

Chapter 2

Aptitude–Achievement Discrepancy

The aptitude–achievement discrepancy approach to learning disabilities (LDs) diagnosis is likely the most well known and most controversial identification method. This is due to many factors, including its historical connection to the original definition of LDs, its apparent simple elegance in describing and identifying individuals with LDs, and the underlying technical difficulties underlying its surface simplicity. Since its inception as a recognized exceptionality, the LD field has proven to be remarkably resistant to change (Stanovich 2005) with the discrepancy formula being just one instance of this invariability.

Origin of Discrepancy Criteria

The currently employed diagnostic criteria remain very similar to Kirk's 1963 definition focusing on exclusions and Bateman's discrepancy (Dombrowski et al. 2004), with changes reflected in the Individuals with Disabilities Education Improvement Act (IDEIA) diagnostic regulations threatening to leave the LD field without the consistent and uniform diagnostic approach it has been in need of for over 30 years. As defined by Kirk, an LD continues to be defined as "a disorder in one or more of the basic psychological processes involved in understanding or using language, spoken or written, which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations." The 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 (Individuals with Disabilities Education Act Amendments of 1997, Sect. 602 (26), p. 13). According to the new regulations, a state may not require the use of a discrepancy formula, although schools may still use it, and must permit the use of a process that determines if the child responds to scientific, research-based intervention as part of the evaluation procedures or the use of other alternative research-based procedures for determining whether a child has an LD (IDEA 2004).

The concept of severe discrepancy spread as a result of attempts to operationalize LDs when the construct was introduced into law with the Education for All

Handicapped Children Act (PL 94–142). According to Reynolds (2003), the only consensus to be found regarding LD in the documents and debates when the education law was originally developed was that it was characterized by a discrepancy between expected academic achievement and actual achievement. Several formulas were developed to determining discrepancy, but they used age and grade equivalents and treated them as if they were interval- and even ratio-scale data. Hence, the formulas were mathematically incorrect.

Discrepancy Within Identification Criteria

Despite the apparent simplicity and clarity of a discrepancy definition of LD, development of an accurate discrepancy formula is more difficult than it appears on the surface. For instance, quantifying severe discrepancy using the standard deviation between intelligence quotient (IQ) and achievement seems to make sense, but because the two scores are positively correlated the new distribution of scores results in a smaller standard deviation, thus identifying fewer children than would be expected. Additionally, it is necessary to take into account regression to the mean when using multiple scores in decision-making models.

The difficulty in developing an appropriate formula has led to different states and agencies using different methods of determining what constitutes a significant discrepancy. As noted above, the definition of LDs has remained the same since they were first described in federal law. This means that the exclusionary criteria, psychological processes, and failure to achieve also remain factors in determining whether a student has an LD in addition to determining whether that student exhibits a discrepancy between achievement and aptitude. Exclusionary criteria include visual, hearing, or motor disabilities, mental retardation, emotional disturbance, and environmental, cultural, or economic disadvantage.

How each state and school district interprets and incorporates all the various definitional factors into LDs identification varies, as do the discrepancy formulas, making a concise description of the actual practice of discrepancy assessment difficult. This lack of uniformity has also led to a lack of reliability in terms of who is diagnosed as having an LD across locations, which is one of the criticisms of the discrepancy model of LD diagnosis. Given the many variations of discrepancy criteria, not all of the possible combinations used for identification can be presented here. Instead, various widely used discrepancy formulas will be described.

Calculating Severe Discrepancy

Simple Standard Score Discrepancy

Discrepancy formulas typically utilize standard score differences. In a simple standard score model, a child is considered to exhibit a significant discrepancy when

Table 2.1 Reynolds' (2003) example of discrepancy calculation

Step 1: Test for reliable difference between ability and achievement scores	$z = \frac{X_i - Y_i}{\sqrt{2 - r_{xx} - r_{yy}}}$ <p>If $z > 1.65$, the discrepancy is reliable</p>
Step 2: Choose value for severity and correct for unreliability	$s = z_a - SE_{\hat{Y}-Y}$
Step 3: Calculate severe discrepancy	
Simple difference model	$SD_{xy}z_a \left(\sqrt{2 - 2r_{xy}} \right)$
Regression model	$\hat{Y} - Y_i > SD_y z_a \left(\sqrt{1 - r_{xy}^2} \right)$

X_i =child's intelligence score, Y_i =child's achievement score, z_a =point on normal curve representing frequency for severe discrepancy, r_{xx} =internal-consistency reliability for intelligence test, r_{yy} =internal-consistency reliability for achievement test, \hat{Y} =mean achievement score for all children with $IQ=X_i$, SD_{xy} =standard deviation of intelligence and achievement scales, SD_y =standard deviation of Y formulas for classification provided tables, r_{xy} = correlation between achievement and intelligence tests

her intelligence standard score is higher than her achievement standard score by a predetermined number of standard score points (with both measurements on the same scale). The standard score points criteria is usually chosen by calculating the percentage of children in the population expected to have a discrepancy of that magnitude. The discrepancy score representing the percentage of the population expected to have an LD can then be selected. This sounds simple, but as with any method of identifying LDs, there is no agreed-upon standard for how many individuals should be considered to have an LD. Once this percentage is agreed upon, reliability must also be taken into account as well as preference for under- versus over-identification, but further discussion of the mathematical issues is beyond the scope of this text. See Table 2.1 for an illustration of the formulas used to calculate discrepancy.

In practice, a simple difference discrepancy model typically specifies only the standard score difference required between an intelligence score and an achievement score. For example, in Georgia, a difference of 20 standard score points between performance on a cognitive measure and achievement measure is required for a child to initially be identified as having an LD. This type of approach does not take into account the correlation between the two instruments.

As mentioned previously, the main difficulty associated with a simple difference discrepancy model is that it does not account for regression effects when comparing achievement and intelligence scores. Given the positive correlation between the two constructs, this model will, therefore, overidentify individuals with above-average IQs and underidentify individuals with below-average IQs as having LDs.

Regression Models of Discrepancy

In order to overcome the problems associated with a simple difference model, regression models of discrepancy have been used. In addition to the obvious

advantage of taking regression effects into account, other advantages include determining whether discrepancies are reliable or are the result of chance, accounting for the correlation between the achievement and intelligence tests, and considering measurement error. Unfortunately, regression discrepancy formulas require choosing the severity level considered to indicate the presence of LDs, allowing variability in who is identified as having an LD. This also complicates research using a discrepancy method since an actual prevalence rate for LDs has been unable to be established.

While there are equations for determining the average achievement score associated with a certain IQ score based upon the correlation, in the majority of states that use, or used, regression, the procedure (Table 2.1) described by Reynolds (2003) involves converting all scores to a standard *z*-score metric. The first step, whether using a simple difference or regression discrepancy model, is to test for significance between the obtained achievement and intelligence scores. When $p=0.05$, the critical value of $z=1.65$. Next, one must determine the frequency of the discrepancy score that is necessary to be severe. This value depends upon preference for minimizing false negatives versus minimizing false positives. Reynolds (2003) recommends using a z value of 2 to represent a severe discrepancy because of the precedent of using 2 standard deviations and .05 confidence levels in other areas of diagnosis and research. The value chosen to represent severity should then be corrected for unreliability, although this is not always done. For a simple difference model, the standard deviation of the achievement and intelligence scales and the correlation between the scales can be entered into the formula to determine the percentage of the population with a discrepancy considered to be severe. For a regression model, the mean achievement score of all children with a given IQ, the standard deviation of the child's achievement score, and the squared correlation between the achievement and intelligence tests are entered into the formula to determine a severe discrepancy.

For example, Washington state regulations (WAC-392-172-130) developed a table based upon the regressed standard score discrepancy with a criterion level of 1.55 standard deviations. In order to use the example table (Table 2.2), the student's overall intellectual standard score is obtained. Next, the age-based achievement standard score is determined. The student's overall intelligence score is located in the left-hand column of the chart and the criterion discrepancy, or cutoff, score is found. The student's achievement score is compared to this criterion. If the achievement score is equal to or less than the criterion score, a severe discrepancy is considered to be present. In order to obtain accurate estimates, however, the correlation between the specific IQ and achievement tests used must be known. Some states developed broader guidelines and explicitly included consideration of test intercorrelations. For an example, see Table 2.3, which is similar to a version previously used in Maryland. There is also an online tool, Test Score Discrepancy Analyzer 2.0 (TSA2) (available at <http://www.interventioncentral.org/tools.php>), developed by the Syracuse, New York school district to calculate discrepancies. The New Jersey Department of Education developed a similar program called ESTIMATOR-NJ.

