 studies describe three subtypes, and 3 studies describe four subtypes. To compound the complexity of these findings, most of the subtypes were derived using different assessment techniques and classification criteria.

Hynd and Cohen (1983), in their review of the literature on dyslexic subtypes, concluded that evidence exists for at least two, and possibly several, subtypes of dyslexic children. They concluded that evidence exists to support a subtype of developmental dyslexia associated with impairment in psycholinguistic abilities and disordered functioning of the left (dominant) hemisphere, another subgroup in whom visual-spatial or visual-motor skills are lacking and who may be deficient in right hemisphere functioning, and a third, less well-differentiated group, whose members experience deficits in the skill areas thought to be subserved by both hemispheres.

Spreen (1987) claims that although no general agreement on a specific reading disability subtype system has emerged, Boder's (1970) system is one that is used frequently. Some neuropsychological textbooks (Kolb & Whishaw, 1990; Hartlage & Telzrow, 1986) refer exclusively to Boder's system of classification when discussing reading disability subtypes. Snowling (1991), however, says that although Boder's classification system was one of the best known early attempts to classify dyslexics based on functional impairments,

Boder's method has largely been superseded, mainly because of difficulties in validating the measures used to define the subgroups.

To add another point of view to the reading disability subtype issue, Siegel, Levey, & Ferris (1985) claim that subtypes of developmental dyslexia do not exist. They reviewed many subtyping studies (1968-1985) and suggested that conclusive and convincing evidence of subtypes of reading disabilities has not emerged. They contend that the term "dyslexia" should be used to refer exclusively to children who are significantly retarded in learning the letter-sound correspondences of the language in question.

As can be seen from the research previously cited, reading disability subtyping is still a contentious and complex issue in the field of learning disabilities. To embrace Boder's subtype classification system and use it and her screening test as the only method of diagnosing reading disabilities would not be an action supported by the subtyping research completed to date. Kolb and Whishaw (1990) suggest that assessment of dyslexia which provides a number of different evaluation criteria combined with counselling directed toward the specific difficulties experienced by each individual is the most effective approach for both research and remediation in this area. Some construct validity studies of Boder's subtypes have been carried out and the research is presented in the next section of this paper.

Construct Validity Studies of Boder Subtypes

In their test manual, Boder & Jarrico (1982) report on six research studies purporting to provide support for the construct validity of her reading disability subtypes. Four of the six studies were unpublished doctoral dissertations and two were published research papers.

Two of the doctoral studies (Ginn, 1979; Smith, 1970) analyzed WISC-R patterns of reading disabled children diagnosed into subtypes by The Boder Test of Reading-Spelling Patterns. Smith's study found similarities between the dyseidetic group and children whose WISC-R scores exhibited a strength in left hemisphere tests as postulated by Bannatyne (1966). Children whose WISC-R patterns showed strength in right hemisphere tests (spatial organization) exhibited the reading-spelling patterns of Boder's dysphonetic group.

Ginn, in his 1979 doctoral dissertation, compared verbal and performance intelligence quotients for a sample of 214 boys, 100 of whom were educationally handicapped. Of the 91 children categorized into one of Boder's three subtypes (9 were in the Undetermined category), as diagnosed by Boder's test, Ginn found significant differences in mean verbal intelligence quotients among the three subtypes. Dyseidetic children obtained the highest

mean verbal IQ score and mixed dysphonetic-dyseidetic children obtained the lowest. These results supposedly confirm the left and right hemisphere processing strengths exhibited by dyseidetics and dysphonetics respectively. However, research since that time provides no empirical support for the once believed premises that the WISC verbal subtests involve more left cerebral functioning and the performance subtests involve more right cerebral functioning and that a large discrepancy between the scores would indicate dysfunction in one hemisphere or the other (Goodman & Whitaker, 1985).

Menken's 1981 doctoral dissertation involved the study of the auditory processing mechanism in normal and dyslexic readers as identified by the Boder. Menken found that there was no difference in analytic function between normal and dyseidetic readers. However, dysphonetic readers showed weakness in analytic function in that they made significantly more errors than the other two groups when asked to determine whether aurally presented syllables were semantically meaningful or were nonsensical.

The fourth unpublished doctoral dissertation Boder cites does not provide any direct evidence supporting the reading disability subtypes. Sporn (1981) examined the distribution of the Boder test dyslexic categories - dysphonetic, dyseidetic, mixed dysphonetic-dyseidetic, and undetermined - according to socioeconomic status and race. Sporn found no significant

differences in the distributions based on socioeconomic status for both sexes and in the distributions based on race for the males. Boder claims that these findings suggest that the Boder test can successfully discriminate between dyslexic subtypes among both low and middle socioeconomic status children and that the findings challenge definitions by exclusion that imply that dyslexia cannot or should not be diagnosed in low socioeconomic status children.

Aaron's (1978) and Malatesha's and Dougan's (1982) studies are cited in the Boder manual as providing evidence for the construct validity of Boder's subtypes. Aaron (1978) administered a psychological test battery to 42 children - 14 normal readers and 28 children who were diagnosed as reading disabled by the Boder test. His tests were supposed to reflect two types of information processing, the analytic-sequential and holistic-simultaneous, similar to Boder's auditory-analytic and visual-gestalt cognitive processes involved in the reading process. He administered four tests: the WISC Digit Span subtest, tests of memory for faces, reproduction of paired-letter stimuli, and reproduction of individual letter-shapes. Test score analysis revealed the following results: that the dysphonetic group (n = 14) identified significantly more faces than the dyseidetic group (n = 14); the dysphonetic group recalled significantly fewer digits in sequence than the normal readers (n = 14), however, the level of statistical significance used was not the

conventional level ($p < .10$); the dysphonetic group reproduced significantly more paired letters as visual gestalts than the dyseidetic or normal groups; on delayed recall the dysphonetic group reversed more letters and shapes than did the dyseidetic and normal reader groups. These results led Aaron to conclude that dyslexic children deficient in one information processing strategy are normal in the other. Such a conclusion is unwarranted because of the small number of subjects utilized in the study, the level of statistical significance chosen to report results, and the assumption that the four tests Aaron administered reflect and exclusively represent the two types of information processing being investigated.

Malatesha and Dougan (1982) used a dichotic listening digits task with normal and dyslexic readers classified by the Boder test. There were 14 first and second grade children in each of the three groups - normals, dysphonetics, and dyseidetics. The authors found no significant difference between normal and dyseidetic readers on the listening task but they did find a significant difference between the normal and dysphonetic groups. Again, conclusions are based on small numbers ($n = 14$) in each group and the evidence that there are group differences for performances on one task is indirect rather than direct evidence for Boder's classification system.

A number of other construct validity studies have been conducted since the publication of The Boder Test of Reading-Spelling Patterns in 1982. Of the four research studies, two do not provide conclusive evidence for Boder's classification system (Nockleby & Galbraith, 1984; Van den Bos, 1984). One study, although it claims to provide supportive construct validity evidence, suggests that the theoretical basis for Boder's system may be faulty (Flynn, Deering, Goldstein, & Rahbar, 1992). Two studies (Flynn et al., 1992; Nockleby & Galbraith, 1984) suggest that some of Boder's subtypes are really variations of reading difficulties that have linguistic origins. Van den Bos (1984), in trying to validate the visual processing aspect of the subtypes, found little difference between the subtypes but did find differences between the non-subtyped dyslexic and the non-dyslexic groups. The findings of the latest research are reported in the following section.

Nockleby and Galbraith (1984) examined Boder's constructs of dysphonetic dyslexia and nonspecific reading retardation. They compared group performances on tasks requiring analytic-sequential and simultaneous-gestalt processing. Numbers were small, 13 dysphonetics, 9 nonspecifics and 10 controls, but the authors concluded that the two constructs received some support because dysphonetics and nonspecifics did not perform significantly different from the controls on any of the simultaneous-gestalt processing

measures, the dysphonetics performed significantly below the normals on three of the four analytic-sequential processing measures, and the nonspecifics performance was not significantly different from the normals on seven of the eight dependent variables.

