The Relationship Between The PASS Model (Planning, Attention, Simultaneous and Successive Processing) The Wechsler Intelligence Scale for Children-Third Edition and Reading Achievement in School Aged Children

by

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ABSTRACT

The present study addressed the relationship of the Das-Naglieri Cognitive Assessment System (based on the PASS model), the Wechsler Intelligence Scale for Children (WISC-III) -(a traditional intelligence test) and two subtests of the Woodcock Johnson Psychoeducational Battery-Revised (Word Attack and Letter-Word Identification). More specifically, reading decoding skills were predicted from the WISC-III and the DN:CAS using hierarchical regression analyses. It was hypothesized that the WISC-III, when organized according to Bannatyne's factors, would be a significant predictor of reading decoding skills, as evidenced by the literature. In addition, it was hypothesized that the DN: CAS, based on the PASS model, would also contribute to the prediction of reading, as evidenced by the literature. It should be noted that normative data was unavailable for the Das-Naglieri Cognitive Assessment System. Therefore, a scoring system was developed which addressed both speed and accuracy.

In general, the results were quite consistent with the above hypotheses. More specifically, it appears as if the Bannatyne factors and the PASS model are measuring much of the same aspects of intelligence. Thus, many of the specific subtests are highly correlated with each other. In turn, both sets were overall significant predictors of reading decoding skills as measured by both Word Attack and Letter-Word Identification subtests of the Woodcock Johnson Psychoeducational Battery -Revised. However, there were also definitive significant individual predictors of note which included Bannatyne's categories of Acquired Knowledge and Conceptualization and the PASS

model scores reflecting Sequential Processing and Planning. In addition, the Attention score of the PASS model was not a significant predictor of reading decoding skills. Similarly, the Simultaneous Processing score did not act as a significant predictor of reading decoding skills.

Such research is beneficial to increase the understanding of cognitive processing profiles among learning disabled, emotionally disturbed and normal school aged children that are indicative of reading disabilities. In addition, it supports the utility of the PASS model in predicting reading disabilities. However, since the normative data of the DN:CAS was not available for this study, it may be conservatively concluded that the PASS model may act as a supplement to the Wechsler Intelligence Scale for Children-Third Edition. The additional knowledge provided from the PASS model will allow professionals to identify reading difficulties and to subsequently recommend appropriate remediation according to the specific processing deficits of each child.

CHAPTER I

INTRODUCTION AND LITERATURE REVIEW

Introduction- Learning Disability and Reading Disability

Learning disability constitutes a major portion of referrals to the school psychologist today. According to Witt and Bartlett (1982), among children with learning disabilities, reading disability is the most frequently encountered problem. In fact, Aaron and Joshi (1992) state that " many children whose reading achievement is discrepant from their IQ are identified as having a learning disability; a substantial number of children identified as having LD have reading disability" (p. 107). The definition of reading disability is somewhat unclear since it is difficult to obtain consensus. Many authors have attempted to define the different kinds of reading disabilities. For example, children with a decoding (word-recognition) deficit but adequate listening comprehension have been considered to have specific reading disability (SRD) (Aaron & Joshi, 1992). The second group of children with reading disability have been represented by children who have adequate word-recognition skills and are deficient in comprehension. Finally, the third group of poor readers, known as low ability readers (LAR), are believed to have difficulty with both decoding and comprehension (Aaron & Joshi, 1992).

In this text, reading disability will be considered a subset of learning disability. In fact, Aaron and Joshi (1992) report that more than half of children evaluated by the school psychologist are referred for poor academic performance. In addition, many of these children are diagnosed as learning disabled based on their performances on standardized reading tests. Thus, the definition is consistent with federal regulations which considers a child learning disabled if he or she

exhibits a discrepancy of fifty percent or more between expected achievement and actual achievement determined on an individual basis. Thus, children in this sample need to first meet the criteria of learning disabled in order to be considered reading disabled. In addition, as previously stated, reading disability is a broad category which includes difficulty with decoding, spelling and/or comprehension. This study will address difficulties with decoding specifically.

Differential diagnosis of reading disability in childhood is a complex process. Although various schools utilize different diagnostic tools and practices, most base their decision on a diagnostic battery which includes standardized psychometric assessment of the child's academic achievement and intellectual functioning, in-depth testing for specific cognitive strengths and weaknesses and information provided from parents. There is a need to integrate and analyze these different types of information in order to attain a dynamic and reliable process of assessment.

