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An analysis and cross-battery assessment of the discrepancy model for diagnosing specific learning disabilities in school-aged children

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AN ANALYSIS AND CROSS-BATTERY ASSESSMENT OF THE DISCREPANCY MODEL FOR DIAGNOSING SPECIFIC LEARNING DISABIILITIES IN SCHOOL-AGED CHILDREN

by
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Dedication

I dedicate this manuscript to my family: John, Doreen, Katie, and Kristen McEnroe and Grace Stranges. Thank you for everything you've done for me.

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Abstract

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The purposes of this study were to examine the current issues of the discrepancy model for identifying specific learning disabilities (SLD) and to perform a cross-battery assessment of the WISC-IV and WIAT-III intelligence batteries to determine if the discrepancy model is truly identifying the areas of concern for students being tested with these batteries or if it is misidentifying students leading to issues with classification and SLD identification. A review of the literature examined the history of the discrepancy model and cross-battery assessments as well as the current issues encompassing the discrepancy model and the application of both the discrepancy formula as well as performing a cross-battery assessment. Data was collected through anonymous archival data provided by Rowan's Assessment and Learning Center. This data consisted of 35 subject's WISC-IV and WIAT-III profiles ran through the Cross-Battery Assessment Data Management and Interpretive Assistant (DMIA v.2.0). The data was then run through a chi-square analysis to determine if there was a significant relationship between the DMIA software and the traditional discrepancy method. Limitations of the study are also discussed as well as interesting findings discovered along the way.

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Chapter 1

Introduction

The current study is focused on the effectiveness of the discrepancy formula in identifying learning disabled children and whether or not it is a reliable way of classifying children. The discrepancy formula is one of the most common methods for identification of learning disabilities. The success of this method is based on intelligence testing whose accuracy has been questioned for decades. If this formula is not accurately classifying students then the entire special education system is failing. Not only would it be costing school districts millions but more importantly children who should be receiving special services are flying under the radar. The discrepancy formula has been studied and found to miss early identification, overlook students struggling academically, and not classify those with a below average IQ (Dombrowski, Kamphaus & Reynolds, 2004). To think that using one formula to classify children with something as unique and complicated as a specific learning disability would be a disservice to those children. A learning disability cannot be identified with a formula just because it provides a simple “yes” or “no” answer, there is far more to understanding a child who suffers from a specific learning disability. This study will explore the issues with the discrepancy formula and whether or not it is actually classifying children who actually need services provided to them.

School budgets are underfunded now more than ever and schools are always looking for ways to improve areas, if this identification process is not doing the job it is supposed to there is a major issue. If the discrepancy formula is not as successful as they intended it to be than it would not make much sense to keep using it to classify children.

The purpose of this study is to see if the discrepancy formula for identifying specific learning disabilities is accurately classifying children. A cross-battery assessment will be performed to measure the accuracy of the discrepancy model and identify students who may be misidentified. Misidentified could mean that a child is diagnosed with a learning disability when they are actually do not have one or not being classified as learning disabled when they actually are.

The hypothesis for this study is that the discrepancy model for identifying specific learning disabilities does not accurately identify children and tends to overlook certain groups of students who are vulnerable to the specific methods of using a discrepancy formula.

The following are the operational definitions used for this study:

Discrepancy Model- The IQ-achievement discrepancy model assesses whether there is a significant difference between a student's scores on a test of general intelligence and scores obtained on an achievement test.

Specific Learning Disability- A specific learning disability is a disorder in one or more of the central nervous system processes involved in perceiving, understanding and/or using concepts through verbal (spoken or written) language or nonverbal means. This disorder manifests itself with a deficit in one or more of the following areas: attention, reasoning, processing, memory, communication, reading, writing, spelling, calculation, coordination, social competence and emotional maturity (Flanagan & Alfonso, 2011).

Intelligence Quotient (IQ) - a measure of a person's intelligence as indicated by an intelligence test; the ratio of a person's mental age to their chronological age (Floyd, Evans & McGrew, 2003).

Cross-battery assessment- the process in which psychologists use information from multiple test batteries to help guide diagnostic decisions and to gain a fuller picture of an individual's cognitive abilities than can be assessed through the use of single-battery assessments (Flanagan & Ortiz, 2001).

It was assumed that WISC-IV and WIAT-III were all administered professionally and correctly. It was also assumed that the subject's age was identified correctly and recorded so. The limitations of this research were that anonymous participants were all obtained through Rowan's Assessment and Learning Center archival database. Data may lack generalized subject pool due to location, age, cost of evaluations, and socioeconomic status.

The current literature review focused on explaining the definitions and guidelines of specific learning disability. The literature review also focused on the issues and history of the discrepancy model as well as history and application of cross-battery assessment. A brief look into intelligence testing and Cattell-Horn-Carroll (CHC) theory was also examined. The current study looked into if the discrepancy formula for identifying specific learning disabilities is accurately classifying children.

The analysis of each individual began with accessing the PsychCorp database and retrieving the profile of the anonymous subjects that fit the criterion. The anonymity of the subjects was maintained by removing the age and any identifying information for the individuals test profile. Step 1 was choosing the intelligence batteries that are being analyzed. In this case the batteries chosen were the WISC-IV and the WIAT-III. The next step in the process was to find the CHC Broad Abilities measured by the intelligence battery. The third step was to identify the narrow abilities measured by the intelligence batteries. Lastly, enter scores into the cross-battery assessment Data Management and Interpretive Assistant software provided and compare the discrepancy data from the WISC-IV and WIAT-III to the cohesiveness, recommendation of a follow up, and divergent scores identified by the cross-battery software (XBA DMIA).

Chapter 2

Literature Review

Introduction

This review of literature will first start by providing a clarification of the term specific learning disorder as well the diagnostic criteria from two of the most reputable sources. Next, a brief historical overview of the discrepancy model for specific learning disabilities as well as the current issues and the application of the discrepancy model in using that approach will be examined. Lastly an overview and application description along with the history of the cross-battery assessment approach will also be provided.

Definitions of Specific Learning Disability (SLD)

Specific Learning Disability is a term that differs depending on the situation and setting at the time of examination. The DSM-V definition as well as the Individuals with Disabilities Education Act of 2004 (IDEA 2004) definition is two of the most commonly used definitions when referring to specific learning disabilities. The definitions as well as diagnostic criteria are listed below:

IDEA 2004 definition for specific learning disability:

"Represents a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. Such term includes such conditions as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. Such term does not include a learning problem that is primarily the result of visual, hearing, or motor disabilities, of mental retardation, of emotional disturbance, or of environmental, cultural, or economic disadvantage.” (IDEA, 2004)

DSM-V definition of specific learning disability:

“Learning Disorders are diagnosed when the individual's achievement on individually administered, standardized tests in reading, mathematics, or written expression is substantially below that expected for age, schooling, and level of intelligence. The learning problems significantly interfere with academic achievement or activities of daily living that require reading, mathematical, or writing skills.”

Both definitions are very similar with the exception that the DSM-IV definition identifies an achievement measure and mentions schooling whereas the IDEA 2004 definition provides a more in depth review of inclusionary and exclusionary detail.