Table 2.2 Criterion discrepancy scores (1.55 standard deviations) table for ages 6–21 years

Overall IQ	Criterion score	Overall IQ	Criterion score
69	62	97	80
70	62	98	81
71	63	99	82
72	64	100	82
73	65	101	83
74	65	102	84
75	66	103	84
76	67	104	85
77	67	105	86
78	68	106	86
79	69	107	87
80	69	108	88
81	70	109	88
82	71	110	89
83	71	111	89
84	72	112	90
85	73	113	91
86	74	114	91
87	74	115	92
88	75	116	93
89	75	117	93
90	76	118	94
91	76	119	95
92	77	120	95
93	78	121	96
94	78	122	97
95	79	123	97
96	80	124	98
		125	99

Table 2.3 Guidelines for comparing expected achievement with actual achievement

IQ score range	Expected achievement range	Discrepancy range
130–139	118–123	95–100
120–129	112–117	89–94
110–119	107–111	83–88
100–109	100–106	77–82
90–99	94–99	71–76
80–89	88–93	65–70
70–79	82–87	59–64

Psychometric Considerations

When making any diagnostic decisions utilizing test data, it is crucial to use quality data, and making decisions using the discrepancy model is no exception. If instruments used have poor technical and/or psychometric properties, the result of the

discrepancy method employed will be flawed and meaningless. Reynolds (2003, pp. 487–494) provides the following useful guidelines for test selection:

1. *A test should meet all requirements stated for assessment devices in the rules and regulations for implementing IDEA (p. 487).*
2. *Normative data should meet contemporary standards of practice and should be provided for a sufficiently large, nationally stratified random sample of children.*
 - a. *The psychological trait being assessed must be amenable to at least ordinal scaling.*
 - b. *The test must provide an adequate operational definition of the trait under consideration.*
 - c. *The test should assess the same psychological construct throughout the entire range of performance.*
 - d. *The normative reference group should consist of a large random sample that is representative of the population to whom the test will be administered or performance compared.*
 - e. *The sample of examinees from the population should have been tested using standard conditions.*
 - f. *The population sampled must be relevant to the test and to the purpose for which the test is to be employed.*
 - g. *Normative data should be provided for as many different groups as may be useful for comparisons of an individual (pp. 488–489).*
3. *Standardization samples for tests whose scores are being compared must be the same or highly comparable (pp. 490).*
4. *For diagnostic purposes, individually administered tests should be used (pp. 490).*
5. *In the measurement of aptitude, an individually administered test of general intellectual ability should be used (pp. 490).*
6. *Age-based standard scores should be used for all measures, and all should be scaled to a common metric (pp. 490).*
7. *The measures employed should demonstrate a high level of reliability, which should be documented in the technical manual accompanying the test (pp. 493).*
8. *The validity coefficient r_{xy} , which represents the relationship between the measures of aptitude and achievement, should be based upon an appropriate sample (pp. 494).*
9. *The validity of test score interpretation should be clearly established (pp. 494).*
10. *Special technical considerations should be addressed when one uses performance-based measures of achievement (e.g., writing skill) (pp. 494).*
11. *Bias studies on the instruments in use should be reported (pp. 494).*

Several of the psychometric issues addressed by Reynolds (2003) are particularly important when using the discrepancy model of LD diagnosis because results from two instruments are being compared. The guidelines regarding appropriate normative samples are especially relevant. It would be ideal for the intelligence and achievement tests to have been conormed, meaning that they were standardized using exactly the same children. Table 2.4 provides examples of some conormed

Table 2.4 Conormed intelligence and achievement tests

Intelligence instrument	Conormed achievement instrument
Wechsler Intelligence Scale for Children, Fourth Edition (WISC-IV; Wechsler 2003)	Wechsler Individual Achievement Test, Second Edition (WIAT-II; The Psychological Corporation 2001)
Kaufman Assessment Battery for Children, Second Edition (KABC-II; Kaufman and Kaufman 2004)	Kaufman Tests of Educational Achievement, Second Edition (KTEA-II; Kaufman and Kaufman 2004)
Woodcock–Johnson III Tests of Cognitive Abilities (WJ-III COG; Woodcock et al. 2001)	Woodcock–Johnson III Tests of Achievement (WJ-III ACH; Woodcock et al. 2001)
Wide Range Intelligence Test (WRIT; Glutting et al. 2000)	Wide Range Achievement Test 3 (WRAT3; Wilkinson 1993)

intelligence and achievement measures. When conormed tests are not available, it is important to ensure that standardization of the measures used took place within the same time period across age and grade levels, since the correlations may change as a function of development, and achievement domains, since correlations may differ across academic areas. If an achievement scale is used that has a very different normative sample from the intelligence scale that is being used, the resulting discrepancy, or lack of discrepancy, may be attributable to the time period or characteristics of the sample when the tests were normed.

Dissatisfaction with Discrepancy

Several researchers have pointed out problems with the discrepancy approach and called for new diagnostic methods (Francis et al. 2005; Shepard et al. 1983; Siegel 2003; Stanovich 2005). Some of the most widely cited shortcomings of the discrepancy model are its lack of reliability and validity, lack of relevance to treatment, and inability to identify children in need of remediation versus those who are not. Each of these issues will be discussed below.

Intelligence as a Controversial Concept

Before considering discrepancy, the use of IQ itself is controversial. What is intelligence? According to the *Oxford English Dictionary*, intelligence is the ability to acquire and apply knowledge and skills. The construct of intelligence became integral to the conceptualization and identification of LDs because of its ability to serve as a comparison in determining unexpected underachievement. Linda Siegel (1989) identified four basic assumptions inherent in intelligence–achievement discrepancy.

First, IQ tests measure intelligence. Second, intelligence can be measured independently of academic achievement. Third, there is a strong correlation between reading and IQ and, fourth, cognitive processes differ between individuals with LD who have low versus those who have high IQ scores. As can be seen from the discussion below, these assumptions factor into several related and unrelated criticisms of the use of intelligence in identifying students as having LDs.

Effect of LDs on Intelligence Test Performance

Siegel (1989) argues that tasks found on intelligence tests will be more difficult for children with LDs. For example, if a child has a reading disability, that child will have had less exposure to print material and verbal information and will perform poorly on verbal reasoning tests such as those measuring vocabulary. Similarly, a child with a mathematics disability will have difficulty completing tasks requiring visual–spatial skills. Thus, these children’s scores on IQ tests measure aspects of their disability and not pure reasoning ability, or intelligence.

The Matthew Effect

A related criticism has been referred to as the Matthew effect (Stanovich 1986). The Matthew effect describes the process whereby strong readers gain more knowledge and vocabulary through access to text allowing them to perform better on reading and cognitive tasks. Poor readers do not have access to more information and fall farther behind peers in reading skills, vocabulary, and knowledge, leading to further declines in reading as well as in cognitive abilities. Thus, poor readers’ intelligence scores will be lower as a result of poor reading ability and their similarly poor performance on achievement and intelligence tasks will make them less likely to exhibit the required discrepancy (Dombrowski et al. 2004).

Global IQ May be Less Meaningful for Individuals with LD

Some critics argue that global IQ should not be used because the deficits that characterize LDs lead to a different factor structure than that derived for the general population (Hale et al. 2007). Thus, this group would suggest interpreting intelligence tests at the factor level, which leads to further contention because this would result in clinicians using different factors within a discrepancy level resulting in great diagnostic variability. Hale and colleagues (2007) argue that subtest and factor scores account for more achievement variance than full-scale IQ, making them preferable when interpreting intelligence test results. They go on to describe full-scale IQ as meaningless because it represents the average of many different cognitive functions. They suggest interpretation of global intelligence is only justified when results are consistent across cognitive domains.