Interestingly, however, the fact that the two experimental groups performed similarly and significantly below the control group on the Lindamood Auditory Conceptualization test (Lindamood & Lindamood, 1971) was construed as evidence against Boder's classification system. The Lindamood Auditory Conceptualization Test diagnoses phonetic skills difficulties. Nockleby and Galbraith suggest that the dysphonetic and the nonspecific readers may be on different points of a continuum of disabled readers who have difficulties processing the sounds of words. Boder (1982) had described individuals in the nonspecific reading retardation category as having intact phonetic analysis and visual gestalt word processing skills.

Van den Bos (1984) presented groups of dyslexic children, who had been subtyped according to the Boder classification system, with reading related tasks that supposedly tapped some aspects of the cognitive dimensions on which, according to Boder (1982), these children are supposed to differ. Specifically, Van den Bos carried out two experiments involving letter

processing in three dyslexic subgroups, diagnosed according to Boder's criteria, and three control groups.

Results of van den Bos's first experiment, which investigated letter-span and letter-scanning skills using stimuli presented via the two modalities (visual and auditory), did not confirm the hypothesis that auditorially presented letter sets should be processed better by dyseidetic than by dysphonetic readers. The only significant result was that all the dyslexic groups performed poorer than the control groups on the letter-scanning tasks.

The second experiment involved letter-matching tasks using six conditions. Two significant findings emerged - that all three dyslexic groups made more errors than the control groups when the letter-matching condition was one whereby capital and lower case letters for the same letter were presented as pairs (e.g., Bb or Dd) and the subjects had to determine whether they were alike or different; and the control groups performed better than the dysphonetic and mixed dyslexic groups when the condition involved pairs of letters that had physically confusing differences (e.g., OQ or EF) but the dyseidetic group performed significantly better than the mixed dyslexic group. Van den Bos concluded that these results suggest a greater similarity in the nature of letter processing problems in dyslexic children than is assumed in Boder and Jarrico's (1982) reading disability subtype test. Van den Bos did

caution that these results focused only on letter-processing and not the reading of whole words so differentiation at the word level would need further research.

In his 1984 report of his study, van den Bos cited a replication study of Aaron's (1978) work carried out by Borst (1980) as part of an unpublished Master's thesis on dyslexia. Borst found no differences in the dysphonetic and dyseidetic groups studied on the measures of memory for faces (as used by Aaron, 1978) and the WISC Digit Span subtest. These findings weaken Aaron's claim that the dyslexic child is most likely deficient in one of two information-processing strategies, namely analytic-sequential and holistic-simultaneous, while being normal in the other. As was mentioned previously, Boder used Aaron's findings to support her claims for the construct validity of her subtypes.

Flynn and Deering (1989), using electroencephalograms recorded during cognitive tasks, investigated the construct validity of Boder's classification system. Two studies were conducted. In the first study which examined 21 dyslexic children and 6 controls, there were significant differences between the dyslexic subgroups and between the dyslexic and control groups on three of the six cognitive tasks. Significant differences were found for two of seven cognitive tasks in the second study which used 33

dyslexic children and 31 controls. The authors also found significant differences in left temporal-parietal theta activity in the electroencephalograms of the dyseidetic children which they interpreted to mean that the reading disabilities of that group may be the result of over-use of linguistic abilities rather than deficient visual-spatial skills.

Finally, Flynn, Deering, Goldstein, and Rahbar (1992) investigated the construct validity of Boder's dyslexia subtypes using quantified EEG. Their results supported Boder's constructs. Using a sample of 27 dysphonetics, 6 dyseidetics, and 6 nondisabled children, they examined EEG amplitudes of children while engaged in contextual reading tasks and at rest. They found left temporal differences in children with dyseidetic dyslexia and right parietal-occipital differences for those with dysphonetic dyslexia. They expected higher amplitudes in children with dyslexia as opposed to the nondisabled, based on the hypothesis that dyslexic children would overcompensate when engaged in contextual reading tasks; however, they obtained the opposite result.

Although the results provided support for Boder's typology, the authors suggest that Boder needs to reconsider her theoretical base. Boder hypothesized that children with dyseidetic dyslexia read poorly because of right-hemisphere deficits. She also believes these children have normal left-

hemisphere-mediated phonetic analysis abilities. Based on results of three independent samples (Flynn & Deering, 1989; Flynn et al., 1992) wherein significant left temporal differences were found in children with dyseidetic dyslexia compared to nondisabled readers, Flynn et al., (1992) propose, using Frith's (1981) analysis of reading development, that dyseidetic dyslexic children do not have normal decoding skills. They claim this group are deficient in reading because of overreliance on lower level linguistic skills. Dyseidetic dyslexics perceive sound-by-sound and do not advance to perception of words and word parts as meaningful units.

Frith (1981) postulates a reading development process that starts with the "logographic" stage, which is the perception of words as separate entities, followed by the "alphabetic" stage, involving discovery of decoding principles, and culminating in the "orthographic" stage, involving analysis of word parts and perception of patterns. Flynn et al. (1992) describe dyseidetic dyslexic readers as having skipped the initial logographic stage and remaining stuck at the alphabetic stage. In contrast, they explain that the dysphonetic dyslexic readers' reading development progress involves doing relatively well at the logographic stage, bypassing the alphabetic stage and progressing through the orthographic stage to become more or less effective readers, recognizing words through analogy to known words and analysis of word parts. This

interpretation recategorizes dyseidetic dyslexia as being of linguistic origin.

As mentioned earlier, the intern wanted to investigate the relationship between Boder's reading disability subtypes and results obtained from the Wechsler Intelligence Scale for Children - Revised (1974). Where Smith (1970) used Bannatyne's (1966) left and right hemisphere test categories, the intern proposed to use Kaufman's (1975) factor scores and his information processing categorizations of subtests. Kaufman's factors were chosen because they have been adopted as part of the most recent edition of the Wechsler Intelligence Scale for Children, the WISC-III (Wechsler, 1991), a test widely used by guidance counsellors and educational psychologists. Following are explanations of Kaufman's factor scores and his categorizations of simultaneous and successive subtests of the Wechsler Intelligence Scale for Children - Revised.

Kaufman's WISC-R Factor Scores

Factor analysis of the standardization group for the Wechsler Intelligence Scale for Children - Revised (Wechsler, 1974) indicated that three factors could describe what the test is measuring: Verbal Comprehension, Perceptual Organization, and the Third Factor, also called Freedom from

Distractibility (Kaufman, 1975). Many clinicians who are involved in the assessment of children analyze WISC-R patterns and use factor scores in an attempt to evaluate a child's strengths and weaknesses. The newest edition of Wechsler's intelligence scale for children, the Wechsler Intelligence Scale for Children - III (Wechsler, 1991), allows for the scoring of the three factors, transformation of the scores into deviation quotients, and provides data for comparative profile analysis purposes.

The Verbal Comprehension factor score measures verbal knowledge and understanding obtained informally and through formal education. Four verbal subtests, Information, Similarities, Vocabulary, and Comprehension have been found to have the highest loadings on the Verbal Comprehension factor. The sum of the scaled scores for these subtests yields a Verbal Comprehension factor score which can be converted to a deviation quotient.

The Perceptual Organization factor, a nonverbal score, reflects the ability to interpret and organize visually perceived material within a time limit. This factor score is calculated by finding the sum of the scaled scores for the Picture Completion, Picture Arrangement, Block Design, and Object Assembly subtests.

Lastly, the Third Factor, or Freedom from Distractibility factor is computed by summing the scaled scores for the Arithmetic, Digit Span, and

Coding B subtests. There have been many interpretations as to what this Third Factor is measuring. Sattler (1988) suggests that this factor score measures the ability to attend or concentrate, but may also involve numerical ability and short-term memory.