Diagnostic Criteria for determining Specific Learning Disabilities

IDEA 2004 criteria for diagnosing an individual with a specific learning disability:

“ The child does not achieve adequately for the child’s age or to meet State-approved grade-level standards in one or more of the following areas, when provided with learning experiences and instruction appropriate for the child’s age or State-approved grade–level standards:

a) Oral expression.

b) Listening comprehension.

c) Written expression.

d) Basic reading skills.

e) Reading fluency skills.

f) Reading comprehension.

g) Mathematics calculation.

h) Mathematics problem solving.

The child does not make sufficient progress to meet age or State-approved grade-level standards in one or more of the areas identified in 34 CFR 300.309(a)(1) when using a process based on the child’s response to scientific, research-based intervention; or the child exhibits a pattern of strengths and weaknesses in performance, achievement, or both, relative to age, State-approved grade-level standards, or intellectual development, that is determined by the group to be relevant to the identification of a specific learning disability, using appropriate assessments, consistent with 34 CFR 300.304 and 300.305; and the group determines that its findings under 34 CFR 300.309(a)(1) and (2) are not primarily the result of:

a) A visual, hearing, or motor disability

b) Mental retardation

c) Emotional disturbance

d) Cultural factors

e) Environmental or economic disadvantage

f) Limited English proficiency.

To ensure that underachievement in a child suspected of having a specific learning disability is not due to lack of appropriate instruction in reading or math, the group must consider, as part of the evaluation described in 34 CFR 300.304 through 300.306:

a) Data that demonstrate that prior to, or as a part of, the referral process, the child was provided appropriate instruction in regular education settings, delivered by qualified personnel; and

b) Data-based documentation of repeated assessments of achievement at reasonable intervals, reflecting formal assessment of student progress during instruction, which was provided to the child's parents.

The public agency must promptly request parental consent to evaluate the child to determine if the child needs special education and related services, and must adhere to the timeframes described in 34 CFR 300.301 and 300.303, unless extended by mutual written agreement of the child's parents and a group of qualified professionals, as described in 34 CFR 300.306(a)(1):

a) If, prior to a referral, a child has not made adequate progress after an appropriate period of time when provided instruction, as described in 34 CFR 300.309(b)(1) and (b)(2); and

b) Whenever a child is referred for an evaluation."

DSM-V (2013) diagnostic criteria for identifying a specific learning disability: "A variety of statistical approaches can be used to establish that a discrepancy is significant. Substantially below is defined as a discrepancy of more than 2 standard deviations between achievement and IQ (between 1 and 2 standard deviations) is sometimes used, especially in cases where an individual's performance on an IQ test may have been compromised by an associated disorder in cognitive processing, a comorbid mental disorder, or general medical condition, or the individual's ethnic or cultural background. If a sensory deficit is present, the learning difficulties must be in excess of those usually associated with the deficit”

The IDEA 2004 diagnostic criterion is more rigorous due to the fact that the Individuals with Disabilities Education Act is what most psychologists working in a school environment would refer to when identifying SLD. However, the criterion provided by the DSM-V shows the factors necessary to determine what is called a significant discrepancy. An assessment of SLD using a discrepancy between one and two is what most school districts practice when classifying a student as learning disabled.

History of Discrepancy Model

In order to determine a severe discrepancy it requires the administrations of a standard IQ test paired with specific academic achievement tests. The data is than compared using the standard scores of the tests. If this comparison shows that a student’s achievement score is significantly lower than his or her ability in a specific area (math or reading) then the student can be diagnosed with a specific learning disorder. The discrepancy cutoff for diagnosing a student with a specific learning disability varies from state-to-state and even on a district to district basis. The goal of the discrepancy model is to ensure that those who have true learning disabilities, which are not the result of reduced opportunity to learn, mental retardation, or sensory, emotional, or socio-economic challenges are identified so that their educational needs may be addressed appropriately (Scruggs and Mastropieri, 2006).This unintentionally allows the administrators of the tests to use their own professional discretion when determining eligibility of a student. The history of using a discrepancy formula when identifying learning disabilities stems from Barbara Bateman in 1965. Bateman was the first to identify the ability-achievement discrepancy which has become the foundation of diagnosing learning disabilities (O'Donnell, 1980). Other researchers such as Kirk (1962) found that it was possible to have discrepancies in some areas while other areas were normal compared to the rest of the student population. Gallagher in 1966 was one of the first researchers to practice the idea of using a discrepancy in classifying children who may have a learning disability. He took scores from the WISC and examined them in a scatter plot to see if there was a clear difference in those who had previously been determined to have a learning disability compared to the general population (Gallagher, 1966). Since the initial discovery of a discrepancy formula it has been a generally accepted practice to use for identification purposes. The acceptance of this could be because it provides a concrete number to look at when trying to classify a student. Individuals prefer to be able to look at a statistic and be provided with a simple "yes or no" type of answer which a discrepancy formula can certainly provide. Meehl in 1954 said that "people do not want to rely on the judgment of another person and preferred to have a number to refer to for justification of learning disability identification". This could be the case especially within school districts, once there is a total reliance on individuals to identify a specific learning disability it creates a target in which to blame if something goes wrong. However, if numbers are provided to back up a classification it is far less likely to be argued. Although it provides a "tangible" method for classification purposes, many professionals have questioned the accuracy of this type of model from the beginning. Even though there were no specific guidelines included for LD determination, the discrepancy model was the primary formula used to classify children by 1975 (Chalfant & King, 1976). In 1976 Bureau of Education for the Handicapped issued the first regulations for identification procedures. “A specific learning disability may be found if a child has a severe discrepancy between achievement and intellectual ability in one or more of several areas; oral expression, written expression, listening comprehension or reading comprehension, basic reading skills, mathematics calculation, mathematics reasoning, or spelling. A “severe discrepancy” is defined to exist when achievement in one or more of the areas falls at or below 50% of the child’s expected achievement level, when age and previous education experiences are taken into consideration (US Department of Education, 1976). Although there was a concrete definition and loose guidelines the states were still able to choose their own specific formula for determining if a severe discrepancy was present. In a 1989 study performed by McLeskey he found that 64% of children in an Indiana learning disabled population qualified under a discrepancy model. That 64% was almost double from 33% found on the same Indiana population found in one of his earlier studies. This large change was caused by changes to the state laws and this statistic shows how great of a change can occur when the guidelines of the discrepancy formula are altered (McLeskey, 1992). The discrepancy formula, guidelines, and practice have remained relatively unchanged over the past two decades. Although the intelligence batteries used to determine this discrepancy has been updated several times the general use of the formula and model has gone unchanged. This has led to researchers and critics to look into the effectiveness of the formula and identify several common issues found amongst professionals looking into this matter.