It has been suggested that normal reading development follows a dual route model (Frith, 1985). The beginning reader processes words according to visual or graphic features of letters and words, relying on visual memory and lexical access. This route is considered to involve simultaneous processing. The second process that develops is alphabetic and involves phonological or sequential processing (Pennington, Lefly, Van Order, Bookman & Smith, 1987). An overreliance or underreliance on one strategy is likely to impede the readiness and may result in reading disability. (Aaron, 1989). In addition, reading speed and cognitive style have been investigated

(Aaron & Joshi, 1992). These authors report that there is a great deal of variation in the speed with which children read. For example, the average reading speed of college students can vary from 300 to 500 words per minute. Furthermore, there is even more variability in reading speed among children in junior high and elementary schools. In general, when excessive speed is achieved, accuracy suffers. Just and Carpenter (1987) found that "speed" readers had a comprehension advantage only with familiar material, that speed reading is not perceptual but conceptual and that speed-readers do more top-down than bottom-up processing. It appears as if reading disabled children are often not aware of their slow reading rates. With this in mind, the cognitive styles that are relevant to reading are "impulsivity-reflectivity, scanning-scrutinizing, and dysfluency-fluency" (Aaron & Joshi, 1992, p. 175). Readers who are impulsive tend to respond quickly without considering all aspects of a problem. Additionally, readers who are scanners may tend to overlook important details and rather take in information in huge chunks. Dysfluent readers are extremely slow in reading even though they may not necessarily have a reading disability. These students will generally do poorly on timed tasks because they do not have enough time to complete the assignment. Thus, in the current study, the concept of speed vs. accuracy with relation to reading disability will be considered when analyzing and interpreting the data.

Current definitions of reading disability all seem to involve the assessment of a discrepancy between reading ability and measure of intelligence (Stanovich, 1993). In fact, since the passage of P.L. 142, the Education for All Handicapped Children Act of 1975, learning disability

has been legally defined as the presence of a significant discrepancy between ability and achievement.

The most widely used approach to the identification of learning disabilities involve discrepancy formulas (Schuerholtz, Harris, et. al., 1995). One group of measures of intelligence that has been traditionally used is the Wechsler Scales. The newest addition, The Wechsler Intelligence Scale for Children-Third Edition (WISC-III), is an individually administered test of ability of children aged 6 years through 16 years 11 months (Wechsler, 1991). It consists of thirteen subtests, each measuring a somewhat different facet of intelligence. The child's performance on these various subtests is summarized into three composite scores, the Verbal Intelligence Quotient (VIQ), the Performance Intelligence (PIQ), and the Full Scale Intelligence Quotient (FSIQ) , which provide estimates of the child's intellectual abilities. The VIQ is based on the following subtests- Information, Similarities, Arithmetic, Vocabulary, and Comprehension. Digit Span, a supplementary subtest , may be substituted for a verbal subtest if one of the standard subtests is invalid or cannot be given. The PIQ is based on scores on the following subtests- Picture Completion, Coding, Picture Arrangement, Block Design, and Object Assembly. In addition, two supplementary subtests, Symbol Search and Mazes, can provide a richer representation of the child's abilities. There has been a great deal of literature which states the utility of the WISC-III in diagnosing learning disabilities and reading difficulties. This literature will be discussed later on in this text.

Some authors disagree with discrepancy based models which rely on the predictability of achievement from ability and feel that the

variables that represent a processing approach may be better predictors of academic success. As previously stated, it seems that discrepancy based models rely on the predictability of achievement from ability. Ability is often measured by using the Wechsler Scales, most recently with the third edition (WISC-III). However, some authors feel that the variables that represent a processing approach may be better predictors of academic success (Schuerholz, L. J., Harris, E. L. et. al., 1995). For example, Siegel (1992) purports that phonological processing variables are more highly correlated with reading success than WISC-R IQ scores. In addition, Schuerholz, Harris et. al. (1995) suggest that IQ measured by the WISC-R not be the sole criteria for diagnosing reading disabilities. These authors suggest using combined scores in reading (Woodcock Johnson Psychoeducational Battery-Revised- Letter Word Identification and Passage Comprehension which comprise the reading cluster), as well as relevant phonological processing deficits as additional criteria in diagnosing reading disability (Schuerholz, Harris et. al., 1995). These authors further suggest that the status of reading disability based on attentional or executive dysfunctional types of neuropsychological deficits is an issue for future research, allowing for a cognitive processing approach to learning disability.

Further, Naglieri and Reardon (1993) examined the relationship between intelligence and phonological coding when ability was redefined according to the PASS (Planning, Attention, Simultaneous and Successive) cognitive processing model. They tested the hypothesis that traditional IQ tests may be less useful in defining learning disabilities, stating that "it has been well documented that the Wechsler

Intelligence Scale for Children- Revised is ineffective when Verbal-Performance, subtest and factor score profiles are used to conduct differential diagnosis" (Naglieri & Reardon, 1993, p. 127). Further, these authors purport that reading disability is related to intelligence when it is conceptualized according to the PASS model partly due to the fact that phonological processing problems may be better defined according to this model.