One must be cautious when interpreting the above recommendations. Psychometrically sound interpretation of test results requires making inferences from the most reliable and valid scores obtained. In general, this means interpreting overall composite scores due to their greater reliability due to a larger sample of behavior and greater evidence of validity from numerous research studies. Kamphaus (2001, p. 476) cautions that “a clinical diagnosis should never be made solely on the basis of a subtest profile.” Many practitioners are hesitant to interpret a global composite score when significant scatter exists among factor scores. All evidence should be considered in every case before drawing conclusions and there may be instances when a global score is not the best description of an individual’s performance. Some researchers (Watkins et al. 2007), however, have determined that full-scale IQ remains a strong predictor of achievement in both general and clinical samples despite factor variability.

Variability in Identification

The debate regarding the appropriate intelligence score to be used highlights yet another difficulty inherent in the discrepancy approach. Should a practitioner use the full-scale, composite scores, or other factor scores when calculating the discrepancy between intelligence and achievement? As discussed above, different individuals have varying opinions on this topic. Generally, states provide guidelines for when it is acceptable to use a score other than the full-scale intelligence score. State departments of education, however, tend to have different interpretations of special education law, so that recommendations across states likely vary just as the actual implementation of recommendations by professionals is likely to vary. Just as using different discrepancy models causes different students to be identified as having an LD across locations, using different scores within the same discrepancy model also results in different students being identified. It should be noted that significant variability across states also exists for many other disability categories, indicating that it is not only an issue for LD identification and may be more related to fidelity of implementation than the actual model of identification used (McKenzie 2009).

IQ Does Not Equal Potential

The use of intelligence in a discrepancy approach assumes that IQ measures “potential” that is unaffected by other skill areas—high IQ should equal high reading ability and low IQ should equal low reading ability (Siegel 1992). Some critics of this assumption still support a discrepancy definition, but suggest using chronological age to determine expected reading level. Children with low IQs and consistently low reading that is below expectation for age are then considered to be “garden variety” poor readers, while children with high IQs and unexpectedly low reading ability are termed “dyslexic.”

Garden Variety Poor Readers vs. Reader with Dyslexia

Keith Stanovich (2001) summarized the two main experimental methods for determining whether the distinction between dyslexia and poor reading ability is valid. The first method is to compare children with dyslexia to younger children without dyslexia matched on reading level. If their reading skills profile is found to be similar, then the differentiation between unexpected poor readers and expected poor readers would not be valid. The second method is to compare dyslexic children to same-age children reading at the same level, which is consistent with expectation given their IQ. Again, if the reading skills of the two groups match, then it would not make sense to assume different underlying causes for their reading difficulty. Unfortunately, the definition of reading level in such studies has been unclear and/or has differed across studies. The mixed results of the various studies have not been enough to answer this question satisfactorily, although Stanovich (2001) integrated his own research to develop the “Phonological-Core Variable-Difference Model.” This framework suggests that the underlying cause of reading disability is poor phonological ability, regardless of IQ, and that low-IQ poor readers simply do not have the compensatory mechanisms of high-IQ poor readers.

Intelligence Does Not Predict Reading Ability

Later studies using more clearly defined criteria have determined that more similarities than differences have been found between IQ-discrepant poor readers and low reading achievement test score poor readers (Shaywitz et al. 1992), suggesting that discrepancy is not a valid indicator of learning (e.g., reading) disability. Further, it has been indicated that skills for which differences have been found between individuals considered to have dyslexia and those considered to be typical poor readers are less related to the key processes involved in reading than to skills for which no differences have been identified (Siegel 1992). Perhaps more importantly, it has been shown that both poor readers and strong readers exist throughout the intelligence continuum, such that an individual with a very high IQ and an individual with a below-average IQ may both be average readers.

“Wait to Fail” Model

The discrepancy approach has also been accused of delaying children’s access to remediation, leading to its alias—the “wait to fail” model (Stuebing et al. 2002). This is because a child is often not referred for intervention until his or her achievement scores are low enough to evidence a discrepancy from teacher expectations of performance for that child. While a teacher may begin to notice that a child is not performing commensurate with expectations based upon comparison to peers or achievement in another academic area, a young child will likely fail to be identified as having an LD through the discrepancy approach. As a result, the child may not

receive access to interventions available outside the classroom. This delay results because children's achievement scores do not begin to decline until the content of achievement tests becomes increasingly complex and abstract, which generally begins to occur around the third grade (Dombrowski et al. 2004).

Intelligence Does Not Guide Treatment

It also fails to provide relevant treatment information because IQ and reading ability are not linearly related, meaning that low- and high-IQ readers do not require different forms of remediation (Vellutino et al. 1996). More information regarding global intelligence is necessary to make classification and intervention decisions (Hale et al. 2007).

In Defense of Intelligence

Other researchers, while not necessarily supporting the discrepancy method, have argued that intelligence is an important part of LDs assessment. For some, intelligence is necessary to identify intraindividual profiles of strengths and weaknesses (e.g., Mather and Gregg 2006). This approach will be discussed further in the chapter addressing cognitive processing assessment. For others, IQ represents a predictor of response to intervention. A review of existing studies was carried out to indicate that IQ influences the effectiveness of reading instruction (Fuchs and Young 2006). This was primarily true in studies of comprehensive reading interventions utilizing intelligence tests with well-established reliability and validity and more complex reading achievement measures, such as reading comprehension, for children in grades two and above. Hence, an aptitude–treatment interaction was suggested in which intelligence is more likely to impact responsiveness to a multicomponent reading intervention than to a strictly phonological intervention. The authors, however, were careful to note the inconsistencies and difficulties in the history of aptitude–treatment interaction research.

In spite of all the criticisms regarding the use of IQ for diagnosing LDs, the reader should not take away the idea that the general intelligence, or Spearman's *g*, is a meaningless concept. Countless studies have shown that global intelligence is an important predictor of many outcomes, such as achieved socioeconomic status, creativity, crime delinquency, mate selection, health risk behavior, quality of life and longevity, educational–vocational choice, and positive psychological adjustment. According to Lubinski (2004, p. 100), "*g* is clearly the most important dimension of individual differences in the study of cognitive abilities to date." Studies conducted using different statistical methodologies (e.g., Dana and Dawes 2007) determined that based on their calculations, the full-scale IQ factor structure for groups with disabilities, including LDs, does not differ from the factor structure for the general population. Perhaps more importantly, it is unwise to discount global intelligence simply because it is a psychological construct rather than an objective entity. One must keep in mind the fact that many psychological and even medical phenomena of interest are not tangible, but are still considered to exist and are given great importance.

Gifted Individuals with LD

Gifted LD is a label applied to individuals who are believed to be capable of high performance, but do not achieve to expectations in a certain area. Given this conception of gifted LD, the discrepancy approach is typically used in identification. Even when the discrepancy approach is not explicitly espoused when discussing gifted LD, the constructs involved require some comparison and reference to high intelligence. An IQ score is obtained and considered a measure of the child's potential. When a child does not meet that potential, i.e., a discrepancy exists between aptitude and achievement, in a given academic subject, they are considered to have a specific LD. Whether formally calculated or not, a discrepancy comparison is conducted when making this judgment.

One can imagine that when combining two groups, such as those considered to have a gifted level of ability and those considered to have an LD, the result can be rather confusing. The ambiguity of LD definitions has been discussed previously. To further complicate matters, the definition of giftedness has not been agreed upon either. Giftedness has been defined as high general intelligence, high ability in a specific academic area, talent in one of multiple intelligences, and above average aptitude in any human endeavor. Of course, conceptualizations of giftedness that depend upon IQ are fraught with issues similar to those of using IQ in LD diagnosis. Brody and Mills (1997) pointed out that while definitional agreement has not been reached, federal definitions of giftedness do not prevent identifying children as having dual exceptionalities of giftedness and LDs, because the definitions do not require that a child be gifted in all areas, do not set lower limits of ability in other areas, and state that a child can be gifted even if they are not performing at a high level. Based on this, it follows that it is possible for a gifted child to also have a disability. Even Lewis Terman (1931), often considered the father of the study of intellectual giftedness, stated that “superiority of one kind does not *necessarily* imply superiority in everything” (p. 568).

It is not uncommon for gifted students who achieve only in the average range in one academic area to be identified as having an LD. While proponents of gifted LD recognize the inherent drawbacks of using an intelligence–achievement discrepancy to identify LD, they tend to cling to it as the only way to identify such dually exceptional students. If the discrepancy model is agreed to be inappropriate for average and below-average achievers, then it must not continue to be applied to gifted individuals. Kavale (2005) points out that discrepancy indicates only the possibility of a disability. In line with this, the gifted LD camp does also often recommend assessing cognitive processing, which will be discussed in more detail in the next chapter. Reluctance to part with the notion of gifted LD stems in part from the idea of an “unexpected” academic failure. As noted above, however, research has shown that, in reading, an idea of some type of unexplained reading failure being different from reading failure with an explanation is simply “folk psychology” (Stanovich 1999).