Issues with Discrepancy Model

The idea of discrepancy was initially not included in the first definition of learning disability. This led to a lack of uniform interpretation of what a discrepancy actually was as well as issues with classifying children (Kavale & Forness, 2000). Kavale in 1987 pointed out that while the discrepancy formula is the most commonly used procedure for school identification that does not necessarily mean it is actually providing evidence of a learning disability. He questioned the relationship between LD and discrepancy and if a discrepancy actually represented the presence a learning disability. Kavale concluded that, “discrepancy is best associated with the concept of underachievement. This is true now and has historically been the case”. The case against the discrepancy model is based on practical, logical, statistical, theorectical, empirical, legal, and ethical considerations (Dombrowski, Kamphaus & Reynolds, 2004). The lack of a universal identification system created confusion, disorganization and poses a significant problem when children are moving from state to state or even district to district (Shepard, 1983). In 1982 Shepard and Smith found in a case study of 1000 individuals that only 28% of the case met strict criterion for identifying learning disabled students with another 15% only showing weak signs of a handicap. They concluded with “the validity of LD (learning disabled) identification cannot be reduced to simplistic statistical rules. Minimal criteria for the reliability and discriminant validity of both formal and informal assessments can be established, but ultimately the integration of separate pieces of diagnostic information must rest of professional judgment”. This early study indicates that issues have been surrounding this model almost since its creation (Shepard, Smith & Vojir, 1983). In their 1983 study Shepard and Smith acknowledged reasons that children with learning disabilities wouldn't be identified using a severe discrepancy model: 1. The LD may have caused the IQ to decline, and if achievement remained at a comparatively low level, then a discrepancy would not exist; 2. skills permitted the students to "compensate" for the effects of LD which means that achievement test scores may reveal an increase while ability level remained constant; 3. a "mild" discrepancy was present but not unexplained because factors such as limited school experience, poor instructional history, behavior problems, or second-language considerations could have been the reason and not an LD (Shepard & Smith, 1983). In another study done in 1992, Kavale and Reese studied Iowa's learning disabled population. They discovered that 55% of those diagnosed as being learning disabled qualified under a discrepancy model. The percentages ranged from 32% to 75% depending on the school location and district. They concluded that using a discrepancy model will usually result in a significant amount of learning disabled individuals who do not meet the criteria under the discrepancy model. They also noted that children who are not learning disabled could also be misidentified due to variability in procedures amongst school districts. Kavale concluded that "Finding substantial inconsistencies about the percentage of students meeting the discrepancy criterion is common among studies analyzing classified LD populations" (Kavale & Reese, 1992). Kavale (1995) argued that learning disabilities are complex and multivariate in nature and that focus needs to be placed on other considerations (grades, observation, family history, etc.) while using the discrepancy model as another tool to help professionals see the bigger picture when pinpointing learning disabilities. Altogether it was found that about one third of the identified learning disabled samples have been found not to qualify when using a discrepancy formula. (Bennett & Clarizio, 1988; Dangel & Ensminger, 1988; Furlong, 1988)

Dombrowski, Kamphaus, and Reynolds argue that this model lacks validity and reliability. They point out that discrepancy model tends to overlook children who are struggling academically but don't exhibit a discrepancy between IQ scores and achievement scores. They also acknowledge that a child who has a 70-85 IQ may perform at a similar level of the achievement tests but that does not indicate that they do not require some sort of assistance. The discrepancy model makes it difficult to identify students in early grades (kindergarten – third grade) because students are not old enough to demonstrate a significant discrepancy (Mather & Roberts, 1994). Dombrowski, Kamphaus, and Reynolds described students classified using the discrepancy model as suffering from the Matthew Effect. The Matthew Effect is a biblical reference that is commonly referred to as "the rich get richer, and the poor get poorer". For example, students who are good at math are more likely to improve in areas of math because they already have a good idea of the subject matter and concepts. This is the same for all subjects and those who have more general subject knowledge will perform better on IQ tests. However, for the children who may suffer from a learning disability it could have an opposite effect. Students struggling in school with poor reading ability will lead to a poor performance on an IQ test. This low IQ score along with the low scores on the subject tests make it harder for these students to qualify using a discrepancy formula (McLeskey & Waldron, 1990). This results in students being trapped; Mather and Roberts (1994) describe the use of discrepancy as a "wait and fail" model because of the inability of the formula to identifying struggling students early enough to provide an intervention. Instead these students are forced to perform badly in school first, and then after the student fails a subject or two than interventions may be provided. The IQ-Discrepancy criterion is potentially harmful to students as it results in delaying intervention until the student's achievement is sufficiently low enough for the discrepancy to be achieved. For most students, identification as learning disabled occurs at an age when academic problems are already so prominent and can rarely make an impact even with the most intense remediation efforts (Torgesen, Alexander, Wagner, Rashotte, Voeller, Conway & Rose, 2001). The "wait to fail" model does not lead to closing the achievement gap for most students placed in special education. Many students placed in special education as SLD show minimal gains in achievement and few ever leave special education (Donovan and Cross, 2002). Some researchers believe that the vagueness of the definition as well as the lack of a universal identification system is the reasons for difficulties in LD determination (Frame, Clarizio, Porter, & Vinsonhaler, 1982). Other studies have also cited issues with the definition and guidelines for specific learning disability identification. Perlmutter & Perus (1983) claim the lack of uniform guidelines for discovering a severe discrepancy across all educational settings is the reason for confusion when it comes to classifying students. When every school is using different criterion for identifying learning disabilities it is no surprise that it is followed by confusion, questions and concerns (Morrison, MacMillan & Kavale, 1985). Some researchers even claim that it is only a matter of time until the discrepancy formula is abandoned as a whole and LD identification will be a more "hands-on" approach with less emphasis on test scores (Aaron, 1997).

History of Cross-Battery Assessment

The Cattell-Horn-Carroll Cross-Battery approach (XBA approach) is a fairly new approach that has garnered the attention of practicing professionals in the field for some time now. This model was introduced by Flanagan and her colleagues in the late 1990's (Flanagan & McGrew, 1997; Flanagan, Genshaft & Harrison, 1996). The empirical basis for XBA approach is CHC theory (Cattell-Horn-Carroll) of cognitive abilities which was developed by John B. Carroll, Raymond Cattell, and John L. Horn. The XBA approach looks at a total range of abilities that single battery assessments cannot. XBA looks at a wide range of broad and narrow abilities including language-based processing which is one of the issues concerning the discrepancy model (Floyd, Keith, Taub & McGrew, 2007). The XBA approach interprets the results at the cluster level and not the subtest level which makes it more reliable. This approach gives professionals the opportunity to make more accurate interpretations of intelligence tests and allows them to supplement IQ tests with other batteries in order to give a more precise interpretation of test results (Taub, Floyd, Keith & McGrew, 2008; Floyd, McGrew, Barry, Rafael & Rogers, 2009). For example, when the cross-battery approach is used with the Weschsler Intelligence Scales (WIAT-III, WISC-IV) it is "possible to measure important abilities that would otherwise go unassessed… abilities that are important in understanding school learning and a variety of vocational and occupational outcomes" (Flanagan & Kaufman, 2004; Flanagan, Ortiz, Alfonso & Mascolo, 2006). John B. Carroll is one of the originators of the Cattell-Horn-Carroll theory and he stated that "The XBA approach represents a significantly improved method of measuring cognitive abilities… XBA can be used to develop the most appropriate information about an individual in a given testing situation"

(Carroll, 1998). This approach was created to provide a step-by-step process for how professionals can administer assessments that represent a complete interpretation of cognitive abilities more specifically than just an intelligence test. XBA allows experts to get a better idea of what specific area a student may be struggling in opposed to a generalized category (Flanagan, Alfonso & Ortiz, 2008). The Cross-Battery approach has been generally accepted in the special education community and continues to grow in popularity due to the need for a more depth analysis in the evaluation of potential learning disabilities (Kavale & Mostert, 2005; Carroll, 1998; Kaufman, 2000). Adding to the positive potential of this method, XBA has been used in the operational definition of learning disability so that it is aligned with federal and legal directives (Flanagan et al., 2006).

