

Research and Practice in the Schools

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Research and Practice in the Schools: The Official Journal of the Texas Association of School Psychologists

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Assessment of Pediatric Bipolar Disorder: What School Psychologists Should Know

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In this paper we review the current state of knowledge regarding Pediatric Bipolar Disorder (PBD), current assessment strategies, and revisions introduced in the Diagnostic and Statistical Manual, Fifth Edition (American Psychiatric Association [APA], 2013) that are intended to enhance assessment and diagnosis of the disorder. This review includes a brief review of the history of PBD and the substantial increase we have witnessed in recent years in its presence. We review the common features of PBD and highlight factors that make it such a challenging disorder to diagnose, particularly the current debate regarding diagnostic criteria. We also review the common assessment strategies that are currently available and the DSM-5's new diagnostic category, Disruptive Mood Dysregulation Disorder (DMDD). Finally, we examine PBD in the context of the IDEA 2004. We believe it is important for school psychologists to be familiar with PBD, as they will likely work with students with PBD in their school practice.

Assessment and Diagnostic Issues

The diagnosis of bipolar disorder in children and adolescents has been the focus of considerable professional discussion in recent years. Historically bipolar disorder had been diagnosed primarily in adults and some adolescents, but in recent years, children and adolescents have been increasingly diagnosed with bipolar disorder (hereafter referred to as Pediatric Bipolar Disorder or PBD). In fact, there has been a greater than 40-fold increase in the diagnosis of PBD in a 10-year period (Youngstrom, Freeman, & Jenkins, 2009). The basis for this striking increase has been the focus of considerable debate in recent years. Had psychologists failed to recognize and diagnose bipolar disorder in children until recently? Does the current trend reflect misdiagnosis

(or over-diagnosis) of the disorder? Have recent changes in the way some researchers/clinicians conceptualize mania in children contributed to the increase (Leibenluft, 2011; Youngstrom et al., 2009)? There are no definitive answers to these questions at this time, but in this paper we will summarize a number of issues related to the assessment and diagnosis of PBD by answering some common questions.

Does Pediatric Bipolar Disorder (PBD) exist?

Yes! A growing base of contemporary research indicates that bipolar disorder often emerges in adolescence or even earlier (American Academy of

Child and Adolescent Psychiatry, [AACAP] 2007; Leibenluft, 2011; Youngstrom et al. 2009). It is often a chronic and debilitating disorder that compromises functioning in a number of major areas such as education, employment, and social relationships. Current estimates place the prevalence of PBD between 1% and 8% depending on how strictly one adheres to DSM-IV-TR (American Psychiatric Association, 2000) criteria (since the DSM-5 has just been released we will reference existing research and statistics based on the previous edition). The 1% estimates reflect the rate of bipolar I disorder and is consistent with the rate reported in adult samples. When the criteria are expanded to include both bipolar I and II the rate tends to increase to the 3-4% range. When the criteria are further expanded to include cyclothymic disorder and bipolar Not Otherwise Specified (NOS) the rate can be as high as 8% (Goodwin & Jamison, 2007; Youngstrom et al., 2009). While there is general agreement that PBD does exist in older children and adolescents, the validity of the diagnosis in children younger than 6 years has not been established and caution should be used when diagnosing PBD in young children (AACAP, 2007).

Why is it difficult to diagnose PBD accurately?

A number of factors make PBD difficult to diagnose. One important complicating factor is that there is not universal agreement regarding the appropriate criteria for diagnosing PBD. On one side of the debate are researchers/clinicians who believe strict DSM-IV-TR criteria should be applied when diagnosing bipolar disorder in children and adolescents. Adult bipolar disorder is typically episodic in nature and characterized by distinct phases of mania and depression. For example, to meet the DSM-IV-TR criteria for a manic episode, distinct periods of manic symptoms must be present for at least 1 week. Similarly, to meet the criteria for a hypomanic episode, the symptoms must be present for at least 4 days. Some of the children currently receiving the diagnosis of PBD have clinical presentations consistent with classic bipolar disorder with clearly defined discrete episodes of mania or hypomania, and this is often referred to as the classic phenotype (Leibenluft, 2011). In contrast, some researchers and clinicians argue that mania in

pediatric samples, particularly in clients under 16 years, does not necessarily look like adult mania. Instead, many children with PBD present with extreme mood lability, irritability, aggression, and recurrent, brief, rapid-cycling manic episodes (i.e., lasting just hours to days; AACAP, 2007). Some researchers/clinicians go further and suggest that nonepisodic severe irritability is a developmental manifestation of mania in children and adolescents, and that the classic episodic feature of mania is not necessary when diagnosing bipolar disorder in children. As a result, some believe an alternate phenotype exists that is legitimately diagnosed as PBD under the DSM-IV-TR category of Bipolar Disorder Not Otherwise Specified (NOS). This is often referred to simply as an alternative phenotype (Leibenluft, 2011). There is ongoing research attempting to determine if children that do not display the classic episodic presentation of bipolar disorder actually have PBD, or some other debilitating, but unrecognized disorder. We will return to these diagnostic issues later in the paper and discuss revisions in the DSM-5 that were designed to help resolve the debate.

To further complicate diagnosis, differential diagnosis is challenging as symptoms of PBD demonstrate considerable overlap with a number of common childhood disorders (e.g., Attention Deficit Hyperactivity Disorder [ADHD], Oppositional Defiant Disorder [ODD]). There also appears to be a high degree of comorbidity with PBD and disorders such as ADHD and ODD (AACAP, 2007; Youngstrom et al., 2009).

What are the common features of PBD?

As suggested by the discussion to this point, statements about common features in PBD should be considered tentative. That being said, there appears to be general agreement that common features of PBD include extreme elated mood, emotional lability/dysregulation, grandiosity, increased energy, decreased need for sleep, racing thoughts, irritable mood, pressured speech, distractibility, flight of ideas, poor judgment, hypersexuality, and psychotic features (AACAP, 2007; Youngstrom, Birmaher, & Findling, 2008). What is unclear is the appropriateness of requiring an episodic presentation with distinct phases of mania and depression. As

noted, some researchers and clinicians hold that while manic episodes in clients 16 years and older often look similar to adult mania, in children mania is often rapid-cycling with little or no inter-episode recovery (AACAP, 2007; Leibenluft, 2010; Youngstrom et al. 2008).

Diagnostic & Assessment Strategies

The AACAP (2007) assessment guidelines emphasize the importance of a careful interview of both parents and child for diagnosing PBD. For example, a family history of bipolar disorder is an established risk factor for PBD. Therefore, if a child has a parent with bipolar disorder, the child has an elevated risk of having PBD. If a “gold standard” exists in diagnosing PBD, it is probably the Washington University in St. Louis Kiddie Schedule for Affective Disorders and Schizophrenia (WASH-U-KSADS; Geller, Williams, Zimmerman, & Frazier, 1996). The WASH-U-KSADS is a semi-structured interview that can be administered to both the child and the parent. While the WASH-U-KSADS has demonstrated good psychometric properties (e.g., Geller, Warner, Williams, & Zimmerman, 1998; Geller et al. 2001), its administration requires considerable training and it is time-consuming, which does not lend itself well to clinical practice.

Broadband instruments like the Behavior Assessment System for Children, 2nd Edition (BASC-2; Reynolds & Kamphaus, 2004) have a role in the assessment of PBD, but do not always provide sufficient specificity for diagnosis. Nevertheless, characteristic PBD profiles have been found that may serve as the basis for clinical comparisons. Figures 1 and 2 present profiles for the BASC-2 Teacher Report Scale (TRS) and Parent Report Scale (PRS). As is evident from these profiles, PBD is characterized by fairly pervasive problems in a number of areas. Both TRS and PRS Scale Score profiles (Figure 1) demonstrate significant elevations (approximately mean t-scores of 70) on the Hyperactivity, Aggression, Conduct Problems, and Depression scales. There was some discrepancy on the Somatization scale, with the TRS higher than the PRS (mean t-scores of 71 and 59 respectively). On the TRS and PRS Content Scale profiles (Figure 2) there is comparable elevation on the Anger Control, Bullying, Emotional Self-Control, Executive Functioning, and Negative Emotionality scales. Consistently, the low mean scores on the Resiliency scale reflect difficulty alleviating stress and solving problems. Taken together these profiles suggest a group of children experiencing substantial problems in most areas of functioning.