In summary, there have been a number of different approaches to the diagnosis of reading difficulties. However, it is important to note that the approaches do vary partly as a function of the definition of reading disabilities at hand. Thus, groups of reading disabled children are quite heterogeneous. In this study, the sample included children with reading difficulties who were also diagnosed as learning disabled. This group should be contrasted from the group of children who only have difficulties with reading. This literature review is organized into two parts. The first addresses research that is relevant to and supporting of the Wechsler Intelligence Scale for Children-Third Edition in diagnosing learning disabilities. The second addresses alternative research and models. More specifically, the research relevant to the PASS model and its relationship to reading difficulties is reviewed.

Clinical Inferential Descriptions of the Wechsler Scales and Reading Disability

The WISC-III provides four factor based index scores which are Verbal Comprehension, Perceptual Organization, Freedom from Distractibility, and Processing Speed. According to the WISC-III manual, Wechsler conceived of intelligence "not as a particular ability but as an

aggregate and global entity, the capacity of the individual to act purposefully, to think rationally, and to deal effectively with his or her environment." (1944, p.3). Thus, subtests of the WISC-III tap into many different mental abilities, with the indication that children develop in different ways and with different patterns of cognitive strengths. Wechsler also considers "nonintellective factors" which affect how a child's abilities are expressed. Matarazzo (1972) states that "it is evident that Wechsler clearly felt that when a test-derived (IQ) is added to other information such as the individual's past educational, social and occupational history, his current drive and overall health, a highly useful composite or clinical index of general intelligence will emerge." (p. 86-87). Furthermore, he feels that such factors are not tapped into by standardized testing but must be considered as they will affect a child's performance.

The WISC-III, as a revised edition of the WISC-R, has been used in psychoeducational assessment of learning disabilities, such as reading disability. Many authors have investigated the use of the Wechsler Scales in diagnosing learning disabilities. For example, Bannatyne (1968) reorganized the WISC subtests into a system that he found useful for diagnosing dyslexic children. Bannatyne (1968) suggests that the division of the Wechsler Scales into Verbal and Performance Scale components may not be too helpful in characterizing the particular deficits of learning disabled children. Instead, he suggests another way to use the WISC in diagnosing learning disabilities. He states three different scores, a Spatial Score (consisting of Picture Completion, Block Design, and Object Assembly); a conceptualizing

score (consisting of Comprehension, Similarities, and Vocabulary), and a sequencing score (consisting of Digit Span, Picture Arrangement, and Coding). Subtests in the Spatial category require the ability to manipulate objects directly or symbolically in multidimensional space. Subtests in the Conceptual category require abilities more closely related to language functioning. Subtests in the Sequential category require the ability to retain sequences of auditory and visual stimuli in short term memory storage (Bannatyne, 1968).

Bannatyne (1971) states that in general, disabled readers receive their highest score on the Spatial category, an intermediate score in the Conceptual category and the lowest score on the Sequential category. He also suggests a fourth category, Acquired Knowledge, consisting of Information, Arithmetic and Vocabulary. He states that thirty percent of children diagnosed as reading disabled are characterized by the distinctively ordered profile of scores as Spatial>Conceptual> Sequential.

Other authors have attempted to reorganize the Wechsler Scales in relation to Bannatyne's factors for diagnostic purposes. For example, it has been proposed that three subtests of the WISC-III Performance Scale- Picture Completion, Block Design and Object Assembly, measure simultaneous processing of information (Kaufman, 1994). This author purports that children with reading disability have performed well in this triad. In fact, patterns of high scores on Bannatyne's Spatial Category and low scores on his Sequential Category have been found among samples of reading disabled children (Profitera & Dersch, 1993). This profile may suggest good simultaneous and poor sequential skills among

reading disabled children (Kaufman, 1994).

Rugel (1974) applied Bannatyne's approach to the WISC profiles of reading and learning disabled children and examined the existence of a Spatial Ability>Verbal Conceptualization Ability>Sequential Ability profile among reading disabled and learning disabled children. He reviewed 25 studies which reported WISC subtest scores of disabled readers. The studies involved 27 populations of reading disability. The criterion for reading disability was generally a reading level which was two or more years below the expected reading level as measured by a standardized test. The specific measures used in various studies were not given. The populations were children referred to reading clinics and children selected from public school classes. The author used Bannatyne's categories to reclassify the subtests. Results showed a similar pattern to which Bannatyne reported. More specifically, disabled readers scored highest in the Spatial category, intermediate in the Conceptual category and lowest in the Sequential category.