Waldron and Saphire (1990) in a comparative analytic study of WISC-R factors for gifted students with and without learning disabilities found no significant difference between the group mean scores for the Third Factor, although the mean was lower for the learning disabled group. Of fourteen WISC-R factor scores computed for the two groups, there was only one significant finding when the groups were compared. The gifted group with learning disabilities scored significantly lower than the gifted group without learning disabilities on the Organic Brain Syndrome factor. This factor was developed by Wechsler (1974) who, after studying the standardization group, noted that a pattern of low scores on the Digit Span, Coding, and Block Design may indicate brain dysfunction. Care should be exercised in generalizing these results, however, as numbers in the groups were small. Only 14 of the experimental group and 17 of the control group had complete data available and were used for all the factor comparisons. For some factor comparisons, such as the Organic Brain Syndrome factor, a two-tailed signed rank test was done based on only 13 observations.

In a review of studies involving interpreting low Third Factor scores, Wielkiewicz (1990) found that the following hypotheses and observations were presented: presence of a learning disability, motivational problems in school, disabled reader with a weakness in short-term memory and visual-motor integration, child would obtain low scores on standardized test of achievement, a specific deficit in arithmetic achievement, more males obtain low Third Factor scores, difficulty in concentration or focusing attention - child is hyperactive; deficit in sequential processing that may be related to difficulty in decoding or "sounding out" words; deficiency in executive problem-solving strategies; child would score low on Part B of The Trail Making Test; child may manifest poor study skills, distractibility, deficits in motor development, deficits in speech and language, and developmental delays. Wielkiewicz, in an attempt to find a single construct to connect this wide range of findings, presents a case for interpreting the Third Factor as reflecting executive and short-term memory processes involved in planning, monitoring, and evaluating task performance.

Kaufman's Simultaneous/Successive Processing Subtests

Kaufman (1979) suggested that the WISC-R subtests can be organized according to the Luria-Das psychoneurological model which postulates two types of mental functioning - simultaneous and successive processing. This model originated from Luria's (1966) research findings with patients manifesting left hemisphere damage. In the early conceptualization of the two processes, the simultaneous process was very closely associated with vision and touch and the successive process with hearing and movement.

In a later refinement by Das, Kirby, and Jarman (1975), simultaneous processing was thought to involve stimuli which are primarily spatial and require multiple processing (i.e., when different independent variables are considered at one time). This type of processing is necessary to form any holistic Gestalt and has typically been associated with a task such as Raven's Progressive Matrices (Das, Kirby, & Jarman, 1979).

Luria (1966) contended that simultaneous synthesis is involved in several types of linguistic processing where logical-grammatical relationships (e.g., brother's son) and comparative spatial relationships (e.g., bigger than, above, below) are required. Naglieri, Kamphaus, and Kaufman (1983) claim that simultaneous processing is likely to be involved when a task requires the

organization of stimuli with consideration of the relationships between each of several components, regardless of the specific content of the task.

Naglieri et al. (1983) state that successive processing involves the organization of stimuli into some temporally organized series in which the specific order of stimuli is more important than the overall relationships among them. Each stimulus is related only to the preceding and following ones. The WISC-R digit span forward is an example of successive processing. Luria (1966) stated that this type of processing is important for the automatization of skilled movements, rote memory, and narrative speech.

Naglieri et al. (1983) use language as a base for contrasting the two processes. They claim that successive processing is important in language and speech for the ordering of words while simultaneous processing is just as important in the formation of the concept or meaning behind the words. Although the Luria-Das model does not have a hierarchical structure, Das (1972) stated that an interrelated existence of the two processing modes is considered beneficial for most higher-level learning.

For assessment and instructional purposes and based on the Das-Kirby neurological model of information processing, Kaufman (1979) suggested the following division of nine of Wechsler's WISC-R subtests:

Simultaneous	Successive
Picture Completion	Picture Arrangement
Block Design	Coding
Object Assembly	Mazes
Similarities	Digit Span
	Arithmetic

In relation to reading difficulties and mental processing styles, three studies have used various test batteries which reflect the two processing modes and have suggested that reading difficulties are related to deficient successive processing (Blackman, Bilsky, Burger, & Mar, 1976; Das & Cummins, 1978; Stoiber, Bracken, & Gissal, 1983). No attempt was made to connect the processing modes with reading disability subtypes, although Stoiber et al. (1983) stated that in reading, word recognition involves simultaneous functions with a sight-word approach, whereas phonetic decoding entails sequential or successive organization which is similar to Boder's interpretation of the sight word approach as being a gestalt task and right hemisphere related and phonetic decoding as being an analytic task and left hemisphere related.

Concurrent Validity of the Boder

Another aspect of the research was to examine the concurrent validity of the Boder using the reading subtest of a standardized test of achievement, the Wide Range Achievement Test - Revised (Jastak & Wilkinson, 1984). The Wide Range Achievement Test - Revised has been widely used in assessing children throughout our local school district and in hospital and clinic settings. The reading subtest involves pronouncing words from a list that increases in level of difficulty. The test can be administered and scored very quickly. Standard scores, percentiles, and reading grade levels can be computed from the raw score. The purpose of this portion of the research was to ascertain whether the Boder Test, despite its psychometric shortcomings, does at least provide valid reading levels.

No studies have been conducted examining the concurrent validity of the reading levels obtained on the Boder and the Wide Range Achievement Test-Revised. The Wide Range Achievement Test was revised in 1984 and is the version most widely used at the present time. Only two references were found for concurrent validity studies involving the original Wide Range Achievement Test and the Boder.

Ginn, in his 1979 doctoral dissertation, computed the correlation between the WRAT and the Boder reading grade levels in 64 reading disabled boys and reported a correlation of 0.74. When he combined the test results of that reading disabled group and 114 normal readers, the pooled correlation was 0.91. Ginn commented, however, that "the Boder reading level, with respect to the WRAT was comparatively lower for the reading disabled sample. That is, the Boder in comparison to the WRAT better differentiated between reading-disabled and normals" (p.31).

Camp & Dolcourt (1977) designed two parallel, standardized reading and spelling forms based on Boder's work. They administered these two reading tests and the WRAT to 34 children from regular fifth-grade classes and 18 children from the fourth to the sixth grade who had been previously diagnosed as retarded readers. They reported a 0.95 correlation between the grade levels obtained on the WRAT and the two parallel forms of the Boder. The authors concluded that scores on their Boder lists were sufficiently comparable to those obtained from the WRAT to warrant substituting the Boder for the WRAT.

Methodology

Research Hypotheses

It was hypothesized that:

(1) Readers categorized as dyseidetic by The Boder Test of Reading-Spelling Patterns would have higher mean WISC-R Verbal Intelligence Quotients than either readers categorized as dysphonetic or mixed dysphonetic-dyseidetic.

(2) Readers categorized as dyseidetic by The Boder Test of Reading-Spelling Patterns would have higher Verbal Comprehension Deviation Quotients derived from the WISC-R scores than either readers categorized as dysphonetic or mixed dysphonetic-dyseidetic.

(3) Readers categorized as dyseidetic by The Boder Test of Reading-Spelling Patterns would have higher scores on the Successive WISC-R subtests than either readers categorized as dysphonetic or mixed dysphonetic-dyseidetic.

(4) Readers categorized as dysphonetic by The Boder Test of Reading-Spelling Patterns would have higher scores on the Simultaneous WISC-R subtests than dyseidetic or mixed dysphonetic-dyseidetic.

(5) Groups identified as dyslexic by The Boder Test of Reading-Spelling Pattterns (i.e. dysphonetic, dyseidetic, and mixed dysphonetic-dyseidetic), as a whole, would have lower deviation quotients for the WISC-R extracted Third Factor than the other groups as a whole (i.e., normal, nonspecific, and nondetermined).

(6) There would be a significant positive correlation between reading scores on the Boder and the WRAT-R.

Research Perspective

This research enabled the intern to explore the scientist-practitioner model and to conduct research activities in parallel with applied activities. Consequently, as will be indicated, there were relatively few subjects available and it was not possible to collect additional data which would be necessary to adequately explore the hypotheses. Therefore, analyses appear which might not normally appear in a published manuscript. This project should be evaluated in the context of this exercise as one which enabled the intern to acquire adequate experience in the process of research.