As stated previously, there is great variability in the students who are identified because different discrepancy methods are used. For instance, it is not stated whether clinicians should use full-scale scores, verbal composites, or processing composites and it is possible to compare any of these scores to several achievement composites or subtests.

Another Type of Discrepancy

Some have proposed an alternative to the discrepancy model that uses only achievement data to determine if a child's low reading achievement is indicative of a disability (Aaron et al. 2008; Joshi 2003). The Component Model of Reading and its associated identification process is based upon Gough and Tunmer's (1986) assertion that reading consists of the abilities to decode words and comprehend text. They represented their view with the formula: $R = D \times L$. R represents reading comprehension, D represents decoding, and L represents linguistic comprehension, which is typically assessed through a test of listening comprehension.

In this model, listening comprehension basically replaces IQ in the typical discrepancy approach. Listening comprehension is considered superior to IQ because it is a key part of linguistics, listening comprehension is a good predictor of reading comprehension, tests of listening comprehension are easy to administer and do not require intensive training as do IQ tests, and findings based on listening comprehension inform intervention (Joshi 2003).

In order to use the Component Model for diagnosis, an achievement profile consisting of listening comprehension, reading comprehension, and decoding must be obtained. If a child's listening comprehension is within the average range or above, but reading comprehension is significantly lower, the reading difficulty is attributed to a word recognition, or sight word decoding, deficiency. If a child's word recognition score is in the average range or above, but the listening and reading comprehension scores are significantly below the word recognition ability, the child is considered to have a deficit in comprehension.

Once the area of deficit has been identified, intervention is developed to specifically address that area. This ability to design interventions targeting the deficient component in the reading equation is considered the primary advantage of this approach to identifying LDs. It is assumed that within the IQ-achievement discrepancy model, assessment ceases once a discrepancy in any area has been identified without concern for determining the key deficit in order to inform remediation strategies. A research study showed that training in the specific area of deficit was more effective than undifferentiated instruction for individuals with identified deficits in each of the reading components (Aaron et al. 2008). The issue of whether targeted instruction provided after identifying deficits through another assessment model would be equally effective was not addressed, but logic would lead one to assume that other assessment methods may yield equally informative information for intervention implementation. Indeed, in the following chapter we will learn about the cognitive processing model of assessment, which some may argue is ideal for discovering the best interventions and accommodations for a particular individual with an LD.

Below are two sample written reports. The first presents an initial evaluation while the second presents a reevaluation. The first uses the Wechsler Intelligence Scale for Children, Fourth Edition (WISC-IV; Wechsler 2003) and the conormed Wechsler Individual Achievement Test, Second Edition (WIAT-II; The Psychological Corporation 2001) as part of a clinic-based evaluation conducted in accordance with the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) (APA 2000). The second sample report uses the Reynolds Intellectual

Assessment Scale (RIAS; Reynolds and Kamphaus 2003) and WIAT-II (The Psychological Corporation 2001), which were both normed during approximately the same time period.

Case Examples

Union Educational Psychology Clinic Psychoeducational Evaluation Confidential

Name: Tess Howard
Gender: Female
Grade: 6th

School: Union Middle School
Age: 11 years, 1 month

Assessment Instruments

Intellectual Functioning

Wechsler Intelligence Scale for Children, Fourth Edition (WISC-IV)

Achievement

Wechsler Individual Achievement Test, Second Edition (WIAT-II)

Social–Emotional

Behavior Assessment System for Children—Parent Rating Scales (BASC-2-PRS)

Behavior Assessment System for Children—Teacher Rating Scales (BASC-2-TRS)

Behavior Assessment System for Children—Self-Report of Personality (BASC-2-SRP)

Additional Information

Parent Interview

Child Interview

Referral Question and Background

Referral Question

Tess was referred to the Union Educational Psychology Clinic by her mother, Dana Howard, whose older son had previously been evaluated at the clinic. Mrs. Howard was concerned about difficulty reading since Tess was in kindergarten. She noted that Tess normally earned A's in school but her grades had begun to decline as the curriculum became more reading intensive across academic areas. Ms. Howard also reported that it takes Tess longer than her classmates to complete assignments, which

might be contributing to feelings of low self-esteem. Mrs. Howard wanted a comprehensive psychoeducational evaluation to get a complete picture of Tess' current functioning and to determine whether her reading difficulties are indicative of "dyslexia."

Family History

Tess is an 11-year, 1-month-old Caucasian female who has resided in Union since birth. She lives with her mother, father, and older brother, Jack, who is 15. Mrs. Howard described the relationship between all family members as "pretty good," despite some sibling rivalry with Jack.

Mrs. Howard reported a significant family history of depressive disorders for Mr. Howard's relatives. This includes a grandfather diagnosed with bipolar disorder, an aunt with severe depressive episodes, and a great-grandfather who was placed in a mental health facility. Mrs. Howard stated that she had been hospitalized for post-partum depression after Jack's birth, but this depressive episode was related to systemic lupus. Tess' brother, Jack, has been diagnosed as having Asperger's disorder which has contributed to Tess experiencing feelings of resentment.

Developmental History

Mrs. Howard reported a difficult pregnancy with Tess due to her age, 40 years, and a large fibroid tumor. Tess was delivered prematurely by Caesarean section at about 35 weeks at normal weight but with a collapsed lung and spent a week in intensive care. She received oxygen for several days as a result of her lung problems. Tess reached developmental milestones within normal limits, with the exception of speaking in sentences. She spoke in sentences at about 2–3 years of age. Tess suffered from migraine headaches when she was younger, but Mrs. Howard stated that she had "since outgrown them."

Educational History

Tess learned to write and read at home before starting kindergarten in the Union public school system. She did well in all academic subjects in the early grades, but according to Mrs. Howard his teachers expressed concern about her ability to identify novel words beginning in kindergarten. As Tess got older, her difficulty with decoding began to affect homework completion time, although she still understood what she read and earned good grades. Mrs. Howard attended school support team meetings for reading fluency difficulties in second and third grade but was dismissed from further services.

Previously, Tess had been earning A's and B's in late elementary school, but Mrs. Howard reported that she had not been participating as much in sixth grade because she feels discouraged by her slower reading rate. She stated that in earlier grades she used

to want to do well and made an effort, but it now seems as if she is no longer motivated. She is currently performing below average in literature and history, although according to Mrs. Howard she is in the advanced mathematics class and enjoys the work. Her apparent reluctance to begin and inability to complete longer reading assignments and projects has a great negative impact on her grades in all academic subjects.

Affect and Social Characteristics

Mrs. Howard described Tess as having a “mellow disposition” but also as a young woman who is curious, compassionate, bright, and funny with a love of learning. She also believes that she has poor self-esteem because of her difficulty completing reading assignments. Mrs. Howard reported that Tess has one best friend whom she has been close to for a few years. She expressed the belief that Tess is not interested in forming more friendships because she feels she has different interests from other children her age. She also noted that Tess feels somewhat embarrassed because her friend is a voracious reader. Tess enjoys karate lessons, band, and using the computer.

Mrs. Howard expressed concern about Tess’ tendency to shut down when things do not go her way or she is disciplined. Typically, discipline involves making use of the computer contingent on finishing homework assignments, and in these instances she simply goes to bed without comment or completing the task. She reported that she has also expressed belief in the fact that she cannot change situations she does not like by saying things such as, “I am not going to try, because it will take forever and I would not finish anyway.”

General Behavioral Observations

Tess was evaluated at the Union Educational Psychology Clinic. She reported that she had not gotten a good night’s rest, but felt as well as she would on a normal school day. Tess was quiet and reserved during test administration and often hung her head or rested it on the table. She worked quickly initially but when tasks became more difficult, took her time and was very persistent. During the interview, she rarely made eye contact with the interviewer, but was willing to answer and expand on any questions. She appeared anxious during reading tasks, often saying, “I am sorry this is taking me so long,” and “I am not good at reading.”