It seems as if Bannatyne's recategorization is meaningful and useful in the diagnosis and remediation of reading disabilities. In fact, the high rank in the Spatial category suggests that disabled readers are strong in visual-spatial skills. In contrast, the lower scores in the Sequential category can be related to deficits in short term memory processes and attentional process (Rugel, 1974). In addition, is also seems related to phonological processing and associative learning.

Finally, the study further explained whether disabled readers are above average, average or below average in the three categories. The results showed that in the sequential category, disabled readers showed

a deficit with respect to normal readers. More specifically, disabled readers scored significantly lower than normal readers on Digit Span in six populations and on Coding in five populations. Scores of disabled readers were not significantly lower on Picture Arrangement. (Rugel, 1974). In terms of the Conceptual category, disabled readers showed only mild deficits in comparison to the normal readers. Disabled readers were significantly lower on Vocabulary in four populations and on Similarities in two populations. On the Comprehension subtest, there were no significant differences in that direction between the two groups. In fact, one population showed significantly higher scores for disabled readers over normal readers on this subtest. Disabled readers seem to be superior to normal readers in the Spatial category, scoring significantly higher on Picture Completion in five populations and on Block Design and Object Assembly in two populations. However, once again, this study does not specify different types of reading disability. In addition, it does not address different types of reading disability based on strategies that were employed by each child. For example, a child with a strength in sequential skills may over-utilize a sequential strategy when reading, not using the holistic sight word approach when indicated.

In reading, word recognition involves simultaneous processing with a sight word approach and sequential organization with phonetic decoding. Further, it has been suggested that learning disabled children may rely on simultaneous processing beyond its efficient utility (Stoiber, Bracken, & Gissal, 1983). It should be noted that the Bannatyne recategorization does not seem to address reading disabled children who have difficulties with visual-spatial skills who over-rely on sequential

skills when reading. In addition, the samples across the twenty-five studies were probably quite heterogeneous and it is difficult to assess whether this model would be successful with individuals as opposed to groups. In fact, even though this pattern was identified for many groups of children with learning difficulties, it has not been found to characterize many individuals or differentially diagnose learning disabled children from those in other special education classes (Berk ,1983).

Another study evaluated Bannatyne's subtyping of reading disabilities using the WISC-R data obtained from 140 disabled readers and their matched controls. There were 29 females and 111 males in the sampie including children between ages 7.8 and 16.9 years with reading achievement level of 1/2 of grade expectancy or lower (Decker & Corley, 1984). In addition, all children had an IQ of at least 90 (WISC-R) with no known emotional or neurological difficulties. Results confirmed Bannatyne's recategorization of disabled readers as a group (Spatial>Conceptual>Sequential). Furthermore, the disabled readers in this sample did not differ significantly from the control group in spatial deficits when deficits in verbal performance were accounted for (Decker & Corley, 1984). The results suggest the conclusion that reading disability is primarily a language-based disorder which may in turn depend on the ability to process and remember sequential information (Vellutino, 1979). Decker and Corley (1984) continue with "the Bannatyne profile appears to have little diagnostic validity for individual children. Although the profile is significantly more common among disabled readers, it does not appear to be associated with any other cognitive or academic achievement indices in our psychometric battery of

tests." (p. 304). It should be noted that the battery of tests included the Peabody Individual Achievement Test, the Spatial Relations subtest of the Primary Mental Abilities Test, the Colorado Expressive Fluency Test-letters and categories, and the ETS Identical Pictures Test. However, with this statement, the authors are neglecting the utility of Bannatyne's recategorization. In addition, the tests mentioned above have not been proven to correlate with measures that are predictive of reading.

Stoiber, Bracken and Gissal (1983) investigated the diagnostic procedure of reading disabilities by using two models. The first was the Luria-Das simultaneous-successive model, measured by the Kaufman Assessment Battery for Children. The second model was Bannatyne's WISC-R subtest recategorization. The sample consisted of 32 children who were diagnosed with reading disability and 32 matched normal children. The age range was from 7 years, 5 months to 11 years, 5 months. Results revealed a clear sequential processing deficit for the reading disabled sample. This group also scored significantly lower on the K-ABC Mental Processing Composite and reading achievement subtests. Bannatyne's complete classification hierarchy (Spatial> Conceptual> Sequential) failed to be significant for the reading disabled sample. These results may be related to the strict criteria that was used to categorize reading disability. However, the system did indicate a significant sequential weakness for the reading disabled children (Stoiber, Bracken, & Gissal, 1983). These authors conclude that "if the cognitive neuropsychological perspective holds promise for understanding academic problems (e.g. reading disabilities), a gradual shift in psychometrics from quantitative indicators (such as IQ scores) to