Subjects

Subjects included 24 boys and 7 girls. The children ranged in age from 7 years 11 months to 17 years 3 months. Fifteen children were in the 7 to 9 year old range, 11 children were in the 10 to 12 year old range, and four children were in the 13 to 17 year old age range.

Thirty of the 31 children had been referred for diagnosis or remediation of reading difficulties. Fourteen of the children had taken part in a psychoeducational assessment carried out by the intern. Sixteen others had been referred by parents, teachers, or counsellors to the Diagnostic and Remedial Unit for summer remediation in reading as carried out by the university's Special Education students. The students were tutoring the children as part of the course requirement for Education 3650, a practicum course in Special Education. Thirty of the children were included in the research project because intelligence test information, specifically WISC-R test data, was available for them.

Instruments

Reading. The Boder Test of Reading-Spelling Patterns (Boder & Jarrico, 1982). This test has been explicitly described in a previous section of this paper.

The Wide Range Achievement Test - Revised (Jastak & Wilkinson, 1984). This standardized achievement test contains three subtests - spelling, arithmetic and reading. Standard scores, percentile ranks, and grade equivalents can be obtained from the raw scores. There are two levels of the test: Level One for children aged 5 years 0 months to 11 years 11 months and Level Two for ages 12 years 0 months to adulthood. Age norms are available for ages 5 years 0 months to 74 years 11 months. Only the reading subtest was used in this study.

Intelligence. The Wechsler Intelligence Scale for Children - Revised (Wechsler, 1974). The WISC-R is a widely used intelligence test which is individually administered to children who range in age from 6 years 0 months to 16 years 11 months. It consists of twelve subtests, six of which make up a Verbal Scale and six which comprise a Performance Scale. The Verbal Scale is considered an index of verbal ability and is dependent on a child's accumulated experience. Questions are presented verbally and responses are given orally. The Performance Scale is considered to be an index of nonverbal ability or visual/spatial/motor abilities and is more dependent on the child's immediate problem-solving ability. The test items are nonverbal and generally presented visually; solutions require motor responses and/or minimal verbal responses. Scaled scores and intelligence quotients can be

calculated from the raw scores. The standardization sample for this test contained 2200 cases, including 200 children in each of eleven age groups.

Report Writer: Wechsler Intelligence Scale for Children -Revised (Dougherty, 1985). This computer program analyzes raw scores from the WISC-R; specifically it categorizes the scores into various factor groupings, statistically compares subtest and factor scores and writes a report based on significant findings. The Report Writer uses the following subtests to make the factor and information processing groupings that were used in this study:

Verbal Comprehension: Information, Similarities, Vocabulary, and Comprehension

Perceptual Organization: Picture Completion, Picture Arrangement, Block Design, and Object Assembly.

Third Factor: Digit Span, Coding B, Arithmetic.

Simultaneous: Picture Completion, Block Design, and Object Assembly

Successive: Picture Arrangement and Coding B.

Procedure

The intern individually administered the Boder Test of Reading-Spelling Patterns (Boder & Jarrico, 1982) to all 31 children. At or around the same time the Boder was administered, twenty-eight of these children were

also administered the reading subtest of the Wide Range Achievement Test-Revised. Eleven of the WRAT-R reading subtests were administered by the intern and 17 were administered by the university practicum students assigned to each child. Wechsler Intelligence Scale for Children - Revised scores were obtained for 30 of the 31 children who had also been administered the Boder. All three sets of test results (i.e., Boder, WRAT-R and WISC-R) were available for 27 of the subjects.

Results

It must be noted here that the small numbers of subjects especially in subgroups of readers make generalization very difficult, if not impossible without a larger sample size which, unfortunately, was not available to the intern.

The means and standard deviations of the subjects' scores on the WRAT-R, WISC-R Full Scale Intelligence Scale, WISC-R Verbal Intelligence Scale, WISC-R Performance Intelligence Scale, and the Boder Test of Reading-Spelling Patterns are presented in Table 1.

A correlation coefficient of 0.89 was obtained between the reading grade levels of the Boder and the WRAT-R. This result is similar to the results obtained by Camp & Dalcourt (1977) and Ginn (1979) when they compared the original WRAT to the Boder.

Table 1

Means and Standard Deviations for WRAT-R, WISC-R and Boder

Variable		M	SD
WRAT-R		2.68	1.78
WISC-R	FIQ[1]	101.40	15.01
	VIQ[2]	97.30	12.96
	PIQ[3]	106.07	16.89
Boder		3.60	2.55

[1]FIQ: Full Scale Intelligence Quotient

[2]VIQ: Verbal Intelligence Scale Quotient

[3]PIQ: Performance Intelligence Scale Quotient

The Boder diagnostic classifications were determined for each subject according to instructions provided in the test manual. Seven classification groups were identified and were as follows:

1. normal (no discrepancy in the reading-spelling pattern and reading quotient is equal to or greater than 100)

2. nonspecific (no discrepancy in the reading-spelling pattern but reading quotient is less than 100)

3. dysphonetic (discrepancy in the reading-spelling pattern such that 50% or fewer Known words are spelled correctly and 50% or fewer Unknown words are spelled as Good Phonetic Equivalents; the reading quotient is greater than or equal to 67)

4. dyseidetic (discrepancy in the reading-spelling pattern such that 50% or fewer Known words are spelled correctly but more than 50% of Unknown words are spelled as Good Phonetic Equivalents; the reading quotient is less than or equal to 80)

5. mixed dysphonetic-dyseidetic (discrepancy in the reading-spelling pattern such that 50% or fewer Known words are spelled correctly and 50% or fewer Unknown words are spelled as Good Phonetic Equivalents; the reading quotient is less than 67)

6. undetermined (discrepancy in the reading-spelling pattern such that 50% or fewer Known words are spelled correctly and more than 50% of Unknown words are spelled as Good Phonetic Equivalents; the reading quotient is greater than 80)

7. other (these subjects could not be classified into any of the categories mentioned above)

The mean grade equivalents and group size of the seven classifications of the 31 subjects are presented in Table 2.

As can be seen in Table 2, the most common classification of reader is the dysphonetic. In fact, the number in the dysphonetic group is almost as large as the other six groups combined.

Means and standard deviations for each of these seven groups on the WISC-R Full-Scale Intelligence Scale, WISC-R Verbal Intelligence Scale, WISC-R Performance Intelligence Scale are presented in Table 3. The Dyseidetic group has higher mean WISC-R Verbal Intelligence Quotients than either the dysphonetic or the mixed dyseidetic-dysphonetic group.

Complete WISC-R factor scores and successive and simultaneous subtest mean scores were calculated for 28 of the subjects using the computer program Report Writer: Wechsler Intelligence Scale for Children-Revised (1985) described earlier this paper. The Third Factor score could not be

Table 2

Group Size, Grade Equivalent Scores, and Standard Deviations of Subjects, Categorized According to the Boder

Reading Group (Boder)	n	Mean Grade Equivalent	Standard Deviation
Normal	2	8.55	.07
Nonspecific	2	1.90	2.12
Dysphonetic	12	2.81	1.62
Dyseidetic	3	3.45	.21
Mixed	4	1.97	2.89
Undetermined	4	4.80	4.07
Other	3	5.17	1.41

Table 3

Means and Standard Deviations of the Reading Groups for WISC-R FIQ, VIQ and PIQ

Reading Group (Boder)	n	WISC-R Scores FIQ	VIQ	PIQ
Normal	2	103.50 (27.58)	103.50 (23.33)	101.00 (26.88)
Nonspecific	2	97.00 (11.31)	92.00 (2.82)	105.00 (21.21)
Dysphonetic	12	94.92 (13.41)	93.33 (14.70)	98.00 (11.72)
Dyseidetic	3	115.00 (18.36)	104.33 (9.71)	124.00 (21.66)
Mixed	4	94.25 (4.57)	92.50 (5.68)	98.50 (8.58)
Undetermined	4	112.25 (16.28)	105.50 (12.71)	117.00 (18.26)
Other	3	110.33 (7.51)	101.00 (12.16)	120.00 (13.08)

calculated for two subjects because the Digit Span subtest of the WISC-R had not been administered.

