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Evaluating a DBR Self-Monitoring Intervention for Middle Schoolers With ADHD

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ABSTRACT OF THE DISSERTATION

Evaluating a DBR Self-Monitoring Intervention for Middle Schoolers With ADHD

by

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Students with Attention-Deficit/Hyperactivity Disorder (ADHD) tend to have difficulty regulating their emotions and behaviors, which can have adverse academic and social effects (e.g., academic underachievement, failing grades, grade retention, suspensions, expulsions, school dropout, and peer rejection). Possible interventions that have demonstrated effectiveness with students with ADHD and are feasible to implement in the school setting are self-monitoring interventions. Direct Behavior Rating-Single Item Scales (DBR-SIS), a common behavioral assessment tool, has recently been adapted into a format that facilitates a self-monitoring intervention approach that can be easily adopted by educators supporting student behavioral challenges. This study evaluates the effects of this approach. Using a multiple baseline design across participants, five middle school students with ADHD participated in a DBR self-monitoring intervention focusing on their academic engagement, respect, and disruptive behavior during a targeted class period. Each day, the student and the teacher rated the student's engagement in the three target behaviors using the DBR-SIS form, discussed the student's behavior, and

performance feedback was provided to the student. Four out of five students experienced increases in academic engagement and respectful behavior, and three out of five students experienced decreases in disruptive behavior. Further, results indicated that the intervention was feasible and acceptable to teachers and students. This study has implications for practitioners and intervention planning for middle schoolers with ADHD. Results also provide further support for the use of the DBR-SIS measure for assessment and intervention purposes.

Table of Contents

List of Tables

List of Figures

List of Appendices

Evaluating a DBR Self-Monitoring Intervention for Middle Schoolers With ADHD

Research suggests that individuals with ADHD are at a greater risk for experiencing negative academic and social outcomes, including academic underachievement, failing grades, grade retention, suspensions, expulsions, school dropout, and peer rejection (Loe & Feldman, 2007). Teachers report that students with ADHD tend to be more stressful to teach, and some research suggests that children with ADHD are more likely to receive negative attention from teachers (Greene et al., 2002; Stormont, 2001). Families of children with ADHD also tend to experience greater family conflict and stress (Johnston & Chronis-Tuscano, 2015). Given the large number of children with ADHD and their concomitant high risk for poor outcomes, it is important to understand how to effectively address the needs of these individuals.

Research indicates that behavioral treatments (e.g., behavioral parent training, behavioral classroom management, behavioral peer interventions) and psychostimulant medication are the most effective interventions for children with ADHD (Barkley, 2014). However, there are noted limitations with the application of some of these evidence-based interventions in the school setting. One such alternative is seen in self-management interventions due to the feasibility of its implementation in the school setting. When utilized, self-management components such as self-monitoring and self-evaluation, can be very effective at improving classroom behaviors (Briesch & Chafouleas, 2009a). Students with ADHD, specifically, tend to have a more difficult time with self-regulation and can greatly benefit from interventions targeting this skill. Though there has been a substantial amount of research documenting the effectiveness of self-monitoring with this

population, the self-monitoring method utilized in many of these studies has limited utility for progress monitoring within a multi-tiered system of support (MTSS) framework.

Direct Behaviors Ratings (DBR), however, can serve as both an intervention and a progress monitoring tool (Chafouleas, Riley-Tillman, & McDougal, 2002). Using a psychometrically defensible assessment that allows for flexible use across both formative assessment and as an intervention mechanism appears advantageous. With a high emphasis on data-based decision making, the flexibility of DBR may be especially useful in school settings. To explore this flexible application, a self-monitoring intervention was implemented utilizing modified Direct Behavior Rating - Single Item Scale (DBR-SIS) formatting to facilitate an intervention focusing on self-monitoring and performance feedback that appears easily adoptable by educators supporting students with behavioral challenges (e.g., students with ADHD).

Attention-Deficit/Hyperactivity Disorder

Prevalence

Attention-Deficit/Hyperactivity Disorder (ADHD) is a disorder characterized by persistent inattention, hyperactivity, and impulsivity. The *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-V*) defines three presentations of ADHD: predominately inattentive, predominately hyperactive/impulsive, and combined type. The DSM-V criteria for an ADHD diagnosis outlines that symptoms must be present for greater than six months across two or more settings (e.g., home, school, community) and have a significant impact on functioning. Pervasive problems with disorganization,

difficulty remaining on-task, delaying gratification, inhibiting responses, and excessive motor activity such as fidgeting, being out of seat, and frequent talking impact the daily functioning of children with ADHD (American Psychiatric Association, 2013). Research indicates that there are gender differences in regard to symptom severity. Generally, males with ADHD tend to demonstrate greater severe inattention, hyperactivity, and externalizing behaviors, while females with ADHD tend to have greater intellectual impairments and more severe internalizing behaviors (Arnett et al., 2015; Gaub & Carlson, 1997; Gershon, 2002; Levy et al., 2005).

According to the National Center for Health Statistics (NCHS, 2017, Table 35), approximately 10.4% of children between the ages of five and seventeen have been identified as having a diagnosis of ADHD. Considering most United States classrooms have 25 students on average (National Center for Education Statistics [NCES], 2012, Table 7), it is estimated that there are two to three students in every general education classroom who have a diagnosis of ADHD. Many students with ADHD qualify for accommodations and/or services under Section 504 of the Rehabilitation Act or the Individuals with Disabilities Act (IDEA; DuPaul et al., 2019). Section 504, which is a federal law designed to protect the rights and welfare of individuals with disabilities, provides students with reasonable accommodations in the school setting. IDEA ensures that students with disabilities receive free and appropriate public education (FAPE) by means of an individualized education program (IEP). Results from a national survey of students receiving special education services under IDEA (Special Education Elementary Longitudinal Study; SEELS) indicated that students with ADHD are most commonly

classified as Other Health Impairment (OHI) and receive services in the general education classroom setting (Schnoes et al., 2006). Criteria for qualifying for OHI is as follows:

> Having limited strength, vitality, or alertness, including a heightened alertness to environmental stimuli, that results in limited alertness with respect to the educational environment that: (A) is due to chronic or acute health problems such as asthma, attention deficit disorder or attention deficit hyperactivity disorder, diabetes, epilepsy, a heart condition, hemophilia, lead poisoning, leukemia, nephritis, rheumatic fever, sickle cell anemia, and Tourette syndrome; and (B) adversely affects a child's educational performance (IDEA, 2004, OHI section).

Data from the 2014 National Survey of the Diagnosis and Treatment of ADHD (NS-DATA) indicated that of the students with ADHD in Kindergarten through twelfth grade, 42.9% currently had an IEP and 13.6% currently had a 504 plan (DuPaul et al., 2019).

Outcomes for Students

Research suggests that students with ADHD are more likely to experience negative academic outcomes. Students with ADHD tend to have lower grade point averages (GPA), are more likely to be placed in remedial courses rather than honors courses, have higher rates of course failures, and score lower on standardized reading, mathematics, and writing achievement tests compared to controls (Barry et al., 2002; Biederman et al., 1996; Frazier et al., 2007; Kent et al., 2011). Further, data indicates that students with more severe ADHD symptoms tend to have greater academic difficulties (Barry et al., 2002). Additional studies suggest that ADHD is associated with higher rates

of grade retention, suspension, and expulsion (Barkley et al., 1990; Biederman et al., 1996; Martin, 2014). LeFever and colleagues (2002), for example, found that students with ADHD were seven times more likely to be suspended or expelled compared to other children. Lastly, some research suggests that compared to their peers, students with ADHD are eight times more likely to drop out of high school (Kent et al., 2011). Barkley and colleagues (2006), for example, found that one third of individuals with ADHD hyperactive/impulsive type failed to complete high school.

Students with ADHD also tend to experience relational difficulties which lead to poor social outcomes. These children tend to have poor social interactions with peers, which oftentimes leads to peer rejection (McQuade & Hoza, 2015; Stormont, 2001; Hoza, 2007). For instance, results of the Multimodal Treatment Study of Children with ADHD (MTA) indicate that children with ADHD have lower social acceptance and fewer dyadic friends compared to similar age peers. Peer sociometric ratings suggest that children with ADHD are classified as "rejected" (52%) more often than their normative peers (14%) (Hoza et al., 2005). One possible reason is that children with ADHD hyperactive/impulsive type, specifically, tend to display aggressive behavior (e.g., starting fights, getting into arguments), which is typically not received well by their peers (Stormont, 2001). In the classroom setting, teachers report that students with ADHD are more stressful to teach compared to their peers (Greene et al., 2002). Further, some research suggests that children with ADHD are more likely to receive negative attention from teachers (Stormont, 2001). Relational difficulties also extend into the family, as families of children with ADHD often have disrupted parent-child relationships, poor

family functioning, and greater family conflict and stress (Johnston & Chronis Tuscano, 2015; Johnston & Mash, 2001). As a result, extensive research has been conducted to identify effective interventions for individuals with ADHD.

Treatment of ADHD

Behavioral treatments and psychostimulant medication are considered to be the most effective interventions for children with ADHD (Barkley, 2014). Stimulant medications, however, are associated with many side effects including loss of appetite, abdominal pain, headaches, sleep disturbance, and decreased growth (Swanson et al., 2007; Wolraich et al., 2019). Additionally, medication is not a treatment that can be elected or effectively managed in a school setting. Further, recent guidelines that have been established for the treatment of children and adolescents with ADHD suggest that behavioral treatments should be considered and implemented prior to initiating medication (Wolraich et al., 2019). Given this, understanding the effectiveness of behavioral intervention options is of utmost importance. Research has demonstrated that behavioral parent training (BPT), behavioral classroom management, behavioral peer interventions, and multicomponent behavioral treatment interventions are evidence-based psychosocial interventions that are effective for children with ADHD (DuPaul et al., 2012; Evans et al., 2014; Evans et al., 2018; Pelham & Fabiano, 2008).

Behavioral Parent Training. Behavioral parent training (BPT) involves teaching parents to use behavior management strategies that can be implemented at home to decrease behavior problems (Long et al., 2017; Reyno & McGrath, 2006). In most BPT programs, parents attend between 8 and 16 weekly group sessions that cover topics such

as (a) general information about ADHD and behavior management, (b) implementing a daily report card (DRC) to create consistency between school and home settings, (c) reinforcing appropriate behavior and ignoring inappropriate behavior, (d) giving commands and reprimands, (e) establishing behavior contingencies, (f) using time outs, (g) using reward systems at home, such as a token economy, (h) using behavior management in other settings, (i) engaging in problem solving, and (j) maintaining skills (Chronis et al., 2004; Long et al., 2017; Pelham & Fabiano, 2008).

Research suggests that BPT is effective at improving symptomatology, disruptive behavior, impairment, and social skills in children with ADHD, oppositional defiant disorder (ODD), conduct disorder (CD), and in children demonstrating severe problem behaviors (Chronis et al., 2004; Evans et al., 2018; Evans et al., 2014; Long et al., 2017; Reyno & McGrath, 2006). BPT has also proven to be effective at improving parenting skills and family cohesion, as well as decreasing parental stress and family conflict (Chronis et al., 2004; Evans et al., 2018; Evans et al., 2014; Reyno & McGrath, 2006). To demonstrate this, Lee and colleagues (2012) examined 40 studies between 1970 and 2011 that focused on outcomes of BPT for children with ADHD. Effect sizes for child behavior (*M* ES = .32), parent behavior (*M* ES = .33), and parental perception of parenting (*M* ES = .53) were in the moderate range, suggesting that BPT is an effective treatment for this population.

Behavioral Classroom Management. Another evidence-based intervention for children with ADHD is behavioral classroom management (Evans et al., 2018; Evans et al., 2014; Fabiano et al., 2009). Behavioral classroom management involves

utilizing contingency management procedures, which consist of (a) identifying and operationally defining a target behavior, (b) setting specific behavioral goals, and (c) providing reinforcement contingent on whether the child meets the proposed goals (DuPaul & Stoner, 2015; Kazdin, 2001). Common classroom-based contingency management procedures include token economies, point systems, praise, and direct attention (Pelham & Fabiano, 2008). Home-based contingency management procedures, such as the implementation of a daily report card (DRC), are also commonly used (Evans et al., 2014).

Research suggests that behavioral classroom management techniques are associated with improvements in classroom behavior, academic engagement, and goal attainment for students with ADHD (DuPaul et al., 2012; Evans et al., 2014). Further, DRCs have demonstrated effectiveness at increasing communication between home and school (DuPaul & Stoner, 2015). In a meta-analysis conducted by DuPaul and colleagues (2012), 60 studies conducted between 1996 and 2010 involving school-based interventions for students with ADHD were examined. Twenty-six of these studies implemented a contingency management intervention; the mean effect on student behavior was in the moderate to large range (within-subjects design *M* ES = 0.87; single-subject design *M* ES = 2.40).

Behavioral Peer Interventions. Children with ADHD often struggle with peer interactions and peer relationships (Pelham & Fabiano, 2008). Behavioral peer interventions target social impairments and aim to teach children essential social skills. Social skills training programs focus on teaching children skills such as

cooperation, problem solving, anger management, communication, friendship development, group entry, and conversational skills (Antshel & Remer, 2003). Research suggests that behavioral peer interventions, whether implemented in a traditional setting or a recreational setting, are effective at improving the social functioning of children with ADHD (Evans et al., 2014).

Limitations of Intervention Options. The goal of any behavioral intervention is for behavior change to continue once the intervention has ended (Cooper, 2007). Ideally, intervention gains will maintain, behavior change will generalize to other behaviors and settings, and independent functioning will be fostered once the intervention has been faded out. This may be more difficult to establish with psychosocial interventions (e.g., behavioral parent training, behavior classroom management, behavioral peer interventions), however, as they require a fair amount of programming for maintenance and generalization. Further, when implemented in the school setting, these interventions require a substantial amount of teacher support. One possible solution is evident in self-management interventions. Self-management procedures decrease reliance on external agents, such as teachers, and facilitate the generalization and maintenance of behavioral change (Cooper, 2007). An influential educational philosopher, John Dewey (1939), concluded that the goal of education is to develop self-control; given this, it is essential that students develop the ability to be self-directed. Self-management interventions may bridge this gap and better facilitate student independence.

School-Based Self-Management/Monitoring Interventions

Self-management is defined as "actions designed to change or maintain one's own behavior" (Shapiro & Cole, 1994, p. 6). Self-management strategies include teaching students how to monitor, evaluate, and/or reinforce their own behavior. The self-monitoring component involves students observing and recording their behavior, whereas the self-evaluation component involves students comparing their behavior rating to an external standard, such as a teacher's rating (Shapiro & Cole, 1994). When utilized separately or together in a packaged intervention, these self-management components can be very effective at improving behaviors in the classroom setting (Briesch & Chafouleas, 2009a).

Utility and Feasibility of Self-Management Interventions

There are several advantages of self-management interventions. First, self-management can be used to change behaviors that may not be readily observable, such as attention (Cooper, 2007). Second, once students are able to self-monitor and self-evaluate, it decreases their reliance on parents or teachers who are often too busy to provide consistent feedback and direction (Cooper, 2007). Third, self-management skills are highly generalizable to multiple settings and have been known to maintain over time (Cooper, 2007; Shapiro & Cole, 1994). Fourth, self-management is an extremely versatile intervention in that it can be used to influence a wide variety of behaviors in a variety of people. Fifth, self-management interventions can be easily individualized to fit the needs of the student. There is flexibility in the target behaviors selected, when and where it is implemented, the intervention procedure, and the resources used. Further, functional

behavior assessment (FBA) results can be used to inform the intervention (Brooks et al., 2003; Ervin et al., 1998). Self-management can also easily be incorporated into a preexisting intervention or can be a part of a multicomponent intervention program. Sixth, self-management tends to have high teacher acceptability, as it does not require teachers to change or alter their teaching methods and it is cost effective. Lastly, teaching students to use self-management skills increases their ability to differentiate between appropriate and inappropriate behaviors on their own, therefore increasing student independence and self-efficacy (Shapiro & Cole, 1994).

Neurological Basis of ADHD

Several of the symptoms associated with ADHD (i.e., poor sustained attention, hyperactivity, and impulsivity) impede the ability to properly self-regulate emotions and behaviors, which can have adverse effects on students' academic and social outcomes (Barkley, 1997). Barkley's (1997) theory of executive functioning explains the cognitive processes behind the executive functions that guide goal directed behavior. Since individuals with ADHD, specifically, tend to have difficulties with these executive functions, they often struggle with engaging in appropriate actions that increase the likelihood of achieving their goals.

Conceptual Model. Barkley (1997) argues that behavioral inhibition, self-awareness, and working memory are essential for completing goal-directed actions. Barkley (1997) suggests that a core deficit in children with ADHD is a lack of behavioral inhibition. Behavioral inhibition involves inhibiting, or stopping, an initial response. Barkley (1997) argues that this "delay of responding" is essential in order to set the stage

for self-regulation. An individual first needs to override the initial response in order to replace it with a more appropriate or advantageous response (Baumeister et al, 1994; Berger, 2011). As the first step in the process, self-regulation will not be attainable if an individual cannot learn to control their impulse responses.

Some research suggests that as a result of poor inhibition, individuals with ADHD have deficits in working memory (Martinussen et al., 2005). Barkley (2004) explains that working memory deficits lead to forgetfulness, a lack of organizational skills, difficulties with time management, and reduced hindsight and forethought in children with ADHD. As a result, these individuals have a difficult time anticipating and planning future responses and engaging in goal-directed behavior, which are core components of self-regulation.

Implications for Intervention. As a result of these deficits in executive functioning, students with ADHD tend to struggle with self-regulation. Self-regulation can be improved or developed by repeatedly practicing self-monitoring, self-stopping, and thinking about and planning for the future (Antshel et al., 2014). Interventions that have proven to be effective for increasing self-regulation in this population include those that teach children with ADHD how to stop and think, learn to wait, self-monitor or self-evaluate their thoughts, behaviors, and emotions, and plan for future events (DuPaul et al., 2009; Garland, 2014). Self-monitoring can be described as combining the following techniques: self-observation and self-recording. Self-observation involves observing and paying attention to one's own behavior and determining whether the target behavior was

performed. Self-recording occurs after self-observation and involves documenting the extent to which the target behavior was engaged in.

Empirical Support for Self-Monitoring Interventions

Previous research has demonstrated the effectiveness of self-monitoring interventions in increasing on-task behavior (e.g., DiGangi et al., 1991; Harris et al., 2005; Mathes & Bender, 1997) and academic productivity and accuracy (e.g., Harris et al., 2005; Shimabukuro et al., 1999), as well as decreasing disruptive behavior (e.g., Hoff & DuPaul, 1998; Koegel et al., 1992). Further, self-monitoring has proved to be effective for a variety of students, including students with autism spectrum disorder (ASD; Lee et al., 2007; Odom et al., 2003), students with a learning disability (LD; Reid, 1996), students with ADHD (Reid et al., 2005; Barry & Haraway, 2005), and students with emotional and behavioral disorders (EBD; Lewis et al., 2004; Mooney et al., 2005).

Additionally, research suggests that children with ADHD can be taught self-management skills, which can improve outcomes for this population. A 2005 meta-analysis found that self-management interventions (e.g., self-monitoring, self-monitoring plus reinforcement, self-reinforcement, self-management) are effective for students with ADHD. Effect sizes for improving inappropriate and disruptive behaviors (*M* ES = 1.26), on-task behavior (*M* ES = 1.61), and academic performance (*M* ES = 1.32) were in the large range (Reid et al., 2005). In a more recent meta-analysis, DuPaul and colleagues (2012) evaluated several school-based interventions for students with ADHD. Results indicated that cognitive-behavioral interventions (*M* ES = 3.31), including self-monitoring, self-reinforcement, and self-instruction, were more effective at improving

behavioral outcomes than academic (*M* ES = 1.53) or contingency-based (*M* ES = 2.40) interventions.

Many studies investigating the effectiveness of self-monitoring interventions, specifically for children with ADHD, have utilized yes or no checklists as the self-monitoring tool. Mathes and Bender (1997), for example, conducted a study that looked at the effectiveness of a simple self-monitoring procedure at increasing the on-task behavior of three elementary students with ADHD. A reversal design with two baseline phases, two intervention phases, and two fading phases was utilized. During the intervention phase, students were instructed to think about whether they were on-task when they heard a tone and to check yes or no on their worksheet. The tone was played through a set of headphones and went off approximately every 45 seconds during a 20-minute interval. In the fading phase, students continued to self-monitor but without the use of the cuing tones. On-task behavior was measured daily using whole-interval recording during 10-minute observations with 10-second intervals. Results suggested that there were significant increases in on-task behavior for all three students during the self-monitoring phases compared to baseline phases. Further, gains still maintained after the tone was faded out, as students continued to self-monitor their on-task behavior themselves.

In a more recent study, Gureasko-Moore et al. (2006) used a multiple baseline design across participants to investigate the effects of a self-management intervention on the behavior of three middle school students with ADHD. Students were given a checklist with six behaviors related to organization and classroom preparedness; during the

intervention students checked whether or not they engaged in each of those behaviors during the school day. Additionally, students developed goals for the number of classroom preparedness behaviors they wanted to demonstrate each day and monitored their daily progress towards those goals. Classroom teachers were responsible for data collection and completed the checklist of six student classroom preparedness behaviors for each student; the percentage of behaviors that the student demonstrated each day was calculated. Data indicated that all three students demonstrated increases in classroom preparedness behaviors as a result of the intervention.

In another study, Barry and Messer (2003) taught five sixth grade students with ADHD how to self-monitor their on-task and disruptive behavior. Every 15-minutes throughout the school day, the classroom teacher verbally prompted the students to fill out a self-monitoring form. Using whole interval recording, students checked yes if they remained on-task for the entire interval; using partial interval recording students checked yes if they engaged in disruptive behavior at any point during the interval. Outcome data was measured by the classroom teacher using the same time sampling procedures as the students. Using a multiple baseline design across participants, substantial improvements in on-task behavior and disruptive behavior were demonstrated between baseline and intervention phases. Over time the verbal prompts were faded into visual prompts, and the visual prompts were faded into not using prompts at all. Across behaviors and participants, the follow-up assessment yielded behavior at a similar level to that at the end of the third intervention phase, suggesting that gains maintained one month later.

Stasolla et al. (2014) implemented a self-monitoring intervention for two elementary-age boys with ADHD and ASD. Target behaviors included on-task behavior and stereotyped behavior. Every 10-seconds for one hour per day, the boys heard a tone through headphones and marked yes for on-task if they remained on-task for the entire interval and marked yes for stereotyped behavior if they engaged in stereotypy at any point during the interval. A token economy with a response cost was also implemented; students earned a token for correct self-monitoring ratings and lost a token for incorrect ratings. Data was collected by a research assistant using whole interval recording with 10-second intervals during one-hour sessions five days per week. Results of the multiple baseline design indicated that on-task behavior increased and stereotyped behaviors decreased for both boys.

Harris et al. (2005) investigated whether self-monitoring attention or self-monitoring performance was more effective at increasing the on-task behavior and academic performance of six elementary age students with ADHD. When self-monitoring attention, students heard a tone through headphones approximately every 45 seconds and were taught to record yes or no on a tally sheet in regard to whether they were paying attention at the time of the tone. When self-monitoring performance, students were taught to count the number of correctly spelled spelling words at the end of the period and then graph it to demonstrate progress. On-task behavior was measured by an external observer using momentary time sampling for 10-minute observations with 3-second intervals. Academic performance was defined as the total number of spelling words that each student wrote correctly during the spelling activity. Though both self-monitoring methods

were similarly effective at improving on-task behavior, the self-monitoring of attention method appeared to have a greater positive impact on academic performance. Despite these positive findings for students, the benefits of the self-monitoring method utilized in these studies may be limited in scope. Specifically, the method utilized does not provide sufficient data for progress monitoring or for documenting student progress in the school setting.