Application of Cross-Battery Assessment

According to Essentials of Cross-Battery Assessment Fourth Edition there are five steps in order to cross analyze the intelligence and achievement tests to produce results reading effectiveness. Step 1 is choosing the intelligence batteries that are being analyzed. Once the intelligence battery is chosen you can move onto the next two steps in the process. The next two steps of performing a cross battery assessment would be to find the CHC Broad and narrow abilities measured by the intelligence battery (Flanagan, Ortiz & Alfonso, 2013). Insert broad and narrow abilities chart from ECBA4th. According to CHC theory there are nine broad abilities and forty narrow abilities. Each intelligence battery measures different broad and narrow abilities according to Flanagan, Ortiz and Alfonso. For example, the Wechsler Intelligence Scale for Children (WISC-IV) measures fluid intelligence (Gf), crystallized intelligence (Gc), visual processing (Gv), short-term memory (Gsm), and processing speed (Gs). These classifications of abilities identified help researchers recognize measures of specific aspects measured in the broad abilities present in CHC theory. These tests when looked at the broad level are needed to help the validity of cognitive assessment (Flanagan, Ortiz & Alfonso, 2013). By knowing what each test specifically measures it allows the researcher to only select tests that look into the area of interest or concern without using all of the irrelevant measures that could affect the results (Flanagan, Ortiz & Alfonso, 2007). Once all of the abilities are found it is up to the researcher to administer the actual intelligence battery. Lastly, they state to enter scores into the cross-battery assessment Data Management and Interpretive Assistant software provided. (XBA DMIA).

Chapter 3

Methodology

Participants

The participants chosen for this study were selected from archival data provided by Rowan's Assessment and Learning Center. Rowan's Assessment and Learning Center is listed as "a state approved agency that can provide independent child study team evaluations" (Assessment and Learning Center Information, 2013). A total of approximately 35 individuals (n = 35) were taken from the database. Individuals whose names were kept anonymous were chosen from a PsychCorp database. The names of the subjects were removed prior to analyzing the data. The criteria for participants were as follows: Participants chose were required to have an intelligence quotient (IQ) of at least 80. The cutoff score of 80 was chosen because any number lower than 80is approaching Cognitive Impairment (IQ 70 or lower to be considered Cognitively Impaired). Subjects who were chosen from database ages ranged from 8-17 and had to have been administered the Wechsler Individual Achievement Test- Third Edition (WIAT-III) as well as the Wechsler Intelligence Scale for Children- Fourth Edition (WISC-IV).

Variables

The program used to obtained the subject's scores was through the PsychCorp database The individuals chosen were based on if they had been administered both the WISC-IV and WIAT-III.

Wechsler Individual Achievement Test- Third Edition (WIAT-III): The Wechsler Individual Achievement Test is an achievement measure manufactured by Pearson. It is an updated individual measure of academic achievement for students in Preschool through Grade 12. The age restrictions set by Pearson range from 4 years, 0 months to 19 years, 12 months (Thompson, McGrew, Johnson, and Bruininks, 2000). The WIAT III contains 16 subtests: Oral Expression, Listening Comprehension, Alphabet Writing Fluency, Sentence Composition, Essay Composition, Spelling, Early Reading Skills, Word Reading, Pseudoword Decoding, Oral Reading Fluency, Reading Comprehension, Numerical Operations, Math Problem Solving, Math Fluency- Addition, Math Fluency- Subtraction, and Math Fluency – Multiplication (Lichtenberger & Breaux, 2010). The purpose of this test is to identify student academic strengths and weaknesses, inform special education eligibility/ placement decisions, and design instructional objectives and plan interventions (McGrew & Flanagan, 1998). The WIAT-III is required to be administered by individuals who have received professional training in educational or psychological assessment; this may include educational diagnosticians (LDT-Cs), school psychologists, and trained educators. Individuals permitted to interpret results from the WIAT-III include school psychologists and educational diagnosticians.

Wechsler Intelligence Scale for Children- Fourth Edition (WISC-IV): The Wechsler Intelligence Scale for Children is an intelligence measure manufactured by Pearson. The WISC-IV is a test to measure intelligence quotients in children ages 6-19. The scale measures general intelligence of specific indices. The WISC-IV contains the 15 subtests: Arithmetic, Block Design, Cancellation, Coding, Comprehension, Digit Span, Information, Letter-Number Sequencing, Matrix Reasoning, Picture Completion, Picture Concepts, Similarities, Symbol Search, Vocabulary, and Word Reasoning (Flanagan &

Alfonso, 2011). Like the WIAT-III the WISC-IV also requires professional training to administer and interpret results.

Data Management and Interpretive Assistant (DMIA) – The Data Management and Interpretive Assistant is a program provided by Flanagan and colleagues that analyzes data from single-batteries and provides an assessment on cohesiveness, divergent scores, and provides a recommendation for a follow-up.

Psychcorp Database- the Psychcorp Database is where all of the subjects scores on the WIAT-III and WISC-IV batteries are stored and accessed.

Procedures

The analysis of each individual began with accessing the PsychCorp database and retrieving the profile of the anonymous subjects that fit the criterion. The anonymity of the subjects was maintained by removing the age and any identifying information for the individuals test profile. The criterion for each subject as listed above as well: a cutoff IQ score of 80 or higher as well as an age range of 8-18. According to Essentials of Cross-Battery Assessment- Second Edition there are five steps in order to cross analyze the intelligence and achievement tests to produce results regarding effectiveness. Step 1 is choosing the intelligence batteries that are being analyzed. In this case the batteries chosen were the WISC-IV and the WIAT-III. According to Flanagan, Ortiz, and Alfonso the WIAT-III is used to supplement the WISC-IV for listening ability (Ls). The next step in the process of performing a cross battery assessment would be to find the CHC Broad Abilities measured by the intelligence battery. The WISC-IV measures fluid intelligence (Gf), crystallized intelligence (Gc), visual processing (Gv), short-term memory (Gsm), and processing speed (Gs). The WIAT-III measures listening ability (Ls) and phonetic coding-analysis (PC: A). The third step is to identify the narrow abilities measured by the intelligence batteries. The WISC-IV measures inductive reasoning (Gf-I) and perceptual speed (Gs-P). The next step is to administer and score the selected intelligence batteries and supplemental tests. In this step both the WISC-IV and WIAT-III scores were provided through the database. Lastly, they state to enter scores into the cross-battery assessment Data Management and Interpretive Assistant software provided (XBA DMIA).

Chapter 4

Results

Characteristics of the Sample

The present study was based on a sample of 35 adolescents who were tested at Rowan's Assessment and Learning Center. The sample contained 24 male subjects (69%) and 11 female subjects (31%). Each participant was required to be over the age of 8 and under the age of 17. It is widely accepted that prior to the age of 8 IQ and other intelligence measures are skewed and may have an impact on the results. The age of 17 was used as the other cut off because the focus of this study was on school aged children who may qualify under a 1.5 standard deviation discrepancy model used by many school districts in the area. Also, assessment measures move onto adult versions after the age of 17 years 11 months. Participants were required to have at least an 80 IQ as to not have any statistics affected by cognitive impairments. The average age of the subjects used in this study was 11.5 years of age. Each participant was required to have been administered the WISC-IV intelligence test as well as the WIAT-III academic achievement test. Samples that had not been fully administered were thrown out of the subject pool to help avoid skewed results.