The means and standard deviations of the reading groups on Verbal Comprehension (Information, Similarities, Vocabulary, and Comprehension), Perceptual Organization (Picture Completion, Picture Arrangement), and the Third Factor (Digit Span, Coding B and Arithmetic) are presented in Table 4. The dyseidetic group had higher mean Verbal Comprehension scores than either the dysphonetic or mixed group.

The means and standard deviations of the groups on the Simultaneous (Picture Completion, Block Design, and Object Assembly) and Successive (Picture Arrangement and Coding B) information processing groupings are presented in Table 5.

Of the three dyslexic reading groups referred to earlier, the dyseidetic group had the highest mean scores on the Successive subtest. However, contrary to expectation, the dysphonetic group did not have the highest score of three groups on the Simultaneous subtest score. In fact, it had the lowest mean score.

While Table 3 indicated that dyseidetics had the highest mean Verbal Intelligence Quotient of the three groups, analysis of variance indicated that the differences between the three groups were not significant ($F(2, 16) = .96$, $< .40$). These results are presented in Table 6.

Table 4

Means and Standard Deviations of the Reading Groups for WISC-R Factors, Verbal Comprehension, Perceptual Organization and the Third Factor

Reading Group (Boder)	n	WISC-R Factors		
		Verbal[1] Comprehension	Perceptual[2] Organization	Third[3] Factor
Normal	2	106.50 (26.16)	103.00 (26.87)	92.00 (16.97)
Nonspecific	2	93.00 (.00)	107.00 (24.04)	96.50 (7.78)
Dysphonetic	12	95.08 (13.23)	100.00 (11.61)	86.08 (12.82)
Dyseidetic	3	107.33 (9.45)	127.33 (19.73)	95.67 (13.50)
Mixed	4	93.00 (3.46)	100.25 (4.79)	90.33 (10.41)
Undetermined	4	107.25 (11.84)	119.75 (20.98)	102.00 (8.29)
Other	3	103.33 (16.80)	116.33 (9.82)	94.50 (4.95)

[1]WISC-R Information, Similarities, Vocabulary and Comprehension subtests.

[2]WISC-R Picture Completion and Picture Arrangement subtests.

[3]WISC-R Digit Span, Coding B and Arithmetic subtests.

Table 5

Mean Simultaneous and Successive Subtest Deviation Quotients and Standard Deviations for the Seven Classifications Resulting from Administration of the Boder

Reading Group (Boder)	n	**Simultaneous[1]**	**Successive[2]**
Normal	2	104.00 (22.63)	95.50 (24.75)
Nonspecific	2	111.00 (24.04)	93.50 (9.19)
Dysphonetic	12	100.67 (10.83)	95.17 (17.28)
Dyseidetic	3	126.00 (15.87)	114.00 (24.98)
Mixed	4	101.00 (4.16)	96.75 (15.20)
Undetermined	4	117.50 (20.94)	112.25 (12.12)
Other	3	114.00 (7.21)	122.33 (16.74)

[1]This subgroup comprises the subtests of Picture Completion, Block Design and Object Assembly.

[2]This subgroup comprises the subtests of Picture Arrangement and Coding B.

Table 6

Analysis of Variance of WISC-R Verbal Intelligence Quotient by Three Categories of Dyslexic Subjects

Source	SS	df	MS	F	p
Between Groups	319.46	2	159.73	.96	.40
Within Groups	2664.33	16	166.52		
Total		18			

Similarly, while the dyseidetic group had the highest mean Verbal Comprehension Deviation Quotient of these three groups, the differences were not significant ($F (2, 16) = 1.58, p < .24$). These results are presented in Table 7.

The dyseidetics, as predicted, had higher scores on the Successive subtests than the dysphonetic and mixed groups. But again the differences were not significant ($F (2, 16) = 1.33, p < .29$). These results are presented in Table 8.

It was predicted that the dysphonetic readers would have higher scores than the dyseidetic or the mixed group on the WISC-R subtests comprising the Simultaneous information processing grouping. Table 5 indicated that this group had the lowest mean score of the three groups. The differences were significant ($F (2, 16) = , p <.01$). The results are presented in Table 9.

In order to examine the hypothesis that dysphonetic, dyseidetic, and mixed dysphonetic-dyseidetic would have lower Third Factor deviation quotients than the other reading groups, the groups were combined to form a Dyslexic group and this group was compared to the other groups combined. The means and standards deviations of these groups on the Third Factor are presented in Table 10.

Table 7

Analysis of Variance of WISC-R Verbal Comprehension Factor by Three Categories of Dyslexic Subjects

Source	SS	df	MS	F	p
Between Groups	425.05	2	212.52	1.58	.24
Within Groups	2139.58	16	133.72		
Total		18			

Table 8

Analysis of Variance of Successive WISC-R Subtests by Three Categories of Dyslexic Subjects

Source	SS	df	MS	F	p
Between Groups	866.32	2	433.16	1.33	.29
Within Groups	5224.42	16	326.53		
Total		18			

Table 9

Analysis of Variance of Simultaneous WISC-R Subtests by Three Categories of Dyslexic Subjects

Source	SS	df	MS	F	p
Between Groups	1611.02	2	805.51	6.98	.01
Within Groups	1846.67	16	115.42		
Total		18			

Table 10

Mean Third Factor Deviation Quotients and Standard Deviations by the Two Groupings, Nondyslexic and Dyslexic Subjects

Reading Group (Boder)	**n**	**Mean Third Factor Deviation Quotient[1]**	**SD**
Nondyslexic[a]	10	97.40	9.07
Dyslexic[b]	18	88.39	12.42

[1]Third factor comprises subtests of Digit Span, Coding B and Arithmetic

[a]includes Normal, Nonspecific, Undetermined, and Other

[b]includes Dysphonetic, Dyseidetic, and Mixed Dysphonetic-Dyseidetic

Analysis of variance indicated that the dyslexic group had significantly lower Third Factor scores than the other group ($F(1, 26) = 4.03$, $p < .05$). Please see Table 11.

Since Boder also considers the undetermined reading group to be dyslexic, that reading group was added to the dyslexic group and the results were re-analyzed. The differences between the two groups of readers on the Third Factor were not significant ($F(1, 26) = .38$, $p < .54$). These results are presented in Table 12.

Table 11

Analysis of Variance of Third Factor by Two Groups of Dyslexic[a] and Non-Dyslexic[b] Subjects

Source	SS	df	MS	F	p
Between Groups	522.00	1	522.01	4.03	.05
Within Groups	3364.68	26	129.41		
Total		27			

[a]includes Dysphonetic, Dyseidetic, and Mixed Dysphonetic-Dyseidetic

[b]includes Normal, Nonspecific, Undetermined, and Other

Table 12

Analysis of Variance of Third Factor by Two Groups of Dyslexic[a] and Non-Dyslexic[b] Subjects

Source	SS	df	MS	F	p
Between Groups	56.75	1	56.75	.39	.54
Within Groups	3364.68	26	147.31		
Total		27			

[a]includes Dysphonetic, Dyseidetic, and Mixed Dysphonetic-Dyseidetic and Undetermined

[b]includes Normal, Nonspecific, and Other

Discussion

The high correlation coefficient obtained between the grade levels obtained on The Boder Test of Reading-Spelling Patterns and the WRAT-R suggests that these tests can be used interchangeably as a measure of recognition of words in isolation. This result gives a measure of reassurance that the Boder can be used as a sight reading test.

The lack of statistical support for the hypothesis that the dyseidetic readers would obtain significantly higher verbal intelligence, verbal comprehension, and Successive subtest deviation quotients is not surprising considering the small numbers used in this sample (30) and the small percentage of subjects classified as dyseidetic. While Ginn's (1979) significant findings were based on a larger sample of 10 dyseidetics, 60 dysphonetics, 21 dysphonetic-dyseidetics, and 9 undetermineds, the present research resulted in only three subjects in the dyseidetic category as compared to 12 in the dysphonetic category. To more adequately attempt to confirm or refute the findings of Ginn (1979), the intern would have had to use a larger sample of subjects. Rather than engaging in a large scale study such as might be required if a thesis option had been chosen, the intern's intent in undertaking this small research project was to explore ideas that had been presented in

previous research concerning the relationship between the Boder and the Wechsler Intelligence Scale for Children.