Intervention in a Multi-tiered Service Delivery Framework

The 2001 No Child Left Behind (NCLB) Act has increased emphasis on prevention, early intervention, and school accountability around documenting student progress. As a result, more schools are implementing a multi-tiered systems of support (MTSS) model. MTSS is defined as a "multicomponent, comprehensive, and cohesive school-wide and classroom-based positive support system through which students at risk for academic and behavioral difficulties are identified and provided with evidence-based and data-informed instruction, support, and intervention" (Stoiber, 2014, pp. 45). Within an MTSS framework, there are multiple tiers in which school-based services are provided. Tier 1 represents universal service delivery and is intended to meet the needs of 80-90% of students. Tier 1 supports include school-wide programs, general curriculum and instruction, classroom management, and prevention. Tier 2 represents targeted service delivery for students who do not respond or make adequate progress with the Tier 1 supports. Within this tier, supplemental interventions are put into place to give at-risk students the extra support that they need. Tier 3 represents intensive service delivery for the 1-5% of students that do not benefit from the supports in the first two tiers. Tier 3

interventions are more individualized, usually conducted one-on-one or in small group settings, and closely align with the student's specific needs (Stoiber, 2014). The adoption of MTSS is accompanied by an increased emphasis on using data-based decision making in schools. This involves using data to identify student problems, develop solutions to improve student outcomes, and monitor student progress toward their goals (Pluymert, 2014).

Data-Based Decision Making

A core component of any MTSS-based endeavor is the use of assessment data to drive decision-making. Nowhere is this concept more evident than in the intervention process. Use of data is critical to the early, appropriate, equitable, and objective identification students at-risk for academic and behavioral difficulties. This data-driven identification should then trigger deployment of supplemental services and supports. Data again plays a crucial role in determining a student's response to these services through concurrent progress monitoring assessment. School psychologists and other service providers are encouraged to continually collect data on students' academic and behavioral progress and to use this data to inform ongoing instruction and intervention (Stoiber, 2014). Proper implementation of MTSS requires the use of assessment methods that are technically adequate and allow for the monitoring of student progress (Chafouleas, Volpe, et al., 2010). When considering assessment and intervention tools used in schools it is important to consider the usability of the tool not just at the student-level, but at the school-level as well. One significant limitation of the self-monitoring method that has been reviewed is that it does not provide adequate behavioral data for

progress monitoring purposes. A significant benefit of using alternative self-monitoring methods, such as behavior ratings, is that it produces assessment data that can be used to monitor student progress toward intervention goals.

Behavioral Assessment in MTSS

Within an MTSS framework, general outcome measures (GOMs) are used in each tier to evaluate student progress (Peacock et al., 2010). GOMs assess global outcomes and answer broad questions about student growth (Fuchs & Deno, 1991). There is a substantial amount of research on the use of curriculum-based measurements (CBMs) to assess student progress in academic domains, specifically reading (Deno, 1985; Deno, 2005; Fuchs & Fuchs, 1991; Wayman et al., 2007). Reading CBMs are typically administered to students three times per year as a screening assessment in order to identify students who are at-risk and who will likely benefit from additional supports. Once students are identified, CBMs are administered more frequently (e.g., weekly) to monitor student progress and evaluate intervention effects (Deno et al., 2009). Research on GOMs for the assessment of behavioral progress is less extensive. Some methods of behavioral data collection in a MTSS include office disciple referrals (ODR), systematic direct observation (SDO), ratings scales, and direct behavior ratings (DBR).

ODRs are frequently used in schools to monitor student behavior. Generally, classroom teachers are responsible for completing an ODR for a student if the student engages in (a) a high intensity behavior (e.g., physical violence) or (b) a high frequency behavior (e.g., off-task, disrespectful, disruptive) that defies school or classroom rules. Within an MTSS model, ODR data is then analyzed and behavioral supports are provided

to students who demonstrate a high number of ODRs. Using ODR data to monitor student behavior problems can be advantageous because this data is already being collected school-wide, therefore no additional data needs to be collected. However, there are substantial disadvantages of using ODRs to monitor student behavior: the sole focus is on what the student is doing wrong and there is no consideration of the positive behaviors that the student may be engaging in, this system relies on teachers' consistent completion of ODRs, and this system assumes that teachers are able to accurately and operationally define the problem behaviors (Chafouleas, Riley-Tillman & Christ, 2009).

SDO is considered the gold standard of behavioral assessment tools due to its high degree of reliability and accuracy (Suen & Ary, 1989). Salvia and Ysseldyke (2009) highlight five core characteristics of SDO. First, target behaviors are operationally defined prior to observation. Operational definitions should include a label for the behavior, a specific and observable description of the topography of the behavior, examples, and non-examples (O'Neill et al., 2015). Definitions should be objective, clear, and complete to ensure that all observers are on the same page for scoring (Kazdin, 2011). Second, the contexts in which observations will take place (e.g., class period or subject) are established and specified beforehand. Third, an observation schedule is selected (e.g., six 15-minute observations, two 30-minute observations, etc.). Fourth, the recording procedure is selected and remains consistent throughout the observation process. When making the decision to use event-based recording procedures (i.e., frequency, rate, duration, latency, recording procedure, percentage of opportunities) or time-based recording procedures (i.e., whole interval, partial interval, momentary time

sampling), the specifics of the target behavior (e.g., frequency, intensity) and the purpose for assessment should be taken into consideration (Chafouleas, Riley-Tillman & Christ, 2009; Miltenberger, 2017). Lastly, the observation procedures should be established, including whether to record via paper or electronically and whether additional materials are needed (e.g., timer, stopwatch, tally counter, beep track and headphones). However, SDO has some disadvantages that make it less than ideal for use in school settings. Disadvantages include brief observations that do not capture the entirety of student behaviors, high risk of reactivity due to an outside observer, and limited feasibility in school settings due to time constraints and lack of resources (Briesch et al., 2010; Chafouleas et al., 2005; Chafouleas, Christ, et al., 2007).

Rating scales are often utilized in schools and can be completed by parents and teachers in a relatively short amount of time. Rating scales tend to ask an informant to use a Likert scale to rate the student's behavior based on the students' engagement in the behavior over a specified number of months. The Strengths and Weakness of ADHD-symptoms and Normal-behavior (SWAN) scale, for example, asks parents to use a 7-point scale ranging from 1 to 7 to rate their child's inattentive and hyperactive-impulsive symptoms over the past month (Swanson et al., 2012). Rating scales can provide helpful estimates of the student's behaviors, usually have sound psychometric properties, and can be useful when attempting to assess low-frequency behaviors (Chafouleas, Riley-Tillman & Christ, 2009). However, rating scales have some disadvantages: many rating scales are not designed for repeated administration, rating scales are typically completed at a point in time that is temporally distant from the actual occurrence of the behavior, and rating

scales tend to focus on measuring negative behaviors (Briesch et al., 2010; Chafouleas, Christ, et al., 2007). Additionally, when selecting an assessment tool, it is important to match the assessment method to the purpose of the assessment and its implications for decision making. Rating scales, though useful for making diagnostic decisions, are not very useful for the purpose of formative assessment (Chafouleas, Riley-Tillman & Christ, 2009).

Direct Behavior Rating

Direct Behavior Rating (DBR) is often referred to as a hybrid assessment tool, as it combines key characteristics of SDO, behavior rating scales, and GOMs (Chafouleas, Riley-Tillman, & Sugai, 2007). Specifically, DBR draws on the immediacy of SDO, the reliability of behavior rating scales, and the efficiency of GOMs (Christ et al., 2009). Overall, there are three defining features of DBR: (a) it is a direct measure, (b) it measures observable behaviors, and (c) it utilizes rating scale responses (Christ et al., 2009).

First, DBR is *direct* in that behavior ratings occur immediately after a specified observation period by a direct observer. Ratings being conducted temporally (i.e., almost immediately following their observation) and proximally close (i.e., by the person that observed them) to the occurrence of the actual behavior draws on the strengths of systematic direct observation (SDO; Chafouleas, Riley-Tillman & Christ, 2009). Time constraints and taxing data collection procedures, however, limit the amount of time an observer can conduct SDOs. A unique benefit of DBR is the flexibility in the duration of the observation period (e.g., 15-minutes, a 45-minute class period, 1 school day). Second,

DBR focuses on measuring *behavior* that is observable. Prior to observation, target behaviors are operationally defined with examples and non-examples (Chafouleas, Riley-Tillman & Christ, 2009). During the observation period, a classroom teacher or other school personnel monitors the student's engagement in the preselected target behaviors. Lastly, DBR evaluates behavior using *ratings*. Drawing from the strengths of behavior rating scales, ratings are a rater's estimate of the target behavior. After the observation period, the rater responds to items such as: "On a scale of 1-10, how often was Lucas academically engaged?" (Christ et al., 2009).

DBR-MIS vs. DBR-SIS

There are two types of DBR, the Multiple Item Scale (DBR-MIS) and the Single Item Scale (DBR-SIS). DBR-MIS is designed to rate multiple specific behaviors that make up a broad behavior class (e.g., reading silently, writing, raising hand, listening to the teacher). After individual ratings are completed on each item, the item ratings are then summated to form an overall rating of a broad behavior (e.g., academic engagement; Christ et al., 2009). DBR-SIS serves a different purpose, to rate several broad behavior domains (e.g., academic engagement, respect, disruptive) independently. Rather than observing and assessing each specific behavior related to academic engagement (e.g., reading silently, writing, raising hand, listening to the teacher) as in DBR-MIS, DBR-SIS groups these specific behaviors together and views them collectively as academic engagement. The ability to rate multiple target behaviors independently of each other leads to greater efficiency in assessment and therefore greater usability in the school setting. Further, DBR-SIS ratings provide a valid measure of student behavior that can be

easily interpreted by school personnel. Since each DBR-SIS rating serves as an individual data point for each target behavior, data from this measure can be easily graphed and student behavioral progress can be clearly tracked (Chafouleas, 2011; Christ et al., 2009).

DBR-SIS Target Behaviors. In an effort to develop a more defensible, flexible, and usable assessment of student classroom behavior, three essential target behavior domains were identified and selected for inclusion on the DBR-SIS (Christ et al., 2009). Extensive literature reviews were conducted to identify high-incident problem behaviors that students demonstrate in the classroom, which include behaviors related to off-task behavior, defiance, and disruptive behavior. Further research yielded constructs that encompass many observable student behaviors associated with favorable student outcomes, these include: academic engagement, compliance/respectful, and non-disruptive behavior (Chafouleas, 2011; Christ et al., 2009). Further research was then conducted to examine the wording of these behavioral domains. Chafouleas and colleagues (2013) found that positive wording was preferred and more accurate for academically engaged and respectful; negative wording, however, was preferred and more accurate for disruptive behavior. Taken together, three constructs were identified as (a) being relevant to all classrooms and (b) influencing student success: academically engaged, respectful, and disruptive (Chafouleas, 2011).

DBR as an Assessment

DBR poses several advantages over other behavioral assessment methods (e.g., SDO, rating scales). First, DBR tends to be more feasible for the classroom teacher, as it has a high degree of flexibility (e.g., target behaviors, scaling, target period) and is

efficient (classroom teacher can complete without disrupting the classroom procedures). An additional benefit is how DBR directly involves the primary stakeholder, in this case the teacher. Second, since external observers are not needed, the natural conditions of the classroom are maintained and the risk of student reactivity is reduced. Third, DBR data can easily be used for progress monitoring. Target behaviors can be based off of behavioral goals, DBR data can be collected daily and in a timely manner, and DBR data can be recorded and graphed to document student behavioral progress. Fourth, DBR links intervention and assessment. Though initially created as an assessment tool, DBR can simultaneously be used as an intervention tool (Chafouleas, Riley-Tillman, & Sugai, 2007). Like any assessment, DBRs also have some limitations that should be considered when selecting an assessment. First, there is a degree of rater bias associated with this measure. DBR utilizes subjective estimates, as ratings are based on the rater's perception of the student's performance (Briesch et al., 2010). A second limitation to consider is the Likert scale format used in DBR, as it ends up clustering response options (e.g., for a Likert scale ranging from 1-10, a rating of 1 represents engaging in the target behavior for 0% to 9% of the time). As a result, the numerical ratings tend to have less accuracy and less sensitivity to change than SDO (Chafouleas, Riley-Tillman, & Sugai, 2007). Despite these limitations, DBRs are frequently used in the school setting due to their high degree of flexibility and feasibility.

Psychometric properties of DBR-SIS. Overall, DBR has demonstrated promising psychometric properties. Several studies found a moderate degree of agreement between DBR and SDO; moderate correlations were found between DBR and

SDO for off-task behavior ($r = .674$, $p < .01$), on-task behavior ($r = .811$, $p < .01$), and disruptive behavior ($r = .874$, $p < .01$) (Chafouleas et al., 2005; Riley-Tillman et al., 2008). Further, when comparing DBR and direct observation data, Chafouleas and colleagues (2005) found that 82-87% of cases differed in agreement by 0 to 1 points and there were no cases that exceeded more than a 2-point difference.

Another measurement aspect to consider is sensitivity to change. It is important to evaluate the measure's ability to detect reliable behavioral change within an individual. Using five different change metrics (i.e., absolute change, percentage of nonoverlapping data [PND], percentage of change, effect size [ES], reliable change index [RCI]), Chafouleas, Sanetti, Kilgus, and Maggin, (2012) evaluated DBR-SIS sensitivity to change for the following behaviors: disruptive behavior, academic engagement, and compliance. Results indicated that there was reliable behavioral change in the anticipated direction for all behaviors, and all five change metrics similarly demonstrated the sensitivity to change of the DBR-SIS. In another study by Sims and colleagues (2017), a difference in DBR-SIS ratings was evident between baseline and intervention phases through the use of visual analysis and mean changes, demonstrating the measure's to sensitivity to behavioral change.

Generalizability studies (G-studies) have been conducted to estimate components of variance within the DBR measure. In one study, Briesch and colleagues (2010) found that the variance of DBR is largely explained by rater-related effects, whereas the variance of SDO is largely explained by changes in student behavior across days and occasions. Similarly, Chafouleas, Christ, and Riley-Tillman (2009) found that with DBR,

the rater is the largest contributor to the variance of the measure. In another study, Chafouleas, Christ, and colleagues (2007) found that the proportion of variance also largely differed depending on the behavior being measured. When measuring conflict resolution, 41% of variance was due to rater-related effects and 18% was due to child-related effects. However, when measuring cooperation, there more variance was explained by child-related effects (38%) than rater-related effects (20%). Contrary to prior G-studies on DBR, Chafouleas, Briesch, and colleagues (2010) found that rater differences did not account for a substantial amount of variance. Rather, child-related effects and behavior changes across days accounted for a large portion of the variance. It is important to note that two out of four of the raters in the Chafouleas, Briesch, and colleagues (2010) study had prior experience with behavioral assessment and the use of DBR. Overall, G-study results indicate that there tends to be variability in how different raters rate student behaviors. Some recommend that teachers receive more training with this behavioral measure in order to improve its reliability across raters (Chafouleas, Christ, et al., 2007). However, rater differences can be useful given the purpose of this specific measure. In the context of school-based data collection, obtaining teacher perceptions of student behavior is valuable given the fact that teachers work with students on a day-to-day basis and are likely to understand the students' behavior patterns better than an external, objective observer.

Decision studies (D-studies) are often conducted after G-studies to determine the effects of variance on the measure's dependability for decision making. Research suggests that reliability coefficients of .70 are needed to support low-stakes decisions

(e.g., classroom instruction, screening) and coefficients of .90 are needed to support high-stakes decisions (e.g., special education eligibility; Macmann & Barnett, 1999). Briesch and colleagues (2010), for example, found that the reliability of a single data point was similar for researcher-conducted SDO and teacher-collected DBR. However, when analyzing dependability based on multiple data points, there was greater reliability with SDO compared to DBR. Specifically, three SDO data points or 20 DBR data points are necessary for reliable decision making at the .70 level (Briesch et al., 2010). In another study, the data indicated that low-stakes decisions are supported after five DBR observations, while high-stakes decisions are supported after 15-20 DBR observations (Christ et al., 2010). Chafouleas, Christ, and colleagues (2007) found slightly different results, in that 7 DBR ratings across 4-7 days were needed for low-stakes decision making and 10 DBR ratings were needed for high-stakes decision making. In another study, Chafouleas, Briesch, and colleagues (2010) analyzed differences in dependability across different types of raters. Results suggested that external observers were more dependable than teacher observers. In order to make reliable high-stakes decisions, external observers need approximately 15 DBR data points, while teachers need at least 20.

Taken together, research indicates moderate levels of agreement between the brief estimates of these behavioral categories using DBR-SIS and the systematic direct observation of those individual behaviors for students. Further, data indicates that DBR can reliability detect behavioral change, suggesting that using this general outcome measure for behavior assessment is valid for making decisions on students' behavioral

progress when the minimum number of observations are conducted (5-7 observations for low-stakes decisions, 15-20 for high-stakes decisions). Overall, this research has established DBR and DBR-SIS as defensible, flexible, efficient, and repeatable methods of behavior assessment. Given the utility of this method, specifically in the school setting, DBR has also been adapted as an intervention component.

DBR as an Intervention

Daily Behavior Report Card. The DBR assessment methodology has been consistently used in the intervention literature in the form of daily behavior report cards (DBRC). According to Chafouleas and colleagues (2002), DBRCs are characterized by (a) rating a specific behavior, (b) completing a rating at least once per day, (c) sharing the ratings with key stakeholders, and (d) using the ratings to monitor student progress. Typically, DBRC ratings are shared with parents who are encouraged to provide contingent reinforcement in the home setting. Previous research suggests that DBRCs are effective at increasing on-task behavior, decreasing disruptive behavior, and improving home-school communication when used as a daily report card (Vannest et al., 2010; DuPaul & Stoner, 2015). With students with ADHD, specifically, research indicates that DBRCs are associated with increased on-task behavior and reduced ADHD symptomatology and externalizing behaviors (Iznardo et al., 2017; Pyle & Fabiano, 2017).

In one such study, students with ADHD were randomly assigned to the intervention group (n = 33) or the control group (n = 30). The eight month-long intervention consisted of a daily report card (DRC) with goals based on IEP goals and

consultation with both the classroom teacher and the students' parents. Results indicated that the DRC group experienced improved classroom behavior, higher academic productivity, decreased disruptive behavior and impairment, and greater attainment of IEP goals compared to the control group. There were no group differences in improvements related to the following: academic achievement testing, ADHD symptomatology, and the student-teacher relationship. Overall, results suggest that the implementation of a DRC with consultation is associated with behavioral and academic improvements in the classroom (Fabiano et al., 2010).

Murray et al. (2008) conducted a similar study evaluating the use of an individualized DRC plus parent-teacher consultation. Twenty-four elementary-age students with a diagnosis of ADHD were randomly assigned to either the intervention group or the control group. The data suggested that the intervention group experienced greater improvements in academic productivity and academic skills than the control group. Differences were not found, however, in regard to student improvements in impulse control and classroom functioning. Further, results suggested that teachers, parents, and students found this intervention to be both feasible and acceptable.

Interestingly, Williams et al. (2012) investigated the effectiveness of an electronic version of the DBRC. Elementary-age students (n = 46) were randomly assigned to one of three groups: the control group, the electronic DBRC group, or the electronic DBRC with performance feedback group. Daily for three weeks, teachers in the DBRC groups used a 3-point scale with three qualitative anchors (*above satisfactory, average, below satisfactory*) to rate students on each of the following behaviors: staying seated,

completing work, talking appropriately, following directions, and completing assignments. Teachers in the DBRC with performance feedback group provided praise and feedback to parents regarding the administration of rating-dependent consequences in the home setting. Results indicated that off-task behavior, internalizing behavior, externalizing behavior, and behavior problems decreased for both DBRC groups, while the control group experienced slight increases in these behaviors. Further, results suggested that the DBRC with performance feedback was the only condition to experience a substantial decrease in ADHD symptomatology. Taken together, results suggest that an electronic DBRC is associated with improvements in classroom behavior and that there may be some added benefit to including a performance feedback component to the intervention.

DBRC's have also demonstrated effectiveness as part of a multicomponent behavioral intervention. In one such study, the MTA Cooperative Group (1999a) conducted a 14-month national randomized control trial to compare the effectiveness of the following treatments: community care, medication management, behavioral treatment, and a combined treatment package. The multicomponent behavioral treatment consisted of behavioral parent training (BPT), teacher consultation sessions, the implementation of a DRC with individualized behavioral goals, a token economy, and an 8-week summer treatment program (STP) focused on teaching social skills. In the combined treatment, participants received medication management and the behavioral treatment. Though medication management was more effective than the behavioral treatment at reducing ADHD symptomatology, the two treatments were equally effective

at decreasing ODD and internalizing symptoms as well as improving social skills and parent-child relations. Further, results indicated that the combination treatment and medication management were equally effective in all domains; however, those receiving the combination treatment required a lower dosage of medication. Overall, findings suggested that adding a multicomponent behavioral treatment intervention addressing academic, behavioral, and social concerns to a medication treatment and implementing it across settings leads to improved outcomes for children with ADHD (MTA Cooperative Group, 1999).

In a more recent multicomponent behavioral intervention study, Owens and colleagues (2005) implemented a similar intervention for elementary school age children with ADHD. The intervention consisted of weekly parenting sessions, biweekly teacher consultation, and the implementation of a DRC for one school year. Per parent report, children in the intervention group demonstrated significant improvements in ODD symptoms, aggression, and peer relations compared to the control group. According to teacher report, the intervention group demonstrated significant improvements in inattention symptoms, impairment, academic functioning, and student-teacher relations compared to the control group.

Check-in Check-out. Another related intervention often implemented in schools to support students with problem behaviors is check-in check-out (CICO). Defining features of this intervention include: (a) students checking in with an adult mentor at the start of the school day to review behavioral expectations, (b) teachers providing feedback via a DBRC after each class period, (c) students checking out with their adult mentor at

the end of the school day to review their daily progress, (d) student receiving reinforcement contingent on meeting the behavioral goals on the Daily Progress report, and (e) parents reviewing and signing the DBRC (Drevon et al., 2019).

One such study implemented CICO with three elementary students, two of which had a diagnosis of ADHD Combined type (Karhu et al., 2019). Students participated in a CICO program that utilized a 3-point DBRC scale with three qualitative anchors (0 = *Expectations not met*, 1 = *Expectations met partly*, 2 = *Expectations met*). Using a multiple baseline design across participants, data was collected during baseline and intervention via direct observation and DBRC teacher ratings. Results suggested that the intervention resulted in decreases in problem behavior and increases in appropriate behavior for all participating students when compared to the baseline phases. Though it was indicated that students were working toward DBRC goals, information was not provided on what the goals were or how often students met those goals. Additionally, there was a moderate to strong correlation (*range*: .64 to .70) between direct observation data and DBRC ratings, suggesting that DBRC ratings may be a reliable source of information in the school setting.

Using an ABABC design, Miller and colleagues (2015) sought to determine whether self-monitoring was an effective fading strategy for the CICO intervention program. Standard CICO protocol was implemented in Phase B, with students checking in and out with an adult mentor and the classroom teacher assessing student behavior at the conclusion of three predetermined class periods. The DBRC utilized in this study was on 6-point scale with six qualitative and quantitative anchors (0 = *Behavior not observed*

(0%), 1 = *Occasionally (1-20%)*, 2= *Some (21-40%),* 3 = *Approximately half (41-60%)*, 4 = *Most (61-80%)*, 5 = *Majority (81-100%)*). Students began the fading phase once problem behavior occurred in less than 20% of the intervals for five consecutive days. Once in the C phase, students were to self-monitor the target behaviors using the DBRC. Direct observation data indicated that the CICO program was effective at decreasing problem behavior and increasing academic engagement in four elementary students with behavioral difficulties. Further, students' behavioral gains maintained during the self-monitoring phase. Throughout the study, data was also collected on DBRC ratings; however, the data was highly variable.