Cognitive Functioning

The WISC-IV was administered to assess Tess’ overall intellectual ability. The WISC-IV is an individually administered clinical instrument for assessing the intellectual ability of children aged 6 years through 16 years, 11 months. The child’s performance on ten subtests is summarized in an overall intelligence score called the

Full Scale standard score. The WISC-IV also yields Verbal, Comprehension, Perceptual Reasoning, Working Memory, and Processing Speed scores.

Tess earned a Verbal Comprehension Index score of 121 (92nd percentile, Superior), a Perceptual Reasoning Index score of 127 (96th percentile, Superior), a Working Memory Index score of 102 (55th percentile, Average), and a Processing Speed Index of 85 (16th percentile, Low Average). Based on these results, Tess has relative strengths in verbal and perceptual reasoning skills. While her Working Memory Index is in the average range, it is significantly lower than her Verbal Comprehension and Perceptual Reasoning indexes. Also, Tess' Processing Speed Index is significantly lower than her Verbal Comprehension, Perceptual Reasoning, and Working Memory indexes. Both of these differences are likely to occur in less than 5% of her same-age standardization sample and should be considered a true difference that did not occur by chance. Due to these significant differences, the Full Scale IQ may not be reliably interpreted. The Verbal Comprehension IQ and Perceptual Reasoning IQ are considered better estimates of Tess' intellectual functioning because they assess higher-level cognitive and reasoning abilities.

The subtest scaled scores of the WISC-IV have a mean of 10 with a standard deviation of 3. Scores between 7 and 13 are considered average.

Verbal comprehension	Scaled score
Similarities	13
Vocabulary	15
Comprehension	13
<i>Perceptual reasoning</i>	
Block design	13
Picture concepts	13
Matrix reasoning	17
<i>Working memory</i>	
Digit span	10
Letter–number sequencing	11
<i>Processing speed</i>	
Coding	6
Symbol search	9
Cancellation	12

Academic Functioning

Reading Achievement

Tess' skills in single-word decoding, nonsense word decoding, and reading comprehension were assessed using the WIAT-II. She earned a standard score of 84 (14th percentile, Below Average) on the Reading composite. She performed in the below average to average range on all Reading subtests.

The WIAT-II yields standard scores with a mean of 100 and a standard deviation of 15.

WIAT-II subtests	Standard scores	Percentile
Word reading	87	19
Reading comprehension	90	25
Pseudoword decoding	82	12

Written Language Skills

Tess’ ability to construct individual sentences, spell words, and write paragraphs was assessed by the WIAT-II. Tess received a standard score of 115 (84th percentile, High Average) on the Written Language Composite. She demonstrated spelling abilities above her age level and responded appropriately to an essay prompt. However, her essay was average in terms of persuasion tactics, supporting arguments, and vocabulary usage.

The WIAT-II yields standard scores with a mean of 100 and a standard deviation of 15.

WIAT-II subtests	Standard scores	95 % band	Percentile
Spelling	117	111–123	87
Written expression	109	100–118	73

Oral Language

Tess’ oral language was assessed using the WIAT-II. The WIAT-II Listening Comprehension scale assesses the ability to listen for detail by selecting a picture that matches a word or sentence and the ability to generate a word that matches a picture or oral description. The Oral Expression scale assesses the examinee’s ability to use oral language to effectively communicate with others through listing several members of a category, telling stories about pictures, and giving specific directions to complete everyday tasks. Tess earned an Oral Language Composite standard score of 139 (99.5 percentile, Very Superior).

The WIAT-II yields standard scores with a mean of 100 and a standard deviation of 15.

WIAT-II subtests	Standard scores	95 % Band	Percentile
Listening comprehension	126	116–136	96
Oral expression	136	126–146	99

Mathematics

Tess’ mathematics achievement was assessed with the WIAT-II. The Numerical Operations subtest assesses the ability to solve written mathematics problems using basic operations such as addition, subtraction, multiplication, and division. The Math Reasoning subtest requires solving single- and multiple-step word problems

using whole numbers, fractions, and graphs. Tess earned a Mathematics Composite standard score of 128 (97th percentile, Very Superior).

The WIAT-II yields standard scores with a mean of 100 and a standard deviation of 15.

The WIAT-II yields standard scores with a mean of 100 and a standard deviation of 15.

WIAT-II subtests	Standard scores	95% band	Percentile
Numerical operations	129	122–136	97
Mathematics reasoning	118	112–124	88

Behavioral and Social–Emotional Functioning

Parent Reports

Tess’ mother, Mrs. Howard, completed Behavior Assessment System for Children-Parent Rating Scales, Second Edition (BASC-2-PRS) to provide an overview of Tess’ behavioral, social, and emotional functioning. Mrs. Howard did not endorse any difficulties within the home environment.

The BASC-2-PRS yields T-scores with a mean of 50 and a standard deviation of 10. Scores above 70 on the clinical scales are considered to be indicative of significant problems. On the Adaptive scales, scores below 30 are considered significantly low. Scores that represent significant problems are marked with two asterisks and scores that represent possible problems are marked with a single asterisk.

Clinical scales	Mother T-scores
Hyperactivity	39
Aggression	46
Conduct problems	37
<i>Externalizing problems</i>	<i>40</i>
Anxiety	47
Depression	45
Somatization	36
<i>Internalizing problems</i>	<i>41</i>
Attention problems	–
Learning problems	–
<i>School problems</i>	–
Atypicality	41
Withdrawal	47
Attention Problems	51
<i>Behavioral Symptoms Index</i>	<i>43</i>
<i>Adaptive Scales</i>	
Adaptability	55
Social Skills	50
Leadership	46
Activities of daily living	49

Clinical scales	Mother T-scores
Study skills	–
Functional communication	50
<i>Adaptive skills composite</i>	50

Teacher Reports

Tess’ literature teacher, Ms. Paxton, completed the BASC-2-TRS to provide information pertaining to Tess’ behavioral, emotional, and academic functioning at school. Ms. Paxton’s ratings indicated that Jaden is having difficulty succeeding in school and that she displays signs of anxiety and depression when working on reading-related tasks. The Withdrawal scale was also in the at-risk range because Ms. Paxton endorsed that Tess prefers to work alone.

The BASC-2-TRS is a questionnaire completed by teachers to obtain ratings of adaptive skills and behavior and emotional problems of students. The BASC-2-TRS yields T-Scores with a mean of 50 and a standard deviation of 10. Scores above 70 are considered to be indicative of significant problems. Scores that are indicative of significant problems are marked with two asterisks and scores that indicate possible problems are marked with a single asterisk.

Clinical scales	Teacher T-score
Hyperactivity	49
Aggression	46
Conduct problems	45
<i>Externalizing problems</i>	46
Anxiety	65*
Depression	66*
Somatization	47
<i>Internalizing problems</i>	62*
Attention problems	62*
Learning problems	78**
<i>School problems</i>	72**
Atypicality	59
Withdrawal	66*
Attention problems	–
<i>Behavioral symptoms index</i>	60*

Adaptive scores below 30 are considered to indicate significant difficulties.

Adaptive scales	Teacher T-score
Adaptability	45
Social skills	42
Leadership	42
Activities of daily living	–
Study skills	38*

Adaptive scales	Teacher T-score
Functional communication	41
<i>Adaptive skills</i>	<i>40</i>

Self Report

While at the clinic, Tess completed the Behavior Assessment System for Children-Self-Report of Personality, Second Edition (BASC-2-SRP). Tess indicated that she experiences a significant Sense of Inadequacy. The Sense of Inadequacy scale assesses perceptions of low achievement expectations, a tendency to not persevere, and a perception of being unsuccessful, particularly in academic endeavors. Specifically, Tess expressed her perception that she should be able to do better in reading, but regardless of her effort she cannot do so. Tess' ratings also resulted in an at-risk Attitude to School scale due to her negative feelings related to her reading experiences. Despite these difficulties, Tess expressed satisfaction with her relationships as well as a positive self-concept.

The BASC-2-SRP yields T-Scores with a mean of 50 and a standard deviation of 10. Scores above 70 on the clinical scales are considered to be indicative of significant problems. Scores below 30 on the personal adjustment scales are considered significantly low. Scores representing significant problems are marked with two asterisks and scores representing possible problems are marked with a single asterisk.