Figure 1: Bipolar Disorder BASC-2 Profiles

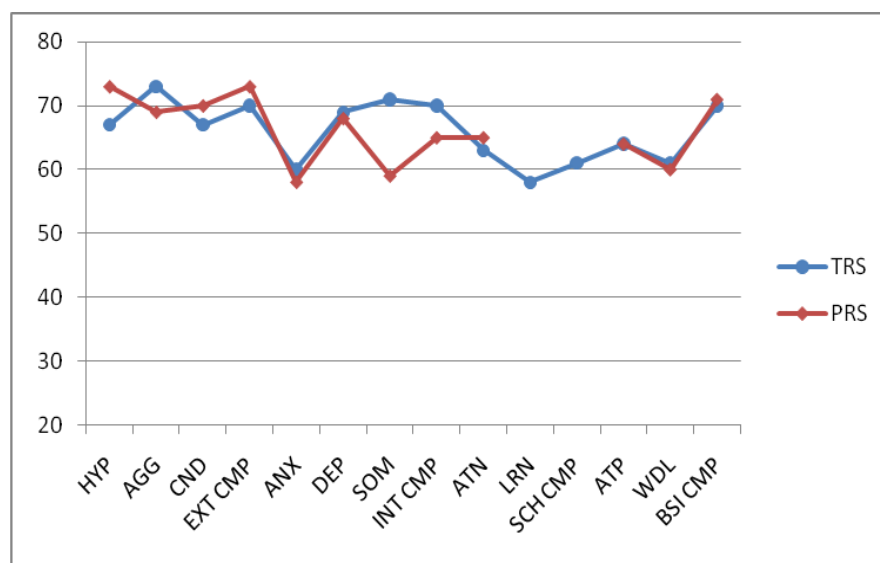


Figure 1. Bipolar BASC-2 Profiles for the Teacher Rating Scale (TRS) and Parent Rating Scale (PRS). HYP=Hyperactivity; AGG=Aggression; CND=Conduct Problems; EXT CMP=Externalizing Problems Composite; ANX=Anxiety; DEP=Depression; SOM=Somatization; INT CMP=Internalizing Problems Composite; ATN=Attention Problems; LRN=Learning Problems; SCH CMP=School Problems Composite; ATP=Atypicality; WDL=Withdrawal; BSI CMP=Behavioral Symptom Index. Adapted from BASC-2 Manual (Reynolds & Kamphaus, 2004). TRS N=18, PRS N=16

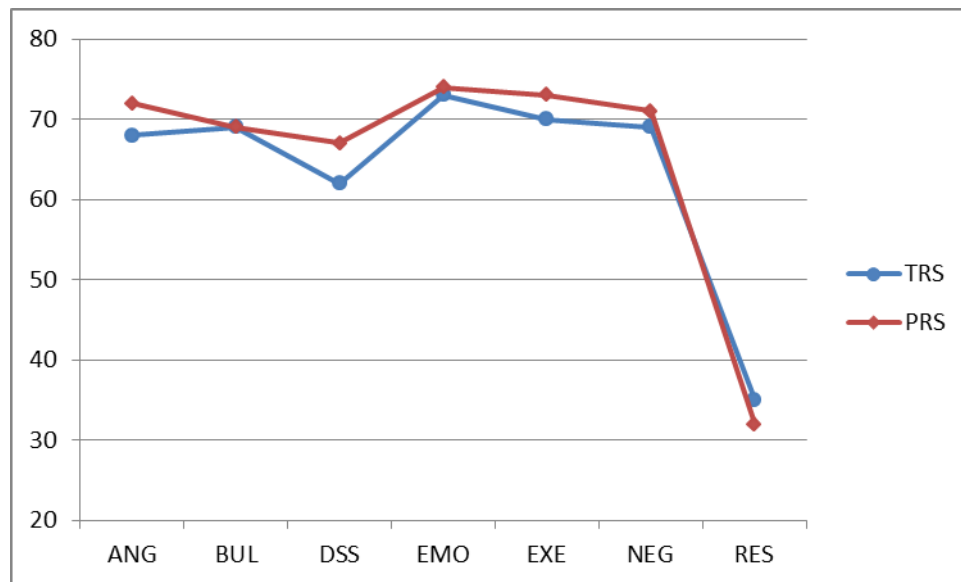
Figure 2: Bipolar BASC-2 Content Scales Profiles

Figure 2. Bipolar BASC-2 Content Scale Profiles for the Teacher Report Scale (TRS) and Parent Report Scale (PRS). ANG = Anger Control; BUL = Bullying; DSS = Developmental Social Disorders; EMO=Emotional Self-Control; EXE= Executive Functionins; NEG=Negative Emotionality; RES=Resiliency. Adapted from BASC-2 Manual (Reynolds & Kamphaus, 2004). TRS N=18, PRS N=16

In terms of narrowband instruments, there are several research scales that hold promise, including the Parent General Behavior Inventory (Parent GBI; Youngstrom, Findling, Danielson, & Calabrese 2001), the Parent Mood Disorder Questionnaire (MDQ; Wagner, Findling, Emslie, Gracious, & Reed, 2006), and the Child Mania Rating Scale (CMRS; Pavuluri, Henry, Devineni, Carbray, & Birmaher, 2006). Youngstrom et al. (2009) report that these three instruments are the best validated and discriminating narrowband scales and that they are comparable in terms of providing useful diagnostic information.

The typical assessment strategy for suspected PBD begins with a thorough clinical interview including a family history. This is followed by the use of broadband behavioral rating scales such as the BASC-2 TRS and PRS. If there is no family history of bipolar disorder and the externalizing scale scores are low, PBD is essentially ruled-out (i.e., the data suggest little likelihood of PBD; Youngstrom et al. 2009). If there is a family history of bipolar

disorder and/or broadband scales reflect high externalizing scores or resemble the prototypical profiles presented in Figures 1 and 2, further assessment with one of the available syndrome-specific scales mentioned previously is indicated (e.g., Youngstrom et al. 2009). To complement this general approach, there are two specific assessment strategies that may facilitate accurate diagnosis. In cases where it is necessary to differentiate between PBD, ADHD, and Oppositional Defiant Disorder/Conduct Disorder, the process of “symptom subtraction” is recommended (Reynolds, 2008). Symptom subtraction involves the following steps:

- 1) List all symptoms of all three disorders that are present.
- 2) Overlapping symptoms (i.e., those characteristic of more than one of the three disorders) are eliminated or subtracted.
- 3) Evaluate remaining symptoms against diagnosis for each category, but with a lower threshold.

Nomograms and other Bayesian methods also hold promise as an assessment strategy for PBD. These are actuarial approaches that allow the clinician to combine information from multiple sources (e.g., family and medical history, broadband scales, syndrome-specific scales) to determine the likelihood that a client has a specific disorder such as PBD. Due to space limitations we are unable to go into detail about this innovative technique, but Youngstrom et al. (2009) provide a good discussion of the technique and illustrate its application.

Where to go from here?

The DSM-5 Task Force suggested changes to address some of the problematic issues related to the diagnosis of bipolar disorder in children and adolescents (American Psychiatric Association [APA], 2011a, 2011b). The primary area of concern centers on what qualifies as a “manic episode.” As noted previously, some of the children currently receiving the diagnosis of PBD have clinical presentations with clearly defined discrete episodes of mania or hypomania (i.e., classic phenotype, Leibenluft, 2011). However, some of the children being diagnosed with PBD have presentations that are characterized primarily by chronic and severe non-episodic irritability and temper outbursts (i.e., alternative phenotype, Leibenluft, 2011). Some researchers suggest that the alternative phenotype may be one of the ways mania is manifested in children, and that the classic and alternative phenotypes are essentially different presentations of the same underlying disorder.

However, there is emerging research that has identified substantive differences between children with the classic presentation of PBD and those with the alternative phenotype. Possibly the most compelling discovery is that children diagnosed with the alternative or non-episodic presentation do not typically manifest bipolar disorder in adulthood, but instead tend to develop unipolar depressive and anxiety disorders (Brotman, et al. 2006; Stringaris, Cohen, Pine, & Leibenluft, 2009). Since a true PBD phenotype that only differed in symptom pattern would be expected to demonstrate longitudinal continuity with classic PBD, these data suggest that it is actually a distinct disorder (APA, 2011a, 2011b).