Descriptive Statistical Analysis

Descriptive statistic procedures were conducted on the entire population of subjects used in this study. These results indicate the effectiveness of both the DMIA software used to perform a cross-battery analysis as well as the effectiveness of the 1.5 standard deviation discrepancy model. By comparing the results from both methods it will allow readers to see a comparison of the two and may provide insight on exactly how accurate or inaccurate the discrepancy model is. The comparison of the two methods is based on whether or not both methods identified the same areas of concern. For example, if the discrepancy model showed a student with a "severe discrepancy" (1.5 standard deviations) in Reading Comprehension on the WIAT-III achievement test than we would expect the results of the DMIA to identify the same issue. The DMIA software is described as a more "in depth" analysis of intelligence and achievement test results so it could potentially identify areas overlooked by a discrepancy model (Flanagan, Ortiz, Alfonso & Dynda, 2010). Before getting into the actual descriptive statistics the method of analyzing the data must be explained. The DMIA software breaks down the WISC-IV and WIAT-III tests in terms of three conditions: Cohesiveness, Recommending a follow-up and Identifying Divergent Scores (Flanagan, McGrew & Ortiz, 2000). The term cohesive is used to describe whether or not the results of the battery are significant, substantial, infrequent or uncommon by Flanagan and colleagues. If the difference between the scores that comprise the composite is not significant and a difference of this size occurs in more than 10% of the general population than it would be considered to be cohesive. If the difference in scores that comprise the composite is significant and occurs in less than 10% of the general population than it would be considered uncommon or not cohesive (Flanagan, Ortiz & Alfonso, 2013). The recommendation of a follow up is based on whether or not the composite score could be considered significant and if so than a follow-up on the area of concern may be necessary. They use the term "No, not considered necessary," for scores that indicate no abnormalities and they will also use the term "Maybe for lowest score" to indicate that a certain composite in the set of subtests may require a follow-up to determine how abnormal that score may be. For scores deemed to be significant they use the term “Yes, recommended for lowest score” and suggest that examiners take a look at these scores to gain a better understanding of an individual’s performance. When results were analyzed in terms of cohesiveness for the WISC-IV intelligence battery it was found that the 1.5 standard deviation discrepancy model identified the same areas deemed “not cohesive” 76% of the time (106/140).

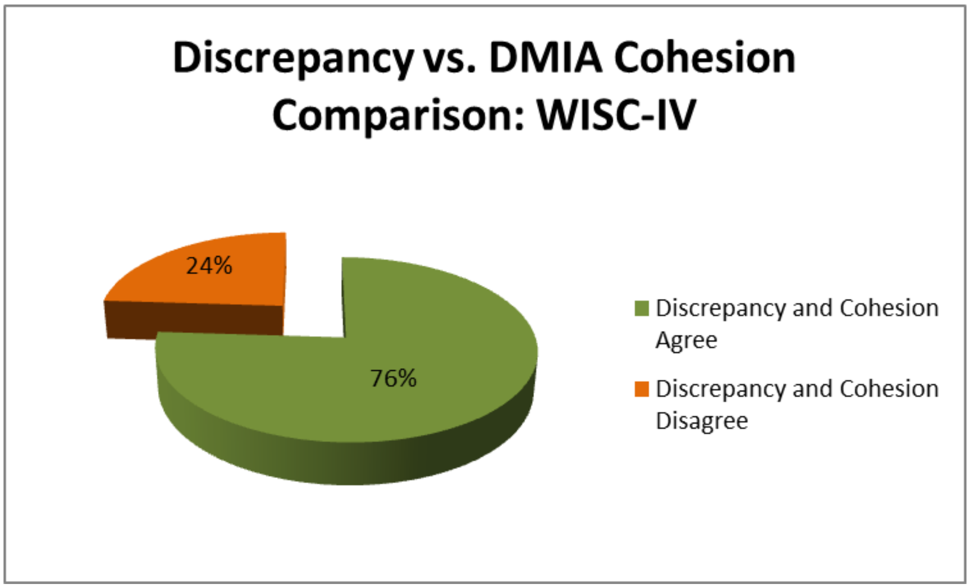

Figure 1. WISC-IV Cohesion-Discrepancy Comparison

It was also analyzed under the follow-up recommendation criteria for the WISC-IV and identified the same area of concern 66% of the time (93/140).

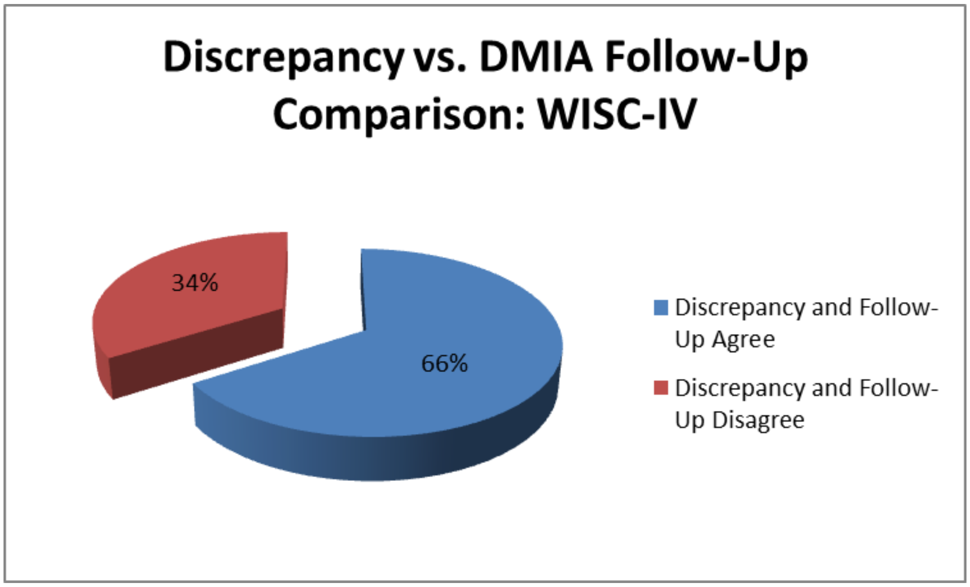

Figure 2. WISC-IV Follow-Up-Discrepancy Comparison

The cohesiveness for the WIAT-III ability index was also looked at and found to identify the same area 67% (165/245) of the time.