The larger number of dysphonetics than dyseidetics or mixed dysphonetic-dyseidetics that resulted from this study was not unexpected. Approximately two-thirds of those diagnosed as dyslexic by The Boder Test of Reading-Spelling Patterns are found to be of the dysphonetic type. From a random sample of 107 children, Boder determined the distribution of the dyseidetic subtype to be approximately 9%, the mixed dysphonetic-dyseidetic, 22% and the undetermined group, 6% (Boder, 1971).

Again, although numbers were small for this project (dyseidetics = 3, dysphonetics = 12, and mixed dysphonetic-dyseidetic = 4) and, therefore, drawing any conclusions based on such numbers would not be warranted, it is worth noting that the significant findings of the analysis of the reading classifications and the simultaneous subtest deviation quotients may be connected to other analyses performed on the data.

The dyseidetic rather than the dysphonetic group obtained the highest mean on the Simultaneous subtests. This finding is likely related to the fact that although there were no significant differences among the reading classification groups when the WISC-R Verbal Quotients were considered, the

results were significant when the Performance Intelligence Scale quotients were analyzed ($p < .05$). The simultaneous subtests are subsumed under the performance intelligence subtests and therefore, the two deviation quotients would be expected to vary in a similar fashion. Perhaps the unexpected result was a result of the small sample size.

Results of the analysis of Kaufman's Third Factor between dyslexic and non-dyslexic groups were supportive of the hypothesis, that learning disability groups would, on the average, score lower on this factor score than non-learning-disabled groups. However, when results were analyzed including the "undetermined" group, one of the reading classifications that Boder considered to be a variation of the dyslexic types, there were no significant findings. Part of the reason for the change in significance is that the mean score on the Third Factor for the "undetermined" group was the highest of all the groupings, although it did not differ significantly from the other groups. The significant findings, however, do cast doubt on the construct validity of Boder's classification system just as Nockleby and Galbraith's (1984) findings and subsequent interpretation that Boder's non-dyslexic classification "nonspecific" may just be a different point on a continuum of disabled readers who have difficulties processing the sounds of words.

Conclusions and Recommendations

This research project enabled the intern to gain more insight into the complexities involved in doing research. Also, examining such a test as the Boder in the research project made the intern very aware of the need for guidance counsellors, educational psychologists and any test users to closely examine tests before using them in assessment batteries.

Since examining the test manual, researching test critiques, and administering The Boder Test of Reading-Spelling Patterns as part of this research project and in subsequent employment situations, the intern has come to the conclusion that the information obtained by administering the Boder is not worth the difficulties encountered in its administration and scoring. If a practitioner wanted information on a child's decoding skills, then other standardized tests, such as the Wide Range Achievement Test-Revised, the Peabody Individual Achievement Test and the Slosson Oral Reading Test, are easier to administer and score than the Boder. Using such tests instead of the Boder would result in less time needed for assessment and more time for remediation planning.

In addition to the problem of time for administrating and scoring of the Boder, Boder's classification system for reading disabilities does not

appear to have enough construct validity research support to warrant using it as a diagnostic method for practitioners assessing reading disabilities. The focus needs to be on determining the strengths and weaknesses of the child so that appropriate intervention and remediation can be developed.

Finally, in the intern's experience assessing children who have difficulties acquiring beginning reading skills, most appear to lack phonological awareness skills. As a result, the intern has used informal assessment tools such as the Test of Auditory Analysis Skills (Rosner, 1979), the Strip Initial Consonant Task (Sattler, 1988) and the Phonological Oddity Task (Sattler, 1988) to check a child's skills in this area, after an informal reading inventory has been administered and it has been determined that the child is reading below expected levels. To get a more accurate picture of the nature and extent of a child's reading difficulties, it is helpful to gather information about the child's background and experience with the printed word, decoding skills, sight word vocabulary, reading comprehension and intelligence levels, and receptive language skills.

In spite of the limitations of the Boder for practicing school psychologists, more refinement of the Boder may contribute to the understanding of below-average readers' problems. This, in turn, is critical to

developing more effective remediation programmes for all children having reading problems.

The seemingly high numbers of children having difficulty with phonological awareness skills also has important implications for the general primary curriculum. In Newfoundland and Labrador, as elsewhere in Canada, children beginning to read are taught to recognize words largely by appearance and to focus on the overall meaning of a story using such cues as pictures. The 'whole-language' methods used de-emphasize the teaching of decoding skills. Indeed, in this province as well as in six others (Simner, 1992), the only textbooks on the approved lists are those that reflect a whole-language philosophy.

There are many for whom this method which de-emphasizes decoding appears not to be appropriate. Children at risk for reading failure and those from disadvantaged backgrounds in which reading and books are not emphasized often require more structure and greater emphasis on phonics than whole-language programming typically provides (Bateman, 1991; Berninger, Thalberg, DeBruyn & Smith, 1987; Carnine, Silbert & Kameenui, 1990; Chall, 1989; Chaney, 1990; Oakhill & Garnham, 1988; Stahl & Miller, 1989; Stahl, Osborn & Lehr, 1990). This is particularly worrisome in a province such as Newfoundland with a high proportion of children coming

from homes which are, what one might call, educationally disadvantaged (Statistics Canada, 1989). The problem is not unique to Newfoundland. Indeed, the Canadian Psychological Association has advised school psychologists to ensure that teachers are encouraged to select reading methods that suit children's needs (Simner, 1992). This is the advice this intern has learned to give as a result of this research and her experience assessing children and observing children in classrooms.

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Appendix A

Tests Examined

Area	Test Title
General Ability	McCarthy Scales of Children's Abilities
	The Wechsler Pre-school and Primary Scale of Intelligence
	Woodcock-Johnson Psychoeducational Battery-Revised
	Raven's Standard Progressive Matrices
	Detroit Tests of Learning Aptitudes - 2
Achievement	Wide Range Achievement Test-Revised
	Peabody Individual Achievement Test-Revised
	Woodcock-Johnson Psychoeducational Battery-Revised
Language	Test of Written Language
	Test of Written Language - 2
Mathematics	Key Math Diagnostic Test-Revised (Canadian Edition)
Reading	Woodcock Reading Mastery Test-Revised
	The Boder Test of Reading-Spelling Patterns
Reading	Alberta Diagnostic Reading Program
	Decoding Skills Test
	Test of Early Reading - 2
	Slosson Oral Reading Test
Autism Related Tests	Psychoeducational Profile-Revised
	Childhood Autism Rating Scale
Visual/Perceptual/ Motor	Motor-Free Visual Perception Test
	Developmental Test of Visual-Motor Integration

Tests Examined

Area	Test Title
Auditory Perception	Wepman Auditory Discrimination Test
	Wepman Auditory Memory Span Test
	Wepman Auditory Sequential Test
Planning & Organization	Porteus Maze Test
Adaptive Behaviour	Vineland Adaptive Behaviour Scales
	Conners Parent Rating Scale
	Conners Teacher Rating Scale

Appendix B

Tests Administered

Tests Administered

Area	Test Title	Times Administered
General Ability	Wechsler Intelligence Scale for Children-Revised	7
	Raven's Standard Progressive Matrices	1
	Detroit Tests of Learning Abilities-2	5
Achievement Screening Tests	Wide Range Achievement Test-Revised	12
	Peabody Individual Achievement Test-Revised	8
Reading	The Boder Test of Reading-Spelling Patterns	27
	Alberta Diagnostic Reading Program	5
	Woodcock Reading Mastery Tests-Revised	2
Mathematics	Key Math Diagnostic Arithmetic Test-Revised	1
Language	Test of Written Language - 2	1
	Peabody Picture Vocabulary Test-Revised	1
Visual/ Perceptual/ Motor Tests	Visual Memory Test	1
	Motor-Free Visual Perception Test	2
	Developmental Test of Visual-Motor Integration	8
Auditory Perceptual/ Memory Tests	Wepman Auditory Discrimination Test	4
	The Auditory Sequential Memory Test	3
	Auditory Memory Span Test	4
Behaviour Rating Scales	Conners Parent Rating Scale	2

Appendix C

Report Format

Name:

Date of Birth:

Parents' Names:

Address:

School:

Grade:

Teacher:

Examiner:

Dates of Assessment:

Reason for Referral:

Background Information:

Tests Administered:

Testing Observations:

Test Results:

Summary of Results:

Recommendations:

Appendix D

Reading List

ATTENTION DEFICIT DISORDER

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OBSESSIVE-COMPULSIVE DISORDER

Rapoport, J. (1989). The Boy Who Couldn't Stop Washing: The Experience and Treatment of Obsessive-Compulsive Disorder. New York: Dutton.