While this alternative phenotype appears to reflect a distinct disorder to many, it is worth noting that children with this presentation are as severely impaired as those with classic PBD. As a result, the DSM-5 includes a new diagnostic category referred to as Disruptive Mood Dysregulation Disorder (DMDD). Below is a brief summary of the criteria for DMDD:

- Severe, recurrent temper outbursts in response to common stressors.
- An average of 3 or more outbursts per week.
- Mood between outbursts is consistently negative (e.g., irritable, angry, sad).
- The above criteria have been present for 12 months.
- The outbursts and/or negative mood occur in at least two settings and severe in at least one.
- Chronological age is at least 6 years and not older than 18.
- Onset before 10 years of age.
- There has *never* been a specific period lasting more than one day during which the criteria for a manic or hypomanic episode have been met.
- The symptoms *do not occur exclusively* during the course of a psychotic or mood disorder.

It is important to note that while DMDD cannot coincide with PBD or Oppositional Defiant Disorder, it can, and often does, present with Conduct Disorder and Attention Deficit Hyperactive Disorder.

It should also be noted that there are some vocal opponents of the inclusion of DMDD in the DSM-5. For example, APA Division 53, The Society of Clinical and Adolescent Psychology did not support the inclusion of DMDD in DSM-5 largely because it does not have a clear scientific base and demonstrates considerable overlap with existing disorders such as dysthymic disorder and oppositional defiant disorder. For example, the negative mood state specified for DMDD is similar to that of dysthymic disorder and the primary behavioral characteristics of DMDD are similar to those of oppositional defiant disorder (E. Youngstrom, personal communication November 12, 2010). There will likely be a lively debate over these issues for the foreseeable future.

While the inclusion of Disruptive Mood Dysregulation Disorder (DMDD) is the most

prominent step taken in the DSM-5 to enhance accurate diagnosis of PBD, there are some additional, more subtle changes. For example, the new diagnostic criteria more clearly emphasize the episodic nature of PBD, noting that the symptoms must reflect a distinct and noticeable change from the individual's normal pattern of behavior. Additionally, the category of Bipolar Disorder Not Otherwise Specified (NOS) was deleted and a new category, Other Specified Bipolar and Related Disorder, added. In coding this disorder the clinician is asked to specify why the presentation does not meet the criteria for a specific bipolar disorder. One example provided in the DSM-5 are "short-duration" hypomanic episodes that meet the symptomatic criteria for hypomania, but are only present for 2-to-3 days and therefore do not meet the standard 4-day criterion.

IDEA Implications

Depending on presentation, it is probable that many children with PBD will meet the criteria for Emotional Disturbance (ED). Below are the well known criteria for ED:

- (i) The term means a condition exhibiting one or more of the following characteristics over a long period of time and to a marked degree that adversely affects a child's educational performance:
 - (A) An inability to learn that cannot be explained by intellectual, sensory, or health factors.
 - (B) An inability to build or maintain satisfactory interpersonal relationships with peers and teachers.
 - (C) Inappropriate types of behavior or feelings under normal circumstances.
 - (D) A general pervasive mood of unhappiness or depression.
 - (E) A tendency to develop physical symptoms or fears associated with personal or school problems.
- (ii) The term includes schizophrenia. The term does not apply to children who are socially maladjusted, unless it is determined that they have an emotional disturbance.

Given the debilitating and chronic nature of PBD, it is likely that many children and adolescents with this disorder will meet at least some of these criteria. In many cases students with PBD will exhibit (C)

Inappropriate types of behavior or feelings under normal circumstances and/ or (D) A general pervasive mood of unhappiness or depression. In actual practice, these children may be among the most challenging students we see in the schools. Fortunately there are evidence based interventions that can help these children function more effectively both academically and socially. Mood stabilizers and atypical antipsychotic medications are typically considered the first-line treatment for these children. Behavioral interventions and psychosocial therapy, particularly cognitive-behavioral therapy, have also been shown to be helpful with these children (e.g., Pavuluri et al. 2004). Consultation with the family and educational personnel may also be helpful to educate them about the disorder, discuss treatment guidelines, and encourage compliance with treatment protocols. The American Academy of Child & Adolescent Psychiatry (2007) provides a detailed presentation on recommended interventions for children with bipolar disorder and their families.

Summary

In this paper we reviewed many of the controversial issues surrounding the diagnosis of Pediatric Bipolar Disorder. In many ways it seems the more we learn about this disorder, the more questions we have. Possibly the most burning question at this time is whether the children currently being diagnosed with PBD all have the same disorder, or do some have other debilitating, but not clearly defined disorders (e.g., Disruptive Mood Dysregulation Disorder). What is clear is that the children and adolescents being diagnosed with PBD (whether with the classic or alternative phenotype) demonstrate a host of problem behaviors that challenge them and those whose mission it is to help them succeed. School psychologists play a pivotal role in identifying and helping these children succeed in our public schools and in life in general. To do this we need to be aware of the disorder and stay updated on developments in the field.

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A Theoretical Model for Measuring Change: Reliable Change Index

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School psychologists often need to measure change in behavior or cognition across time and treatment conditions. This is typically done without consideration of issues such as reliability and statistical significance. This article presents a psychometrically sound model for determining when statistically significant change has occurred. Two theoretical datasets were created to represent scores obtained during baseline and follow-up, after theoretical interventions were emplaced. A Reliable Change Index (RCI; Jacobson and Truax, 1991) was calculated for each measure. Results indicate that some of the scores met the criteria for change, as defined by the RCI and the chosen confidence interval, while other scores did not meet the criteria. This illustrates that while a clinical review of a child's performance might suggest substantive change, when the data are examined in a statistical framework, there may be inadequate evidence of statistically significant change; the difference between pre- and post-intervention scores might simply reflect measurement error.

Psychological and educational studies have an extensive history of utilizing a wide range of statistical approaches in determining the statistical differences between group means. However, in some domains of study, there may be an interest in determining whether change has occurred in an *individual's* score from point A to point B. This is especially useful when trying to determine an individual's response to a treatment or intervention, in which we would compare scores on a particular outcome measure over time. In 1991, Jacobson and Truax proposed the idea of Reliable Change Index (RCI) to provide a psychometric approach to the measurement of this type of change. The RCI represents the number of points needed on a given psychometric measure to determine if a change in score from baseline to post-treatment reflects real change or chance variation. The RCI is calculated using the standard error of the measure (SEM) to estimate chance variation. When the difference exceeds the value of the RCI, there is a high level of confidence that the change in scores is not due solely to chance variation; in other words, real change has occurred.

The Jacobson and Truax model has evolved over the years, with additional variables and modifiers being added to the formula, depending on the complexity warranted in any given situation (see Jacobson, Roberts, Berns, & McGlinchey, 1999). In reviewing the recent literature on the use of the RCI, it appears that its most common use is in the study of general healthcare interventions. Ferguson, Robinson, and Splaine (2002) proposed a model that used the RCI to determine the treatment outcome using the SF-36, a popular multi-purpose health survey. Similarly, Cepukiene and Pakrosnis (2011) used the RCI to determine change in a study involving solution-focused brief therapy in 92 adolescents. Marsden et al. (2010) compared the performance of RCI with three alternative methods, using data from individuals receiving treatment for substance use disorders. This study involved the analysis of the records of 18,163 individuals who were part of the English National Treatment Outcome Monitoring Database. The authors concluded that the Jacobson and Truax model appeared to be the optimal measure of change for evaluations of treatment for substance use disorders.

The RCI has been recommended as an excellent approach for assessing change in neuropsychological testing as well. Strauss, Sherman, and Spreen (2006) discuss its potential uses in determining change in an individual's scores across serial neuropsychological assessments. The RCI model was used by Knight, McMahon, Skeaff, and Green (2007) to evaluate cognitive change in a one-year follow-up in older adults taking the Rey Auditory Verbal Learning Test (RAVLT), a popular memory measure. Strauss et al. (2006) also briefly describe some of the more sophisticated variations of the RCI that have been developed to account for additional variables, such as practice effects which are typically observed over repeated test administrations. For example, Chelune, Naugle, Lüders, Sedlak, and Awad (1993) suggested an updated model that attempts to account for this psychometric phenomenon. Herein, Chelune and colleagues (1993) observed that their model for Adjusted RCI scores controlling for practice effects demonstrated greater sensitivity to cognitive decline following epilepsy surgery. Determining change in an individual's scores across time or post-treatment is especially important in clinical work in medicine, psychotherapy, and neuropsychology. As such, these types of applications have recently begun to rely upon the RCI as the determinant of significant change. Although we have found no evidence of previous use of the RCI within a school setting, the need to assess change in a child's scores at different intervals suggests a possible role for the RCI model.