In another study conducted by Parry (2014), a combined CICO and self-monitoring intervention was implemented with three 4th and 5th grade students who had behavior problems maintained by adult attention. Similar to traditional CICO programming, students checked-in with the coordinator at the start of the day and checked-out with the coordinator at the end of the day. All participants had a DBRC with three behaviors (i.e., be safe, be respectful, and responsible) that they carried with them throughout the school day. During each class period, participating students self-monitored themselves on the target behaviors using a three-point scale (1 = *Expectations not met*, 2 = *Some expectations met*, 3 = *Met all expectations*). At the end of each class period, the teacher compared behavioral ratings with the student and provided feedback on rating accuracy. During the end of the day check-out, students totaled up their daily points and received reinforcement contingent on whether they met their daily point goal; points were dependent on (a) meeting their behavioral goals and (b) having accurate

ratings. The accuracy comparisons with the classroom teacher were faded once 80% of their ratings agreed with the teacher for four consecutive days. Results of the ABABC design indicated that student on-task behavior substantially increased during both intervention phases and remained low during the baseline phases for all three students. Further, intervention effects maintained during the fading period. Improvements in disruptive behavior were not seen, but this is likely because baseline levels of disruptive behavior were substantially low to begin with. Additionally, the data indicated that the three students met their behavioral point goals for majority of the days during the intervention period (74.08%, 82.60%, 90.9%). A significant limitation of this finding, however, is that data on whether students met their daily behavioral goals was not collected during baseline.

Self-Monitoring Interventions. Fewer studies, however, have utilized DBR as a self-monitoring intervention. As discussed, majority of studies investigating the effectiveness of self-management interventions, specifically for children with ADHD, utilize yes or no checklists as the self-monitoring tool. DBR, however, may be a more effective self-monitoring tool for use in school settings. First, rating scales provide more detailed information on the student's behavior than a dichotomous item. DBR gives students and teachers the opportunity to provide information on the frequency and severity of a behavior, rather than simply identifying whether or not the behavior occurred. Second, comparing student and teacher DBR ratings provides students with an adequate opportunity to receive teacher feedback. Research suggests that performance feedback is an evidence-based classroom management strategy that is effective at

reducing inappropriate behavior (Simonsen et al., 2008). DBRs can serve as a tool to provide performance feedback because students and teachers can discuss, for example, why a student rated themselves as a five rather than a seven. It is likely that students will have a greater understanding of their behavior if there is an increased opportunity for feedback and discussion. Lastly, available self-monitoring interventions tend to neglect more rigorous data collection approaches (i.e., consistent baseline and progress monitoring) in favor of a focus on goal attainment as an outcome measure. DBR, however, can serve as both an intervention and a progress monitoring tool (Chafouleas, Riley-Tillman, & McDougal, 2002). Using a psychometrically defensible assessment that allows for flexible use across both formative assessment and as an intervention mechanism appears advantageous. With a high emphasis on data-based decision making, the flexibility of DBR may be especially useful in school settings. To explore this flexible application, modified DBR-SIS formatting was used to facilitate an intervention focusing on self-monitoring and performance feedback, which appears easily adoptable by educators supporting students with behavioral challenges.

Though born out of the Daily Behavior Report Card (DBRC), few studies have implemented a self-monitoring intervention that combines both teacher and student DBR-SIS ratings as an intervention mechanism. In one such study conducted by Chafouleas, Sanetti, Jaffery, and Fallon (2012), a class-wide self-management and group contingency intervention package was implemented in three middle school classrooms using a multiple baseline design across participating classrooms. Using a DBR-SIS form, target behaviors were rated on an 11-point scale with three qualitative anchors (0 = *Not at all*,

5 = *Some*, 10 = *Totally*). During the baseline phase, students completed the form at the end of each class period and evaluated their level of preparedness, academic engagement, and homework completion during the class period. Classroom teachers then compared their ratings with each student's rating and points were given to students for matching the teacher's rating. The group contingency component was added in the intervention phase. Students were organized into teams and individual points were combined into a team score. Teams graphed their team score and received reinforcement for reaching their team goal. Teacher DBR-SIS data suggested that there were slight improvements in all three behaviors from baseline to intervention, while researcher-collected SDO data indicated that students had substantial improvements in academic engagement. Though results of this study seem promising, there are several limitations to take into consideration. First, since the self-evaluation intervention was implemented in the baseline phase rather than proceeding with business as usual, the individual influence of self-evaluation on behavior is unknown. Second, What Works Clearinghouse (Kratochwill et al., 2010) guidelines recommend that five data points are collected per phase; this study did not meet this standard. Third, data collection was not continuous.

In another study, three students with a traumatic brain injury (TBI) participated in a self-monitoring intervention using DBR (Davies et al., 2010). Target behaviors, rule following and work completion, were rated on a 6-point scale with six qualitative anchors (0 = *Totally Unacceptable,* 1 = *Poor*, 2= *Below Average,* 3 = *Average*, 4 = *Very Good*, 5 = *Excellent*). DBR-MIS forms were completed by students and teachers for two observation periods (i.e., morning and afternoon). Teacher and student ratings were

compared at the end of each observation period; students received feedback on their performance and were praised for matching the teacher's rating. Based on teacher DBR-MIS data, students' total DBR points increased from baseline to intervention and improvements maintained during the fading phase. It is important to note that the two target behaviors were analyzed as one combined variable, so it is unclear how the intervention differentially impacted rule following and work completion. Further, given that the study utilized a multiple baseline design across participants, a limitation of this study is that implementation of the intervention was not adequately staggered across different points in time, as two students were introduced to the intervention within one day of each other.

In an earlier study, Hoff and DuPaul (1998) implemented a DBR-like self-evaluation intervention in the classroom and playground settings with three 4th grade students with ADHD. At the end of a 15-minute session, students and teachers rated the student's level of disruptive behavior on a 6-point scale with six qualitative anchors (0 = *Totally Unacceptable,* 1 = *Poor*, 2= *Below Average,* 3 = *Average*, 4 = *Very Good*, 5 = *Excellent*). Ratings were then compared and students earned points for having ratings that were similar to the teacher's ratings. Using a multiple baseline design, intervention implementation was staggered across participants. Overall, SDO data indicated that self-management was effective at reducing disruptive and aggressive behavior in the classroom and on the playground. One limitation of this study, however, is the short duration of the interval. Because self-evaluation occurred at the end of a 15-minute session, results cannot be generalized to longer durations (e.g., entire class periods).

Ardoin and Martens (2004) implemented a similar self-evaluation intervention using a DBR-like rating scale with four elementary boys demonstrating high levels of inattention and hyperactivity. A 4-point scale with four quantitative anchors (1 = 0-25%, 2 = 26-50%, 3 = 51-75%, 4 = 76-100%) was used to monitor the following behaviors: looking around, playing with objects, out of seat, and inappropriate peer interactions. The intervention was implemented in three phases: self-monitoring only, self-monitoring plus accuracy training, and self-monitoring plus accuracy training with a focus on academic productivity. In the conditions that involved accuracy training, students compared their ratings to the ratings of an external observer and were provided with performance feedback. The main finding of this study was that based on SDO data, the self-monitoring only intervention decreased the disruptive behavior of one student, whereas the self-monitoring plus accuracy training intervention reduced disruptive behavior for all students. A significant limitation of this study is the design. The authors claimed to utilize an ABA design, however there was no return to baseline. After the baseline phase, the three phases of the intervention were implemented one after another. According to What Works Clearinghouse (Kratochwill et al., 2010) guidelines for single case designs, there must be an introduction and withdrawal of the independent variable. Given this lack of adherence to design standards, three demonstrations of effect were not present and therefore results should be interpreted with caution.

Limitations of Past Research

Despite the evidence-base for self-monitoring interventions, few studies have utilized a rating scale format (e.g., DBR) to document student progress. In the context of

school-based data-collection, using methods such as DBR-SIS to collect behavioral data is not only more feasible, but more advantageous for progress monitoring purposes. Adding structure in the form of a structured behavioral assessment (e.g., operationally defined behaviors, item scoring, standardization) that can be used throughout the course of intervention, for example, can better facilitate the monitoring process. Though some studies have attempted to implement interventions using DBR-like scales (e.g., DBRC, CICO, self-monitoring), these studies typically used SDO as their dependent variable. Using SDO as the sole dependent variable poses a significant limitation, in that there is a lack of continuity in DBR data collection between baseline and intervention data. When DBR data is only collected as an intervention component, studies tend to not obtain DBR data in baseline. This is especially problematic in the context of intervention implementation in the applied setting (e.g., school, classroom), where SDO data collection is more difficult due to training and resource allocation issues. Given this, it is imperative that there is research demonstrating intervention effects via DBR ratings, this can be accomplished by collecting DBR data throughout the baseline phase as well as the intervention phase. Future studies should aim to collect both DBR and SDO data throughout baseline and intervention phases in order to fully document student progress. An additional limitation of the DBR self-monitoring literature is that there are a limited number of studies evaluating this specific intervention with students with ADHD.

Further, a majority of the literature on self-management interventions for students with ADHD focuses on elementary-age students. There are significantly fewer studies that investigate the effectiveness of self-management interventions for secondary students

with ADHD. One such study, conducted by Gureasko-Moore and colleagues (2006), found that self-monitoring was effective at increasing organization and preparedness in middle school students with ADHD. However, the self-monitoring tool utilized in this study was a simple yes or no checklist. In another study with middle schoolers, a class-wide self-management with reinforcement intervention was implemented in several general education classrooms (Chafouleas, Sanetti, Jaffery, & Fallon, 2012). Though generally effective at increasing student academic engagement, there were some methodological issues in the study. Future studies should investigate the effectiveness of self-monitoring with middle school students using sound methodology.

Lastly, not all studies abide by the single case design Standards 1.0 set by What Works Clearinghouse (WWC). Key indicators of quality SCD studies include: (1) systematic manipulation of the independent variable, (2) measuring the dependent variable repeatedly over time, (3) providing at least three demonstrations of intervention effect, (4) having at least three to five data points in each phase, (5) calculating and reporting interobserver agreement (IOA) for at least 20% of sessions in each condition, and (6) having an IOA above 80% for agreement or having a Kappa value above .60 (Kratochwill et al., 2010). Maggin et al. (2013) reviewed 30 single-case self-management studies (106 cases) and found that only 2/3 of cases (n = 68; 64%) met the six WWC standards with or without reservations. Sound methodology is preferred when making determinations about the effectiveness of an intervention, therefore future studies utilizing a single case design should strive for rigorous methodology that follows the WWC standards.

DBR Self-Monitoring Intervention

The intervention was developed to facilitate the self-monitoring process using DBR methodology (i.e., standardized behavioral assessment, temporal proximity between rating and observation, direct observer completing rating, structured data collection). The intervention teaches students to self-monitor their academic engagement, respectful behavior, and disruptive behavior using a DBR form. These behaviors are monitored using both student and teacher behavioral ratings. Students are given time to meet with their classroom teacher to receive performance feedback and to reflect on their behavior, which elicits positive and productive conversations between student-teacher pairs regarding students' classroom behaviors. With the classroom teacher simultaneously completing DBR ratings, there is a direct connection between intervention implementation and assessment data collection. Overall, the aim of the DBR self-monitoring intervention is to (a) improve students' classroom behaviors through self-monitoring, (b) increase positive teacher-student interactions, and (c) make data collection more feasible for classroom teachers by incorporating it into the intervention process.

Study Purpose

The current study sought to evaluate the efficacy and perceived usability of the DBR self-monitoring intervention for middle school students with ADHD. This study aimed to fill a gap in the self-management literature by (a) expanding the available self-monitoring-based interventions available for use in educational settings, (b) expand the body of literature supporting the DBR-SIS assessment methodology for varied uses, (c)

evaluate the effectiveness of the DBR self-monitoring intervention for students with ADHD, and (d) evaluate the social validity (i.e., perceived usability) of the intervention. This study evaluates the effects of this approach using a strong methodological design that follows What Works Clearinghouse (Kratochwill et al., 2010) standards for single case research. Specific research questions guiding the study include:

1. Will a self-monitoring intervention utilizing DBR result in increased academic engagement and respectful behavior displayed by students with ADHD?
2. Will a self-monitoring intervention utilizing DBR result in decreased disruptive behavior displayed by students with ADHD?
3. Will teachers and students rate the intervention as highly usable, acceptable, and feasible?

Method

Participants and Recruitment

Recruitment

Participants included five middle school student-teacher combinations. To meet eligibility for the present study, middle school students needed to meet the following eligibility criteria: (a) have an Individualized Education Plan (IEP) under the category of Other Health Impairment (OHI) or have a 504 plan for ADHD, (b) have a documented diagnosis of ADHD from a qualified medical or mental health service provider (i.e., physician, psychiatrist, licensed psychologist), (c) spend more than 50% of their educational day in the general education classroom setting, (d) demonstrate academic and behavioral difficulties in the classroom, and (e) be in grades 6 through 8. Students were

recruited with the help of school personnel (i.e., referral from school psychologist, special educator, or administrator). These educators identified potential participants based on their knowledge of students' eligibility status and current difficulties in the school setting. Five students were identified who meet the inclusion criteria. In order to decrease the risk of interdependence between baselines, multiple students were not selected from the same classroom teacher or from the same class. Recruitment materials and consent/assent forms were provided for these students and their educational decision makers; only students for whom consent was obtained participated in the study. The recruitment flyer and consent forms were sent home with each student in a sealed folder; all parents were called beforehand to let them know forms were being sent home. All participating students were compensated with a digital tablet (e.g., Samsung tablet, Apple iPad) at the completion of the study.

Teacher participants were recruited from classes in which the participating students were enrolled in and displaying academic and behavioral challenges in. This is to say, once a student received parental consent to participate in the study, teachers and administrators were consulted with to determine the class period in which the student was demonstrating the most academic and behavioral challenges. Once the class period was identified, recruitment materials and consent forms were provided to the corresponding teacher. All participating teachers were compensated with a digital tablet (e.g., Samsung tablet, Apple iPad) at the completion of the study.

Student Participants

All participating students were receiving school-based behavioral services (e.g., IEP, 504 plan, BIP), had a documented diagnosis of ADHD, spent the majority of their day in the general education setting, and were referred for demonstrating academic and behavioral difficulties in the classroom. Participants were in sixth through eighth grade and all were male (see Table 1 for more information). Though the student population is 100% male in the present study, this aligns with the prevalence of ADHD across genders. According to the National Center for Health Statistics (2017), an ADHD diagnosis is significantly more common in males (14.2%) than females (6.4%). To maintain confidentiality, student participants have been given aliases within this manuscript.

Student 1. Caleb is an 8th grade male student (age 13). He is Caucasian and non-Hispanic. Caleb has a documented diagnosis of ADHD combined type. He does not have any comorbid diagnoses and is not taking any medication. Caleb has a 504 plan with the following accommodations to provide him with support for his ADHD in the school setting: preferential seating, opportunity to work in a different area away from classmates to reduce distractions, use of fidgets when needed, breaking down and clarifying instructions, and extended time to complete assignments. Spanish class was identified as the most behaviorally challenging for Caleb, therefore the intervention was implemented in his 3rd period Spanish class.

Student 2. Ivan is a 7th grade male student (age 12). He is Caucasian and non-Hispanic. Ivan has a documented diagnosis of ADHD combined type and is currently taking medication. He does not have any additional comorbid diagnoses. Ivan has a 504

plan with the following accommodations to provide him with support for his ADHD in the school setting: preferential seating and a break pass when needed. History class was identified as the most behaviorally challenging for Ivan, therefore the intervention was implemented in his 7th period History class.

Student 3. Robert is a 7th grade male student (age 12) who is Hispanic. Robert has a documented diagnosis of ADHD inattentive type and is currently taking medication. He also has comorbid diagnoses of anxiety and obsessive-compulsive disorder (OCD). Robert has a 504 plan with the following accommodations to provide him with support for his ADHD in the school setting: preferential seating, a break pass when needed, prompting to use calming techniques in the classroom, and small group counseling to teach stress management. He also has a behavior intervention plan (BIP) for the behavior function of escape/avoidance; BIP strategies include: CICO with a behavioral contract, scheduled breaks, and reduced workload. Math class was identified as the most behaviorally challenging for Robert, therefore the intervention was implemented in his 5th period Math class.

Student 4. Riley is a 6th grade male student (age 11). He is Caucasian and non-Hispanic. Riley has a documented diagnosis of ADHD combined type and is currently taking medication. He also has a comorbid diagnosis of unspecified anxiety disorder. Riley is currently eligible for an individualized education plan (IEP) under Other Health Impairment (OHI). He receives 80 minutes of behavior related services in the special education setting weekly and is provided the following accommodations: flexible schedule as needed, adjusted grouping as needed, and extended response time. He also

has a behavior intervention plan (BIP) for the behavior function of escape/avoidance; BIP strategies include: CICO, a behavioral contract with a points reinforcement system, scheduled breaks, and weekly social skills training with the school social worker. English language arts (ELA) class was identified as the most behaviorally challenging for Riley, therefore the intervention was implemented in his 5th period ELA class.

Student 5. Kevin is a 6th grade male student (age 11) who is Black/African American. Kevin has a documented diagnosis of ADHD combined type. He also has comorbid diagnoses of anxiety and oppositional defiant disorder (ODD). Kevin has a 504 plan with the following accommodations to provide him with support for his ADHD in the school setting: preferential seating, a break pass when needed, and prompting to use calming techniques in the classroom. History class was identified as the most behaviorally challenging for Kevin, therefore the intervention was implemented in his 5th period History class.

Teacher Participants

All participating teachers were middle school (grades 6-8) general education teachers. One teacher taught History, one teacher taught Mathematics, one teacher taught both ELA and History, one teacher taught both ELA and Spanish, and one teacher taught both History and Science. Majority of teachers were White and non-Hispanic. Four teachers were fairly new to teaching middle school, with three out of five teachers being in their first few years of teaching (see Table 2 for more information).

Setting

This study was conducted at a middle school in the greater Salt Lake City area. The school served 971 students. The student demographics for the 2021-2022 school year are as follow: 57% Hispanic or Latino, 28% White, 6% Pacific Islander, 5% African American, 3% Asian, and 1% two or more races. Of these students, 65% were classified as economically disadvantaged. Students attended seven periods per day, each class period was 45 minutes in duration. The study was conducted during the Fall semester (October - November 2021).

Measures

Demographic Forms

Demographic questionnaires were included in the student and teacher recruitment packets. Parents were asked to complete a student demographic form in order to obtain information on student gender, age, grade, race/ethnicity, ADHD diagnosis, comorbid diagnoses, and medication regimen (see Appendix A). Participating teachers were asked to complete a teacher demographic form in order to collect data on teacher gender, race, ethnicity, highest degree obtained, certifications/credentials, and years of experience (see Appendix B).

Direct Behavior Rating - Single Item Scale (DBR-SIS)

As the primary outcome measure, the DBR-SIS (Chafouleas, Riley-Tillman, & Christ, 2009) was utilized by the classroom teacher daily during both baseline and intervention phases (see Appendix C). The DBR-SIS utilizes an 11-point scale with three quantitative and qualitative anchors (0 = 0%, *Never;* 5 = 50%, *Sometimes*; 10 = 100%,

Always). It was used to measure the percentage of total time that each student engaged in each of the three behaviors (i.e., academic engagement, respectful behavior, disruptive behavior) during the specified observation period. At the bottom of the DBR-SIS form, there was an additional space for the teacher to write comments about the student's behavior that day or whether any changes were made to the daily routine (e.g., fire drill, assembly schedule). The DBR-SIS form was completed by teachers via Google Form.

Academically engaged (AE) is defined as actively or passively participating in the classroom activity. Examples include writing, raising hand, answering a question, talking about a lesson, listening to the teacher, reading silently, or looking at instructional materials. Non-examples include working on unrelated tasks, talking to peers about topics unrelated to classroom instruction, looking around the room, and staring off into space.

Respectful behavior (R) is defined as compliant and polite behavior in response to adult direction and/or interactions with peers and adults. Examples include following teacher direction, engaging in prosocial interactions with peers, having positive response to adult requests, and verbalizations without a negative tone/connotation. Non-examples include refusal to follow directions, talking back, eye rolling, inappropriate gesturing, using inappropriate language, and having an inappropriate tone or interactions with adults or peers.

Disruptive behavior (D) is defined as student behavior that disrupts or distracts from regular school or classroom activities. Examples include being out of seat, fidgeting, playing with objects, acting aggressively, and talking or yelling about things

unrelated to classroom instruction. Non-examples include staying in seat, keeping hands still, using objects appropriately, staying calm, talking at appropriate times about appropriate topics, and keeping hands, feet, and other objects to themselves at all times.

Student Version of the DBR-SIS. During the intervention phase, students utilized the DBR-SIS form to rate their daily performance (see Appendix D). After self-monitoring, students used this form to record their perceptions of the percentage of total observation time spent engaged in the following three behaviors: academically engaged, respectful behavior, and disruptive behavior. The DBR-SIS form was completed by students via Google Form. The primary difference between the DBR-SIS teacher form and DBR-SIS student form was that the teacher form provided an additional space for the teacher to write comments.

Systematic Direct Observation (SDO)

SDO was utilized for a portion of the observations to provide supplemental information about the scope of the behavioral change and to further document IOA (Kazdin, 2011). A momentary time sampling procedure was used to measure the percentages of intervals in which the student was academically engaged, respectful, and disruptive (see Appendix E). With momentary time sampling, the presence or absence of the target behavior is recorded at the exact instance the specified interval begins. Momentary time sampling was selected because it is the most accurate and reliable time sampling procedure, as other methods tend to overestimate (partial interval recording) or underestimate (whole interval recording) the occurrence of the target behavior (Cooper, 2007). Another advantage of momentary time sampling is that the observer does not have

to continuously monitor and record the student's behavior throughout the entire interval, making this method less taxing on the observer (Cooper, 2007; Miltenberger, 2017).

At 10-second intervals during a 15-minute observation toward the start of the class period, student participants were observed by external observers (i.e., graduate and undergraduate student researchers, school social worker, school psychologist, school behavioral specialist). Observers stood in the back of the classroom during the observations in order to decrease disruption or distraction in the classroom. At the start of each 10 second interval, the observer coded whether the student was engaged in each of the three target behaviors. Observers utilized a pencil and paper format for SDO data collection.

Social Validity Instruments

In addition to assessing the effectiveness of an intervention, researchers are encouraged to evaluate the social validity of an intervention, or how acceptable it is to key stakeholders (Kazdin, 1977; Snodgrass et al., 2018; Wolf, 1978). When assessing the social validity of an intervention, the following questions should be considered: (a) Are the intervention goals socially significant?, (b) Are the procedures socially appropriate?, and (c) Are the intervention effects socially important? (Wolf, 1978). To adequately answer these questions, the perspectives of the individuals directly involved in the intervention process must be sought out. Therefore, at the conclusion of the study, the Usage Rating Profile – Intervention Revised (URP-IR; Chafouleas et al., 2011) was administered to participating teachers to assess the acceptability and feasibility of intervention procedures, teacher understanding of the intervention goals and procedures,

and perceived system-level support for the intervention. The URP-IR is a 29-item survey that utilizes a 6-point Likert scale (1 = *Strongly Disagree,* 2 = *Disagree,* 3 = *Slightly Disagree,* 4 = *Slightly Agree,* 5 = *Agree,* 6 = *Strongly Agree*). Internal consistency for the URP-IR is high for acceptability (α = .96), understanding (α = .90), feasibility (α = .90), and systems support (α = .84; Chafouleas, Briesch, Riley-Tillman, & McCoach, 2009). Higher scores for the acceptability, understanding, and feasibility items suggest higher intervention acceptability. However, lower scores on systems support suggest higher intervention acceptability because it reflects the teacher's ability to independently carry out the intervention without system-level support.

The Children's Usage Rating Profile (CURP; Briesch & Chafouleas, 2009c) was also administered to participating students to assess student perceptions of intervention usability, the extent to which the intervention is helpful, and student understanding of the intervention procedures. The CURP is a 21-item survey that utilizes a 4-point Likert scale (1 = *I totally disagree,* 2 = *I kind of disagree,* 3 = *I kind of agree,* 4 = *I totally agree*). Research suggests that the CURP demonstrated relatively high internal consistency for personal desirability (α = 0.92), feasibility (α = 0.82), and understanding (α = 0.75; Briesch & Chafouleas, 2009b). Higher scores on the personal desirability and understanding items suggest higher intervention acceptability. Lower scores on the feasibility items suggest greater intervention acceptability; therefore, for ease of interpretation these items will be reverse coded so that higher scores represent higher intervention acceptability.