Clinical scales	T-Score
Attitude to school	68*
Attitude to teachers	40
<i>School problems</i>	<i>55</i>
Atypicality	47
Locus of control	42
Social stress	46
Anxiety	58
Depression	46
Sense of inadequacy	77**
<i>Internalizing problems</i>	<i>53</i>
Attention problems	53
Hyperactivity	40
<i>Inattention/hyperactivity</i>	<i>46</i>
<i>Emotional symptoms index</i>	<i>55</i>
<i>Personal adjustment scales</i>	
Relations with parents	60
Interpersonal relations	59
Self-esteem	58
Self-reliance	47
<i>Personal adjustment</i>	<i>58</i>

Summary and Diagnostic Impressions

Tess is an 11-year, 1-month-old female who was referred to the Union Educational Psychology Clinic by her mother for a psychoeducational evaluation. Results of the evaluation indicate that Tess’ verbal and perceptual cognitive abilities are in the superior range, while her working memory and processing speed are average and low average, respectively. Her academic abilities range from below average to very superior. It is apparent that she is quite capable academically, but her reading ability, particularly her reading decoding, is lower than her ability in other academic subjects and within the below average range. When comparing her reading composite score to her WISC-IV Verbal Comprehension Index, it is clear that Tess’ reading performance is significantly lower than expectations given her cognitive ability. Based on results from parent interview, rating scales, and psychoeducational testing, and the DSM-IV criteria, Tess’ ipsative weakness in reading warrants a diagnosis of Reading Disorder.

Axis I	Reading disorder (315.00)
Axis II	None
Axis III	None
Axis IV	None
Axis V	GAF=70 (current)

Recommendations

1. Tess’ parents should share the results of this evaluation with Union Middle School so that appropriate interventions and accommodations may be implemented in the school setting.
2. Teach Tess a specific method for identifying and decoding unfamiliar words.
3. Use word banks and flash cards to assist Tess in developing a sight word vocabulary.
4. Tess’ parents may wish to seek professional consultation in assisting her with homework completion as her classes across the curriculum require more reading.

OAKVILLE ACADEMY
CONFIDENTIAL
PSYCHOEDUCATIONAL REPORT

This report is provided to school personnel for professional use in planning an appropriate educational program. Access is to be limited to those identified as appropriate under state and federal guidelines. Duplication of this report is prohibited without appropriate authorization of release to the Psychological Services Department.

NAME: Shari Gage
BIRTH DATE: 06/15/1992

AGE: 16 years, 5 months
SEX: Female
PARENT/GUARDIAN: Mary Gage
REFERRED BY: IEP Team (REEVALUATION)
SCHOOL: Oakville Academy
GRADE: 10
VISION: 11/19/2008
HEARING: 11/19/2008
CONSENT FOR EVALUATION: 11/24/2008
DATES EVALUATED: 12/01/2008, 12/02/2008, 12/05/2008, 02/15/2009

Evaluation Instruments Administered

Shari was administered a battery of tests which included the following instruments:

Reynolds Intellectual Assessment Scales (RIASs)
Wechsler Individual Achievement Test, Second Edition (WIAT-II)
Wide Range Achievement Test-4 (WRAT-4)
The Behavior Assessment System for Children, Second Edition (BASC-2)

- Parent Rating Scales (PRS)
- Teacher Rating Scales (TRS)
- Self-Report of Personality (SRP)

Clinical Interview

Review of Records

Reason for Referral

Shari was referred for a comprehensive psychoeducational evaluation in order to evaluate academic progress, to determine instructional needs, and to determine possible eligibility for future special education services. Shari has been being served through the Learning Disability program.

Background Information

According to a December 3, 2004 report by School District Office of Psychological Services, Shari was initially referred for evaluation in preschool and was determined to be eligible for services through the Significantly Developmentally Delayed program. In March of 1997, as a kindergarten student, Shari was reevaluated and found eligible for Emotional and Behavioral Disorder services due to distractibility, difficulty transitioning, and verbal and physical outbursts. After reevaluation in 1999, Shari's emotional control was considered improved enough that she was no longer considered

eligible for the Emotional and Behavioral Disorder program and she was found eligible for Learning Disabilities services. Ms. Privitera's evaluation revealed that Shari's reading and mathematics skills were in the borderline range and writing skills were in the low average range as measured by the Diagnostic Achievement Battery–3. Shari's intellectual functioning was measured by the Wechsler Abbreviated Scale of Intelligence and results indicated low average verbal abilities, average nonverbal ability, and low average overall ability.

Social History

Shari's mother, Ms. Mary Gage, completed a social history update questionnaire on November 1, 2008. Ms. Gage noted that Shari lives at home with her mother and 17-year-old sister, Jeri. She also indicated that she was biologically Shari's maternal grandmother but adopted Shari when she was 3 years old. She reported that she and her husband divorced when Shari was 11 years old. Ms. Gage indicated that Shari is involved in the community by regularly attending church.

General Description/Testing Observations

Shari is a 16-year-old female who is noted to be of average height and above average weight for her chronological age. She was tested at Oakville Academy over four sessions. Shari entered the testing situation willingly and rapport was easily established and maintained. Her affect was appropriate to the testing situation and her mood was pleasant and cooperative. Shari attempted all tasks and put forth adequate effort, although her first statement to the examiner was, "I am probably going to fail everything." At times, Shari required extra encouragement to persevere with difficult tasks. The quality of Shari's expressive language was considered to be within the average range. She was alert and appeared oriented throughout the evaluative sessions. Her eye contact was appropriate and no disturbances in her thought processes were observed. Overall test results appear to be a valid estimate of Shari's current level of functioning.

Test Results and Interpretation

Intelligence

Shari was administered the *RIAS* in order to provide an estimate of her cognitive ability. The *RIAS* is an individually administered test designed to provide subtest and composite scores that represent intellectual functioning in specific cognitive domains. The *RIAS* also yields a co-normed, supplemental measure of memory. The *RIAS* includes a two-subtest Verbal Intelligence Index (VIX) and a two-subtest Nonverbal Intelligence Index (NIX). The scaled sums of T scores for the four subtests

are combined to form the Composite Intelligence Index (CIX), which is a summary estimate of global intelligence. Her score on the Verbal Intelligence Index suggested low average verbal reasoning ability and crystallized intellectual functioning. Shari’s performance on the NIX suggested average nonverbal reasoning ability and fluid intellectual functioning. Shari’s overall performance was within the low average range of intellectual functioning. Her CIX score was a standard score of 84, which corresponds to the 14th percentile, which means that Shari is functioning at the same level as or better than 14% of children her same age. The chance that the range of scores from 79 to 90 includes Shari’s true IQ is 95 out of 100.

The various indexes yielded by the RIAS are scaled to a mean of 100 and a standard deviation of 15. Composite scores that fall between 90 and 109 are considered average. Shari’s scores were as follows:

Index score	Standard score	Percentile
Verbal intelligence index (VIX)	82	12
Nonverbal intelligence index (NIX)	90	25
Composite intelligence index (CIX)	84	14
Composite memory index (CMX)	79	8

The following scores reflect Shari’s performance on individual subtests. Each subtest score is scaled to a mean of 50 and a standard deviation of 10. Subtest scores that fall between 45 and 54 are considered average.

Verbal subtest	T-score
Guess what (GWH)	31
Verbal reasoning (VRZ)	41
<i>Nonverbal subtest</i>	
Odd-item out (OIO)	39
What’s missing (WHM)	48
<i>Memory subtest</i>	
Verbal memory (VRM)	34
Nonverbal memory (NVM)	41

In the area of memory, Shari obtained a Composite Memory Index (CMX) composite score of 79 (eighth percentile), which is in the borderline range. Shari’s VIX and NIX are fairly consistent with her CIX and this indicated that Shari’s verbal and nonverbal abilities are similarly developed. When compared to her overall intelligence, Shari’s memory score (CMX) indicates a slight weakness in working memory skills both in the verbal and nonverbal areas.

Academic Achievement

Shari was administered selected subtests of the *WIAT-II* to determine her current level of academic achievement. These tests are individually administered, norm-

referenced tests that assess performance in the essential academic areas of reading and mathematics. Standard scores are based upon a mean of 100 and a standard deviation of 15. Scores that fall between 85 and 115 are considered to be within the average range.