Since school psychologists often need to measure a change in behavior or cognitive skills over time and/or across treatment conditions, the RCI model may prove a highly effective tool within the school setting. School psychologists may be expected to observe changes in scores and make inferences that can have a significant impact on students. With the implementation of Response to Intervention (RTI) in school districts, it is often the role of school personnel to assess whether a significant change has occurred in a particular domain.

The most common method to measure student academic growth within an RTI model is progress monitoring using a curriculum-based measurement (CBM) approach. Progress monitoring entails giving a student brief assessments (1-3 minutes) on a bi-weekly basis to determine if a student is responding to evidence-based instruction as expected (Stecker,

Fuchs, & Fuchs, 2008). Data from the progress monitoring are plotted on a graph. If the student's actual rate of progress is less steep than the projected rate of improvement as indicated by the aim line, the teacher makes adjustments to instruction. CBM progress monitoring falls into a class of measurement known as General Outcome Measurement (GOM). According to Walker, Carta, Greenwood, and Buzhardt (2008), GOMs are designed to reflect progress toward an identified outcome. With a GOM approach, a child's proficiency can be assessed and probed frequently relative to an expected outcome. One drawback in using progress monitoring is that the reliability and validity of many curriculum-based measures are unknown because they are not standardized; they are specifically designed by the teacher for a specific student (Hosp & Hosp, 2003). Furthermore, despite the value of CBM measures, it is unclear how benchmarks from these measures can reliably be used to determine a child's movement across the tiers of intervention (Fletcher & Vaughn, 2009). Measurement of student growth within an RTI model is a critical issue that has yet to be adequately addressed (Ardoin & Christ, 2008). Schools may wish to consider adding another dimension of measurement to their RTI process by using norm-referenced testing at each tier in order to have a reliable and valid measure of student growth. For example, a student struggling in the area of sight word identification could be given subtest 2 Letter and Word Identification from the *Kaufman Tests of Educational Achievement, Second Edition* (Kaufman & Kaufman, 2004) at each tier of intervention in order to measure growth.

In addition to academic performance, RTI can be used to address a student's social or behavioral functioning (Coffee & Ray-Subramanian, 2009). While the literature is replete with articles discussing appropriate progress-monitoring tools for academic issues, little discussion focuses on appropriate progress-monitoring tools for behavior. Most often, direct observation has been paired with standardized behavioral screening instruments as a means to measure a student's response to behavioral intervention (see Barnett, Elliott, Wolsing, Bunker, Haski, & McKissick, 2006). Goal Attainment Scaling (GAS) is an option used for progress monitoring of behavioral interventions within an RTI service delivery model. Originally proposed by

Kiersuk and Sherman (1968) for use in mental health services, GAS is a tool adopted by schools to facilitate individualized goal setting. In this model, the teacher first identifies a goal and corresponding indicators in collaboration with the student. In the traditional GAS format, at least three goals are identified, a scale is developed for each and the goals are weighted according to priority and a GAS score may be calculated. While the use of GAS prompts school personnel to work together in a collaborative fashion, its primary limitation is a lack of psychometric properties. In some situations, repeated administrations of norm-referenced rating scales such as the *Behavior Assessment System for Children, Second Edition* (Reynolds & Kamphaus, 2004) may be a more appropriate measure of determining progress in behavior.

Although observing a change in scores may initially appear to be a rather straightforward process, it actually involves a complex consideration of the psychometric properties of the measures involved. A number of problem-solving approaches as previously described may be effective; however, this paper focuses on the use of the RCI.

Method

Two hypothetical sets of data were constructed to represent scores obtained by individual students at baseline and at follow-up. An RCI was calculated for each measure. The RCI was originally described by Jacobson and Truax (1991) as a method for determining if changes in test scores are reliable. The RCI is an indicator of the probability that an observed difference between two scores from the same examinee on the same test can be attributed to measurement error. The RCI is calculated using the *Standard Error of the Difference* (SE_D). The formula for the (SE_D) is:

$$SE_D = \sqrt{2 \cdot (SEM)^2}$$

where SEM is the Standard Error of Measurement.

The RCI is calculated by dividing the observed amount of change by the SE_D as follows:

$$RCI = (S_2 - S_1) / SE_D$$

S_1 = an examinee's initial test score

S_2 = an examinee's score at retest on the same measure

As one can see from inspection of the formulae, the RCI score is critically dependent on the test's standard error of measure. As such, the reliability of scores produced by a test becomes paramount when giving consideration to the value of a nominal change in scores.

In the second example provided, Adjusted RCI scores are also calculated and compared with traditional RCI scores based on the aforementioned formula proposed by Jacobson and Truax (1991). The Adjusted RCI was suggested by Chelune and associates (1993) as a modification to the original model in order to control for practice effects resulting from previous test exposure. The Adjusted RCI is calculated by subtracting the mean change score of an appropriate reference group from an individual's observed amount of change, and then dividing the difference by the SE_D as follows:

$$\text{Adjusted RCI} = [(S_2 - S_1) - (M_C)] / SE_D$$

S_1 = an examinee's initial test score

S_2 = an examinee's score at retest on the same measure

M_C = mean change score of reference group (Retest – Test)

Thus, while Adjusted RCI scores remain dependent on the test's standard error of measure, this formula also incorporates the test-retest reliability of a given measure.

The examiner can choose any of several confidence intervals by which to evaluate change using the RCI (or Adjusted RCI), although a 95% confidence interval is routinely used. When using the 95% confidence interval, scores falling outside a range of -1.96 to 1.96 would be expected to occur less than 5% of the time as a result of measurement error alone; hence, reliable change has likely occurred. If the examiner chooses a less stringent confidence interval of 90%, scores falling outside the range of -1.64 to 1.64 would represent a reliable change.

Results

Example 1: The Case of Mary

The following hypothetical set of scores is presented as an example (Table 1). Mary, a fictional student, was struggling with reading, despite good performance in other classes and intellectual ability within the average range. Mary was measured at baseline in a number of cognitive domains. She was placed in a specialized reading program geared at improving her literacy skills. Follow-up scores were obtained on the same tests 3 months later. The example also illustrates how a significant decline in performance can be detected using the RCI. Upon initial inspection of the scores from baseline to follow-up, it appears that Mary's scores have improved in most domains and decreased in a few. For instance, her performance in Working Memory improved thirteen points—thereby raising her clinical classification within this domain from below average to average.

However, a closer inspection of the data utilizing the RCI value indicates that significant improvement occurred in only two domains: Word Identification and Spelling. That is, based on the empirically

established psychometric properties of these specific measures, the magnitude of her improvements in these domains is unlikely to have occurred by chance, and may thus be attributed to an additional variable (e.g., the academic intervention provided). Alternatively, Mary demonstrated a statistically significant decline in the domain of Mathematical Concepts—again indicating that such a change is unlikely to have occurred by chance. In this case, however, Mary's performance declivity may be attributable to her academic intervention's focus on Reading skills, possibly at the expense of continued practice or further instruction in Mathematical Concepts. Thus, while the trend of Mary's scores appears to be generally positive based on a non-statistical observation (for example, her nominally higher score in Working Memory), the use of the RCI formulae tempers these conclusions and suggests caution in interpretation. This example illustrates the importance of the relationship between a test's SEM and the RCI, and the resultant effect this can have on the inferences made about such score changes.

Table 1

Mary's Scores at Baseline and Follow-up

Test	Baseline	Follow-up	SEM	RCI
Word Identification	94	108	3.2	3.09*
Reading Comprehension	81	87	3.8	1.12
Mathematical Concepts	106	92	3.5	-2.83*
Calculation	112	108	3.8	-0.74
Spelling	85	96	2.8	2.78*
Written Expression	113	123	5.2	1.36
Spatial Reasoning	108	100	4.8	-1.18
Working Memory	86	99	5.7	1.61

Note. * Indicates a significant change at the 95% confidence interval based on the RCI value outside of the range of -1.96 and 1.96.