Implementation Fidelity Checklist

Implementation fidelity assesses the degree to which the intervention plan was implemented as planned. In general, higher levels of implementation fidelity are associated with better outcomes (Sanetti & Kratochwill, 2009). According to Dane and Schneider (1998), the following components are important in the assessment of treatment integrity: (a) adherence, (b) exposure, (c) quality, (d) participant responsiveness, and (e) program differentiation. Adherence is defined as the number of intervention elements that are delivered. Exposure, also known as dosage, refers to the amount of intervention that is provided. Quality of delivery refers to the way in which the intervention was delivered, taking into consideration factors such as effectiveness, enthusiasm, and preparedness. Participant responsiveness reflects the extent to which the participant is engaged in the intervention. Lastly, program differentiation is defined as the degree to which the delivered intervention reflects the elements of the planned intervention.

In the present study, adherence, exposure, and quality were evaluated. Each participating teacher was instructed to complete an implementation fidelity checklist for each day of intervention (see Appendix F). To assess adherence, the teacher marked + or – to indicate whether each intervention step was completed per day. Exposure, defined as the number of days students participated in the intervention, was documented by the dated DBR-SIS forms and implementation fidelity checklists completed by the teacher. External observers simultaneously completed an intervention fidelity checklist for a portion of the observations. In addition to collecting adherence data, external observers also collected data on the quality of teacher implementation. Overall quality of

implementation was assessed through the following dimensions: enthusiasm and preparedness. These two quality dimensions were rated by the external observer using a scale of 1 to 5 (1 = *low*, 3 = *moderate*, 5 = *high*; see Appendix G).

Study Design

In the field of school psychology and education research, single-case design (SCD) is a well-established methodological approach (Kazdin, 2011; Kennedy, 2005). Though this design utilizes a relatively small number of participants, it is considered an experimental design that has the ability to establish a functional relationship between an independent variable and a dependent variable (Horner et al., 2005). The following characteristics are defining features of SCD. First, there must be continuous assessment throughout baseline and intervention. In SCD, the dependent variable is repeatedly administered over time (i.e., daily). Second, each participant serves as his or her own control and improvements are assessed within a participant. Each participant is assessed in the presence and absence of intervention (i.e., baseline and treatment phases). Third, the researcher systematically manipulates the conditions, meaning that the researcher controls the timing of the intervention. Fourth, there must be at least three demonstrations of effect; each time the independent variable is manipulated and there is a behavior change (Kazdin, 2011; Shadish et al., 2015).

To address the first three research questions and demonstrate the functional relationship between the independent variable (i.e., DBR-SIS) and the dependent variables (i.e., level of academic engagement, respect, and disruptive behavior), a concurrent multiple baseline design across participants was utilized. In this design, the

intervention is introduced to each participant at a different time point. Scattering the introduction of the intervention provides multiple opportunities to demonstrate effect; if there is behavior change each time the intervention is introduced to a different participant at a different time, the behavior change can be attributed to the intervention (Kazdin, 2011). A multiple baseline design was selected, rather than an ABAB design, because it would be unethical to withdraw an effective intervention. Further, a multiple baseline design across participants was selected over a design across behaviors due to concerns related to interdependence of the baselines; it is possible that changing the first behavior may impact changes in the subsequent behaviors (Kazdin, 2011). Given the limitations associated with the other design options, the multiple baseline design across participants is the best fit for this study.

Design Criteria for Meeting Evidence Standards

According to What Works Clearinghouse (WWC), there are several criteria that a single case design study must meet in order to *Meet Evidence Standards* (Kratochwill et al., 2010). First, the independent variable must be systematically manipulated by the researcher. For the current study, baseline data collection began at the same time for all participants and the introduction of the independent variable was staggered across participants. Once stable responding was demonstrated with the first participant, the intervention was implemented with the first participant; baseline data continued to be collected for all other participants during this time. This process continued until all participants were receiving the DBR self-monitoring intervention. The primary investigator (PI) was responsible for determining when stable responding has been met

and when the phase changes occurred. The PI graphed and analyzed progress monitoring data daily in order to assess progress and determine phase changes. Second, the dependent variable must be administered repeatedly over time. Teacher DBR-SIS data, the primary dependent variable, was collected daily throughout all phases of the study. Third, WWC standards require that at least three demonstrations of intervention effect are demonstrated. Five student-teacher pairs participated in the present study, which provided an acceptable number of opportunities to demonstrate effect. Effects are demonstrated each time that the intervention is introduced to a participant and behavior changes are seen between baseline and intervention. Fourth, to align with WWC standards, at least six phases needed to have a minimum of five data points; all other phases should have at least three data points. In the present study, one phase had three data points and nine phases had greater than five data points. Lastly, standards indicate that interobserver agreement (IOA) be collected and reported for at least 20% of all sessions in each phase. In the present study, external observers collected DBR-SIS data and SDO data for 24% of sessions in the baseline and 27% of sessions in intervention. To meet evidence standards, IOA must be above 80% for agreement or have a Kappa value above .60 (Kratochwill et al., 2010).

Procedure

Prior to initiating this study, university Institutional Review Board (IRB) approval, school district IRB approval, principal consent, teacher consent, student assent, and parent permission were all obtained.

Training

Observers. External observers included school personnel (i.e., school social worker, school psychologist, school behavioral specialist) as well as trained undergraduate and graduate student researchers from a local university. Following consent by teacher and student participants, the primary investigator provided one-on-one 30-minute training sessions with the external observers. The training focused on teaching the observers the procedures for (a) collecting data with the DBR-SIS measure, (b) collecting data with the SDO measure, and (c) completing the intervention fidelity checklist. During the training session, the intervention procedures were reviewed, the operational definitions of the target behaviors were reviewed, the DBR-SIS and SDO data collection procedures were taught, and the DBR-SIS and SDO data collection procedures were practiced. At the conclusion of the training session, observers were given the opportunity to ask questions about their role and expectations, the data collection procedures, and the intervention procedure. External observers were also encouraged to complete an online training program that reviews the use of DBR-SIS (https://dbrtraining.education.uconn.edu/). The online training consists of an overview of the DBR-SIS form and opportunities to practice recording behaviors based on video examples. All observers were compensated with a $200 gift card at the completion of the study.

Teachers. One-on-one 45-minute training sessions were provided to teacher participants by the primary investigator during their preparation period. The training covered DBR self-monitoring intervention implementation procedures, which involved

reviewing the implementation fidelity checklist form and practicing the intervention procedural script (see Appendix J). The training also reviewed the operational definitions of the target behavior and how to use the DBR-SIS measure. At the conclusion of the training session, teachers were given the opportunity to ask questions about the data collection process and the intervention procedure.

Students. At the start of the intervention phase, the school psychologist conducted a 20-minute training session with each of the students to teach the self-monitoring procedure. The school psychologist provided definitions, including examples and non-examples, of each behavior and taught the student the procedure for filling out the DBR-SIS self-monitoring form. During this time, the school psychologist informed each student that ratings of eight or higher are desirable for AE and R, and ratings of three or lower are desirable for D (i.e., student goals should be AE = 8, R = 8, and D = 3). At the conclusion of the training session, students were given the opportunity to ask questions about self-monitoring, the target behaviors, and the intervention. Following training, the self-monitoring intervention was implemented daily during the targeted class period.

Intervention Procedures

Intervention implementation and all behavioral observations occurred in the class period that the participating students demonstrated the most behavioral difficulty in; this remained consistent throughout the study procedures. Throughout the study, student IEP services, 504 accommodations, and BIP procedures were maintained and carried out according to the students' individualized plan.

Baseline Phase. During baseline, classroom procedures were not altered; this phase represents "business as usual". Using the DBR-SIS Google form on the tablet, each teacher collected baseline data daily on the total percentage of academic engagement, respectful behavior, and disruptive behavior that the student engaged in during the targeted instructional period.

Intervention Phase. A self-monitoring intervention was implemented to improve student classroom behaviors. The implementation setting was different for each participant, as the intervention was implemented during the academic class period that was identified as most problematic for the student. At the start of the identified class period, the teacher (a) provided a verbal prompt to the student to monitor their level of academic engagement, respect, and disruptive behavior during the targeted class period and (b) verbally set expectations for the class period (see Appendix J). For example, the teacher would approach the student independently and state "Caleb, remember to monitor how often you are on-task, respectful, and disruptive today in class. During class, we will be completing a worksheet independently and then doing silent reading."

Throughout the class period, the teacher monitored the student's level of academic engagement, respect, and disruptive behavior. This looked like the teacher walking around the classroom and cognitively monitoring student behavior as part of their typical classroom routine.

In the last five minutes of the class period, the teacher gave the student a tablet with the DBR-SIS form on it and provided a verbal prompt to record the percentage of total time that they think they displayed the three target behaviors. While the student

recorded their behavior ratings, the teacher completed the DBR-SIS Google form on the tablet which records the percentage of total time that the student displayed the target behaviors (i.e., academic engagement, respect, and disruptive behavior) during the targeted instructional period; this form was used solely for data collection purposes. Once both the student and the teacher completed their ratings on the Google Form, the teacher briefly met with the student to discuss each of the ratings. Following the guidelines in the intervention script, the teacher (a) gave the student the opportunity to reflect on their performance, (b) discussed agreement/disagreement between student and teacher ratings, and (c) provided the student with performance feedback (see Appendix J). This conversation lasted approximately three minutes (e.g., one minute per target behavior).

Assessment Procedures

Interobserver Agreement. To ensure that teacher DBR-SIS ratings were reliable, external observers conducted concurrent DBR-SIS and SDO observations. Observers were present in the classroom for the duration of the 45-minute class period; the SDO observation was completed toward the start of class and the DBR-SIS ratings were completed at the end of the class period. The reliability of intervention implementation was also assessed; external observers completed the implementation fidelity checklist during each observation. At the conclusion of the study, agreement between the two observers (i.e., teacher and external observer) was calculated.

Implementation Fidelity. Implementation fidelity data was collected daily by the classroom teacher during the intervention phase using the researcher-created intervention fidelity checklist. When teachers did not receive 90% adherence, as recorded by teachers

on the fidelity checklist, and moderate to high quality ratings, as recorded by the external observers, additional training sessions were conducted with the teacher. The additional training consisted of reviewing the operational behavior definitions, reviewing the intervention script, and re-teaching the procedures for completing the DBR-SIS.

Social Validity. After the intervention phase, acceptability measures were administered to all participants. The Children's Usage Rating Profile (CURP; Briesch & Chafouleas, 2009b) was given to the student participants to obtain student perspectives of the usability of the intervention. The Usage Rating Profile – Intervention Revised (URP-IR; Briesch et al., 2013) was given to all participating teachers to obtain information on teachers' perception of intervention usability and feasibility. For both measures, higher ratings are indicative of greater intervention acceptability.

Data Analyses

Visual Analysis

The first two research questions sought to determine whether a self-monitoring intervention utilizing DBR would improve students' classroom behaviors (i.e., academic engagement, respect, disruptive behavior). To address research questions 1 and 2, DBR-SIS data is analyzed using visual analysis, which is the traditional approach used to analyze results in a single case design study (Horner et al., 2005; Kazdin, 2011). To analyze effects within and between phases, these interpretation methods are used: (a) level, (b) trend, (c) variability, (d) immediacy of the effect, (e) consistency of data patterns across similar phases, and (f) overlap between phases.

Level refers to the mean or median of the data in a particular phase. Changes in level are analyzed by determining whether there is a clear shift in performance from the end of one phase (e.g., baseline) to the beginning of the following phase (e.g., intervention). Trend is the overall slope of the data, whether it tends to increase or decrease over time. Changes in trend are analyzed to determine the direction of behavior change within each phase (Kazdin, 2011). Variability refers to how variable or consistent the data is in a particular phase (Kratochwill et al., 2010). Immediacy assesses the magnitude of change between the data points in one phase to another (e.g., baseline phase to intervention phase). The more rapid the change is from one phase to another, the more convincing the evidence is of the impact of the intervention. Lastly, consistency refers to whether data from similar conditions demonstrates similar effects across participants.

Overlap is the proportion of data from the intervention phase that overlaps with data from the baseline phase. When interpreting overlap statistics, a smaller proportion of overlap is indicative of a greater effect. The following nonparametric statistics are utilized in the proposed study to provide a nonoverlap index: Percentage of Nonoverlapping Data (PND) and Percentage of Data Exceeding the Median (PEM).

First, PND is the percentage of data points in the intervention phase that are *better* than the baseline phase. For academic engagement and respectful behavior, PND can be calculated by dividing the number of intervention data points that are greater than the highest baseline data point by the total number of data points in the intervention phase. For disruptive behavior, PND can be calculated by dividing the number of intervention data points that are less than the lowest baseline data point by the total number of data

points in the intervention phase (Scruggs et al., 1987). Some advantages of PND include being relatively easy to calculate and interpret, as well as directly relating to overlap, one of the key components of visual analysis (Parker, Vannest, & Davis, 2011). This method also has some limitations that should be taken into consideration when interpreting the results, including an overemphasis on one score in the baseline phase, a lack of sensitivity or discrimination ability, and susceptibility to ceiling and floor effects (Parker et al., 2007).

Second, PEM is the percentage of data points in the intervention phase that exceed the median of baseline phase (Ma, 2006). To calculate PEM, the number of data points in the intervention phase that exceed the median of the baseline phase is divided by the total number of data points in the intervention phase. PEM is advantageous in that it is not severely impacted by outliers and it addresses concerns with floor or ceiling limits. A limitation of this method is that it does not account for the magnitude of change above or below the median (Ma, 2006).

The demonstration of a functional relationship is established when (a) there is a short latency between manipulation of the independent variable and the change in the dependent variable, (b) changes in level across conditions is large, and (c) trends are in the predicted direction following the manipulation of the independent variable (Horner et al., 2005). Further, having low variability within phases, low overlap between phases, and high consistency across similar phases strengthens the argument for the demonstration of a functional relationship (Kazdin, 2011).

Effect Size Analysis

Though visual analysis is the primary and most recognized and accepted method for analyzing single case design data, calculating and reporting effect sizes can also be beneficial. Effect sizes provide a way for SCD to be included in evidence-based practice reviews (Shadish et al., 2015). First, it allows reviewers to interpret single case results using similar conventions as other designs, such as between-subjects. Second, standardized effect sizes put outcomes on a common scale, which can be useful for researchers who want to compare results across similar single case design studies (Shadish et al., 2015). Between-Case Standardized Mean Difference (BC-SMD) was used in the present study.

BC-SMD was used to obtain an overall estimate of the effect size of the intervention (Pustejovsky et al., 2014). This estimate provides a similar metric to Cohen's *d* which is typically used in between-groups randomized designs. For a multiple baseline across participants design, BC-SMD requires at least three participants. This method uses Hedges' *g* to correct for small sample bias and uses restricted maximum likelihood estimation to control for baseline trend and take into account the change in slope (Valentine et al., 2016). An online BC-SMD tool, R package scdhlm (Pustejovsky et al., 2021), was utilized to obtain these estimates. Cohen's (1988) guidelines were used to interpret the *d*-statistics: <0.20 represents no effect, 0.20 - 0.49 represents a small effect size, 0.50 - 0.79 represents a medium effect size, and values of 0.80 or higher represent a large effect size.

When interpreting effect sizes in single case design, it is important to keep in mind that a large effect size alone is not indicative of the behavioral change being the result of the intervention. For this reason, a combination of visual analysis and effect sizes is utilized in this analysis (Kratochwill et al., 2010). Visual analysis is used to identify a functional relationship between the independent and dependent variable, and effect sizes are used to confirm whether the results of visual analysis accurately depict the data.

Statistical Analysis

Statistical analyses were conducted using SPSS version 27. Frequency data from the student and teacher demographics questionnaire were analyzed and reported. IOA calculations, including Kappa and ICC analyses, were also completed using SPSS. To address research question three, which inquires about teacher and student perceptions of the acceptability and feasibility of the DBR self-monitoring intervention, descriptive statistics of teacher URP-IR ratings and student CURP ratings were analyzed and the means and standard deviations of responses were obtained.

Implementation Fidelity

For each date of observation, the number of intervention steps marked with a + were totaled. The number of intervention steps implemented were then divided by the total number of applicable steps; this value was converted into a percentage to represent the percentage of implementation adherence. In regard to implementation quality, levels of the teacher's enthusiasm and preparedness were rated on a scale of 1 to 5 (1 = *low*, 3 =

moderate, 5 = *high*) for a portion of the implementation days. For each of these quality dimensions, the total points earned were divided by the total number of possible points.

Interobserver Agreement

At the conclusion of the study, the mean percentage of agreement between the teacher and external observers were calculated. Teachers collected DBR-SIS and implementation fidelity data daily; external observers collected DBR-SIS data, SDO data, and implementation fidelity data for 26% of sessions overall. Ratings were compared for each target behavior, for each observation session. When comparing teacher and external observer DBR-SIS ratings, DBR-SIS ratings that were the exact same or are within two points of each other qualified as an agreement. The number of observations in which the teacher and observer were in agreement were totaled and divided by the total number of observations; this value was converted into a percentage.

An additional measure of agreement was conducted by analyzing the relative agreement between external observer SDO data and teacher DBR-SIS ratings. To calculate this, the SDO data was first converted into percentages for each target behavior for each observation. Those percentages were then converted to the corresponding numerical DBR-SIS rating (e.g., 53% = 5). Percentages were rounded up if the smallest place digit was greater than or equal to 5 (e.g., 26% = 3). Then, teacher DBR-SIS ratings were compared to the converted observer SDO ratings to assess agreement. Ratings that were the exact same or are within two points of each other qualified as an agreement. Overall, above 80% is considered acceptable when interpreting IOA values (Kratochwill et al., 2010).

An additional measure of interobserver agreement was calculated using Cohen's kappa coefficient, which corrects for chance between observers (Cohen, 1965; Kazdin, 2011). Cohen's weighted Kappa coefficient was utilized because it places a greater emphasis on large differences between ratings, rather than considering all disagreements as equal (Sim & Wright, 2005). Since IOA is being calculated by agreements within two points, rather than an exact agreement, weighted Kappa seems more appropriate. Generally, Kappa values above .70 are considered acceptable (Kazdin, 2011; Viera & Garrett, 2005). Lastly, intraclass correlation coefficients (ICC) were obtained as a measure of interrater reliability; SPSS was used for this analysis. A one-way random effects model was utilized to account for multiple raters. Calculating ICC consistency estimates provide insight into the degree to which teacher and external observer ratings are equal when systematic error is taken into account (Koo & Li, 2016). Koo and Li (2016) provide the following interpretation guidelines for ICC: < 0.50 is poor reliability, 0.50-0.75 is moderate reliability, 0.75-0.90 is good reliability, and > 0.90 is excellent reliability.

Results

Research Question 1

Research question one asked: Will a self-monitoring intervention utilizing DBR result in increased academic engagement and respectful behavior displayed by students with ADHD? In regard to consistency across participants, four out of five participants demonstrated an increase in academic engagement and respectful behavior after the intervention was introduced (see Figures 1 and 2). In regard to the overlap statistics for

academic engagement, the Percentage of Nonoverlapping Data (PND) was 52.4% indicating that 47.6% of data in the intervention phase overlapped with the baseline phase, and Percentage of Data Exceeding the Median (PEM) was 68.3% indicating that 31.7% of data in the intervention phase overlapped with data below the median of the baseline phase. For respectful behavior, PND was 30.5% which indicates that 69.5% of data in the intervention phase overlapped with the baseline phase, and PEM was 59.8% which indicates that 40.2% of data in the intervention phase overlapped with data below the median of the baseline phase. Effect size analyses indicate that the *d*-statistic for academic engagement was large for the primary outcome measure (d = 1.2, 95% CI [-1.3, 3.6]). The *d*-statistic was small for respectful behavior (d = 0.25, 95% CI [-1.9, 2.4]).

Academic Engagement

Caleb's academic engagement averaged 3.3% of the class period during the baseline phase with minimal variability (range: 0-10%). His overall level of academic engagement substantially increased, averaging 68.6% of the class period during the intervention phase. Caleb's level of academic engagement also became more variable in the intervention phase (range: 10-100%). Additionally, Caleb demonstrated an immediate increase in academic engagement when the intervention was introduced. Though Caleb's academic engagement demonstrated a decreasing trend in baseline, it became more stable in the intervention phase. Lastly, there was only one overlapping data point between baseline and intervention.

Ivan's academic engagement averaged 16.0% of the class period during the baseline phase with minimal variability (range: 10-20%). Ivan demonstrated an

immediate increase in academic engagement when the intervention was introduced. Though his level of academic engagement became substantially more variable during the intervention phase (range: 0-90%), his overall level of academic engagement increased to an average of 44.4% of the class period. Additionally, Ivan's academic engagement was relatively stable with no systematic trend overtime across baseline. In the intervention phase, the data was variable with no systematic trend.

Robert was academically engaged for 78.9% of the class period during the baseline phase and he demonstrated minimal variability (range: 70-90%). His overall level of academic engagement increased during the intervention phase, averaging 87.9% of the class period. Robert's level of academic engagement became more variable in the intervention phase (range: 50-100%). An immediate increase in academic engagement was present when the intervention was introduced. Academic engagement was relatively stable with no systematic trend overtime across baseline and intervention phases for Robert.

Riley was academically engaged for 56.7% of the class period during the baseline phase, however his percentage of academic engagement was highly variable (range: 0-90%). Though his level of academic engagement decreased to an average of 46.7% during the intervention phase, his academic engagement became slightly less variable overall (range: 10-80%). Riley demonstrated a slightly decreasing trend in regard to academic engagement in both the baseline and intervention phases. An immediate level change was not present.

Kevin's academic engagement averaged 58.2% of the class period during the baseline phase with substantial variability (range: 10-90%). His overall level of academic engagement increased during the intervention phase, averaging 77.7% of the class period, and became slightly less variable (range: 30-100%). Additionally, Kevin demonstrated an immediate increase in academic engagement when the intervention was introduced. Kevin's baseline data for academic engagement demonstrated a decreasing trend; Kevin had a relatively stable trend in the beginning of the intervention phase, but the data demonstrated a decreasing trend in the last three days of the intervention phase.

Respectful Behavior

Caleb's level of respectful behavior averaged 43.3% of the class period during the baseline phase with minimal variability (range: 40-50%). An immediate increase in respectful behavior was present when the intervention was introduced. His overall level of respectful behavior substantially increased, averaging 74.1% of the class period during the intervention phase. Caleb's level of respect became more variable in the intervention phase (range: 30-100%). Additionally, Caleb demonstrated an increasing trend in baseline; his data in the intervention phase demonstrated a relatively stable trend.

Ivan's level of respectful behavior averaged 78.0% of the class period during the baseline phase with minimal variability (range: 70-90%). His overall level of respectful behavior increased to an average of 81.7% during the intervention phase (range: 60-100%). A decreasing trend was present in the baseline phase. Rather than an immediate change in respectful behavior, Ivan demonstrated a gradual increase in respectful behavior during the intervention phase.

Robert engaged in respectful behavior for 78.8% of the class period on average during the baseline phase; his level of respectful behavior was variable during this time (range: 60-100%). An immediate increase in respectful behavior was demonstrated when the intervention was introduced. His overall level of respectful behavior increased during the intervention phase, averaging 95.0% of the class period. With the exception of one day during the intervention phase where he was respectful 50% of the period, his level of respectful behavior became less variable during the intervention phase (range: 90-100%). Robert's respectful behavior was relatively stable with no systematic trend overtime across baseline and intervention phases.

Riley was engaged in respectful behavior for 56.7% of the class period during the baseline phase; his level of respectful behavior was variable during this time (range: 60-100%). During the intervention phase, his level of respectful behavior decreased to an average of 46.7% and became more variable (range: 30-100%). Though Riley demonstrated a decreasing trend in baseline, he had a relatively stable trend throughout the intervention phase. Interestingly, an immediate decrease in respectful behavior was demonstrated when the intervention was introduced.