READING DISABILITIES

Beck, I.L., & Carpenter, P.A. (1986). Cognitive Approaches to Understanding Reading: Implications for Instructional Practice. American Psychologist, 41(10), 1098-1105.

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Solan, H.A. (1990). An Appraisal of the Irlen Technique of Correcting Reading Disorders Using Tinted Overlays and Tinted Lenses. Journal of Learning Disabilities, 23(10), 621-626.

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Appendix E

The Boder Test of Reading-Spelling Patterns Examiner's Recording Form

ELENA BODER, M.D.
SYLVIA JARRICO, M.A.

The Boder Test of Reading–Spelling Patterns

Reading Test: Examiner's Recording Form

Name _____ Age ___ Birth date _____
Date _____ School _____
Grade ___ Examiner _____

 0-8089-1446-4 7906-35

Preprimer (List A)

		Flash	Untimed	Not Read
1.	big			
2.	come			
3.	can			
4.	have			
5.	help			
6.	little			
7.	not			
8.	mother			
9.	red			
10.	said			
11.	and			
12.	ball			
13.	go			
14.	ride			
15.	in			
16.	the			
17.	up			
18.	to			
19.	we			
20.	want			
	Total (number)			
	No. phonetic words			
	No. nonphonetic words			
	Total (percent)			

Primer (List B)

		Flash	Untimed	Not Read
1.	did			
2.	are			
3.	fast			
4.	blue			
5.	on			
6.	boat			
7.	run			
8.	house			
9.	stop			
10.	play			
11.	am			
12.	eat			
13.	but			
14.	father			
15.	no			
16.	train			
17.	with			
18.	what			
19.	yes			
20.	your			
	Total (number)			
	No. phonetic words			
	No. nonphonetic words			
	Total (percent)			

First Grade (List 1)

		Flash	Untimed	Not Read
1.	after			
2.	bird			
3.	came			
4.	funny			
5.	dog			
6.	horse			
7.	fish			
8.	shoe			
9.	man			
10.	was			
11.	box			
12.	apple			
13.	hand			
14.	girl			
15.	sat			
16.	store			
17.	under			
18.	there			
19.	then			
20.	work			
	Total (number)			
	No. phonetic words			
	No. nonphonetic words			
	Total (percent)			

Second Grade (List 2)

		Flash	Untimed	Not Read
1.	ever			
2.	does			
3.	faster			
4.	eyes			
5.	name			
6.	right			
7.	show			
8.	table			
9.	step			
10.	talk			
11.	grass			
12.	any			
13.	keep			
14.	buy			
15.	much			
16.	city			
17.	nest			
18.	gone			
19.	well			
20.	today			
	Total (number)			
	No. phonetic words			
	No. nonphonetic words			
	Total (percent)			

Third Grade (List 3)

		Flash	Untimed	Not Read
1.	awake			
2.	great			
3.	child			
4.	knife			
5.	flowers			
6.	laugh			
7.	forget			
8.	listen			
9.	yesterday			
10.	should			
11.	block			
12.	half			
13.	farther			
14.	lose			
15.	hundred			
16.	sewing			
17.	north			
18.	sugar			
19.	tool			
20.	whole			
	Total (number)			
	No. phonetic words			
	No. nonphonetic words			
	Total (percent)			

Fourth Grade (List 4)

		Flash	Untimed	Not Read
1.	holiday			
2.	flight			
3.	hunger			
4.	friendship			
5.	quit			
6.	honest			
7.	remember			
8.	pigeon			
9.	study			
10.	weigh			
11.	important			
12.	blood			
13.	kettle			
14.	comb			
15.	nobody			
16.	fought			
17.	painting			
18.	prove			
19.	unless			
20.	rough			
	Total (number)			
	No. phonetic words			
	No. nonphonetic words			
	Total (percent)			

Fifth Grade (List 5)

		Flash	Untimed	Not Read
1.	crocodile			
2.	beauty			
3.	human			
4.	business			
5.	program			
6.	character			
7.	scrambled			
8.	cough			
9.	tomato			
10.	height			
11.	divide			
12.	chalk			
13.	elbow			
14.	freight			
15.	example			
16.	pleasure			
17.	lame			
18.	review			
19.	quilted			
20.	wrist			
Total (number)				
No. phonetic words				
No. nonphonetic words				
Total (percent)				

Sixth Grade (List 6)

		Flash	Untimed	Not Read
1.	badge			
2.	bureau			
3.	dictionary			
4.	climate			
5.	entertainment			
6.	foreign			
7.	industry			
8.	justice			
9.	varnish			
10.	lifeguard			
11.	athletic			
12.	encourage			
13.	monument			
14.	honorable			
15.	photograph			
16.	poultry			
17.	population			
18.	source			
19.	respectfully			
20.	writers			
Total (number)				
No. phonetic words				
No. nonphonetic words				
Total (percent)				

Seventh Grade (List 7)

		Flash	Untimed	Not Read
1.	astronomy			
2.	doubtful			
3.	democrat			
4.	hasten			
5.	frequent			
6.	judgment			
7.	quotation			
8.	knapsack			
9.	publisher			
10.	liquor			
11.	charity			
12.	acknowledge			
13.	handicap			
14.	cruise			
15.	nevertheless			
16.	scientific			
17.	representative			
18.	sergeant			
19.	revenge			
20.	thorough			
	Total (number)			
	No. phonetic words			
	No. nonphonetic words			
	Total (percent)			

Eighth Grade (List 8)

		Flash	Untimed	Not Read
1.	discriminate			
2.	circuit			
3.	fantastic			
4.	guarantee			
5.	hibernation			
6.	lieutenant			
7.	perforated			
8.	mortgage			
9.	unemployed			
10.	schedule			
11.	armament			
12.	acreage			
13.	diploma			
14.	nourishing			
15.	detestable			
16.	pursuit			
17.	omitted			
18.	reigned			
19.	testify			
20.	temperate			
	Total (number)			
	No. phonetic words			
	No. nonphonetic words			
	Total (percent)			

Ninth Grade (List 9)

		Flash	Untimed	Not Read
1.	abstract			
2.	carastrophe			
3.	destitute			
4.	chaos			
5.	misconduct			
6.	encore			
7.	optimistic			
8.	geyser			
9.	remedial			
10.	isthmus			
11.	insignificant			
12.	bosom			
13.	prehistoric			
14.	champagne			
15.	sublime			
16.	espionage			
17.	telescope			
18.	limousine			
19.	verify			
20.	righteous			
	Total (number)			
	No. phonetic words			
	No. nonphonetic words			
	Total (percent)			

High School (List 10–12)

		Flash	Untimed	Not Read
1.	fastidious			
2.	distraught			
3.	insinuate			
4.	heirloom			
5.	kinetic			
6.	jeopardize			
7.	orthodox			
8.	rhapsody			
9.	proximity			
10.	sovereign			
11.	linguistic			
12.	ensemble			
13.	nonentity			
14.	indictment			
15.	procrastinate			
16.	mediocre			
17.	ramifications			
18.	psychology			
19.	transitory			
20.	silhouette			
	Total (number)			
	No. phonetic words			
	No. nonphonetic words			
	Total (percent)			