Example 2: The Case of John

John, a fictional student, had been experiencing considerable difficulty with attention maintenance and impulsivity at school, which had recently begun to negatively impact his general academic performance. John was administered a number of cognitive and behavioral measures at baseline, and subsequently provided with a behavior modification program collaboratively developed by his school psychologist along with his parents and homeroom teacher. To monitor his progress, a follow-up assessment was conducted three months later. John's hypothetical baseline and follow-up scores are presented in Table 2. This example illustrates the detection of performance changes while controlling for practice effects using an Adjusted RCI formula (Chelune et al., 1993).

In this case, initial inspection of the scores from baseline to follow-up indicate an improvement in John's performance in all cognitive and behavioral domains—with statistically significant improvements

(i.e., based on RCI values) in Mathematical Concepts, Calculation, Spelling, Working Memory, and Behavioral Adjustment. Again, based on the empirically established psychometric properties of these specific measures, the magnitude of John's improvements in these domains is unlikely to have occurred by chance. However, such gains may not be entirely attributable to the behavioral modification program. A closer inspection of the data utilizing Adjusted RCI values indicates that after controlling for practice effects, John's improvements were only statistically significant in three domains: Calculation, Working Memory, and Behavioral Adjustment. As such, a reasonable conclusion to draw from the data would be that John's behavioral modification program has been significantly efficacious with respect to his Calculation, Working Memory and Behavioral Adjustment, while his improvements in other domains may be an artifact of his improved attentional and behavioral functioning and/or the result of practice effects on these measures. Here again, the use of statistical formulae—including both

Table 2

John's Scores at Baseline and Follow-up

Test	Baseline	Follow-up	M_C	SEM	RCI	A-RCI
Word Identification	90	98	6	3.2	1.77	0.44
Reading Comprehension	89	99	5	3.8	1.86	0.93
Mathematical Concepts	93	103	4	3.5	2.02*	1.21
Calculation	85	101	5	3.8	2.98*	2.05*
Spelling	92	100	4	2.8	2.02*	1.01
Written Expression	90	98	7	5.2	1.09	0.14
Spatial Reasoning	97	110	6	4.8	1.92	1.03
Working Memory	80	102	5	5.7	2.73*	2.11*
Behavioral Adjustment	79	105	3	4.9	3.75*	3.32*

Note. * Indicates a significant change at the 95% confidence interval based on the RCI value outside of the range of -1.96 and 1.96. A-RCI = Adjusted RCI (Chelune et al., 1993)

the RCI and Adjusted RCI—tempers these conclusions and suggests caution in interpretation. In addition to further illustrating the importance of the relationship between a test's SEM and the RCI, this case also highlights the inevitable occurrence of practice effects and the considerable influence this source of measurement error can have on inferences made about such score changes.

Discussion

School psychologists are often asked to assist in implementing changes to a student's programming or environment, and are then expected to measure any changes in performance or behavior. However, many of the models that have been proposed for measuring these changes do not take into consideration psychometric and statistical factors. The use of the RCI (and Adjusted RCI) offers a psychometrically sound option for measuring change in an individual's score set across time and/or across treatment options. It also highlights the importance of using caution in interpreting changes without knowledge of the measure's SEM. It is hoped that school psychologists may give consideration to the use of the RCI model when it is necessary to measure change in a student's performance on cognitive or behavioral measures.

An additional area in which school psychologists may consider the use of the RCI model is in the development of measurable annual goals in a student's individual education plan (IEP). The Individuals with Disabilities Education Act (IDEA, 2004) requires that IEP goals and objectives be measurable. Lack of measurable progress on an IEP could be considered a denial of a free and appropriate public education (FAPE). With the new emphasis on accountability, the use of the RCI model could be used to demonstrate objectively measured progress on IEP goals. IEP teams may wish to consider developing IEP goals delineating how much improvement from the baseline data point the student will achieve in one year. For example, Mary, one of the fictional students previously described, struggles with reading. The IEP team could develop an IEP which specifically targets improvement in her reading comprehension standard score. An example IEP goal may include: By the end of the 2012-2013 school year, utilizing graphic organizers, Mary will increase her reading comprehension standard score

on the Kaufman Test of Educational Achievement (Kaufman & Kaufman, 2004) from 88 to 106.

The aim of this article was to present the applicability of the RCI for school settings. Given that this article serves as an introduction of the concept, we presented the RCI in its most basic form. Since its original inception, Jacobson and other investigators have developed more sophisticated models that account for additional variables. The Adjusted RCI model proposed by Chelune et al. (1993) and briefly presented here is only one of many variations that have been developed. While more complex models exist, Chelune et al.'s (1993) Adjusted RCI model is a simple modification that may be utilized to account for practice effects. This approach may offer some advantages over the traditional RCI, especially for tests with large practice effects.

It is also important to consider that the basic RCI model examines the reliability of significant change from a purely mathematical standpoint. It provides no information regarding the *clinical* significance of that change. Jacobson et al. (1999) have explored the use of additional modifiers of the RCI that account for clinically significant change in medical settings. Although analysis of data using these modifiers is beyond the scope of this article, it appears possible to adapt the modified RCI formula for a school setting.

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The Role of the School Psychologist in Behavior Response-to-Intervention

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The role of the school psychologist in Behavior Response-to-Intervention (Behavior RtI) is evolving. This pilot study examined data from surveys handed out at the 2011 Texas Association of School Psychologists conference. Ninety-two school psychologists specified the intervention task and tier in which they had an active role. Results support that consultation with teachers, the collection of data, and development of a behavior intervention plan are prominent roles for school psychologists in Behavior RtI, specifically at the Tier 3 and Special Education levels.

Response-to-intervention (RtI) is a multi-tiered, preventative framework designed to increase achievement and reduce behavior problems. Key characteristics of an RtI system include using data-based decision making to identify at-risk students and monitor student progress, providing evidence-based interventions, and adjusting interventions depending on students' response (National Center for Response to Intervention, n.d.). The origins of RtI within educational legislation can be traced to the 2004 reauthorization of the Individuals with Disabilities Education Improvement Act (IDEIA, 2004), which included a section allowing the consideration of students' responsiveness to intervention when determining the presence or absence of a learning disability. Although RtI gained momentum as an academic framework related to learning disability identification, the 1997 and 2004 reauthorizations of IDEA also included language for scientifically based behavioral interventions and supports, and researchers had already begun to examine the effectiveness of behavioral multi-tiered systems, such as School-Wide Positive Behavior Interventions and Supports (SWPBIS; Sugai & Horner, 2009).

At the state level, Texas does not require RtI implementation for behavior; however, the Texas Administrative Code was amended in 2002 to include provisions for training of school personnel in positive behavior interventions and supports (PBIS). As a result, the Texas Education Agency (TEA) developed the Texas Behavior Support Initiative (TBSI) to provide training and guidance to core teams at all schools on the use of PBIS in Texas. The term "Behavior RtI" is used throughout this paper, though this is designed to mean any multi-tiered, systematic behavior framework (i.e., SWPBIS) that meets the description provided previously by the National Center for Response to Intervention.

Behavior Response-to-Intervention

Behavior RtI uses a tiered approach to provide behavioral supports to students. An RtI framework provides a continuum of supports or services, ranging from universal methods aimed at preventing behavioral problems from developing to individualized methods to address and remediate severe behavioral problems (Ogonosky & Mintsoulis, 2011; Sugai & Horner, 2009). Most RtI models use three tiers.

The first tier (Tier 1) includes universal preventative interventions in the core classroom or school-wide supports, such as positive behavior supports, clearly defined school-wide and classroom expectations, and positive reinforcement systems (Horner et al., 2009; Ogonosky & Mintsoulis, 2011). Most students (80-90%) will respond to this level of supports; however, some students (up to 15%) exhibit behaviors that require more intensive supports and they receive strategic interventions (Tier 2), such as small social skills groups, the use of a token economy system in the classroom, parent training, behavior contracting, the use of evidenced-based behavior techniques (Ogonosky & Mintsoulis, 2011), a daily report card (e.g., check-in/check-out), or self-monitoring systems (McIntosh, Goodman, & Bohanon, 2010b). Despite Tier 2 interventions, some students (approximately 3-5%) continue to exhibit more severe or chronic behavior problems that require more intensive, individualized, and specialized supports (Sugai & Horner, 2009). This may involve intensifying Tier 2 interventions or developing a more individualized behavior plan (Ogonosky & Mintsoulis, 2011). In some systems, failure to make progress in Tier 3 would warrant a referral for a comprehensive evaluation.