Kevin's respectful behavior averaged 65.5% of the class period during the baseline phase with substantial variability (range: 20-90%). An immediate increase in respectful behavior was present when the intervention was introduced. During the intervention phase, his level of respectful behavior increased to an average of 78.5% of the class period. Overall, he demonstrated more variability in the intervention phase (range: 0-100%). However, for 11 out of 13 of the intervention phase days Kevin's level

of respectful behavior ranged from 70% to 100%. Kevin's baseline data for respectful behavior demonstrated a decreasing trend; Kevin had a relatively stable trend in the beginning of the intervention phase, but the data demonstrated a decreasing trend in the last three days of the intervention phase.

Research Question 2

Research question two asked: Will a self-monitoring intervention utilizing DBR result in decreased disruptive behavior displayed by students with ADHD? In regard to consistency across participants, three out of five participants demonstrated a decrease in disruptive behavior after the intervention was introduced (see Figure 3). In regard to the overlap statistics for disruptive behavior, PND was 21.7% indicating that 78.3% of data in the intervention phase overlapped with the baseline phase, and PEM was 46.3% indicating that 53.7% of data in the intervention phase overlapped with data below the median of the baseline phase. Effect size analyses produced a *d*-statistic that suggested no effect for disruptive behavior (d = -0.17, 95% CI [-1.9, 1.6]).

Caleb's average level of disruptive behavior was 6.7% during the baseline phase with minimal variability (range: 0-10%). His overall level of disruptive behavior substantially increased, averaging 32.7% of the class period during the intervention phase. Caleb's level of disruptive behavior also became much more variable in the intervention phase (range: 0-100%). Interestingly, an immediate increase in disruptive behavior was evident upon introduction to the intervention. Caleb's disruptive behavior was relatively stable with no systematic trend overtime across baseline. In the intervention phase, the data was variable with no systematic trend.

Ivan's disruptive behavior averaged 60.0% of the class period during the baseline phase with some variability (range: 30-80%). Though his level of disruptive behavior became substantially more variable during the intervention phase (range: 0-100%), his overall level of disruptive behavior decreased slightly, averaging 54.4% of the class period. Though Ivan's respectful behavior demonstrated an increasing trend in baseline, it became a decreasing trend in the intervention phase. An immediate level change was not present.

Robert was engaged in disruptive behavior for 22.2% of the class period during the baseline phase; his level of disruptive behavior was variable during this time (range: 10-40%). During the intervention phase, his level of disruptive behavior decreased to an average of 7.9% and remained variable (range: 0-40%). However, for 10 out of 14 of the intervention days Robert was disruptive for 0% of the class period. Additionally, an immediate decrease in disruptive behavior was present when the intervention was introduced. Though Robert demonstrated an increasing trend in baseline, he had a relatively stable trend throughout the intervention phase.

Riley's level of disruptive behavior averaged 55.6% of the class period during the baseline phase with some variability (range: 30-70%). His overall level of disruptive behavior increased to an average of 62.0% during the intervention phase. Riley's level of disruptive behavior became slightly more variable in the intervention phase (range: 30-80%). Riley demonstrated a stable baseline with no systematic trend; there was a decreasing trend in the intervention phase. An immediate level change was not present.

Kevin was engaged in disruptive behavior for 39.1% of the class period during the baseline phase; his level of respectful behavior was variable during this time (range: 10-70%). During the intervention phase, his level of disruptive behavior slightly decreased to an average of 31.5% and became more variable (range: 0-100%). An immediate decrease in disruptive behavior was present when the intervention was introduced. Additionally, there was no systematic trend in the data across baseline and intervention phases for Kevin.

Research Question 3

Research question three asked: Will teachers and students rate the intervention as highly usable, acceptable, and feasible?

Analysis of post-intervention teacher URP-IR ratings suggest that teacher implementers found the self-monitoring intervention feasible (M = 4.77, SD = 0.77), acceptable (M = 4.96, SD = 0.93), and understandable (M = 5.60, SD = 0.51). Additionally, teachers felt that the intervention required minimal system-level support and could be implemented independently (M = 2.73, SD = 1.03). Overall, results suggest that teachers found the DBR self-monitoring intervention to be usable in the middle school setting (M = 4.78, SD = 0.99).

Analysis of post-intervention student CURP ratings suggest that student participants found the self-monitoring intervention feasible (M = 3.55, SD = 0.81) and understandable (M = 3.80, SD = 0.41). Further, students found the intervention to be moderately desirable (M = 2.97, SD = 1.15). Overall, students indicated that the self-monitoring intervention was usable in the middle school setting (M = 3.43, SD: 0.92).

Interobserver Agreement (IOA)

IOA data was collected for 26% of sessions across participants, which exceeds the WWC standard of completing IOA for 20% of sessions across all phases (Kazdin, 2011). Observers collected DBR and SDO data for 24% of sessions in baseline and 27% of sessions in the intervention phase. IOA for the DBR-SIS ratings averaged 75% across observer-teacher pairs over the course of the study, ranging from 50% to 100%. IOA between the teacher DBR-SIS rating and the observer SDO data averaged 72% over the course of the study (*range* = 50-100%). Cohen's weighted Kappa averaged 0.540 for the DBR-SIS ratings, suggesting moderate agreement. For the SDO observer ratings and teacher DBR-SIS ratings, Cohen's weighted Kappa averaged 0.536, also suggesting moderate agreement. ICC estimates for the DBR-SIS ratings were 0.72 (95% CI: 0.60-0.80), suggesting moderate reliability. ICC estimates for the observer SDO ratings and teacher DBR-SIS ratings were 0.68 (95% CI: 0.56-0.78), suggesting moderate reliability.

IOA was also calculated between the observer SDO ratings and observer DBR-SIS ratings, which were collected within the same 45-minute observation period. IOA averaged 88% across observers, ranging from 83% to 100%. Cohen's weighted Kappa averaged 0.687 for the observer DBR-SIS and SDO ratings, suggesting substantial agreement. ICC estimates between the observer ratings were 0.88 (95% CI: 0.82-0.92), suggesting good reliability. Results suggest that raters remained fairly consistent across their SDO ratings and subsequent DBR ratings.

Implementation Fidelity

Implementation fidelity was collected by teachers for 72% of intervention days. In regard to implementation adherence, 91% of intervention steps were completed across teachers. Teacher 1 had 96% implementation adherence, Teacher 2 had 100%, Teacher 3 had 90%, Teacher 4 had 86%, and Teacher 5 had 73%. A brief re-training session was held with Teachers 4 and 5 partway through intervention implementation in order to review the intervention procedure. External observers collected implementation fidelity data for 26% of intervention sessions, during this time implementation quality ratings were also obtained. Overall, observer data indicated that on average 86% of intervention steps were completed by teachers with high enthusiasm ($M = 4.64$) and high preparedness ($M = 4.73$).

Exposure

In regard to intervention exposure, since the study method utilized was a multiple baseline design by participants, the total number of intervention days varied by participant. Caleb had 22 days of intervention, Ivan had 18, Robert had 14, Riley had 15, and Kevin had 13 days of intervention. Some students had missing data on some of the scheduled intervention days due to student or teacher absences: Caleb had one absence during the intervention phase, Ivan and Robert each had three absences during the intervention phase, Riley had one absence during baseline and one absence during the intervention phase, and though Kevin had no absences, his teacher had two absences during the baseline phase. No students or teachers were absent due to COVID-19, which

could introduce symptoms of extreme fatigue and irritable behavior. No other student or teacher absences were noted.

Discussion

The purpose of the present study was to (a) evaluate the effectiveness of a DBR self-monitoring intervention for middle school students with ADHD, (b) evaluate the perceived usability of the DBR self-monitoring intervention, (c) expand the available self-monitoring interventions available for use in educational settings, and (d) expand the body of literature supporting the DBR-SIS assessment methodology for varied uses.

Improving Student Classroom Behavior

Research question one explored whether student academic engagement and respectful behavior would increase as a result of the intervention. Results indicated that four out of five participants demonstrated an increase in academic engagement and respectful behavior after intervention implementation, with the most prominent improvements seen in academic engagement. A positive effect on level was seen for students in the areas of academic engagement and respectful behavior, with the exception of Riley who did not demonstrate improvements.

Caleb demonstrated the largest increase in academic engagement, as he was academically engaged for 65.3% more of the time in intervention than in baseline. Ivan, Robert, and Kevin also became more academically engaged in intervention with average increases of 28.4%, 9.0%, and 19.5% respectively. Improvements in academic engagement for these four students were seen immediately after the intervention was introduced. Though levels of academic engagement were fairly variable for some

students (e.g., Ivan) leading to a considerable amount of overlap between baseline and intervention, research suggests that students with ADHD tend to have variable behavior (Harris et al., 2005) and therefore this was not unexpected.

In regard to respectful behavior, Caleb again demonstrated the greatest degree of improvement as he was respectful for 30.8% more of the time in intervention than in baseline. Ivan, Robert, and Kevin also were more respectful in intervention with average increases of 3.7%, 16.2%, and 13.0% respectively. Some students demonstrated overall level increases for respectful behavior between baseline and intervention, but had a few days of variable behavior that impacted these averages. Robert's respectful behavior, for example, ranged from 90-100% with the exception of one day in intervention. On the day that Robert demonstrated lower levels of respectful behavior, Robert's teacher noted that they were engaging in a new activity that day. With the exception of two days in intervention, Kevin's respectful behavior ranged from 70-100%. On one of the days that Kevin demonstrated low levels of respectful behavior, his teacher noted that he came into class angry (i.e., swearing, work refusal) and this behavior continued throughout the duration of the class period. After intervention implementation, improvements in respectful behavior were immediate for three of these students; for Ivan, however, the improvements were gradual.

Research question two explored whether student disruptive behavior would decrease as a result of the intervention. Results indicated that three out of five participants demonstrated a decrease in disruptive behavior after intervention implementation. A positive effect on level was seen for students for disruptive behavior,

with the exception of Ivan and Riley who did not demonstrate improvements. Though the decrease in disruptive behavior was slight, Ivan, Robert, and Kevin were less disruptive during intervention with average decreases of 5.6%, 14.3%, and 7.6% respectively. After intervention initialization, improvements in disruptive behavior were immediate for these three students. Robert demonstrated the lowest levels of disruptive behavior during intervention, with 0% disruptive behavior for 10 out of 14 intervention days. Levels of disruptive behavior were fairly variable for students, which again is somewhat expected for this population based on previous research findings demonstrating that students with ADHD tend to struggle with impaired behavioral regulation (Barkley, 1997; Harris et al., 2005; Willcutt et al., 2005).

Improving the Student-Teacher Relationship

Research suggests that students with ADHD tend to have poorer relationships with their teachers when compared to typical peers, which tends to have a negative impact on their success in school (Ewe, 2019; Rushton et al., 2020; Zendarski et al., 2020). Ewe (2019), for example, reviewed seven studies on the student-teacher relationship and students with ADHD and found that across studies (a) students with ADHD tended to report lacking feelings of closeness to their teachers and (b) teachers tended to report there being less cooperation and greater conflict between them and their students with ADHD. To address this, one aspect of the intervention focused on teachers providing students with performance feedback, which included error correction with strategy suggestions as well as positive praise, in order to build and establish a more positive student-teacher relationship.

Error correction, which involves discussing the observed behaviors and explaining to the student exactly what contrasting positive behavior they can engage in to improve in the future, is an evidence-based classroom management strategy that is associated with decreases in disruptive behavior (Simonsen et al., 2008). While contrasting examples have been shown to help low performing student comprehension of abstract concepts like social behavior, providing specific praise in the classroom is associated with increases in student engagement and decreases in inappropriate behavior, specifically for students with behavioral challenges (Allday et al., 2012; Sutherland et al., 2000).

When the present study concluded, Ivan's teacher explained that the intervention helped her to recall more of Ivan's positive behaviors rather than focus solely on the negative behaviors, which helped her engage with the student in a more productive way more frequently during class. Similarly, Robert's teacher shared that collecting the DBR data helped her notice more of Robert's positive behaviors and remind her to praise him for that, which she indicated helped to improve their interactions and relationship immensely. Kevin's teacher also noted that the check-in portion of the intervention helped build a positive relationship with the student because it gave them a chance to talk about behavior in a positive and constructive way.

Feasibility of Intervention Implementation

Research question three explored whether participants found the intervention to be feasible for implementation in the classroom setting. All teachers completed a 29-item social validity measure (Chafouleas et al., 2011) at the conclusion of the study, with each

question rated on a 1 (strongly disagree) to 6 (strongly agree) scale of intervention usability. All teachers found the intervention to be feasible, acceptable, and understandable. Additionally, teachers were able to implement the intervention with minimal system-level support or resources. This finding is significant because the intervention was not entirely effective for all students; despite intervention effectiveness, teachers still found the intervention procedures to be feasible and acceptable. Possible explanations for the high level of intervention acceptability by teachers is the relative simplicity of the intervention as well as the involvement of the student in implementation. One of the primary advantages of self-monitoring interventions are how they increase student independence, therefore decreasing reliance on teachers and school resources (Cooper, 2007). Additionally, since the intervention tends to be more flexible (e.g., target behaviors monitored, duration of self-monitoring period, resources used), it can more easily fit into a teacher's existing classroom structure and pedagogical format regardless of lesson content area. At the conclusion of the study, all students completed a similar 21-item social validity measure (Briesch & Chafouleas, 2009c) with each question rated on a 1 (I totally disagree) to 4 (I totally agree) scale. Results indicated that students understood the intervention and found it feasible. Research findings suggest that when the intervention is viewed as acceptable, teachers are more likely to implement the intervention in their classroom and students are more likely to be compliant with the intervention (Briesch & Chafouleas, 2009).

Discussion of Non-Effects

While these key findings are important to highlight the validity of using DBR-SIS methods as an intervention for students with ADHD, non-effects are also worth discussing. The exploration of non-effects may indicate potential factors that impacted the effectiveness of the intervention under certain conditions or settings.

Student 1

In regard to Ivan's increase in disruptive behavior after the intervention was implemented, it is important to note that prior to starting intervention his classroom teacher indicated that academic engagement was the primary concern. With this particular student, in baseline he had extremely low levels of both academic engagement and disruptive behavior because he spent the majority of the class period with his head down on his desk and refusing to participate. Given this, he was minimally disruptive and had little to no participation in the classroom activities. During the intervention, he became substantially more involved in the classroom activities, participated rather than putting his head down, and was engaged in the academic content. As a result of this increase in participation, his levels of disruptive behavior commensurately increased. However, when consulting with the classroom teacher, he made it clear that this was a preferred change; he was accepting of the increase in disruptive behavior because of the significant increase in academic engagement and work completion, as well as the potential for at least some positive interaction.

Student 4

One student in particular, Riley, did not demonstrate improvements in any of the target behaviors. Though Riley's grade, diagnosis type, and presence of comorbid diagnoses were similar to the other students, one possible reason for this different outcome is his lack of engagement in the intervention process. Prior to initiating the study, an informational flyer that detailed the project involvement and compensation procedures (i.e., student receipt of a tablet when the project was complete) was sent home to participants' parents. Throughout the study, Riley continually asked his classroom teacher when he was going to receive the tablet and frequently refused to participate in the performance feedback session with the classroom teacher because she would not give him the tablet to take home. It is hypothesized that Riley's parent disclosed the compensation procedure to him, which appears to have impacted his behavior with his teacher and his level of cooperation during the intervention. None of the other student participants expressed awareness of the tablet as compensation and all other students had a high level of cooperation throughout the intervention.

Another potential factor that may have impacted Riley's non-response to the intervention is that Riley was the only participant receiving services through an IEP. Research indicates that students whose ADHD symptoms are more severe tend to receive services through an IEP rather than a 504 plan (DuPaul et al., 2019). Within a response to intervention (RTI) approach to assessment, a student is typically referred for a special education evaluation and subsequent IEP plan if the student does not demonstrate adequate progress in response to evidence-based interventions at the Tier 2 level

(Sprague et al., 2008). Additionally, in order to qualify for special education and IEP services, students must demonstrate that their disability is adversely affecting their educational performance (IDEA, 2004, OHI section). Given this, it is possible that Riley has not responded to behavioral interventions in the past and that his ADHD symptoms are more severe, when compared to the four other participants who were on a 504 plan. Based on this, school-based service plans (IEP vs. 504 plan) and ADHD symptom severity may be factors that impact whether a student responds to this intervention. Additionally, findings suggest that this DBR self-monitoring intervention may have more utility as a Tier 2 behavioral support.

Limitations

Limited Access to Student Data

As previously noted, ADHD symptom severity may have been a potential factor that impacted student response versus non-response to this intervention. Results of the Multimodal Treatment Study of Children with ADHD (MTA), for example, indicated that ADHD symptom severity significantly impacted treatment outcomes, in that children with less severe ADHD symptoms at baseline demonstrated a greater response to the combined behavioral treatment (Hinshaw, 2007; MTA Cooperative Group, 1999). Given this, one limitation of the present study is that ADHD symptom severity was not assessed prior to the start of the study. It would have been useful to administer a measure of ADHD symptomatology, such as the Strengths and Weakness of ADHD-symptoms and Normal-behavior (SWAN; Swanson et al., 2012) scale or the Vanderbilt ADHD Diagnostic Rating Scale (VADRS; Wolraich et al., 2003), to obtain baseline levels of

ADHD severity. This data could have been used to (a) assess changes in symptom severity before and after intervention and/or (b) serve as an exclusion criteria for the present study to rule out students whose ADHD symptoms were too severe for a Tier 2 intervention. Though this suggestion was presented to the district prior to initiating this study, the district did not approve diagnostic/assessment procedures to be completed due to district policy of keeping intervention/progress monitoring procedures and assessment procedures separate. Future studies should assess symptom severity in order to further understand its impact on intervention response and student outcomes.

Interobserver Agreement

One limitation of the present study is that the IOA did not reach What Works Clearinghouse (WWC) standards of 80% agreement (Kratochwill et al., 2010), meaning that the classroom teachers and external observers did not have an acceptable degree of inter-rater agreement within their ratings. Across the course of the study, IOA for the DBR-SIS ratings averaged 75%, while IOA between the teacher DBR-SIS rating and the observer SDO data averaged 72%. One potential reason for this is that observer ratings may have been impacted by the structure of the observation sessions. Observers collected SDO for 15 minutes toward the beginning of the class period, observed for the duration of the class period, and then completed the DBR-SIS ratings at the end of the 45-minute class period. Since SDO data was collected at the beginning, it is possible that those percentages may have impacted the observers' subsequent DBR-SIS ratings. It is unclear the extent to which collecting these two forms of data within the same 45-minute time period may have impacted the ratings.

Additionally, generalizability studies have demonstrated that rater effects consistently contribute to the variance in DBR scores (Briesch et al., 2010; Chafouleas, Christ, et al., 2007; Chafouleas, Christ, & Riley-Tilman, 2009; Christ et al., 2010; Volpe & Briesch, 2012). In one study that used DBR-SIS to assess the behavior of middle school students, conducted by Chafouleas, Briesch, and colleagues (2010), visual analyses of student ratings across raters showed rating discrepancies between the head teacher, consultant teacher, and two research assistants. Specifically, results indicated that raters were more consistent when student behavior was extreme (e.g., very high vs. very low) and were more variable when rating behavior that was moderate or variable (Chafouleas, Briesch, et al., 2010). Similarly, when investigating rater effects within DBR, Anthony and colleagues (2022) found that though raters tended to be consistent in their rating style over time, overall some raters tended to be more lenient while other raters were more stringent across time points despite protocol training (Anthony et al., 2022). This trend was found in the present study, with differences in how teachers and external observers rated student behavior. When interpreting on-task behavior, for example, if the class expectation was to watch a video and take notes, teachers tended to rate highly if the student was engaged and watching the video (more lenient). Despite standardization across training and scoring expectations, the external observers, on the other hand, tended to rate that same behavior low for on-task because the student was not simultaneously taking notes (more stringent). To improve IOA in future studies, it may be beneficial to clarify target behaviors more in the training sessions. One possible solution would be to consult with teachers beforehand to develop definitions/examples

for what the target behaviors are expected to look like in their classroom and tailor the behavioral definitions to fit the teacher's preference and classroom style, rather than utilizing generic and broad behavior definitions.

Taken together, the present research suggests that there tends to be some degree of variability in how different raters rate student behaviors when using DBR. As a result, those rater effects are likely a key contributor to the low interobserver agreement in the present study. Despite the low IOA, obtaining the teacher's perception of student behavior is extremely valuable given the purpose of this measure. Research supports using and interpreting DBR data from only one rater to progress monitor student behavior, rather than generalizing results across raters (Chafouleas, Christ, et al., 2007; Anthony, et al., 2022). Specifically, Chafouleas, Briesch, and colleagues (2010) recommended that the main classroom teacher is likely to produce the most reliable data due to their higher degree of interactions with the student throughout the period.

Follow-up Data

Although many studies have demonstrated the immediate effectiveness of self-monitoring interventions for children with ADHD, there is a lack of research examining the generalization of immediately reported benefits across settings or findings that indicate initial benefits are maintained over time. In a broad meta-analysis, DuPaul et al. (2012) examined 60 school-based intervention studies for students with ADHD that were conducted between 1996 and 2010 and found that only 20% conducted follow-up assessments. Looking specifically at self-monitoring interventions, Sheffield and Waller (2010) found that very few studies collect and report maintenance data. Because ADHD

is a chronic disorder and symptoms often persist into adulthood, it is especially important to investigate long-term benefits and whether intervention effects are maintained over time (Subcommittee on Attention-Deficit/Hyperactivity Disorder, 2011). Sibley and colleagues (2018) recommend that in order to fully understand the intervention impact for students with ADHD, future studies should conduct follow-up assessments at least one year after treatment completion.

Given this, an additional limitation of the present study is that follow-up data was not collected. Originally, maintenance observations were going to be conducted to assess whether gains endured over time. One month after intervention completion, data was going to be collected on participants' academic engagement, respect, and disruptive behavior in the previously targeted class period. The teacher and external observer were going to once again conduct observations and record student behavior using the DBR-SIS daily for one school week. However, due to school site recommendation the study was concluded after the intervention phase; this administrative decision was unrelated to the intervention or the present study. Future studies should aim to include a maintenance phase and collect follow-up data.

Implications

Given the large number of children with ADHD and their concomitant high risk for poor outcomes, it is important to understand how to effectively support and encourage academic and social growth of these individuals in the school setting. Specifically, previous investigations have indicated that teachers report students with ADHD as more difficult to work with and support (Greene et al., 2002; Stormont, 2001), and that they

generate more disruptive behaviors which result in lower academic performance overall. Thus, providing teachers with effective and feasible intervention options to support this population is of utmost importance. Research further suggests that teaching students self-monitoring is an intervention option that is both feasible for classroom teachers and effective for students with ADHD (Cooper 2007; Reid et al., 2005; Shapiro & Cole, 1994). The present study aimed to adapt the self-monitoring procedure by utilizing DBR assessment methodology, giving the intervention greater utility within a school system using a multi-tiered system of support (MTSS) model.

The present study provided further support for using DBR methodology as both an assessment tool and an intervention mechanism (Chafouleas et al., 2002). First, results indicated that the DBR self-monitoring intervention is effective for improving classroom behavior (e.g., academic engagement, respectful behavior, disruptive behavior) in middle school students with ADHD, especially for increasing academic engagement amongst students. Second, this study demonstrated that a progress monitoring tool (i.e., DBR data collection) can be built into the intervention, therefore making school-based data collection easier. The data collected as part of the intervention can be used for school-based decision making (e.g., Tier II progress monitoring, recommendation for Tier III, special education eligibility, etc.). Lastly, the present study provided support for the feasibility and acceptability of the intervention in a classroom setting.