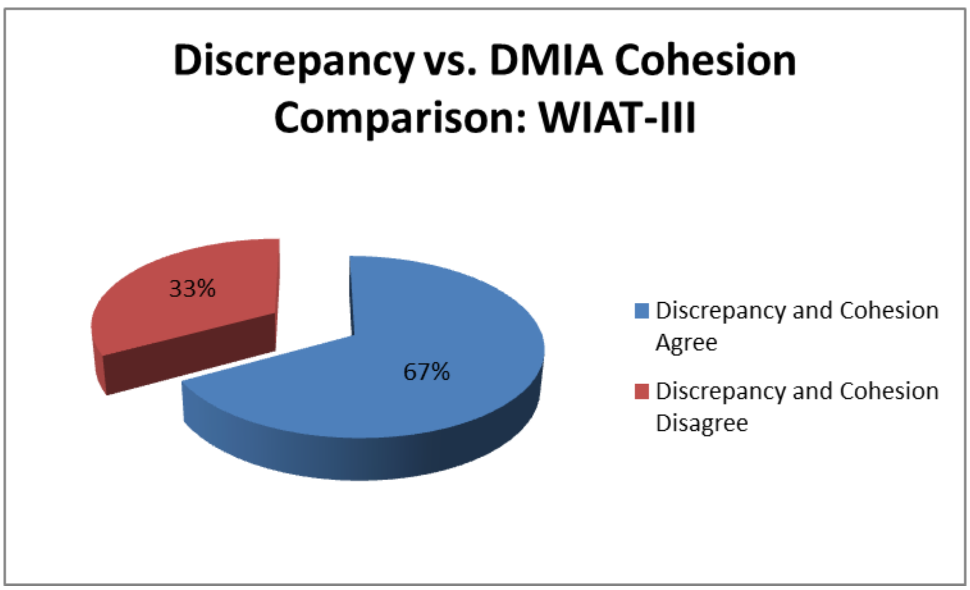

Figure 3. WIAT-III Cohesion-Discrepancy Comparison

When follow-up recommendation similarities were calculated it was found that 63% of the time the discrepancy model and XBA DMIA software agreed on areas where a follow up was recommended and a significant discrepancy was also found.

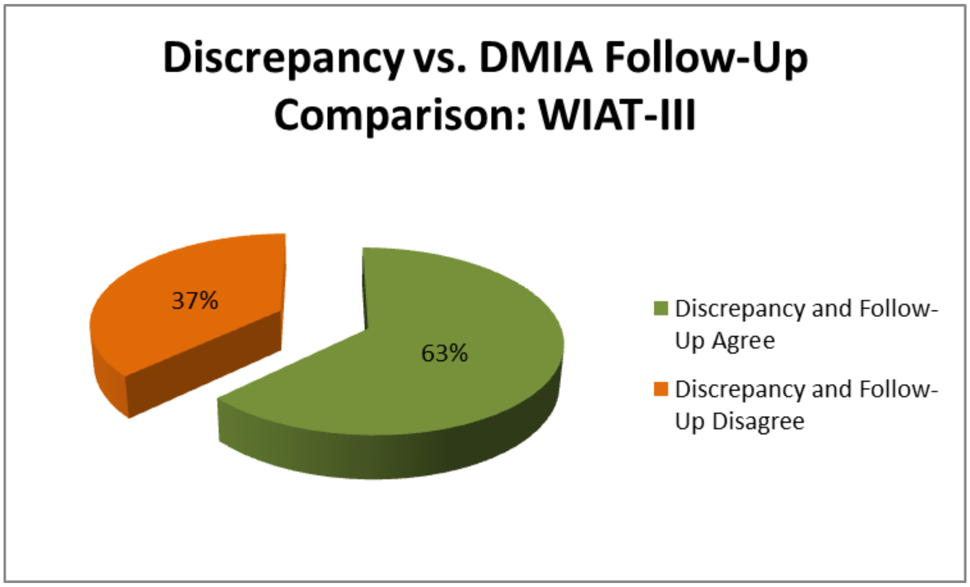

Figure 4. WIAT-III Follow-Up-Discrepancy Comparison

Lastly, the divergence scores were analyzed to determine if the discrepancy model and DMIA software identified the same areas as being potentially problematic to individuals. When looking at the divergence scores in terms of total subtests it was found that 87% (548/630) of the time the discrepancy model identified a severe enough discrepancy in the same subtest that a score was considered divergent in the DMIA software.

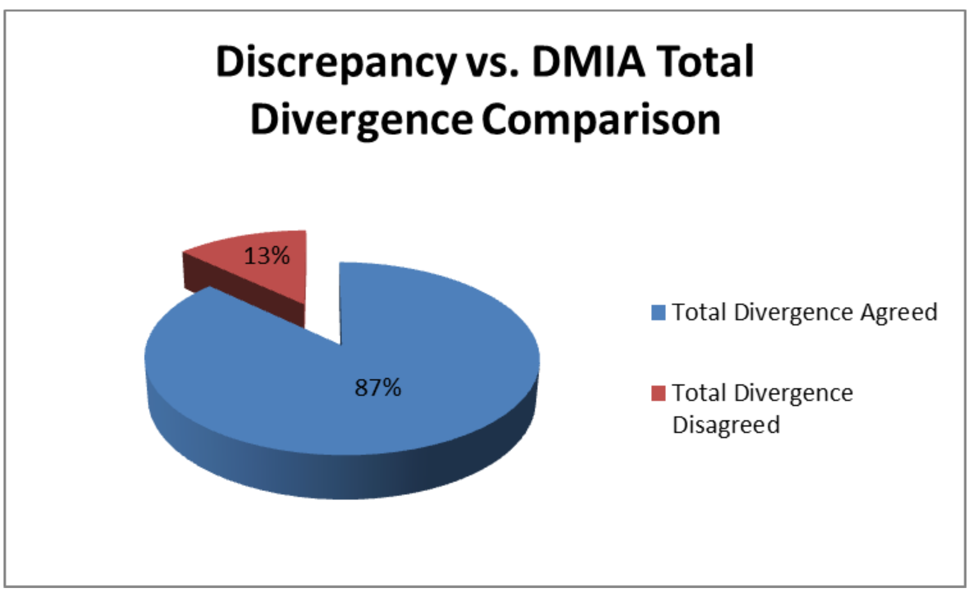

Figure 5. Discrepancy-Divergence Comparison

However, when these numbers were examined under only subtests that were determined divergent it was found that only 9/71 or 13% were also identified as having a discrepancy using a 1.5 standard deviation model.