Throughout all tiers, progress is monitored using objective data. This allows data-based decision making to determine students' responsiveness and subsequent need for more or less intensive service. Data are also used to determine overall system effectiveness (i.e., "health" of core programs and interventions). Data collection methods could include office discipline referrals (ODRs) at Tier 1 and daily report card performance or Direct Behavior Ratings (DBRs) at Tiers 2 and 3 (McIntosh, Goodman, & Bohanon, 2010a).

Implementation of Behavior RtI or SWPBIS systems has been shown using randomized controlled trials to improve student outcomes, such as decreased discipline referrals and suspensions (Bradshaw, Mitchell, & Leaf, 2010) and increased perceived school safety and academic achievement (Horner et al., 2009). School-wide systems can also lead to (a) organizational changes, such as increased overall organizational health, staff affiliation, and resource influence of school administrators (Bradshaw, Koth, Bevans, Ialongo, & Leaf, 2008), and (b) increased

implementation of positive behavioral interventions and supports, such as clearly defining and teaching expectations, monitoring behavior, using data-based decision making, and administrative support for behavioral interventions when compared to control schools (Bradshaw, Reinke, Brown, Bevans, & Leaf, 2008).

School Psychologists' Training and Roles

According to national training standards put forth by the National Association of School Psychologists (NASP; 2010b), school psychologists are to be trained in 10 domains, many of which are relevant to Behavior RtI implementation: data-driven decision making and accountability, consultation and collaboration, instruction and development of cognitive/academic skills, social development, student diversity and learning, school systems, prevention and crisis intervention, home/school/community collaboration, research and program evaluation, and legal/ethical practice and professional development. These services provided by school psychologists can be both direct and indirect and can occur at multiple levels (from an individual student to large systems). The NASP Practice Model (2010a) emphasizes interventions, instruction support, and mental health services.

Despite the recommendation for training across 10 domains and the emphasis on intervention, school psychologists continue to spend more time conducting psychoeducational evaluations than any other activity (Reschly, 2000). In the most recent NASP survey, school psychologists spend an average of 47% of their time conducting special education evaluations and re-evaluations (Curtis, Castillo, & Gelley, 2012). An additional 11.4% of school psychologists' time is spent on special education teams; thus, the majority of school psychologists' time is spent on special education services (Curtis et al., 2012). Although school psychologists are shifting their views of role *preference* away from assessment and toward direct interventions or consultation (Hosp & Reschly, 2002; Reschly, 2000), it is not clear to what extent this is actually happening.

Role of School Psychologists in Behavior RtI

Leadership is a necessary component to the sustainability of school-wide, multi-tiered behavior systems (Coffey & Horner, 2012), and school psychologists are in a position to contribute in many ways (Ross, Powell, & Elias, 2002; Sullivan, Long, & Kucera, 2011). A recent survey of school psychologists indicates that a large majority of school psychologists have received training in behavior modification (97.1%), functional behavior assessment (97.7%), behavior improvement planning (90.7%), positive behavior supports (84.1%), and SWPBIS (74.5%), and the majority (72%) of school psychologists in that survey are a member of the team that responds to students' behavior problems (Sullivan et al., 2011). Though school psychologists are clearly involved in behavioral supports, their specific role and function is not clearly identified.

The school psychologist's involvement in a Behavior RtI framework may include providing direct intervention and/or consultation, analyzing student data, providing professional development for educators, and observing instruction to provide feedback (Harlacher & Siler, 2011). These services provided by a school psychologist illustrate the range of methods in ameliorating behavior concerns, from indirect Tier 1 (relatively low intensity) to direct Tier 3 services (highly intensive). The ultimate goal of the school psychologist in this role is to support students and educators in changing students' behavior to more acceptable ways by implementing a continuum of behavior supports (Hawken, 2006; McGraw & Koonce, 2011).

There is an abundance of information about roles and functions of the school psychologist (Curtis et al., 2012; Reschly, 2000); however, school psychologists' specific roles and extent of involvement across different levels of intensity has not yet been researched. This pilot study was designed to investigate the following research questions:

1. What percentage of school psychologists are involved in roles and specific activities associated with Behavior RtI?

2. At what Tier or level (1, 2, 3, or special education) do school psychologists engage in these roles or activities?

Method

Participants

The participants in this study were credentialed or in preparation for credentialing as Licensed Specialists in School Psychology (LSSP). This is the credential for school psychology practice in Texas and reflects a minimum of a 60-hour program based on the standards of the National Association of School Psychologists (NASP). In this article, the terms LSSP and school psychologist are used interchangeably.

A total of 92 participants completed the survey; 17 held Ph.D. degrees and 75 held Master's or Specialist degrees. The vast majority of those completing the survey were credentialed as LSSPs ($n = 84$), with 7 participants noting that they were interns (there was one case with missing data). The majority of the sample had 4 or more years of experience (0-3 years: $n = 20$; 4-9 years: $n = 34$, and 10+ years: $n = 34$; 4 participants did not denote years of experience). The sample reflected individuals working in rural ($n = 20$), urban ($n = 23$) and suburban ($n = 41$) districts (8 participants did not indicate the type of district).

The survey was disseminated at the state conference for the Texas Association of School Psychologists (TASP). This annual conference was attended by 593 participants, including practitioners and university professors. The survey was designed specifically for practitioners, and approximately 30 conference participants were professors; thus, the total n for response rate was 563. Ninety-two surveys were completed representing a 16% rate of response, which is above the response rate in the most recent Sullivan et al. (2011) NASP survey addressing this issue (10%). The TASP conference is the largest gathering of school psychologists in Texas and is comprised of school psychologists from across the state. Data collection at this venue was considered to be an appropriate method for this pilot study to obtain a representative sample of school-based practitioners

from our state. Overall, the majority of the sample consisted of Specialist-level school psychologists with four or more years of experience working in urban and suburban districts.

Materials

To address the research questions, the authors of this pilot study designed a survey that addressed various aspects of school psychological services related to behavior assessment and intervention within a multi-tiered framework. The authors reviewed the Behavior RtI literature, and in particular Ogonosky's text (Ogonosky & Mintsioulis, 2011) and used personal experiences and training (assisting districts with RtI development; TBSI training) to develop the questions.

The resulting survey was designed to include demographic items (items 1-4: highest degree, credential, years of experience, type of district) and questions regarding general participation in the RtI process (items 5-9: involvement in SWPBIS, involvement in pre-referral, provision of in-service to teachers, leadership role in BRtI, involvement in transition between tiers). The remaining 10 items referred to specific roles and functions (consultation with teachers, development or modification of behavior plans, collection of data, provision of direct services, conduction of FBA, demonstration of behavior management, collaboration with parents, participation in data analysis, use of screening activities, and development of crisis plans) and asked the participants to first indicate their degree of involvement on a 4-point Likert scale from always to never and then to identify at what stage of intervention (Tier 1, 2, 3, or Special Education) this involvement occurred. The survey is presented in the Appendix.

Procedure

The surveys were completed in October 2011 at a state conference for school psychologists. The investigators had a designated booth in the main lobby at the conference with a sign requesting participation in the study. An announcement was made in one of the workshops requesting completion of the survey. A consent form describing the study accompanied each survey, and any questions were answered directly by one of the investigators. Those

attendees who completed the survey returned them to a designated completion box on the table.

Results

General Participation in RtI for Behavior

Participants answered initial questions about their general participation in behavior RtI, including level of involvement in school-wide (Tier 1) positive behavior supports, pre-referral or intervention teams, training, leadership, and transitions between tiers. Of the sample, 60% reported that they are *somewhat* or *very* involved in the school-wide positive behavior support system (Tier 1), and 37% reported that they are *somewhat* or *very* involved in the pre-referral or intervention team that targets student concerns. Seventy percent reported that they provide training or in-service to teachers. Regarding school psychologists' role as leaders in Behavior RtI, 40% of respondents reported a leadership role at the building/campus level, and 23% of respondents reported a leadership role in Behavior RtI at the district level. Regarding school psychologists' involvement in transitions between tiers, 24% reported no involvement in the transition between tiers, 22% reported involvement in the transition between Tiers 1 and 2, 45% reported involvement between Tiers 2 and 3, and 74% reported involvement in the transition between Tier 3 and Special Education.