References

Allday, R. A., Hinkson-Lee, K., Hudson, T., Neilsen-Gatti, S., Kleinke, A., & Russel, C. S. (2012). Training general educators to increase behavior-specific praise: Effects on students with EBD. *Behavioral Disorders*, *37*(2), 87-98. Retrieved from http://www.jstor.org/stable/23890733

American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

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

Anthony, C.J., Styck, K.M., & Volpe, R.J. (2022, February 15-18). Exploring Rater Effects for Direct Behavior Ratings and Multi-Item Scales (PA249) [Conference presentation]. NASP 2022 Convention, Boston, MA, United States. https://apps.nasponline.org/professional-development/convention/session-detail.aspx?ID=22747

Antshel, K. M., & Remer, R. (2003). Social skills training in children with attention deficit hyperactivity disorder: A randomized-controlled clinical trial. *Journal of Clinical Child and Adolescent Psychology, 32*(1), 153-165. doi: 10.1207/15374420360533149

Ardoin, S. P., & Martens, B. K. (2004). Training children to make accurate self-evaluations: Effects on behavior and the quality of self-ratings. *Journal of Behavioral Education, 13*(1), 1-23. doi: 10.1023/B:JOBE.0000011257.63085.88

Arnett, A. B., Pennington, B. F., Willcutt, E. G., DeFries, J. C., & Olson, R. K. (2014). Sex differences in ADHD symptom severity. *Journal of Child Psychology and Psychiatry*, *56*(6), 632-639. doi: 10.1111/jcpp.12337

Barkley, R.A. (1997). Behavioral inhibition, sustained attention, and executive functions: Constructing a unifying theory of ADHD. *Psychological Bulletin, 121*(1), 65-94. doi: 10.1037/0033-2909.121.1.65

Barkley, R.A. (2004). Attention-deficit/Hyperactivity disorder and self-regulation: Taking an evolutionary perspective on executive functioning. In R.F. Baumeister & K.D. Voks (Eds.), *Handbook of self-regulation: Research, theory, and applications* (pp. 301-323). New York, NY: Guilford Press.

Barkley, R. A. (Ed.). (2014). *Attention-deficit hyperactivity disorder: A handbook for diagnosis and treatment*. Guilford Publications.

Barkley, R. A., Fischer, M., Edelbrock, C. S., & Smallish, L. (1990). The adolescent outcome of hyperactive children diagnosed by research criteria: I. An 8-year prospective follow-up study. *Journal of the American Academy of Child & Adolescent Psychiatry, 29*(4), 546-557. doi: 10.1097/00004583-199007000-00007

Barkley, R. A., Fischer, M., Smallish, L., & Fletcher, K. (2006). Young adult outcome of hyperactive children: adaptive functioning in major life activities. *Journal of the American Academy of Child & Adolescent Psychiatry*, *45*(2), 192-202. doi: 10.1097/01.chi.0000189134.97436.e2

Barry, L. M., & Haraway, D. L. (2005). Self-management and ADHD: A literature review. The Behavior Analyst Today, 6(1), 48-64. doi: 10.1037/h0100051

Barry, T. D., Lyman, R. D., & Klinger, L. G. (2002). Academic underachievement and attention-deficit/hyperactivity disorder: The negative impact of symptom severity on school performance. *Journal of school psychology*, *40*(3), 259-283. doi: 10.1016/S0022-4405(02)00100-0

Barry, L. M., & Messer, J. J. (2003). A Practical Application of Self-Management for Students Diagnosed with Attention-Deficit/Hyperactivity Disorder. *Journal of Positive Behavior Interventions, 5*, 238-248. doi: 10.1177/10983007030050040701

Baumeister, R. F., Heatherton, T. F., & Tice, D. M. (1994). *Losing control: How and why people fail at self-regulation.* San Diego, CA: Academic Press.

Berger, A. (2011). *Self-regulation: Brain, cognition, and development*. Washington, DC: American Psychological Association.

Biederman, J., Faraone, S., Milberger, S., Guite, J., Mick, E., Chen, L., ... & Spencer, T. (1996). A prospective 4-year follow-up study of attention-deficit hyperactivity and related disorders. *Archives of General Psychiatry*, *53*(5), 437-446. doi: 10.1001/archpsyc.1996.01830050073012

Briesch, A. M., & Chafouleas, S. M. (2009a). Review and analysis of literature on self-management interventions to promote appropriate classroom behaviors (1988-2008). *School Psychology Quarterly, 24*, 106-118. doi: 10.1037/a0016159

Briesch, A. M., & Chafouleas, S. M. (2009b). Exploring student buy-in: Initial development of an instrument to measure likelihood of children's intervention usage. *Journal of Educational and Psychological Consultation, 19*, 321-336. doi: 10.1080/10474410903408885

Briesch, A. M., & Chafouleas, S. M. (2009c). *Children's Usage Rating Profile (Actual)*. Storrs, CT: University of Connecticut.

Briesch, A. M., Chafouleas, S. M., Neugebauer, S. R., & Riley-Tillman, T. C. (2013). Assessing influences on intervention use: Revision of the Usage Rating Profile-Intervention. *Journal of School Psychology, 51*, 81-96. doi: 10.1016/j.jsp.2012.08.006

Briesch, A.M., Chafouleas, S.M., & Riley-Tillman, T.C. (2010). Generalizability and dependability of behavior assessment methods to estimate academic engagement: A comparison of systematic direct observation and Direct Behavior Rating. *School Psychology Review, 39*(3), 408-421. doi: 10.1080/02796015.2010.12087761

Brooks, A., Todd, A. W., Tofflemover, S., & Horner, R. H. (2003). Use of functional assessment and a self-management system to increase academic engagement and work completion. *Journal of Positive Behavior Interventions, 5*, 144-152. doi: 10.1177/10983007030050030301

Chafouleas, S. M. (2011). Direct Behavior Rating: A review of the issues and research in its development. *Education and Treatment of Children, 34*(4), 575-591. doi: 10.1353/etc.2011.0034

Chafouleas, S. M., Briesch, A. M., Neugebauer, S. R., & Riley-Tillman, T. C. (2011). *Usage Rating Profile – Intervention (Revised)*. Storrs, CT: University of Connecticut.

Chafouleas, S.M., Briesch, A.M., Riley-Tillman, T.C., Christ, T.C., Black, A.C., & Kilgus, S.P. (2010). An investigation of the generalizability and dependability of Direct Behavior Rating Single Item Scales (DBR-SIS) to measure academic engagement and disruptive behavior of middle school students. *Journal of School Psychology, 48*, 219-246. doi: 10.1016/j.jsp.2010.02.001

Chafouleas, S. M., Christ, T. J., & Riley-Tillman, T. C. (2009). Generalizability of scaling gradients on direct behavior ratings. *Educational and Psychological Measurement, 69*, 157-173. doi: 10.1177/0013164408322005

Chafouleas, S.M., Christ, T., Riley-Tillman, T.C., Briesch, A.M., & Chanese, J. (2007). Generalizability and dependability of Direct Behavior Ratings to measure social behavior of preschoolers. *School Psychology Review, 36(1),* 63-79. doi: 10.1080/02796015.2007.12087952

Chafouleas, S. M., Jaffery, R., Riley-Tillman, T. C., Christ, T. J., & Sen, R. (2013). The impact of target, wording, and duration on rating accuracy for direct behavior rating. *Assessment for Effective Intervention, 39*(1), 39-53. doi: 10.1177/1534508413489335

Chafouleas, S. M., McDougal, J. L., Riley-Tillman, T. C., Panahon, C. J., & Hilt, A. M. (2005). What do daily behavior report cards (DBRCs) measure? An initial comparison of DBRCs with direct observation for off-task behavior. *Psychology in the Schools, 42*, 669-676. doi: 10.1002/pits.20102

Chafouleas, S. M., Riley-Tillman, T. C., & Christ, T. J. (2009). Direct Behavior Rating (DBR): An emerging method for assessing social behavior within a tiered intervention system. *Assessment for Effective Intervention, 34*(4), 195-200. doi: 10.1177/1534508409340391

Chafouleas, S.M., Riley-Tillman, T.C., & McDougal, J. (2002). Good, bad, or in-between: How does the daily behavior report card rate? *Psychology in the Schools, 39*, 157-169. doi: 10.1002/pits.10027

Chafouleas, S. M., Riley-Tillman, T. C., & Sugai, G. (2007). *School-based behavior assessment and monitoring for informing instruction and intervention*. New York, NY: Guilford Press.

Chafouleas, S. M., Sanetti, L. M. H., Jaffery, R., & Fallon, L. M. (2012). An evaluation of a classwide intervention package involving self-management and a group contingency on classroom behavior of middle school students. *Journal of Behavioral Education*, *21*(1), 34-57. doi: 10.1007/s10864-9135-8

Chafouleas, S. M., Sanetti, L. M., Kilgus, S. P., & Maggin, D. M. (2012). Evaluating sensitivity to behavioral change using direct behavior rating single-item scales. *Exceptional Children, 78*(4), 491-505. doi: 10.1177/001440291207800406

Chafouleas, S.M., Volpe, R.J., Gresham, F.M., & Cook, C.R. (2010). School-based behavioral assessment within problem-solving models: Current status and future directions. *School Psychology Review, 39*(3), 343-349. doi: 10.1080/02796015.2010.12087756

California Department of Education (n.d.). *Data Quest.* Retrieved from https://dq.cde.ca.gov/dataquest/

Christ, T. J., Riley-Tillman, T. C., & Chafouleas, S. M. (2009). Foundation for the development and use of Direct Behavior Rating (DBR) to assess and evaluate student behavior. *Assessment for Effective Intervention, 34*(4), 201-213. doi: 10.1177/1534508409340390

Christ, T. J., Riley-Tillman, T. C., Chafouleas, S. M., & Boice, C. H. (2010). Generalizability and dependability of Direct Behavior Ratings (DBR) across raters and observations. *Educational and Psychological Measurement, 70*(5), 825-843. doi: 10.1177/0013164410366695

Chronis, A. M., Chacko, A., Fabiano, G. A., Wymbs, B. T., & Pelham, W. E. (2004). Enhancements to the behavioral parent training paradigm for families of children with ADHD: Review and future directions. *Clinical Child and Family Psychology Review, 7*(1), 1-27. doi: 10.1023/b:ccfp.0000020190.60808.a4

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). *Applied behavior analysis* (2nd ed). Upper Saddle River, NJ: Pearson.

Dane, A. V., & Schneider, B. H. (1998). Program integrity in primary and early secondary prevention: are implementation effects out of control?. *Clinical Psychology Review, 18*(1), 23-45. doi: 10.1016/s0272-7358(97)00043-3

Davies, S. C., Jones, K. M., & Rafoth, M. A. (2010). Effects of a self-monitoring intervention on children with traumatic brain injury. *Journal of Applied School Psychology*, *26*(4), 308-326. doi: 10.1080/15377903.2010.518587

Deno, S. L. (1985). Curriculum-based measurement: The emerging alternative. *Exceptional Children, 52*(3), 219-232. doi: 10.1177/001440298505200303

Deno, S. L. (2005). Problem-solving assessment. In R. Brown-Chidsey (Ed.), *Assessment for intervention: A problem-solving approach* (pp. 10–40). New York, NY: Gilford.

Deno, S. L., Reschly, A. L., Lembke, E. S., Magnusson, D., Callender, S. A., Windram, H., & Stachel, N. (2009). Developing a school-wide progress-monitoring system. *Psychology in the Schools, 46*(1), 44-55. doi: 10.1002/pits.20353

Dewey, J. (1939). *Experience and education.* New York: Macmillian.

DiGangi, S. A., Maag, J. W., & Rutherford Jr, R. B. (1991). Self-graphing of on-task behavior: Enhancing the reactive effects of self-monitoring on on-task behavior and academic performance. *Learning Disability Quarterly, 14*(3), 221-230. doi: 10.2307/1510851

Drevon, D. D., Hixson, M. D., Wyse, R. D., & Rigney, A. M. (2019). A meta-analytic review of the evidence for check-in check-out. *Psychology in the Schools*, *56*(3), 393-412. doi: 10.1002/pits.22195

DuPaul, G.J., Arbolino, L.A., & Booster, G.D. (2009). Cognitive-behavioral interventions for Attention-Deficit/Hyperactivity Disorder. In M.J. Mayer, R. Van Acker, J.E. Lochman, & F.M. Gresham (Eds.), *Cognitive-behavioral interventions for emotional and behavioral disorders: School-based practice* (pp. 295-327). New York: Guilford Press.

DuPaul, G. J., Chronis-Tuscano, A., Danielson, M. L., & Visser, S. N. (2019). Predictors of receipt of school services in a national sample of youth with ADHD. *Journal of Attention Disorders, 23*(11), 1303-1319. doi: 10.1177/1087054718816169

DuPaul, G. J., Eckert, T. L., & Vilardo, B. (2012). The effects of school-based interventions for attention deficit hyperactivity disorder: A meta-analysis 1996-2010. *School Psychology Review*, *41*(4), 387-412. doi: 10.1080/02796015.2012.12087496

DuPaul, G. J., & Stoner, G. (2015). *ADHD in the schools: Assessment and intervention strategies* (3rd ed.). New York, NY: Guilford Press.

Ervin, R. A., DuPaul, G. J., Kern, L., & Friman, P. C. (1998). Classroom-based functional and adjunctive assessments: Proactive approaches to intervention selection for adolescents with attention deficit hyperactivity disorder. *Journal of Applied Behavior Analysis, 31*(1), 65-78. doi: 10.1901/jaba.1998.31-65

Evans, S. W., Owens, J. S., & Bunford, N. (2014). Evidence-based psychosocial treatments for children and adolescents with attention-deficit/hyperactivity disorder. *Journal of Clinical Child & Adolescent Psychology, 43*(4), 527-551. doi: 10.1080/15374416.2013.850700

Evans, S. W., Owens, J. S., Wymbs, B. T., & Ray, A. R. (2018). Evidence-based psychosocial treatments for children and adolescents with attention deficit/hyperactivity disorder. *Journal of Clinical Child & Adolescent Psychology*, *47*(2), 157-198. doi: 10.1080/15374416.2017.1390757

Ewe, L. P. (2019). ADHD symptoms and the teacher–student relationship: a systematic literature review. *Emotional and Behavioural Difficulties*, *24*(2), 136-155. doi: 10.1080/13632752.2019.1597562

Fabiano, G. A., Pelham, W. E., Coles, E. K., Gnagy, E. M., Chronis-Tuscano, A., & O'Connor, B. C. (2009). A meta-analysis of behavioral treatments for attention-deficit/hyperactivity disorder. *Clinical Psychology Review*, *29*(2), 129-140. doi: 10.1016/j.cpr.2008.11.001

Fabiano, G. A., Vujnovic, R. K., Pelham, W. E., Waschbusch, D. A., Massetti, G. M., Pariseau, M. E., ... & Greiner, A. R. (2010). Enhancing the effectiveness of special education programming for children with attention deficit hyperactivity disorder using a daily report card. *School Psychology Review, 39*(2), 219-239. doi: 10.1080/02796015.2010.12087775

Frazier, T. W., Youngstrom, E. A., Glutting, J. J., & Watkins, M. W. (2007). ADHD and achievement: Meta-analysis of the child, adolescent, and adult literatures and a concomitant study with college students. *Journal of Learning Disabilities, 40*(1), 49-65. doi: 10.1177/00222194070400010401

Fuchs, L. S., & Deno, S. L. (1991). Paradigmatic distinctions between instructionally relevant measurement models. *Exceptional Children, 57*(6), 488-500. doi: 10.1177/001440299105700603

Fuchs, L. S., & Fuchs, D. (1991). Curriculum-based measurements: Current applications and future directions. *Preventing School Failure: Alternative Education for Children and Youth, 35*(3), 6-11. doi: 10.1080/1045988X.1991.10871068

Garland, T. (2014). *Self-regulation interventions and strategies: Keeping the body, mind and emotions on task in children with Autism, ADHD or sensory disorders*. Eau Claire, Wisconsin: Pesi Publishing & Media.

Gaub, M., & Carlson, C. L. (1997). Gender differences in ADHD: A meta-analysis and critical review. *Journal of the American Academy of Child & Adolescent Psychiatry*, *36*(8), 1036-1045. doi: 10.1097/00004583-199708000-00011
Gershon, J. (2002). A meta-analytic review of gender differences in ADHD. *Journal of Attention Disorders*, *5*(3), 143-154. doi: 10.1177/108705470200500302

Greene, R. W., Beszterczey, S. K., Katzenstein, T., Park, K., & Goring, J. (2002). Are students with ADHD more stressful to teach? Patterns of teacher stress in an elementary school sample. *Journal of Emotional and Behavioral Disorders*, *10*(2), 79-89. doi: 10.1177/10634266020100020201

Gureasko-Moore, S., DuPaul, G. J., & White, G. P. (2006). The effects of self-management in general education classrooms on the organizational skills of adolescents with ADHD. *Behavior Modification*, 30(2), 159-183. doi: 10.1177/0145445503259387

Harris, K. R., Friedlander, B. D., & Saddler, B. (2005). Self-monitoring of attention versus self-monitoring of academic performance: Effects among students with ADHD in the general education classroom. *Journal of Special Education, 39*, 145-156. doi: 10.1177/00224669050390030201

Hinshaw, S. P. (2007). Moderators and mediators of treatment outcome for youth with ADHD: Understanding for whom and how interventions work. *Journal of pediatric psychology*, *32*(6), 664-675. doi: 10.1093/jpepsy/jsl055

Hoff, K. E. & DuPaul, G. J. (1998). Reducing disruptive behavior in general education classrooms: The use of self-management strategies. *School Psychology Review, 27*(2), 290-303. doi: 10.1080/02796015.1998.12085916

Horner, R. H., Carr, E. G., Halle, J., McGee, G., Odom, S., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. *Exceptional Children*, 71(2), 165-179. doi: 10.1177/001440290507100203

Hoza, B. (2007). Peer functioning in children with ADHD. *Journal of Pediatric Psychology, 32*(6), 655-663. doi: 10.1093/jpepsy/jsm024

Hoza, B., Mrug, S., Gerdes, A. C., Hinshaw, S. P., Bukowski, W. M., Gold, J. A., ... & Arnold, L. E. (2005). What aspects of peer relationships are impaired in children with attention-deficit/hyperactivity disorder?. *Journal of Consulting and Clinical Psychology, 73*(3), 411-423. doi: 10.1037/0022-006X.73.3.411

Individuals with Disabilities Education Act, 20 U.S.C. § 1400 (2004).

Iznardo, M., Rogers, M. A., Volpe, R. J., Labelle, P. R., & Robaey, P. (2017). The effectiveness of daily behavior report cards for children with ADHD: A meta-analysis. *Journal of Attention Disorders*, 1-14. doi: 10.1177/1087054717734646

Johnston, C., & Chronis-Tuscano, A. (2015). Families and ADHD. In R. A. Barkley (Ed.), *Attention-deficit hyperactivity disorder: A handbook for diagnosis and treatment* (pp. 191-209). New York, NY: Guilford Press.

Johnston, C., & Mash, E. J. (2001). Families of children with attention-deficit/hyperactivity disorder: review and recommendations for future research. *Clinical Child and Family Psychology Review*, *4*(3), 183-207. doi: 10.1023/a:1017592030434

Karhu, A. Närhi, V., & Savolainen, H. (2019). Check in-check out intervention for supporting pupils' behaviour: Effectiveness and feasibility in Finnish schools. *European Journal of Special Needs Education*, *34*(1), 136-146. doi: 10.1080/08856257.2018.1452144

Kazdin, A. E. (1977). Assessing the clinical or applied importance of behavior change through social validation. *Behavior Modification*, *1*(4), 427-452. doi: 10.1177/014544557714001

Kazdin, A.E. (2001). *Behavior modification in applied settings*. Long Grove, IL: Waveland Press, Inc.

Kazdin, A. E. (2011). *Single case research designs: Methods for clinical and applied settings* (2nd ed.). New York: Oxford University Press.

Kennedy, C. H. (2005). *Single case designs for educational research*. Boston: Allyn & Bacon.

Kent, K. M., Pelham, W. E., Molina, B. S., Sibley, M. H., Waschbusch, D. A., Yu, J., ... & Karch, K. M. (2011). The academic experience of male high school students with ADHD. *Journal of Abnormal Child Psychology*, *39*(3), 451-462. doi: 10.1007/s10802-010-9472-4

Koegel, L. K., Koegel, R. L., Hurley, C., & Frea, W. D. (1992). Improving social skills and disruptive behavior in children with autism through self-management. *Journal of Applied Behavior Analysis, 25*(2), 341-353. doi: 10.1901/jaba.1992.25-341

Koo, T. K., & Li, M. Y. (2016). A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *Journal of Chiropractic Medicine, 15*(2), 155-163. doi: 10.1016/j.jcm.2016.02.012

Kratochwill, T. R., Hitchcock, J., Horner, R. H., Levin, J. R., Odom, S. L., Rindskopf, D. M. & Shadish, W. R. (2010). *Single case-designs technical documentation*. Retrieved from What Works Clearinghouse website: https://ies.ed.gov/ncee/wwc/Document/229.

LeFever, G. B., Villers, M. S., Morrow, A. L., & Vaughn III, E. S. (2002). Parental perceptions of adverse educational outcomes among children diagnosed and treated for ADHD: A call for improved school/provider collaboration. *Psychology in the Schools*, *39*(1), 63-71. doi: 10.1002/pits.10000

Lee, P. C., Niew, W. I., Yang, H. J., Chen, V. C. H., & Lin, K. C. (2012). A meta-analysis of behavioral parent training for children with attention deficit hyperactivity disorder. *Research in Developmental Disabilities*, *33*(6), 2040-2049. doi: 10.1016/j.ridd.2012.05.011

Lee, S. H., Simpson, R. L., & Shogren, K. A. (2007). Effects and implications of self-management for students with autism: A meta-analysis. *Focus on Autism and Other Developmental Disabilities, 22*(1), 2-13. doi: 10.1177/10883576070220010101

Levy, F., Hay, D. A., Bennett, K. S., & Mcstephen, M. (2005). Gender differences in ADHD subtype comorbidity. *Journal of the American Academy of Child & Adolescent Psychiatry*, *44*(4), 368-376. doi: 10.1097/01.chi.0000153232.64968.c1

Lewis, T. J., Hudson, S., Richter, M., & Johnson, N. (2004). Scientifically supported practices in emotional and behavioral disorders: A proposed approach and brief review of current practices. *Behavioral Disorders*, *29*(3), 247-259. doi: 10.1177/019874290402900306

Loe, I. M., & Feldman, H. M. (2007). Academic and educational outcomes of children with ADHD. *Journal of pediatric psychology*, *32*(6), 643-654. doi: 10.1093/jpepsy/jsl054

Long, N., Edwards, M. C., & Bellando, J. (2017). Parent Training Interventions. In J. L. Matson (Ed.), *Handbook of Childhood Psychopathology and Developmental Disabilities Treatment* (pp. 63-86). Cham, Switzerland: Springer International Publishing.

Ma, H. H. (2006). An alternative method for quantitative synthesis of single-subject researches: Percentage of data points exceeding the median. *Behavior Modification, 30*(5), 598-617. doi: 10.1177/0145445504272974

Macmann, G. M., & Barnett, D. W. (1999). Diagnostic decision making in school psychology: Understanding and coping with uncertainty. In C. Reynolds & T. Gutkin (Eds.), *The handbook of school psychology* (pp. 519-543). New York: John Wiley & Sons.

Martin, A. J. (2014). The role of ADHD in academic adversity: Disentangling ADHD effects from other personal and contextual factors. *School Psychology Quarterly*, *29*(4), 395-408. doi: 10.1037/spq0000069

Martinussen, R., Hayden, J., Hogg-Johnson, S., & Tannock, R. (2005). A meta-analysis of working memory impairments in children with attention-deficit/hyperactivity disorder. *Journal of the American Academy of Child & Adolescent Psychiatry*, *44*(4), 377-384. doi: 10.1097/01.chi.0000153228.72591.73

Mathes, M. Y., & Bender, W. N. (1997). The effects of self-monitoring on children with attention-deficit/hyperactivity disorder who are receiving pharmacological interventions. *Remedial and Special Education, 18*(2), 121-128. doi: 10.1177/074193259701800206

McQuade, J. D., & Hoza, B. (2015). Peer relationships of children with ADHD. In R. A. Barkley (Ed.), *Attention-deficit hyperactivity disorder: A handbook for diagnosis and treatment* (pp. 210-222). New York, NY: Guilford Press.

Miller, L., Dufrene, B.A., Olmi, D.J., Tingstrom, D.H., & Filce, H. (2015). Self-monitoring as a viable fading option in check-in/check-out. *Journal of School Psychology, 53*, 121-135. doi: 10.1016/j.jsp.2014.12.004

Miltenberger, R. G. (2017). *Behavior modification: Principles and procedures* (6th ed). Cengage Learning.