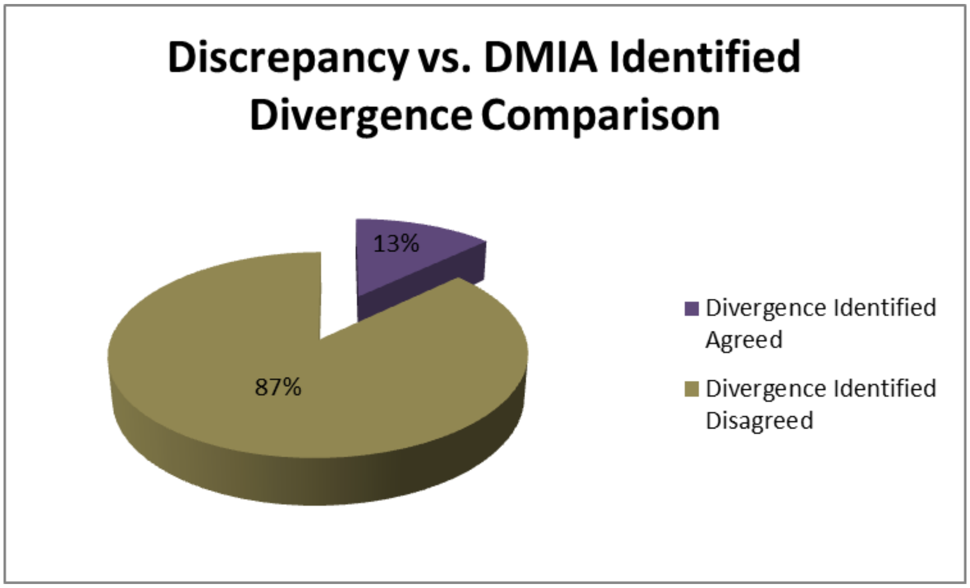

Figure 6. *Discrepancy-Identified Divergence Comparison*

Inferential Statistical Analysis

A chi-square analysis was performed to test how likely it is that an observed distribution is due to chance. A chi-square analysis is designed to analyze categorical data that has been counted and divided into categories. This non-parametric test is used when data is analyzed and not assumed to reflect a normal distribution. This allows the test to yield either significant or non-significant results that indicate whether a specific outcome may have been due to chance or the presence of some kind of relationship between the two variables. These analyses are used when a researcher is trying to determine the number of participants that fall within a specific group. In this study, these groups would be subtests that displayed Cohesion/Discrepancy, No-cohesion/Discrepancy, Cohesion/No discrepancy and No-cohesion/No discrepancy. A chi-square analysis does not conclude the strength of a relationship between variables but rather the existence or non-existence of a relationship that is not due to chance. Chi-square test analysis revealed a significant relationship at the .05 significance level between Cohesion and Discrepancy when analyzing the WISC-IV intelligence battery. , X2 (1) = 12.90, p= .000328. When analyzing Cohesion and Discrepancy for the WIAT-III achievement battery the results were not significant at a .05 level. The relationship, X2 (1) = 1.291, p= 0.256, was not determined to show any signs of a significant relationship between the cohesiveness according to the DMIA software and the discrepancy determined using a severe discrepancy model at the 1.5 standard deviation level.

Chapter 5

Discussion

Conclusions

It was hypothesized that the DMIA software would identify more areas of concern when analyzing WISC-IV and WIAT-III battery scores than the 1.5 standard deviation discrepancy scores. Based on the descriptive statistics it was discovered that the same areas of need were found in both methods no more than 76% of the time. Based on the chi-square test performed the analysis revealed a significant link for the Cohesiveness and Discrepancy of the WISC-IV intelligence test although when analyzing the WIAT-III achievement test, no significant relationship was found. The results of prior research indicated that the discrepancy model of classifying children may not be the most accurate measure (Gottlieb, Alter, Gottlieb & Wishner, 1994). The results found from this study seem to back up the claim that although areas of need are identified the model could be misidentifying students. One interesting finding discovered through this research was the difference in score between the Divergent vs. Discrepancy and the Identified Divergent vs. Discrepancy. When analyzing the general divergent scores it was found that they agreed with the areas of discrepant or non-discrepant 87% of the time. However, when analyzing only the scores that were determined to be divergent versus those scores under the discrepancy formula it was found that they only agreed 13% of the time, which is the complete opposite of the first comparison.

This study was conducted through the information obtained from the archival data at Rowan’s Assessment and Learning Center. These findings imply that the discrepancy model for classifying children that is commonly used in school districts all around the US today may not be identifying all areas of potential concern for students that could be suffering from a specific learning disability. These findings might help to decide how often professionals need to perform more measures instead of relying on one simple mathematic formula when determining whether or not a child qualifies for accommodations.

Limitations

The strengths of this study were a large representative sample as well as professional administration of the tests with no foreseen biases. Some weaknesses of this experiment is that it was a cross-sectional study and since it’s a cross sectional study no causal inferences can be made as well as all of the samples being obtained through a database at Rowan University. This means that all students who were administered the WISC-IV or WIAT-III had come to Rowan University seeking psychological and learning evaluations. Another limitation of this study was that the sample size wasn’t amble enough to yield more significant results. The analysis from the chi-square could have produced significant results if there were more samples to compare between the DMIA software and discrepancy model.

Future Research Recommendations

There has been a lot of research regarding the analysis of the discrepancy model and the potential issues of using a method of this nature. Researchers that have done work on this topic have predicted this model to fail and have called for the discrepancy model to be removed from consideration as an accurate way of classifying children (Aaron, 1997; Harrison, 2002; MacMillan, Gresham & Bocian, 1998; Sternberg & Grigorenko, 2002). The research on this topic is pretty well covered and most of the relevant and current issues have been explored and for the most part, indicated that this model has little accuracy when identifying specific learning disabilities. However, there has been little research conducted regarding Flanagan's cross-battery assessment software and materials. Future research should look further into the cross-battery assessment model to assess how accurate it is when identifying areas of concern for children who may have a specific learning disability. Future research should also do a longitudinal design to measure how many students that were determined to not qualify under the discrepancy end up having further learning problems throughout their academic career and if so, what further measures could have been used to help aid them and provide them with the opportunity to succeed academically.

References

Aaron, P.G. (1997). The impending demise of the discrepancy formula. *Review of Educational Research, 67*, 461-502.

American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed.). Arlington, VA: American Psychiatric Publishing.

Assessment and Learning Center Information. (2013). www.rowan.edu. Retrieved from http://www.rowan.edu/colleges/education/programs/llse/assessmentcenter.html

Bateman, B. (1965). *Learning disabilities: An overview. Journal of School Psychology, 3(3)*, 1-12.

Bennett, D. & Clarizio, H. (1988). A comparison of methods for calculating a severe discrepancy. *Journal of School Psychology, 20*, 359-369.

Carroll, J.B. (1998). Foreword. In McGrew, K.S., & Flanagan, D.P., The intelligence test desk reference: Gf-Gc cross-battery assessment (pg xi-xii). Boston: Allyn & Bacon.

Chalfant, J.C., & King, F.S. (1976). An approach to operationalizing the definition of learning disabilities. *Journal of Learning Disabilities, 9*, 228-243.

Dangel, H.L., 7 Ensminger, E.E. (1988). The use of discrepancy formulas with LD students. *Learning Disabilities Focus, 4*, 24-31.

Dombrowski, S.F., Kamphaus, R.W., & Reynolds, C.R. (2004). After the demise of the discrepancy: Proposed learning disabilities diagnostic criteria. *Professional Psychology: Research and Practice, 35(4)*, 364-372.

Donovan, M. S., & Cross, C. T. (Eds.). (2002). Minority students in special and gifted education. Washington, DC: National Academy Press.

Flanagan, D.L., & Alfonso, V.C. (2011). Essentials of Specific Learning Disability Identification. New York: Wiley.

Flanagan, D. P., Alfonso, V. C., Ortiz, S. O., & Dynda, A. (2010). Integrating cognitive assessment in school neuropsychological evaluations. In D. C. Miller (Ed.), Best practices in school neuropsychology: Guidelines for effective practice, assessment, and evidence-based intervention (pg. 101-140). Hoboken, NJ: Wiley.

Flanagan, D.P., Genshaft, J.L., & Harrison, P.L. (1996). Contemporary intellectual assessment: Theories, tests, and issues (314-325). New York: Guilford.

Flanagan, D.L., & Kaufman, A.S. (2004). Essentials of the WISC-IV. New York: Wiley.

Flanagan, D.P., & McGrew, K.S., (1997). A cross-battery approach to assessing and interpreting cognitive abilities: Narrowing the gap between practice and cognitive science. In Flanagan, D.P., Genshaft, J.L., & Harrison, P.L. (Eds.), Contemporary intellectual assessment: Theories, tests, and issues (314-325). New York: Guilford.

Flanagan, D., McGrew, K. & Ortiz, S. (2000). The Wechsler Intelligence Scales and Gf-Gc theory. A contemporary approach to interpretation. Boston. Allyn & Bacon.