Roles and Activities of the School Psychologist

Table 1 presents the percentage of school psychologists who indicated level of involvement in various roles and activities using a Likert Scale of *Never*, *Sometimes*, *Often*, and *Always*. For purposes of descriptive analysis and interpretation, the authors were most interested in the general frequency (most often, least often) with which school psychologists participate in the various functions, thus *Often/Always* and *Sometimes/Never* were combined for data presentation. Combining the levels of *Often/Always*, the roles and activities endorsed most often by school psychologists included consultation with teachers on behavior management and/or social skills (65%), development or modification of behavior plans (60%), collecting data for individual students (53%), providing direct services to students

(52%), and conducting functional behavior assessments (51%). The roles and functions endorsed least often by the school psychologists included modeling or demonstrating behavior management strategies for teachers (42%), collaborating with parents (40%), participating in data analysis (38%), the use of screening activities to identify potential problems (29%), and developing crisis plans (29%).

Support at Each Tier

Additional analysis was completed to determine the specific tier or level at which an activity occurs (See Table 2). With the exception of using screening activities to identify potential behavior problems, approximately 80% of the respondents endorsed all roles at the special education level. At the special education level, the most predominant roles were modify behavior plans (87%), conduct functional behavioral assessments (85%), collaborate with parents (84%), and consult with teachers for behavior management and/or social skills (83%). At the Tier 3 level, three main roles emerged: consult with teachers (71%), model or demonstrate behavior management (62%), and direct collection of data for individual students (52%). For Tier 2, only consultation with teachers was the principal role (54%).

Participants were least likely to endorse participation in roles or activities at the Tier 1 level, as none of the roles or activities were endorsed by fifty percent or more of the respondents; however, consulting with teachers and modeling/demonstrating behavior management were the most commonly endorsed roles (both at 29%). Less than a tenth of the respondents endorsed the following roles at the Tier 1 level: conduct functional behavior assessments (8%), develop a behavior plan (8%), collect data for individual students (9%), and collaborate with parents (9%).

To better understand the role of school psychologists in preventative service delivery, additional analyses were conducted by collapsing responses across Tier 1 and Tier 2 (i.e., percentage of respondents who indicated they engage in activity at Tier 1, Tier 2, or both). The most common *preventative* (Tier 1 and/or Tier 2) services were consultation (59%), modeling or demonstrating behavior management and/or social skills techniques (49%), and using screening activities (36%). Less common preventative services included collecting data (25%), developing crisis plans (21%), conducting data analysis (20%), and collaborating with parents (19%). The least common preventative

Table 1

Participants' Involvement in Roles/Activities

Role/Activity	Percentage			
	Always	Often	Sometimes	Never
Consultation with Teachers	16	49	34	1
Develop/Modify Behavior Plans	17	42	33	8
Collect Data for Individual Students	11	42	35	12
Provide Direct Services	17	35	31	17
Conduct FBA	14	37	38	11
Model or Demonstrate Behavior Management	14	28	46	12
Collaborate with Parents	9	31	49	11
Participate in Data Analysis	11	27	40	22
Use Screening Activities	10	19	36	35
Develop Crisis Plan	10	19	51	20

services were developing or modifying a behavior plan to form a more individualized plan (14%) and conducting an FBA (12%). Data were also analyzed by combining Tiers 1, 2, and 3 to determine which services were most commonly engaged in prior to special education. These data closely mirrored the percentages noted for Tier 3 (see Table 2), with the only activities engaged in by greater than 50% of respondents being consultation (78%), modeling/demonstrating behavior management or social skills techniques (70%), and collecting data (54%).

Discussion

School psychologists are trained in a variety of areas that align with NASP domains, and many practitioners provide services across domains; however, “school psychologists continue to spend the majority of their time engaged in special education-related activities” (Curtis et al., 2012, p. 5). The results of this study are consistent with this in that 80% of participants endorsed all roles at the special education level.

Findings from the current study also indicated that with regards to behavioral services, the majority of school psychologists frequently (i.e., often/always) engage in the following behavioral services in general education and/or special education: consulting with teachers on behavior management and/or social skills, developing or modifying behavior plans, collecting data for individual students, providing direct services to students, and conducting functional behavior assessments. These results are consistent with current research on consultative services: 96% or more of school psychologists engage in student-centered consultation (Curtis et al., 2012). The present study provides further evidence that not only do the majority of school psychologists engage in consultation, but 78% of school psychologists engage in consultation prior to special education, and 59% engage in consultation as a primary or secondary intervention in Tiers 1 and/or 2. Only two other activities were endorsed by the majority of school psychologists prior to special education: modeling/demonstrating behavior management techniques and collecting data.

Table 2

Participants’ Involvement at Each Tier

Role/Activity	Percentage			
	Tier 1	Tier 2	Tier 3	Special Education
Consultation with Teachers	29	54	71	83
Develop/Modify Behavior Plans	8	13	37	87
Collect Data for Individual Students	9	24	52	77
Provide Direct Services	12	16	24	77
Conduct FBA	8	12	41	85
Model or Demonstrate Behavior Management	29	46	62	74
Collaborate with Parents	9	19	40	84
Participate in Data Analysis	12	19	45	71
Use Screening Activities	19	26	37	51
Develop Crisis Plan	13	21	39	74

Previous researchers found that most school psychologists are engaged in behavior intervention activities, such as functional behavior assessments and behavior plans, and many schools include components of systematic, multi-tiered behavioral supports (Sullivan et al., 2011); and the results of this study extend this research by examining school psychologists' roles and activities within these systems at particular tiers. The results of this study support that school psychologists are engaging in many roles and activities related to behavior RtI, but the activities occur predominantly at the Special Education level. School psychologists also engage in many activities at Tier 3; however, it is difficult to characterize these behaviors as truly preventative, as many of the services at Tier 3 are intensive in nature and may be related to impending referrals. To gain a better understanding of school psychologists' roles in general education activities, Tiers 1 and 2 should be examined. At Tier 1, the majority of respondents indicated that they were somewhat or very involved in school-wide positive behavior supports. At Tiers 1 and 2, the most common activities engaged in by school psychologists were consulting with teachers, modeling/demonstrating behavior management and/or social skills strategies, and using screening activities to identify behavior problems. Consultation was the only activity engaged in by the majority of respondents in Tiers 1 and/or 2.

Because some activities are intensive and/or individualized in nature, they may be more likely to fall under the auspices of Tier 3 or special education, and it is expected that they would occur less often in Tiers 1 and 2. For example, it is not surprising that FBAs, crisis plans, data collection for individual students, collaboration with parents, and provision of direct intervention services are uncommon activities for school psychologists at Tier 1 and/or 2, as these are generally intensive and individualized activities. However, some activities clearly occur at Tiers 1 and 2 and are within the scope of training and practice for school psychologists, yet the respondents in this sample do not regularly engage in those activities. For example, just 25% of school psychologists rated that they were involved in collecting data, 20% were involved in data analysis, and 14% were involved with developing or modifying behavior plans in Tiers 1 and/or 2. In addition, 24% of respondents indicated

that they were in no way involved with students' transition between tiers, and a minority were involved in the transition between Tiers 1 and 2 (22%) or Tiers 2 and 3 (45%). If school psychologists hope to increase their engagement in preventative behavioral services, these activities (i.e., data collection, data analysis, transitions between tiers and developing behavior plans) may be potential directions for expansion.