	Standard score	Percentile
Word reading	68	2
Reading comprehension	60	0.4
Pseudoword decoding	80	9
<i>Reading composite</i>	<i>65</i>	<i>1</i>
Numerical operations	66	1
Math reasoning	66	1
<i>Mathematics composite</i>	<i>62</i>	<i>1</i>
Spelling	88	21
Written expression	87	19
<i>Written language composite</i>	<i>86</i>	<i>86</i>
Listening comprehension	71	3
Oral expression	87	19
<i>Oral language composite</i>	<i>76</i>	<i>5</i>

Shari obtained a Reading Composite score of 65 (first percentile), which is in the Extremely Low range of functioning. This composite included three subtests—Word Reading, Reading Comprehension, and Pseudoword Decoding. On the Word Reading subtest, which requires quickly reading through a list of words, Shari obtained a standard score of 68, which is in the Extremely Low range. When reading through the list, Shari only sounded out unfamiliar words when prompted, and sometimes substituted words similar in appearance to the target word. Based on these observations, it appears that Shari tends to rely on a sight word approach to reading, but may not be familiar with a wide range of words. On the Reading Comprehension subtest, Shari obtained a standard score of 60, which is also in the Extremely Low range. The Reading Comprehension subtest requires reading sentences and short passages and then answering questions about the main idea, specific details, or the order of events. Shari was unable to respond to the first set of items for her grade level and, thus, was administered the previous set of items. She demonstrated difficulty recalling information she had just read, was often unable to identify the necessary details by looking back at the passage, and sometimes did not appear to understand the main point of the passage. Finally, on the Pseudoword Decoding subtest, Shari was able to correctly sound out several “fake” words, earning a standard score of 80, which is in the Low Average range. Based on these results, Shari appears to have a stronger phonemic decoding ability than sight word vocabulary.

In the area of mathematics skills, Shari obtained a Math Composite score of 62 (1st percentile), which is in the Extremely Low range of functioning. This composite included two subtests—Numerical Operations and Math Reasoning. On the Numerical Operations subtest, Shari obtained a standard score of 66, which is in the Extremely Low range. Shari successfully completed multi-digit addition and subtraction with regrouping and division with a single digit divisor. She was unable to correctly

perform various operations on fractions and decimals. On the Math Reasoning subtest, Shari obtained a standard score of 66, which is also in the Extremely Low range. Shari solved word problems requiring reading a graph, using patterns, and stating fractions. She was unable to solve problems that required geometric reasoning, ordering quantities less than a whole, and complex multiplication and division problems.

Within the area of written language, Shari obtained a standard score of 88 on the Spelling subtest, which is in the Low Average range, and a standard score of 87 on the Written Expression subtest, which is also in the Low Average range. Her Written Language composite score was 86 (18th percentile), which is within the Low Average range. On four of the spelling items, Shari substituted the incorrect homonym (e.g., absents for absence) and appeared to attempt to use spelling conventions, i.e., an orthographic approach, to spell unfamiliar words. Shari was able to combine sentences into one complete sentence, but sometimes incorrectly communicated the original meaning or made punctuation or word omission errors.

Shari earned a standard score of 76 on the Oral Language composite, which is within the Borderline range. On the Listening Comprehension subtest, she obtained a score of 71, which is in the Borderline range. On this subtest, Shari was better able to identify pictures that matched words or sentences spoken by the examiner than to produce words that corresponded to a picture. In other words, her receptive ability appeared better developed than her expressive ability in this context. On the Oral Expression subtest, Shari earned a score of 87, which is within the Low Average range. Shari correctly described stories and gave directions, but tended to leave out specific details and descriptive elements.

Shari was also administered the Wide Range Achievement Test, Fourth Edition (WRAT-IV) in August 2007 as standard school procedure. The WRAT-IV measures academic functioning, rendering a Word Reading score and Math Computation score.

	Standard score	Percentile
Word reading	79	8
Sentence comprehension	78	7
<i>Reading composite</i>	76	5
Math computation	76	5

Shari’s scores on the WRAT-IV were within the Borderline range for reading and mathematics, which are slightly higher than her WIAT-II results.

Social/Emotional/Behavioral Rating Scales

Shari’s mother and teacher completed the *BASC-2*, a measure that evaluates levels of behavioral, emotional, and social competencies relative to adolescents of the same age and gender. On the clinical scales and composite scores of the *BASC-2*, T-scores of 70 and above are considered clinically significant, scores between 60 and 69 are in the at-risk range, and scores of 41–59 are in the average range. Adaptive scale scores of 30 or less are considered clinically significant, scores of 31–40 are at-risk, and scores between 41 and 59 are average.

Skill area	T-score (mother)	T-score (teacher)
Hyperactivity	54	60*
Aggression	50	70**
Conduct problems	55	63*
<i>Externalizing problems</i>	53	65*
Anxiety	46	68*
Depression	49	86**
Somatization	41	96**
<i>Internalizing problems</i>	44	89**
Attention problems	—	61*
Learning problems	—	76**
<i>School problems</i>	—	70**
Atypicality	52	48
Withdrawal	47	66*
Attention problems	56	—
<i>Behavioral symptoms index</i>	52	69*
Adaptability	56	48
Social skills	62	55
Leadership	46	51
Activities of daily living	43	—
Study skills	—	40*
Functional communication	57	36*
<i>Adaptive skills</i>	53	46

*At-risk; **Clinically significant/high level of maladjustment

The F, Response Pattern, and Consistency indexes were all within the acceptable range for Dr. Decker's report. Teacher results indicated clinically significant scores for Aggression (e.g., sometimes engages in several forms of verbal aggression, loses temper easily), Depression (e.g., seems lonely, is negative, is sad), Somatization (e.g., several physical complaints resulting in frequent visits to the school nurse), and Learning Problems (e.g., had difficulty keeping up in several academic areas). Results also indicated that Shari was at risk for Hyperactivity (e.g., sometimes has problems seeks attention while working, gets out of seat, or interrupts), Conduct Problems (e.g., sometimes disobeys and sneaks around), Anxiety (e.g., worries and is nervous, particularly about tests), Attention Problems (e.g., easily distracted with short attention span), Withdrawal (e.g., does not always join group activities or seek companionship), Study Skills (e.g., does not consistently complete tasks necessary for academic success), and Functional Communication (e.g., does not always clearly communicate). As a result of the significant Depression and Somatization scales and the at-risk Anxiety scale, the Internalizing Problems composite was also elevated. Similarly, the School Problems composite score reflects the at-risk levels of Attention Problems and significant Learning Problems.

Ms. Gage's F and Response Pattern indexes were within the acceptable range, but her Consistency index fell in the caution range, indicating that her responses differed for similar items perhaps due to not carefully reading item content or changing perspective during the completion of the form. An inspection of the inconsistent items revealed that pairs of items differed slightly, for example, applying to slightly

different circumstances, or were rated similarly although not exactly the same. Ms. Gage indicated that she did not perceive Shari's behavior as being problematic in the home environment.

Thus, ratings indicated that Shari appears to have significant difficulty with aggression, depression, somatization, and academics at school and she has some problems with impulse control, disobeying, anxiety, inattention, withdrawal, academic task completion, and functional communication in the school environment, but does not demonstrate similar difficulties at home. It may be hypothesized that Shari's behavioral and emotional difficulties at school are related to her learning challenges.

Shari also completed the BASC-2-SRP to provide her perception of her behavioral, emotional, and social functioning. Shari's F, Response Pattern, V, L, and Consistency Indexes were within the acceptable range. Specific T-scores obtained on the BASC are listed below:

Skill area	T-score
Attitude to school	65*
Attitude to teachers	53
Sensation seeking	60*
<i>School problems</i>	62*
Atypicality	45
Locus of control	57
Social stress	51
Anxiety	54
Depression	49
Sense of inadequacy	56
Somatization	60*
<i>Internalizing problems</i>	54
Attention problems	70**
Hyperactivity	48
<i>Inattention/hyperactivity</i>	60*
<i>Emotional symptoms index</i>	55
Relations with parents	51
Interpersonal relations	36*
Self-esteem	45
Self-reliance	44
<i>Personal adjustment</i>	42

*At-risk; **Clinically significant/high level of maladjustment

Shari rated herself as being within the at-risk range for School Problems and Inattention/Hyperactivity. Within the School Problems scale, Shari endorsed disliking school because she believes it is boring and enjoying high excitement activities like playing rough sports and daring other to do things resulting in scores in the at-risk range for Attitude to School and Sensation Seeking. The Inattention/Hyperactivity scale was elevated due to Shari endorsing clinically significant Attention Problems. Shari also rated herself as being at-risk for Somatization and difficulties in Interpersonal Relations due to various body aches and her perception that others do not always like her, respectively.