Flanagan, D.L. & Ortiz, S.O. (2001). Essentials of Cross-Battery Assessment. New York: Wiley.

Flanagan, D.L., Ortiz, S.O., & Alfonso, V.C. (2008). Essentials of Cross-Battery Assessment (2nd ed.). New York: Wiley.

Flanagan, D.L., Ortiz, S.O., & Alfonso, V.C. (2013). Essentials of Cross-Battery Assessment (4th ed.). New York: Wiley.

Flanagan, D.P., Ortiz, S.O., Alfonso, V.C., & Mascolo, J.T. (2006). The achievement test desk reference (ADTR): A guide to learning disability identification. Boston: Allyn & Bacon.

Floyd, R. G., Evans, J. J., & McGrew, K. S. (2003). Relations between measures of Cattell-Horn-Carroll (CHC) cognitive abilities and mathematics achievement across the school-age years. Psychology in the Schools, *40(2),* 155-171.

Floyd, R. G., Keith, T. Z., Taub, G. E., & McGrew, K. S. (2007). Cattell-Horn-Carroll cognitive abilities and their effects on reading decoding skills. g has indirect effects, more specific abilities have direct effects. *School Psychology Quarterly, 22(2),* 200-233.

Floyd, R. G., McGrew, K. S., Barry, A., Rafael, F. & Rogers, J. (2009). General and specific effects on Cattell–Horn–Carroll Broad Ability Composites. Analysis of the Woodcock–Johnson III Normative Update CHC factor clusters across development. *School Psychology Review, 38 (2),* 249-265.

Frame, R.E., Clarizio, H.F., Porter, A.F., & Vinsonhaler, J.R. (1982). Inter-clinician agreement and bias in school psychologists' diagnostic and treatment recommendations for a learning disabled child. *Psychology in the Schools, 19,* 319-327.

Furlong, M.J. (1988). An examination of an implementation of simple difference score distribution model in learning disability identification. *Psychology in the Schools, 25*, 132-145.

Gallagher, J.J. (1966). Children with developmental imbalances: A psychoeducational definition. *The teacher of brain-injured children* (20-34). Syracuse, NY: Syracuse University Press.

Gottlieb, J., Alter, M., Gottlieb, B.W., & Wishner, J. (1994). Special education in urban America: It's not justifiable for many. *The Journal of Special Education, 27*, 453-465.

Harrison, P.L. (2002). The demise of IQ testing for children with learning disabilities: Distinguished lecture by Robert Pasternack. *NASP Communique*, *30(7*), 41.

Individuals with Disability Education Act Amendments of 2004 [IDEA]. (2004). Retrieved from http://thomas.loc.gov/home/thomas.php

Kaufman, A.S. (2000). Foreword. In Flanagan, D.P., McGrew, K.S., & Ortiz, S.O. (Eds.), The Weschler intelligence scales and Gf-Gc theory: A comtemporary approach to interpretation. Needham Heights, MA: Allyn & Bacon.

Kavale, K.A. (1987). Theoretical issues surrounding severe discrepancy. *Learning Disabilities Research*, *3*, 12-20.

Kavale, K.A. (1995). Setting the record straight on learning disability and low achievement: The tortuous path of ideology. *Learning Disabilities Research and Practice, 10,* 145-152.

Kavale, K.A., & Forness, S.R. (2000). What definitions of learning disability say and don't say: A critical analysis. *Journal of Learning Disabilities, 33,* 239-256.

Kavale, K.A., & Mostert, M.P. (2004). Social skills interventions for individuals with learning disabilities. *Learning Disability Quarterly, 27(1),* 31-43.

Kavale, K.A., & Reese, J.H., (1992). The character of learning disabilities: An Iowa profile. *Learning Disability Quarterly*, *15*, 74-94.

Kirk, S.A., (1962). *Educating exceptional children*. Boston: Hougton Mifflin.

MacMillan, D.L., Gresham, F.M., & Bocian, K.L. (1998). Discrepancy between definitions and school practices: An empirical investigation. *Journal of Learning Disabilities*, *31(4),* 314-326.

Mathers, N., & Roberts, R. (1994). Learning disabilities: A field in danger of extinction? *Learning Disabilities Research & Practice*, *9,* 49-58.

McGrew, K. & Flanagan, D. (1998). The intelligence test desk reference: The Gf-Gc cross-battery assessment. Boston. Allyn & Bacon.

McLeskey, J. (1989). The influence of level of discrepancy on the identification of students with learning disabilities. *Journal of Learning Disabilities*, *22*, 435-438, 443.

McLeskey, J. (1992). Students with learning disabilities at primary, intermediate, and secondary grade levels: Identification and characteristics. *Learning Disability Quarterly*, *15*, 13-19.

McLeskey, J. & Waldron, N.L. (1990). The identification and characteristics of students with learning disabilities in Indiana. *Learning Disabilities Research*, *5*, 72-78.

Meehl, P.E. (1954). *Clinical versus statistical prediction*. Minneapolis: University of Minnesota Press.

Morrison, G.M., MacMillan, D.L., & Kavale, K.A. (1985). System identification of learning disabled children: Implications for research sampling. *Learning Disability Quarterly, 8*, 2-10.

O'Donnell, L.E. (1980). Intra-individual discrepancy in diagnosing specific learning disabilities. *Learning Disability Quarterly, 3*, 10-18.

Perlmutter, B., & Parus, M. (1983). Identifying children with learning disabilities: A comparison of diagnostic procedures across school districts. *Learning Disability Quarterly, 6*, 321-328.

Scruggs, T.E., & Mastropieri, M.A. (2006). Response to "competing views: A dialogue on response to intervention". *Assessment for Effective Intervention, 32(1),* 62-64.

Shepard, L.A. (1983). The role of measurement in educational policy: Lessons from the identification of learning disabilities. *Educational Measurement: Issues and Practices*, *2,* 4-8.

Shepard, L.A., & Smith, M.L. (1983). An evaluation of the identification of learning disabled students in Colorado. *Learning Disability Quarterly, 6*, 115-127.

Shepard, L.A., Smith, M.L., & Vojir, C.P. (1983). Characteristics of pupils identified as learning disabled. *American Educational Research Journal, 20*, 309-331.

Sternberg, R.J., & Grigorenko, E.L. (2002). Difference scores in the identification of children with learning disabilities: It's time to use a different method. *Journal of School Psychology*, *40(1),* 65-83.

Taub, G., Floyd, R. G., Keith, T. Z., & McGrew, K. S. (2008). Effects of general and broad cognitive abilities on mathematics. *School Psychology Quarterly*, *23(2*), 187-198.

Thompson, J. R., McGrew, K. S., Johnson, D. R., & Bruininks, R. H. (2000). Refining a multidimensional model of community adjustment through an analysis of post-school follow-up data. *Exceptionality, 8(2)*, 73-99.

Torgesen, J.K., Alexander, A. W., Wagner, R.K., Rashotte, C.A., Voeller, K., Conway, T. & Rose, E. (2001). Intensive remedial instruction for children with severe reading disabilities: Immediate and long-term outcomes from two instructional approaches. *Journal of Learning Disabilities, 34,* 33-58.

U.S. Office of Education (1976, December 29). Proposed rulemaking. *Federal register*, 41, (230), 52404-52407. Washington, DC: U.S. Government Printing Office.