Limitations and Future Research

All respondents in this study were school psychologists from the state of Texas, and the survey was distributed at the state conference. Because the group was drawn from a sample that elected to attend the state conference, the attendees may differ from the general population of school psychologists within this state and in other states. This research could be extended with a national sample. A larger sample size would also allow between-group comparisons in order to determine if sub-groups of school psychologists (such as newer versus more experienced or urban versus rural) engage in different activities within a Behavior RtI model. More specific demographic data could be collected, such as primary versus secondary settings, in order to determine further sub-group differences. In addition, respondents indicated if they were credentialed as an LSSP, but it is possible that some respondents who are credentialed as an LSSP are not actively in an LSSP role and were working in a different capacity that could impact their service delivery (i.e., administrators, behavior coaches). Another limitation of this study is the assumption that a three-tier model for behavior intervention is in place. According to the Sullivan et al. (2011) study, only 21.81% of the respondents indicated a three-tiered system of support was in place. It is likely that the participants in this study came from districts with highly variable behavior supports, and this would need to be investigated. If respondents are not in systems with effective behavior RtI implementation in place, the roles of LSSPs in these systems is likely to be impacted. Future research could examine how fidelity of RtI in a school impacts LSSP roles (i.e., whether the role of the LSSP in a school that is implementing Behavior RtI with fidelity differs from the role of the LSSP in a school that is not implementing Behavior

RtI). Another limitation of this study is that the wording of specific survey items may have skewed responses. For example, using the term *behavior plan* (rather than *behavior intervention*) may have led respondents to associate this item with Behavior Intervention Plans, which are generally considered to be a more intensive intervention.

In addition, further research could review other possible services that could be provided by school psychologists within Tiers 1 and 2, as well as who currently engages in these services. In other words, if only 20% of school psychologists analyze data in Tiers 1 and 2, who else (if anybody) is currently engaging in data analysis? Perhaps most importantly, researchers should investigate *how* school psychologists can spur the shift from reactive to preventative and intervention-oriented behavioral services within a multi-tiered model. A major implication of this investigation is that the field of school psychology must continue to close the gap between training and practice. It would be interesting to know how many training programs thoroughly address Tiers 1 and 2 Behavior RtI. NASP's requirement to have both academic and behavior intervention cases during internship is a step in this direction. In addition, training programs and graduates must work more closely with districts to ensure districts' understanding of the contributions that school psychologists can make in establishing, implementing, and improving Behavior RtI.

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Book Review: ***Reading assessment: Linking language, literacy and cognition.***

By M.L. Farrall (2012, John Wiley & Sons)

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The integrated approach to reading assessment, Farrall proposes, is the linking of reading, language, literacy and cognition. In order to know what interventions to plan for a particular student, consideration of these areas separately is important but possibly more important is how these areas connect with one another. This book contributes to the field by connecting language, literacy and cognition to reading which also appears to be the main strength of the text. This is a complex task that does not appear to have been undertaken much in past works possibly due to the intricacies of constructs such as language, literacy and cognition, each of which could easily be the sole subject for a text like this one.

Content and Structure

The book is comprised of fifteen chapters, appendices and additional resources. Following an introduction to the text, chapters on reading theory, stages of reading acquisition, oral language, linguistic and cultural diversity, statistics and test development, and administration and report writing are found. Next, chapters covering response to intervention, the role of intellectual assessment, oral language assessment, underlying processes, decoding, informal inventories and readability, and a chapter on written expression and spelling are included. Lastly, Farrall concludes the book with a chapter noting that “reading has become an essential daily living skill” (p. 308) which is important and essential for a better life.

The book’s stated purpose is to serve “as an integrated approach to reading assessment” for graduate level reading assessment courses or general assessment courses covering these areas (p. 2). Farrall reviews a brief history of early theories of learning followed by a brief historical perspective on views of reading. The importance and predictive value of language impairments in regards to reading

difficulties is discussed. Although indicated not to be a causal factor of reading problems, influences of poverty, as well as linguistic and cultural roles are discussed. Farrall includes topics such as statistics and test development, test administration, report writing and response to intervention, and also critically reviews the role of intellectual assessment and voices concern regarding global intelligence scores emphasizing variations in interpretation including examiner subjectivity. However, Farrall suggests that many assessment measures, including intelligence tests, are useful methods to investigate and assess areas such as oral language. Late in the text underlying processes are reviewed including phonological memory, decoding, and comprehension, in addition to discussion of informal reading inventories and readability followed lastly by written expression and spelling.

Critique

The text is readable and the quality of writing is good overall. However, the content appears to be very opinionated. Information on topics at times is very brief such as models of working memory and reading comprehension. It appears as though Farrall overwhelmingly prefers some researchers over others as well as theories of learning and methods with which to determine a learning disability. The text appears to be expanded in areas where Farrall agrees with the research and theories, and contradicting or competing theories are less thoroughly and very briefly discussed.

As mentioned, Farrall’s intent was for the book to serve as a graduate level reading assessment or general assessment text. However, included in the text are chapters on topics that a graduate level student would most likely already be familiar with such as statistics, test administration, report writing and the role of intellectual assessment. For some graduate students these topics may already be well

learned therefore the inclusion in this text may be somewhat unnecessary, although these chapters might be beneficial to graduate students early in their studies. Similarly, the chapter on response to intervention (which includes discussion of the concept of learning disability, the Elementary and Secondary Education Act, the Rehabilitation Act of 1973, the Educational for all Handicapped Children Act of 1975, Individuals with Disabilities Act and No Child Left Behind) may be superfluous for some readers while this information will be helpful for those reading the text who are not yet familiar with RTI and associated concepts and legal issues.

When considering what professional groups would benefit from this text it appears that portions and perhaps even most of the text are written for novices given the inclusion of sections on statistics, the role of intellectual assessment and especially passages over report writing style, proofing the report and test administration procedures for beginners. Other portions of the text such as the RTI chapter include information that might be helpful for interventionists or RTI team meeting facilitators as well as general education administrators and other general education teaching staff.

Farrall also indicates that “a full discussion of XBA is beyond the scope of this book” and refers to additional resources for the reader (p. 126). Given the book’s focus on assessment, cross-battery assessment is a topic that could have been included and expanded significantly whereas other topics such as those previously mentioned could not have been. Also, the text includes limited discussion of measures of intelligence and assessment of cognition and its influence on reading achievement. Inclusion of more information about cognition, psychological processes and expansion of these connections would have been helpful to see in this text which sets out to discuss assessment and cognition. We know that information about cognitive processing is important as part of a comprehensive assessment to determine strengths and weaknesses of students as well as to determine the presence of a learning disability and planning for provision of academic interventions (Wendling & Mather, 2009). Further discussion of this would have contributed greatly to this text.

Additionally, only one model of reading comprehension is discussed. This occurs also for working memory which was very briefly discussed. The importance of working memory is emphasized but is not discussed in enough detail including the importance of evaluating working memory within a reading assessment. Insufficient attention is given to prominent research, theories, definitions or models of working memory by Baddeley and others who have developed models of working memory and who have

conducted research and written texts in this area (Baddeley, Eysenck & Anderson, 2009; Dehn, 2008; Unsworth & Engle 2005).

Farrall appears at times to underestimate the responsibility of the professional evaluator to use all information gained in a thorough evaluation process in determining if a student has a learning disability. For example, de-emphasis on test scores is mentioned throughout the text although competent and proficient evaluators will not base decisions on scores alone and will examine, use and report multiple sources of data including cognitive scores to determine findings and recommendations. The author uses comparisons to movies as a way to make critical comments of certain measures, which does not seem helpful. The author also notes that the WJ-III Reading Fluency subtest is contrived which begs the question what test, CBA or other progress monitoring system would not be artificial and would occur in a purely natural manner.

Overall it appears as though those beginning to learn about assessment and those involved in the RTI process could benefit the most from this text. Readers should be cautioned that the author seems to have preferences towards specific theories and methods in which to determine the presence of a learning disability. However, Farrall provides a good review of oral language. She also includes information about cultural diversity in the text to alert the reader to the importance of diversity in children and their acquisition of learning and in the reading process. Farrall also includes helpful recommendations for at risk readers which are detailed in Chapter 4. From a standpoint of reading assessment Farrall does a good job of providing information for the novice about inclusion of background history, previous testing and other relevant information and its importance in the assessment process. Additionally, Farrall includes information about learning a new test for beginners with a twelve-step process which may also be helpful for the novice evaluator. The author describes the importance of learning the alphabet as a strong predictor of word reading skill as well as the importance of inclusion of measures of rapid naming in all reading screening and assessments. Overall Farrall appears to have contributed to the field with the undertaking of delineating the connections and important linkages among language, literacy and cognition.

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