Clinical Interview

In a separate interview, Shari described her perception of events in her life as well as her thoughts and feelings on several issues. According to Shari, she was held back in kindergarten and people picked on her from first through ninth grade. Shari described herself as outgoing, hardworking, and smart, although she noted that she often makes self-deprecating comments when experiencing frustration with schoolwork. She endorsed doing her best to remind herself that she is smart, but just has a problem with certain subjects.

Classroom Observation

Shari was observed on December 13, 2007, by Dr. Decker, while in tenth grade literature. During the observation, Shari was completing an open book lesson quiz and tended to complain about the difficulty level, saying that she did not understand the story she had read because being in class was “too much.” Shari left the classroom once during this time for a restroom break and had difficulty resuming the task when she returned. When given the opportunity for free time, she then laid her head down and fell asleep. Ms. Simpson reported that this was typical behavior for Shari and expressed concern that she gives up on tasks too easily.

Shari was also observed on January 15, 2008, by the examiner, while in Mr. Griffin’s class for mathematics. Shari was the only student in the classroom studying mathematics at the time and, therefore, did not interact with other students in the room. Shari began working on her mathematics assignment, which involved calculating repeating digits and multi-operation problems, with assistance from Mr. Griffin. She attempted all items, but required a great deal of assistance, particularly if some aspect of the task was different from the items demonstrated by Mr. Griffin. Throughout the period, Shari was engaged in the assignment and instruction, although she did briefly leave the room at one point. She did, however, come back to her desk and immediately resumed her work. Mr. Griffin stated that Shari’s behaved in the typical manner while in his classroom and praised her willingness and ability to seek assistance.

Summary

Shari is a 16-year-old, tenth-grade student who was referred for a comprehensive psychoeducational evaluation to assist in determining continuing eligibility for special education services. Current test results suggest that Shari is functioning intellectually in the below-average range. She displayed below-average abilities associated with language development and acquired knowledge. Her nonverbal reasoning ability was just within the average range. Academically, Shari’s performance in mathematics and reading was in the extremely low to borderline range. Her oral language ability was within the borderline range, while her written language performance

was within the low average range. Her oral language score was not considered an accurate representation of her actual communication ability. Behavioral ratings indicated that Shari has some difficulties at school that are likely related to her academic frustration.

Results of the current assessment indicate that Shari exhibits a significant discrepancy between her ability and reading and mathematics achievement, indicating that she continues to meet criteria for the Specific Learning Disability category. The eligibility team is encouraged to take these results and all other pertinent information into consideration when determining Shari's eligibility for special education services.

Summary of Key Points

- The concept of severe discrepancy originated with the introduction of the LDs into law with Education for All Handicapped Children Act (EAHCA) and was based upon a combination of the Kirk's and Bateman's work.
- Measurement issues of the discrepancy method, including regression to the mean and positive correlation between intelligence and achievement resulting in a smaller standard deviation, affect the accuracy of identification.
- Different discrepancy formulas are used across locations, resulting in different identification rates. Simple standard score discrepancy requires intelligence scores to be a certain number of standard score points higher than achievement scores and results in overidentifying students with average and above intelligence and underidentifying students with below-average intelligence. Regression methods account for regression to the mean and are a psychometric improvement to standard score methods; however, regression methods still require choosing a level to represent significant discrepancy.
- Several researchers have questioned the use of intelligence in identification of LDs. Issues discussed have included the effect of LDs on intelligence scores, the Matthew effect, decreased meaningfulness of global IQ for individuals with LD, the various intelligence scores available to use, the idea the IQ is equal to potential, the lack of IQ's ability to predict reading ability, and irrelevance to treatment.
- Some researchers have argued that intelligence may influence individual's response to intervention and general intelligence, or "g", is a good predictor of many life outcomes.
- The discrepancy formula allows the questionable practice of identifying gifted individuals with average or better achievement scores to be classified as having an LD.
- An alternative but similar model called the Component Model of Reading has been proposed. The equation $R = D \times L$ replaces IQ with listening comprehension (L) to determine if a student has a deficit in reading decoding (D) or reading comprehension (R).

Questions and Answers with the Expert: Cecil R. Reynolds



Meet the expert: Cecil R. Reynolds, PhD, ABN, earned his doctoral degree from the University of Georgia in 1978 under the tutelage of Dr. Alan S. Kaufman, with a major in School Psychology and minors in Statistics and in Clinical Neuropsychology. He served an internship divided between the Medical College of Georgia (Pediatric Neurology section and Neurological Surgery section) and the Rutland Center for Severely Emotional Disturbed Children. Prior to joining the Texas A & M University faculty in 1981, Dr. Reynolds was a faculty member at the University of Nebraska Lincoln, where he served as Associate Director and Acting Director of the Buros Institute of Mental Measurement, after writing the grants and proposals to move the Institute to Nebraska following the death of its founder, Oscar Buros. His primary research interests are in all aspects of psychological assessment with particular emphasis on assessment of memory, emotional and affective states and traits, and issues of cultural bias in testing. He is the author of more than 300 scholarly publications and the author or editor of over 50 books and several widely used tests of personality and behavior. He maintained a clinical practice treating trauma victims and individuals with traumatic brain injury for 25 years before retiring from clinical work at the end of 2003. Dr. Reynolds holds a diplomate in Clinical Neuropsychology from the American Board of Professional Neuropsychology, of which he is also a past president, and he was a diplomate in School Psychology of the American Board of Professional Psychology, prior to retiring his diplomate in 2004. He has served in a variety of prestigious positions for professional organizations and has been the recipient of many awards and recognition for his professional contributions.

Question 1: How would you describe the key elements of the discrepancy approach to learning disabilities (LDs) diagnosis?

Answer 1: Establishing unexpected levels of underachievement has always been central to the concept of an LD. Simple difference (SD) analysis does that but it requires care and consistency. To do it properly requires: (1) use of an intelligence measure that is not adversely confounded by the student's disability, (2) highly reliable achievement measures that appropriately sample the curriculum to which the student has been exposed, (3) proper (i.e., effective) instruction that has been demonstrated to work with nondisabled students, (4) knowledge of the statistical relationship between the intelligence and achievement measures, and (5) application of a regression-based prediction method such as recommended in the Federal task force report I authored in 1984. One must also realize that the presence of a severe discrepancy should be treated as a necessary but insufficient condition for the diagnosis of an SLD—this is often overlooked. There are additional criteria that must be applied.

Question 2: What are the positive and negative aspects of the discrepancy approach to LDs identification?

Answer 2: Some of the negative aspects are related to the method itself but most are related to inconsistencies in practice. The SD model has never been consistently applied; so, it has never been truly tested. This is a huge issue and will become over time an even bigger issue in RTI models. The other difficulties with the SD approach center around the difficulties in locating and using appropriate measures that possess the qualities described above and knowing and applying the mathematical models accurately. The strengths lie in the fact that we know no superior way to determine that unexpected underachievement exists and that the method, as I have presented it, is objective.

Question 3: What role, if any, should intelligence assessment play in LD diagnosis?

Answer 3: It is central to determining unexpected underachievement. Intelligence is related to academic learning and to deny this is nonsensical.

Question 4: What do you consider best practice for LD identification?

Answer 4: Once a student has failed to respond adequately in an RTI model, best practice for me dictates the use of a true comprehensive assessment that evaluates and documents the criteria as present or absent in the Federal definition. No shortcuts, no subjective appraisals, no assumptions that if RTI fails a student must be SLD, but rather a comprehensive evaluation that assesses the criteria in the definition using instruments with the qualities I have described above to determine if a SD exists and then the use of strong tests of processing as well as measures of academic learning skills. There are many reasons why a student may fail in RTI and the presence of an SLD is but one possible reason. We must then rule out emotional and behavioral disorders, or determine they are comorbid with the SLD, rule out mental retardation (MR), rule out health-related issues, other developmental disorders, and then move forward with accurate diagnosis and the development of effective instructional programs for an SLD child that are driven by student characteristics.

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