Mooney, P., Ryan, J. B., Uhing, B. M., Reid, R., Epstein, M. H. (2005). A review of self-management learning interventions on academic outcomes for students with emotional and behavioral disorders. *Journal of Behavioral Education, 14*, 203-221. doi: 10.1007/s10864-005-6298-1

MTA Cooperative Group (1999). A 14-Month Randomized Clinical Trial of Treatment Strategies for Attention-Deficit/Hyperactivity Disorder. *Archives of General Psychiatry*, *56*(12), 1073-1086. doi: 10.1001/archpsyc.56.12.1073

Murray, D. W., Rabiner, D., Schulte, A., & Newitt, K. (2008). Feasibility and integrity of a parent–teacher consultation intervention for ADHD students. *Child & Youth Care Forum, 37*, 111-126. doi: 10.1007/s10566-008-9054-6

National Center for Education Statistics. (2012). *Schools and Staffing Survey (SASS): Table 7. Average class size in public primary schools, middle schools, high schools, and schools with combined grades, by classroom type and state: 2011–12.* U.S. Department of Education. Retrieved from https://nces.ed.gov/surveys/sass/tables/sass1112_2013314 _t1s_007.asp

National Center for Health Statistics. (2017). *Health, United States, 2016: With chartbook on long-term trends in health: Table 35. Health conditions among children under age 18*. Hyattsville, MD: National Center for Health Statistics. Retrieved from https://www.cdc.gov/nchs/data/hus/hus16.pdf

Odom, S. L., Brown, W. H., Frey, T., Karasu, N., Lee Smith-Canter, L., & Strain, P. S. (2003). Evidence-based practices for young children with autism: Contributions for single-subject design research. *Focus on Autism and Other Developmental Disabilities, 18*(3), 166-175. doi: 10.1177/10883576030180030401

O'Neill, R. E., Albin, R. W., Storey, K., Horner, R. H., & Sprague, J. R. (2015). *Functional assessment and program development for problem behavior: A practical handbook* (3rd ed). Stamford, CT: Cengage Learning.

Owens, J. S., Richerson, L., Beilstein, E. A., Crane, A., Murphy, C. E., & Vancouver, J. B. (2005). School-based mental health programming for children with inattentive and disruptive behavior problems: First-year treatment outcome. *Journal of Attention Disorders*, *9*(1), 261-274. doi: 10.1177/1087054705279299

Parker, R. I., Hagan-Burke, S., & Vannest, K. (2007). Percentage of all non-overlapping data (PAND) an alternative to PND. *The Journal of Special Education, 40*(4), 194-204. doi: 10.1177/00224669070400040101

Parker, R. I., Vannest, K. J., & Davis, J. L. (2011). Effect size in single-case research: A review of nine nonoverlap techniques. *Behavior Modification, 35*(4), 303-322. doi: 10.1177/0145445511399147

Parker, R. I., Vannest, K. J., Davis, J. L., & Sauber, S. B. (2011). Combining nonoverlap and trend for single-case research: Tau-U. *Behavior Therapy, 42*(2), 284-299. doi: 10.1016/j.beth.2010.08.006

Peacock, G. G., Ervin, R. A., Daly, E. J., & Merrell, K. W. (Eds.). (2010). *Practical handbook of school psychology: Effective practices for the 21st century.* New York: Guilford.

Pelham, W. J., & Fabiano, G. A. (2008). Evidence-based psychosocial treatments for attention-deficit/hyperactivity disorder. *Journal of Clinical Child & Adolescent Psychology, 37*(1), 184-214. doi: 10.1080/15374410701818681

Pluymert, K. (2014). Problem-solving foundations for school psychological services. In P.L. Harrison & A. Thomas (Eds.), *Best practices in school psychology: Data-based and collaborative decision making* (pp. 71-84). Bethesda, MD: NASP.

Pustejovsky, J. E., Chen, M., & Hamilton, B. (2021). scdhlm: A web-based calculator for between-case standardized mean differences (Version 0.5.2) [Web application]. Retrieved from: https://jepusto.shinyapps.io/scdhlm

Pustejovsky, J. E., Hedges, L. V, & Shadish, W. R. (2014). Design-comparable effect sizes in multiple baseline designs: A general modeling framework. *Journal of Educational and Behavioral Statistics*, 39(5), 368–393. doi: 10.3102/1076998614547577

Pyle, K., & Fabiano, G. A. (2017). Daily report card intervention and attention deficit hyperactivity disorder: A meta-analysis of single-case studies. *Exceptional Children, 83*(4), 378-395. doi: 10.1177/0014402917706370

Rakap, S. (2015). Effect sizes as result interpretation aids in single-subject experimental research: description and application of four nonoverlap methods. *British Journal of Special Education, 42*(1), 11-33. doi: 10.1111/1467-8578.12091

Reid, R. (1996). Research in self-monitoring with students with learning disabilities: The present, the prospects, the pitfalls. *Journal of Learning Disabilities*, *29*(3), 317-331. doi: 10.1177/002221949602900311

Reid, R., Trout, A. L., & Schartz, M. (2005). Self-regulation interventions for children with attention deficit/hyperactivity disorder. *Exceptional Children*, *71*(4), 361-377. Retrieved from https://journals.sagepub.com/home/ecx

Reyno, S. M., & McGrath, P. J. (2006). Predictors of parent training efficacy for child externalizing behavior problems – a meta-analytic review. *Journal of Child Psychology and Psychiatry, 47*(1), 99-111. doi: 10.1111/j.1469-7610.2005.01544.x

Riley-Tillman, T. C., Burns, M. K., & Kilgus, S. P. (2020). *Evaluating educational interventions: Single-case design for measuring response to intervention.* Guilford Press.

Riley-Tillman, T.C., Chafouleas, S.M., Sassu, K.A., Chanese, J.A.M., & Glazer, A.D. (2008). Examining the agreement of Direct Behavior Ratings and Systematic Direct Observation for on-task and disruptive behavior. *Journal of Positive Behavior Interventions, 10*, 136-143. doi: 10.1177/1098300707312542

Rushton, S., Giallo, R., & Efron, D. (2020). ADHD and emotional engagement with school in the primary years: Investigating the role of student–teacher relationships. *British Journal of Educational Psychology*, *90*, 193-209. doi: 10.1111/bjep.12316

Salvia, J. & Ysseldyke, J. (2009). *Assessment: In special and inclusive education* (11th ed). Belmont, CA: Wadsworth/Cencage Learning.

Sanetti, L. M. H., & Kratochwill, T. R. (2009). Toward developing a science of treatment integrity: Introduction to the special series. *School Psychology Review, 38*(4), 445-459.

Schnoes, C., Reid, R., Wagner, M., & Marder, C. (2006). ADHD among students receiving special education services: A national survey. *Exceptional Children, 72*(4), 483-496. doi: 10.1177/001440290607200406

Scruggs, T. E., & Mastropieri, M. A. (1998). Summarizing single-subject research: Issues and applications. *Behavior Modification, 22*(3), 221-242. doi: 10.1177/01454455980223001

Scruggs, T. E., Mastropieri, M. A., & Casto, G. (1987). The quantitative synthesis of single-subject research: Methodology and validation. *Remedial and Special education, 8*(2), 24-33. doi: 10.1177/074193258700800206

Shadish, W.R., Hedges, L.V., Horner, R.H., and Odom, S.L. (2015). *The role of between-case effect size in conducting, interpreting, and summarizing single-case research* (NCER 2015-002) Washington, DC: National Center for Education Research, Institute of Education Sciences, U.S. Department of Education. This report is available on the Institute website at http://ies.ed.gov/.

Shapiro, E.S., & Cole, C.L. (1994). *Behavior change in the classroom: Self-management interventions*. New York, NY: Guilford Press.

Sheffield, K., & Waller, R. J. (2010). A review of single-case studies utilizing self-monitoring interventions to reduce problem classroom behaviors. *Beyond Behavior, 19*(2), 7-13. Retrieved from https://journals.sagepub.com/home/bbx

Shimabukuro, S. M., Parker, M. A., Jenkins, A., & Edelen-Smith, P. (1999). The effects of self-monitoring of academic performance on students with learning disabilities and ADD/ADHD. *Education and Treatment of Children, 22*(4), 397-414. Retrieved from https://www.jstor.org/stable/42899585

Sibley, M. H., Coxe, S. J., Campez, M., Morley, C., Olson, S., Hidalgo-Gato, N., ... & Pelham, W. E. (2018). High versus low intensity summer treatment for ADHD delivered at secondary school transitions. *Journal of Clinical Child & Adolescent Psychology*, *47*(2), 248-265. doi: 10.1080/15374416.2018.1426005

Sim, J., & Wright, C. C. (2005). The kappa statistic in reliability studies: use, interpretation, and sample size requirements. *Physical Therapy*, *85*(3), 257-268. doi: 10.1093/ptj/85.3.257

Simonsen, B., Fairbanks, S., Briesch, A., Myers, D., & Sugai, G. (2008). Evidence-based practices in classroom management: Considerations for research to practice. *Education and Treatment of Children, 31*(3), 351-380. doi: 10.1353/etc.0.0007

Sims, W. A., Riley-Tillman, C., & Cohen, D. R. (2017). Formative assessment using Direct Behavior Ratings: Evaluating intervention effects of daily behavior report cards. *Assessment for Effective Intervention*, *43*(1), 6-20. doi: 10.1177/1534508417708183

Snodgrass, M. R., Chung, M. Y., Meadan, H., & Halle, J. W. (2018). Social validity in single-case research: A systematic literature review of prevalence and application. *Research in Developmental Disabilities*, *74*, 160-173. doi: 10.1016/j.ridd.2018.01.007

Sprague, J., Cook, C. R., Wright, D. B., & Sadler, C. (2008). RTI and behavior: A guide to integrating behavioral and academic supports. *Palm Beach, FL: LRP Publications*.

Stasolla, F., Perilli, V., & Damiani, R. (2014). Self monitoring to promote on-task behavior by two high functioning boys with autism spectrum disorders and symptoms of ADHD. *Research in Autism Spectrum Disorders, 8*(5), 472-479. doi: 10.1016/j.rasd.2014.01.007

Stoiber, K.C. (2014). A comprehensive framework for multitiered systems of support in school psychology. In P.L. Harrison & A. Thomas (Eds.), *Best practices in school psychology: Data-based and collaborative decision making* (pp. 71-84). Bethesda, MD: NASP.

Stormont, M. (2001). Social outcomes of children with AD/HD: Contributing factors and implications for practice. *Psychology in the Schools*, *38*(6), 521-531. doi: 10.1002/pits.1040

Subcommittee on Attention-Deficit/Hyperactivity Disorder, Steering Committee on Quality Improvement and Management. (2011). ADHD: Clinical practice guideline for the diagnosis, evaluation, and treatment of attention-deficit/hyperactivity disorder in children and adolescents. *Pediatrics*, 128, 1007-1022. doi: 10.1542/peds.2011-2654

Suen, H. K., & Ary, D. (1989). *Analyzing quantitative behavioral observation data*. Hillsdale, NJ: Erlbaum.

Sutherland, K. S., Wehby, J. H., & Copeland, S. R. (2000). Effect of varying rates of behavior-specific praise on the on-task behavior of students with EBD. *Journal of Emotional and Behavioral Disorders*, *8*(1), 2-8. doi: 10.1177/106342660000800101

Swanson, J. M., Elliott, G. R., Greenhill, L. L., Wigal, T., Arnold, L. E., Vitiello, B., ... & Newcorn, J. H. (2007). Effects of stimulant medication on growth rates across 3 years in the MTA follow-up. *Journal of the American Academy of Child & Adolescent Psychiatry*, *46*(8), 1015-1027. doi: 10.1097/chi.0b013e3180686d7e

Swanson, J. M., Schuck, S., Porter, M. M., Carlson, C., Hartman, C. A., Sergeant, J. A., Clevenger, W., Wasdell, M., McCleary, Lakes, K., Wigal, T. (2012). Categorical and dimensional definitions and evaluations of symptoms of ADHD: History of the SNAP and the SWAN rating scales. *The International Journal of Educational and Psychological Assessment*, *10*(1), 51-70. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4618695/

Valentine, J. C., Tanner-Smith, E. E., Pustejovsky, J. E., & Lau, T. S. (2016). Between-case standardized mean difference effect sizes for single-case designs: a primer and tutorial using the scdhlm web application. *Campbell Systematic Reviews*, *12*(1), 1-31. doi: 10.4073/cmdp.2016.1

Vannest, K. J., Davis, J. L., Davis, C. R., Mason, B. A., & Burke, M. D. (2010). Effective intervention for behavior with a daily behavior report card: A meta-analysis. *School Psychology Review*, *39*(4), 654-672. doi: 10.1080/02796015.2010.12087748

Viera, A. J., & Garrett, J. M. (2005). Understanding interobserver agreement: the kappa statistic. *Family Medicine*, *37*(5), 360-363. PMID: 15883903

Volpe, R.J. & Briesch, A.M. (2012). Generalizability and Dependability of Single-Item and Multiple-Item Direct Behavior Rating Scales for Engagement and Disruptive Behavior. *School Psychology Review*, 41(3), 246-261. doi: 10.1080/02796015.2012.12087506

Wayman, M.M., Wallace, T., Wiley, H. I., Tichá, R., & Espin, C. A. (2007). Literature synthesis on curriculum-based measurement in reading. *The Journal of Special Education, 41*(2), 85-120. doi: 10.1177/00224669070410020401

Willcutt, E. G., Doyle, A. E., Nigg, J. T., Faraone, S. V., & Pennington, B. F. (2005). Validity of the executive function theory of attention-deficit/hyperactivity disorder: a meta-analytic review. *Biological psychiatry*, *57*(11), 1336-1346. doi: 10.1016/j.biopsych.2005.02.006

Williams, K. L., Noell, G. H., Jones, B. A., & Gansle, K. A. (2012). Modifying students' classroom behaviors using an electronic daily behavior report card. *Child & Family Behavior Therapy, 34*(4), 269-289. doi: 10.1080/07317107.2012.732844

Wolf, M. M. (1978). Social validity: the case for subjective measurement or how applied behavior analysis is finding its heart. *Journal of Applied Behavior Analysis, 11*(2), 203-214. doi: 10.1901/jaba.1978.11-203

Wolraich, M. L., Hagan, J. F., Allan, C., Chan, E., Davison, D., Earls, M., ... & Holbrook, J. R. (2019). Clinical practice guideline for the diagnosis, evaluation, and treatment of attention-deficit/hyperactivity disorder in children and adolescents. *Pediatrics*, *144*(4), e20192528. doi: 10.1542/peds.2019-2528

Wolraich, M. L., Lambert, W., Doffing, M. A., Bickman, L., Simmons, T., & Worley, K. (2003). Psychometric properties of the Vanderbilt ADHD diagnostic parent rating scale in a referred population. *Journal of Pediatric Psychology*, 28(8), 559-568. doi: 10.1093/jpepsy/jsg046

Zendarski, N., Haebich, K., Bhide, S., Quek, J., Nicholson, J. M., Jacobs, K. E., ... & Sciberras, E. (2020). Student–teacher relationship quality in children with and without ADHD: A cross-sectional community based study. *Early Childhood Research Quarterly*, *51*, 275-284. doi: 10.1016/j.ecresq.2019.12.00

Table 1.

Demographic Characteristics for Students

Characteristics	Students (n = 5)
Gender	
Male	5 (100%)
Female	0 (0%)
Ethnicity	
Non-Hispanic/Latino/Spanish	4 (80%)
Hispanic/Latino/Spanish	1 (20%)
Race	
White/Caucasian	3 (60%)
Hispanic	1 (20%)
African American	1 (20%)
Grade	
6	2 (40%)
7	2 (40%)
8	1 (20%)
ADHD Diagnosis	
Inattentive type	1 (20%)
Hyperactive/Impulsive type	0 (0%)
Combined Type	4 (80%)
Comorbid Diagnoses	
Yes	3 (60%)
No	2 (40%)
Medication	
Yes	3 (60%)
No	2 (40%)

Table 2

Demographic Characteristics for Teachers

Characteristics	Teachers (n = 5)
Gender	
Male	2 (40%)
Female	3 (60%)
Ethnicity	
Non-Hispanic/Latino/Spanish	4 (80%)
Hispanic/Latino/Spanish	1 (20%)
Race	
White/Caucasian	5 (100%)
Grade Taught	
6	2 (40%)
7	2 (40%)
8	1 (20%)
Years Teaching Current Grade	
1-5	4 (80%)
6-10	0 (0%)
11-15	1 (20%)
16-20	0 (0%)
20+	0 (0%)
Total Years Teaching	
1-5	3 (60%)
6-10	0 (0%)
11-15	1 (20%)
16-20	0 (0%)
20+	1 (20%)
Highest Degree Obtained	
Bachelors	2 (40%)
Masters	2 (40%)
Masters Plus	1 (20%)
Doctorate	0 (0%)

Figure 1

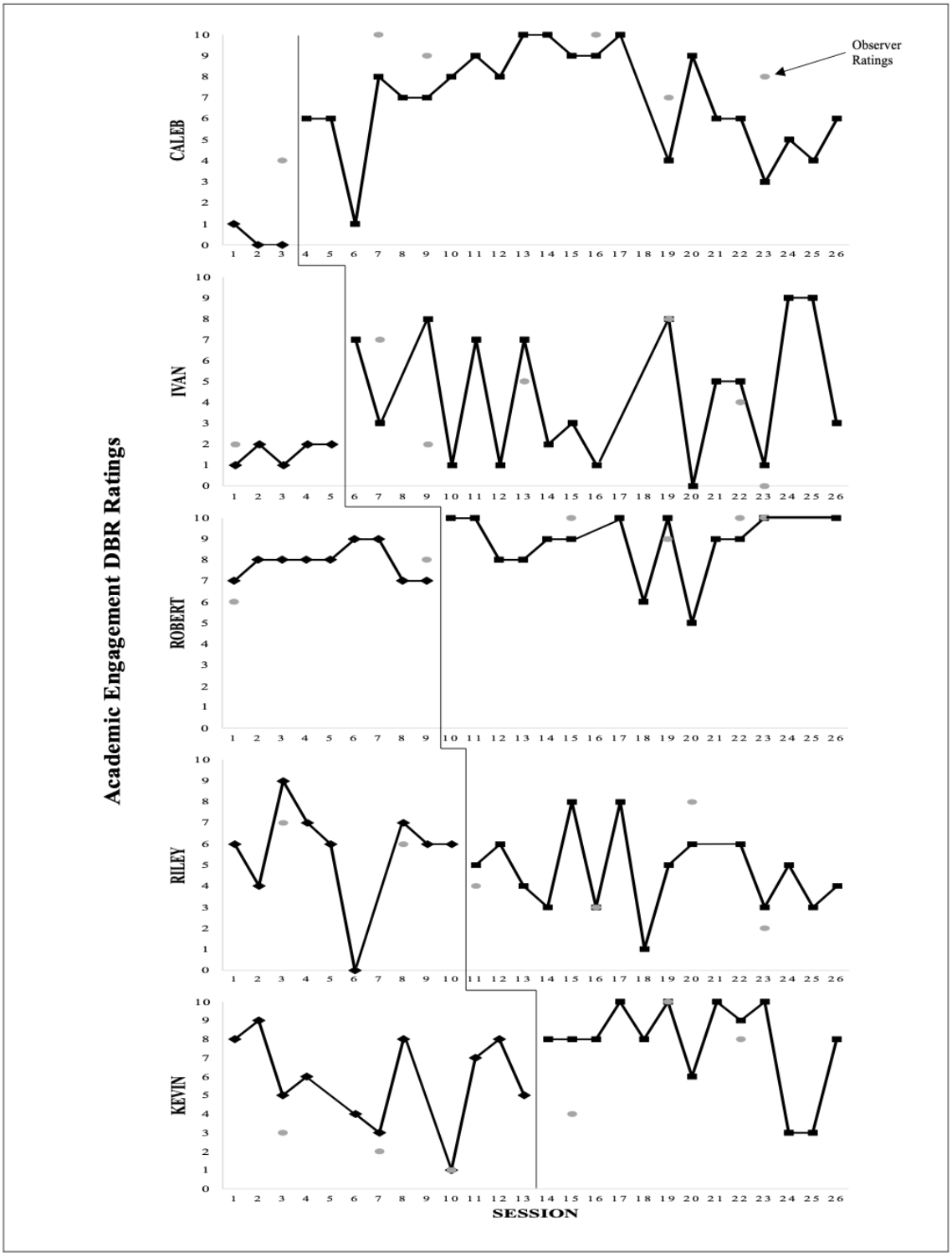

Academic Engagement DBR Ratings
CALEB
IVAN
ROBERT
RILEY
KEVIN
Observer Ratings
SESSION