Adult (List 13)

		Flash	Untimed	Not Read
1.	didactic			
2.	baroque			
3.	gesticulate			
4.	chauvinism			
5.	iconoclast			
6.	détente			
7.	protagonist			
8.	epilogue			
9.	recalcitrant			
10.	posthumous			
11.	improvident			
12.	benign			
13.	matriculate			
14.	corpuscle			
15.	megalomania			
16.	entrepreneur			
17.	sporadic			
18.	facsimile			
19.	ubiquitous			
20.	succumbed			
	Total (number)			
	No. phonetic words			
	No. nonphonetic words			
	Total (percent)			

Spelling Lists for Dictation

	Known Words	(Grade Level)
Phonetic	1.	( )
	2.	( )
	3.	( )
	4.	( )
	5.	( )
Nonphonetic	6.	( )
	7.	( )
	8.	( )
	9.	( )
	10.	( )

	Unknown Words	(Grade Level)
Phonetic	1.	( )
	2.	( )
	3.	( )
	4.	( )
	5.	( )
Nonphonetic	6.	( )
	7.	( )
	8.	( )
	9.	( )
	10.	( )

Appendix F

Additional Details of Administration and Scoring for The Boder Test of Reading-Spelling Patterns

Reading Levels and Ages

If the reading level is at the student's actual grade level, the examiner has to ask the child to read, using flash presentation only, the next two lists beyond the grade level. If the reading is above the grade level, the examiner presents by flash the next two word lists beyond the reading level. If the reading level is below the actual grade level, the examiner uses the word list at the actual grade level and one grade beyond and uses the flash presentation only.

A reading level is determined before the spelling test is administered. The reading level is the highest grade level at which the student reads at least 50 percent of the word list flash. A round figure is frequently used for the reading level. If a more precise reading level is desired, the examiner adds one-tenth of a year (0.1) to the reading level for each two words the student reads flash beyond the required 10 (50 percent) at reading level and one-tenth for each two words the child reads flash at the next reading level. A reading age and reading quotient can also be calculated for each child but it is suggested that these be determined after the administration of the spelling test.

Reading age is calculated by adding five to the reading level. The reading quotient is determined by dividing the reading age by the

chronological age and multiplying the result by 100. However, if the child's overall mental ability is substantially above or below his chronological age, the reading quotient must be corrected for mental age. Having calculated the mental age by multiplying the child's Intelligence Quotient by his chronological age and dividing the result by 100, the mental age is included in the following modified reading quotient formula:

$$\text{reading quotient} = \frac{2 \times \text{reading age}}{\text{mental age} + \text{chronological age}} \times 100$$

When there is a disparity of a year or more between a reader's grade age and chronological age, the examiner is directed to use a learning quotient formula attributed to Myklebust (1968):

$$\text{learning quotient} = \frac{3 \times \text{reading age}}{\text{mental age} + \text{chronological age} + \text{grade age}} \times 100$$

If a child has a 'borderline' reading level, which means if the sum of the words the child read flash at reading level and at the next grade level equals 20 or more, and who spells more than 50 percent of the Known Words spelling list correctly, a second Known Words list must be prepared. This new list is drawn from the reading level and one grade above, starting the selection at the grade above reading level, filling in with words read flash at reading level, as required.

Spelling Test

The second spelling list consists of words that were not read by the child at flash presentation or were sounded out with much difficulty in untimed presentations. This Unknown Words list is used to tap the reader's phonic word-analysis skills in spelling. If the reading level is below actual grade level, the examiner selects five phonetic words and five nonphonetic words at grade level, and one grade above if more words are needed. If the reading level is at grade level, words are selected at grade level and one or two grades above as needed. If the reading grade is above actual grade level, the examiner selects the Unknown Words at reading level and one or two grades above as needed. The examiner is cautioned to choose one or two short phonetic words and several multisyllabic words to tap the range of phonic skills.

Scoring of the Known Words list involves recording the number and percent of correctly spelled words and the numbers of correctly spelled words that are phonetic and nonphonetic. Scoring of the Unknown Words list involves correctly spelled words and words that are Good Phonetic Equivalents. Good Phonetic Equivalents are phonetically accurate misspellings in which the sequence of phonemes in the dictated word is represented by appropriate corresponding graphemes in the same sequence

(e.g., "bissnis" for "business", "hibrnashun" for "hibernation"). Sounding out a good phonetic equivalent will yield the original dictated word. Guidelines for determining good phonetic equivalent given in the test manual.

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The Boder Test of Reading–Spelling Patterns

Spelling Test Form

Name_____ Date_____

Known Words	Unknown Words
1. _____	1. _____
2. _____	2. _____
3. _____	3. _____
4. _____	4. _____
5. _____	5. _____
6. _____	6. _____
7. _____	7. _____
8. _____	8. _____
9. _____	9. _____
10. _____	10. _____

Total correct ____%
No. phonetic words ____
No. nonphonetic words ____

Total GFEs (GFE misspellings and phonetic words correct) ____%
No. GFE misspellings ____
No. phonetic words correct ____

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Appendix G

The Boder Test of Reading-Spelling Patterns Supplementary Tasks

The manual lists several supplementary tasks that may be given to children at the same time the Boder is being administered, however, it is claimed that these tasks are not essential to the identification of reading subtypes if the student has developed some reading and spelling skills at the time of testing. If the child does have reading and spelling skills, then the tasks can assist in diagnosing the severity of the reading disability, corroborate the reader subtype, and offer additional guidance in developing remedial strategies.

The supplementary tasks include alphabet tasks, syllabicating tasks, and drawing the face of a clock from memory. When a child has a sight vocabulary below the preprimer level or is not reading at all, the alphabet tasks are used as diagnostic indicators, as "pre-reading" tasks. The alphabet tasks include asking the child to recite the alphabet in sequence, name and give the sound of upper and lower case letters that are presented in mixed order, and write the alphabet in sequence.

Boder classifies subtypes based on these tasks in the following manner: Dysphonetic and mixed dysphonetic-dyseidetic may omit or repeat letters and make errors in letter sequence on the 'reacting alphabet' task. Dysphonetics may have trouble giving letter sounds for the mixed letter presentations dyseidetics may have trouble identifying the letters by name but can give the

sounds, severe dyseidetics and mixed dysphonetic-dyseidetics may not be able to recognize the letter forms until they are in third grade or beyond. On the 'writing alphabet' task, Boder says dysphonetics usually cannot write the letters in sequence, dyseidetics and mixed dysphonetic-dyseidetics may not be able to even write all the letters until fourth grade or beyond. Additionally, severe dyseidetics can recite the alphabet fluently but often have to recite to themselves the full sequence of letters preceding the letter they wish to write before they can revisualize it.

Use of a syllabicating task is suggested if a child gives no evidence of being to decode words phonetically. Several multisyllabic phonetic words that were not read by the student are selected. In an attempt to see if the deficit in phonic skills is at the synthetic level of blending the component letter sounds into syllables and/or the syllables into words, students are asked to identify the letter-sound components in words and blend the sounds into a word and to identify the syllables of a word and subsequently blend the syllable sounds into a word. Another task is to ask the student how many syllables they hear in words. Dysphonetics and mixed dysphonetic-dyseidetics would have difficulty with these tasks.

Finally, if the child is old enough to tell time, he could be asked to draw the face of a clock from memory. Boder and Jarrico (1982) claim that,

based on clinical observation, this task may help differentiate dysphonetic and normal readers from dyseidetic and mixed dysphonetic-dyseidetic readers. Specifically, they have noticed that dysphonetic and normal readers generally start putting in the numbers in the clockface by setting up a symmetrical framework - that is, writing the numbers 12, 3, 6, and 9 in first and filling in the other numbers after. In contrast, dyseidetics and mixed dysphonetic-dyseidetics do not set up this framework and frequently end up crowding the numbers in one half of the clockface and spacing them too far apart in the other.