Figure 2

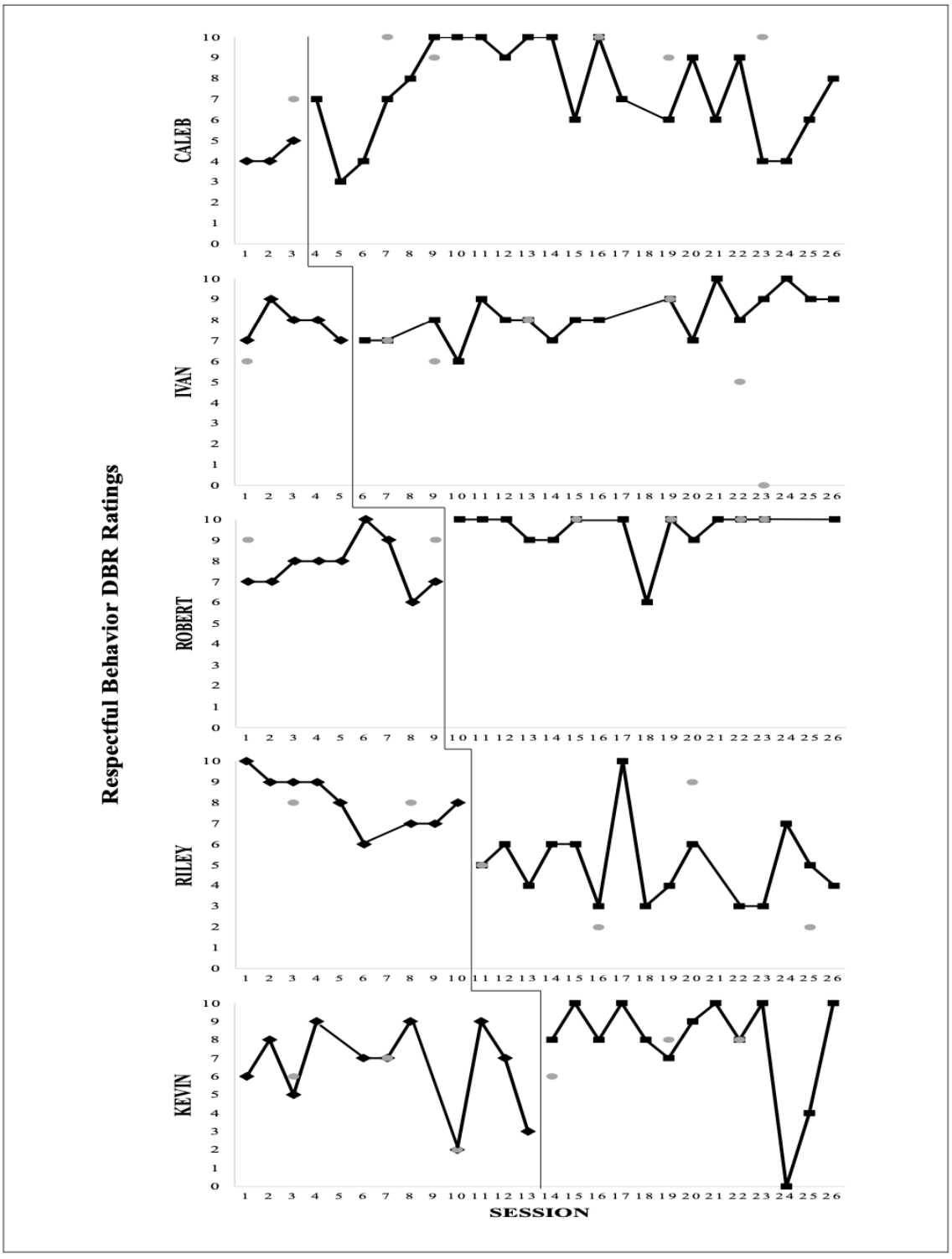
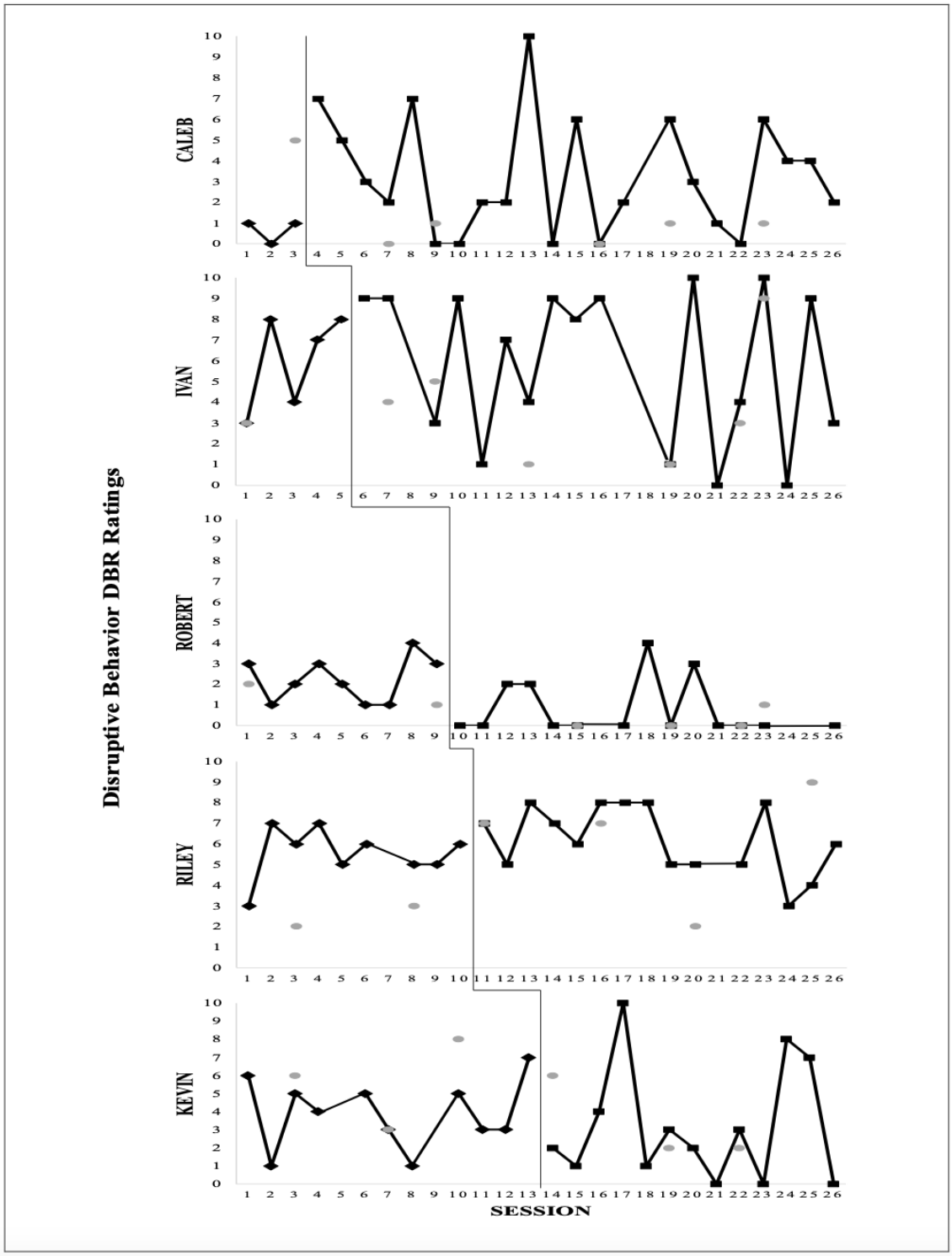

Respectful Behavior DBR Ratings
CALEB
IVAN
ROBERT
RILEY
KEVIN
SESSION

Figure 3


Disruptive Behavior DBR Ratings
CALEB
IVAN
ROBERT
RILEY
KEVIN
SESSION

Appendix A

Student Information Sheet

Please provide the following information about <u>your child</u>:

Name: _____ School: _____

Grade: _____ **Age: _____**

Gender:

- ☐ Male
- ☐ Female

Race:

- ☐ White
- ☐ Black or African-American
- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Pacific Islander
- ☐ Other: _____

Ethnicity: ☐ Non-Hispanic ☐ Hispanic

ADHD diagnosis:

- ☐ Inattentive Type
- ☐ Hyperactive/Impulsive Type
- ☐ Combined Type
- ☐ Unknown

Other diagnoses:

- ☐ If Yes, please indicate: _____
- ☐ No

Currently taking medication?

- ☐ If Yes, please indicate: _____
- ☐ No

Appendix B

Teacher Information Sheet

Please provide the following information about <u>yourself</u>:

Name: _____ School: _____

Grade: _____ # of Students in Class: _____

Gender:
- ☐ Male
- ☐ Female

Race:
- ☐ White
- ☐ Black or African-American
- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Pacific Islander
- ☐ Other: _____

Ethnicity: ☐ Non-Hispanic ☐ Hispanic

Total years teaching:
- ☐ 1-5
- ☐ 6-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20+

Years teaching this grade:
- ☐ 1-5
- ☐ 6-10
- ☐ 11-15
- ☐ 16-20
- ☐ 20+

Highest degree attained:
- ☐ Bachelor's
- ☐ Master's
- ☐ Master's Plus
- ☐ Doctorate
- ☐ Other: _____

Appendix C

Direct Behavior Rating – Single Item Scale (DBR-SIS) - Teacher Form

Direct Behavior Rating Single Item Scale (DBR-SIS)

Directions: Select the mark along the line that best reflects the percentage of total time the student exhibited each target behavior. Note that the percentages do not need to total 100% across behaviors since some behaviors may co-occur.

Date: *

MM DD

/

ACADEMICALLY ENGAGED *

Academically engaged is actively or passively participating in the classroom activity. For example: writing, raising hand, answering a question, talking about a lesson, listening to the teacher, reading silently, or looking at instructional materials.

	0	1	2	3	4	5	6	7	8	9	10	
0% (Never)	○	○	○	○	○	○	○	○	○	○	○	100% (Always)

RESPECTFUL *

Respectful is defined as compliant and polite behavior in response to adult direction and/or interactions with peers and adults. For example: follows teacher direction, pro-social interaction with peers, positive response to adult request, verbal or physical disruption without a negative tone/connotation.

	0	1	2	3	4	5	6	7	8	9	10	
0% (Never)	○	○	○	○	○	○	○	○	○	○	○	100% (Always)

DISRUPTIVE *

Disruptive is student behavior that goes against classroom expectations and interrupts regular school or classroom activity. For example: being out of seat, fidgeting, playing with objects, acting aggressively, and talking or yelling about things unrelated to classroom instruction.

	0	1	2	3	4	5	6	7	8	9	10	
0% (Never)	○	○	○	○	○	○	○	○	○	○	○	100% (Always)

Describe any change(s) in the typical classroom routine (e.g., fire drill, assembly, field trip, etc.):

Your answer

Submit Clear form

Appendix D

Direct Behavior Rating – Single Item Scale (DBR-SIS) - Student Form

DBR-SIS - Self Monitoring - STUDENT

Directions: Select the mark along the line that best reflects the percentage of total time you exhibited each target behavior. Note that the percentages do not need to total 100% across behaviors since some behaviors may co-occur.

ON-TASK *

On-task (academically engaged) is actively or passively participating in the classroom activity. For example: writing, raising hand, answering a question, talking about a lesson, listening to the teacher, reading silently, or looking at instructional materials.

	0	1	2	3	4	5	6	7	8	9	10	
0% (Never)	○	○	○	○	○	○	○	○	○	○	○	100% (Always)

RESPECTFUL *

Respectful is defined as compliant and polite behavior in response to adult direction and/or interactions with peers and adults. For example: follows teacher direction, pro-social interaction with peers, positive response to adult request, verbal or physical disruption without a negative tone/connotation.

	0	1	2	3	4	5	6	7	8	9	10	
0% (Never)	○	○	○	○	○	○	○	○	○	○	○	100% (Always)

DISRUPTIVE *

Disruptive is student behavior that goes against classroom expectations and interrupts regular school or classroom activity. For example: being out of seat, fidgeting, playing with objects, acting aggressively, and talking or yelling about things unrelated to classroom instruction.

	0	1	2	3	4	5	6	7	8	9	10	
0% (Never)	○	○	○	○	○	○	○	○	○	○	○	100% (Always)

Appendix E

Systematic Direct Observation Form

Observer name:_____

Student name: _____

Date:	Time start:	Time stop:	Setting/Activity:

Academically Engaged (AE) is participation in the classroom activity. Examples: writing, raising hand, answering a question, talking about a lesson, listening to the teacher, reading silently, or looking at instructional materials.

Respectful is following teacher direction and using polite behavior during interactions with peers and adults. Examples: follows teacher directions, is positive with peers and to adults, NOT using a negative tone such as talking back or inappropriate gesture and language.

Disruptive behavior is action that interrupts regular school or classroom activity. Examples: out of seat, fidgeting, playing with objects, acting aggressively, talking/yelling about things that are unrelated to classroom instruction.

Time (Start)	:00	:10	:20	:30	:40	:50	1:00	1:10	1:20	1:30	1:40	1:50	2:00	2:10	2:20
AE															
Respectful															
Disruptive															
Time (Start)	**2:30**	**2:40**	**2:50**	**3:00**	**3:10**	**3:20**	**3:30**	**3:40**	**3:50**	**4:00**	**4:10**	**4:20**	**4:30**	**4:40**	**4:50**
AE															
Respectful															
Disruptive															
Time (Start)	**5:00**	**5:10**	**5:20**	**5:30**	**5:40**	**5:50**	**6:00**	**6:10**	**6:20**	**6:30**	**6:40**	**6:50**	**7:00**	**7:10**	**7:20**
AE															
Respectful															
Disruptive															
Time (Start)	**7:30**	**7:40**	**7:50**	**8:00**	**8:10**	**8:20**	**8:30**	**8:40**	**8:50**	**9:00**	**9:10**	**9:20**	**9:30**	**9:40**	**9:50**
AE															
Respectful															
Disruptive															
Time (Start)	**10:00**	**10:10**	**10:20**	**10:30**	**10:40**	**10:50**	**11:00**	**11:10**	**11:20**	**11:30**	**11:40**	**11:50**	**12:00**	**12:10**	**12:20**
AE															
Respectful															
Disruptive															
Time (Start)	**12:30**	**12:40**	**12:50**	**13:00**	**13:10**	**13:20**	**13:30**	**13:40**	**13:50**	**14:00**	**14:10**	**14:20**	**14:30**	**14:40**	**14:50**
AE															
Respectful															
Disruptive															
Time (Start)	**15:00**		**AE**				**Respectful**			**Disruptive**					
AE															
Respectful			**/ 91**				**/ 91**			**/ 91**					
Disruptive			**Number of X / 91**				**Number of X / 91**			**Number of X / 91**					

Appendix F

Implementation Fidelity Checklist - Teacher

Self-Monitoring Fidelity Checklist

Please check off the intervention steps that you accurately completed.

Date: *

Date

mm/dd/yyyy

Start of Class Period *

	Completed	Did not do
Reminded student to monitor their on-task, respectful, and disruptive behaviors during the period.	☐	☐
Set behavioral expectations.	☐	☐

During Class Period *

	Completed	Did not do
Periodically observed student behavior.	☐	☐

End of Class Period *

	Completed	Did not do
Gave the student their tablet and prompted them to fill out the Google Form.	☐	☐
I recorded student behavior on the Google Form using my tablet.	☐	☐
Asked student about their ratings; gave them the opportunity to reflect on their behaviors (see script).	☐	☐
Explained my ratings and discussed agreement/ disagreement (see script).	☐	☐
Provided performance feedback and praise for all three target behaviors.	☐	☐
Retrieved student tablet.	☐	☐

Submit Clear form

Appendix G

Implementation Fidelity Checklist - Observer

Student: _____ **Observer:** _____

Date: _____ **Class Activity:** _____

When…	**Teacher will…**	
	Scored (+/-)	(+ = completed step)
The start of the targeted period	Remind student to monitor their on-task, respectful, and disruptive behaviors during the period.	
	Set behavioral expectations.	
During the targeted period	*Monitor and observe student behavior.*	
After the targeted period	Give student their tablet and prompt them to fill out the behavior Google Form.	
	Teacher records student behavior on their Google Form (for all three target behaviors) using tablet.	
	Ask student about their ratings; give them the opportunity to reflect on their engagement in all three target behaviors.	
	Explain teacher ratings of three target behaviors and discuss agreement/ disagreement.	
	Provide performance feedback and praise for all three target behaviors.	
	Retrieve student tablet.	
Overall teacher **Enthusiasm** (*Scored* 1-5; 1 = low, 3 = moderate, 5 = high)		
Overall teacher **Preparedness** (*Scored* 1-5; 1 = low, 3 = moderate, 5 = high)		

Appendix H

DBR Self-Monitoring Intervention Procedural Script

Start of the Targeted Class Period

Teacher will remind student to think about their on-task, respectful, and disruptive behaviors throughout the class period.

Teacher will also explain the behavioral expectations for the day*:*

- *"**Academically engaged** means working on [insert activity] during class today.*
- ***Respectful** means following directions, having positive interactions with your peers, and having a good attitude in class.*
- *Not being **Disruptive,** meaning not getting out of your seat, interrupting, or talking about things unrelated to [insert activity student should be working on]*

At the end of the class period, I will come back and we can compare ratings."

During the Targeted Class Period

Teacher will keep an eye on the student and monitor the student's engagement in the three target behaviors (academic engagement, respectful, disruptive).

End of the Targeted Class Period

Teacher will give the student their tablet and prompt the student to record their ratings on the form: "*[Student name], remember to mark your ratings on the Google Form for how often you were engaged in the three behaviors during this period. I will be over in a minute to go over the form with you.* **Wait to click submit until after we chat.***"*

While the student completes their ratings, the teacher will record their ratings on a DBR-SIS Google Form (this form will be used for data collection).

(A) After approx. 1 minute, the teacher will walk over to the student to discuss student ratings:

- Teacher: *Hey [student name], let's go over your behavior ratings. I see that you rated yourself as a [insert number] for academically engaged. Tell me why you rated yourself as a [insert number]?*
- Student: student will explain their rationale for the behavior ratings

(B) Teacher will explain what they rated the student and will provide performance feedback:

- Teacher: *[I agree/I disagree], I rated you as a [insert number] for academic engagement because [provide rationale].*
    - *Provide examples of positive/appropriate behaviors that the student displayed.*
    - *Describe what the student could work on next time to improve.*
- Student: student has an opportunity to reflect

Repeat the scripted discussion about (A) the student ratings and (B) the teacher ratings for Respectful and Disruptive.

**Teacher will collect the student tablet at the end of the class period.

Appendix I

Graduate School of Education
1207 Sproul Hall
900 University Ave.
Riverside, CA 92521

The Direct Behavior Ratings Self-Monitoring Project District Recruitment

To Whom It May Concern,

Your school district is invited to partner with the School Service Provision Research Collaborative (SSPPRC) lab at the University of California Riverside, Graduate School of Education and to be part of a project that will teach students with ADHD how to self-monitor the behaviors they exhibit in the classroom. Specifically, this study aims to increase student academic engagement and respectfulness, as well as decrease disruptive behaviors in the classroom through the use of a self-monitoring intervention. Student behaviors will be monitored using both student and teacher behavioral ratings. Students will be given time to meet with the teacher to receive feedback and to reflect on their behavior, which will elicit positive and productive conversations between student-teacher pairs regarding students' classroom behaviors. Overall, the aim of the study is to improve students' classroom behaviors through self-monitoring and to increase positive teacher-student interactions.

If your district agrees to take part in the study, you will be asked to:

1. Allow teachers to complete training, including how to use the script and the ratings systems, and reliability checks using the rating system.
2. Allow UCR researchers to observe classrooms during core instructional time to collect data.
3. Allow teacher-student pairs time to discuss their behavioral ratings together.

The decision to have your district participate in this project is completely voluntary. Once consent is received, you may withdraw from the study at any time. The results of all data are confidential and will not be attached to your name, your school, or your school district in published reports. All data will be coded and protected using passwords and will be kept in a locked file cabinet in a locked research office that is available to only project personal at the university. The potential benefit of participating in this study are gaining skills related to direct behavioral assessment and insight into observation and assessment of classroom management. Additionally, this study will support the development of feasible, flexible, and robust data needed to facilitate the identification and evidence of empirically based supports in a multi-tiered system of educator support model.

If you have any comments or questions regarding the conduct of this research or other details of this study, please contact Ashley Donham, graduate student PI of the project at apfen001@ucr.edu. If you have any questions about your rights as a research subject, please contact the UCR Office of Research Integrity at (951) 827-4811 or to contact by email, IRB@ucr.edu. If interested in participating in this study, please contact Ashley Donham at apfen001@ucr.edu. Thank you.

Sincerely,

Ashley Donham, M.A.
Graduate Student in School Psychology
University of California, Riverside

Appendix J

Graduate School of Education
1207 Sproul Hall
900 University Ave.
Riverside, CA 92521

Parent Information Flyer & Consent Form

Using the Direct Behavior Rating (DBR) to Self-Monitor Classroom Behaviors
Principal Investigator: Ashley Donham, M.A.
Sponsor: Graduate School of Education
University of California, Riverside

Dear Parent or Guardian,

Your child is invited to participate in a research project evaluating the effectiveness and usability of the Direct Behavior Rating (DBR) as a self-monitoring intervention. The DBR measure will be used to monitor students' engagement in the following classroom behaviors: academic engagement, respect, and disruptive behavior.

What will your student be asked to do? What are the project procedures?
The focus of this project will be on your child's ability to self-monitor their classroom behaviors. You and/or your child will be asked to provide information about yourselves, including gender, age, grade, race/ethnicity, diagnoses, and educational services. Next, your child will be trained in what self-monitoring is and how to use the DBR form to self-monitor their behaviors. Throughout a targeted class period, your child will be responsible for monitoring their levels of academic engagement, respect, and disruptive behavior. At the end of the class period, your child will rate their behaviors on the DBR form, discuss their ratings with their classroom teacher, and will receive performance feedback from their teacher. As part of the study, there will be several instances where graduate student researchers will be in the classroom to monitor and record your child's behavior. Finally, following completion of research activities, participating students will be asked to provide information about their experiences during the project. This information will be obtained using a brief survey.

What are the risks or inconveniences associated with the project for students?
The risks associated with participating in this project are minimal. The presence of observers in classrooms may pose some minor distraction for participating teachers and their students. Care will be taken by research staff that the presence of observers is as inconspicuous as possible.

What are the benefits of the project?

The result of this project will yield information supporting the use of DBR as a self-monitoring intervention designed to improve student academic engagement, respect, and disruptive behavior. Project findings will also inform activities and interventions to improve students' classroom behaviors and strengthen the student-teacher relationship. Ultimately, improved classroom behavior should lead to improvements in student outcomes.

How will personal information/data be protected?

Since personally identifying student information will be collected as part of this project, the following procedures will be used to protect the confidentiality of collected data. All identifying information will be removed from observations and project protocols and replaced with a subject number. Researchers will keep all project records (including any participant-participant number key) locked in secure locations. Research records will be deidentified with a participant-participant number. A master key that links names and participant numbers will be maintained in a separate, secure location. The master key will be destroyed after 3 years. All electronic files (e.g., database, spreadsheet, survey responses, records) containing identifiable information will be password protected. Any computer hosting such files will also have password protection to prevent access by unauthorized users. Only project staff will have access to passwords.

The University of California-Riverside Institutional Review Board (IRB) and the Office of Research Compliance may inspect project records as part of its auditing program, but these reviews will only focus on the researchers and not on your involvement. The IRB is a group of people who review research studies to protect the rights and welfare of research participants.

These privacy and confidentiality protections will not apply in only a few instances. If there is suspicion or observation of abuse of a child, project personnel are mandated to report these concerns to the appropriate authorities, including district administration. If there is an indication that your child might harm him/herself or others, project personnel are mandated to report these concerns to the appropriate authorities, including district administration.

Can I stop being in the study and what are my rights?

Your child does not have to participate in this study if you do not want him/her to participate. If you consent for your child to participate in the study, but later change your mind, you may withdraw at any time. There are no penalties or consequences of any kind if you decide that you do not want to participate. We will notify you of all significant new findings during the course of the study's activities that may affect your willingness to continue.

Who should I contact if I have questions about the project?

Research personnel, including the principal investigator, welcome the opportunity to answer any question you have about this project. If you have further questions about this project or if you have a research-related problem, you may contact the principal investigator, Ashley Donham (apfen001@ucr.edu). If you have any questions concerning your child's rights as a research participant, you may contact the University of California, Riverside Institutional Review Board (IRB) at 951-827-4802 during business hours, or contact them by email at irb@ucr.edu.

Kindly,

Ashley Donham, M.A
Graduate Student in School Psychology
University of California, Riverside

Appendix K

Graduate School of Education
1207 Sproul Hall
900 University Ave.
Riverside, CA 92521

Student Information Flyer & Assent Form

Using the Direct Behavior Rating (DBR) to Self-Monitor Classroom Behaviors
Principal Investigator: Ashley Donham, M.A.
Sponsor: Graduate School of Education
University of California, Riverside

Dear Student,

You are invited to participate in a research project evaluating the effectiveness and usability of the Direct Behavior Rating (DBR) as a self-monitoring intervention. You will use the DBR measure to monitor your engagement in the following classroom behaviors: academic engagement, respect, and disruptive behavior.

What will you be asked to do? What are the project procedures?

The focus of this project will be on your ability to self-monitor your classroom behaviors. You and/or your parent will be asked to provide information about yourselves, including gender, age, grade, race/ethnicity, diagnoses, and educational services. Next, you will be trained in what self-monitoring is and how to use the DBR form to self-monitor your behaviors. Throughout a targeted class period, you will be responsible for monitoring your levels of academic engagement, respect, and disruptive behavior. At the end of the class period, you will rate your behaviors on the DBR form, discuss your ratings with your classroom teacher, and receive performance feedback from your teacher. As part of the study, there will be several instances where graduate student researchers will be in the classroom to monitor and record your behavior. Finally, following completion of research activities, you will be asked to provide information about your experience during the project. This information will be obtained using a brief survey.

What are the risks or inconveniences associated with the project for students?

The risks associated with participating in this project are minimal. The presence of observers in classrooms may pose some minor distraction for participating teachers and their students. Care will be taken by research staff that the presence of observers is as inconspicuous as possible.

What are the benefits of the project?

The result of this project will yield information supporting the use of DBR as a self-monitoring intervention designed to improve student academic engagement, respect, and disruptive behavior. Project findings will also inform activities and interventions to improve students' classroom behaviors and strengthen the student-teacher relationship. Ultimately, improved classroom behavior should lead to improvements in student outcomes.

How will personal information/data be protected?

Since personally identifying student information will be collected as part of this project, the following procedures will be used to protect the confidentiality of collected data. All identifying information will be removed from observations and project protocols and replaced with a subject number. Researchers will keep all project records (including any participant-participant number key) locked in secure locations. Research records will be deidentified with a participant-participant number. A master key that links names and participant numbers will be maintained in a separate, secure location. The master key will be destroyed after 3 years. All electronic files (e.g., database, spreadsheet, survey responses, records) containing identifiable information will be password protected. Any computer hosting such files will also have password protection to prevent access by unauthorized users. Only project staff will have access to passwords.

The University of California-Riverside Institutional Review Board (IRB) and the Office of Research Compliance may inspect project records as part of its auditing program, but these reviews will only focus on the researchers and not on your involvement. The IRB is a group of people who review research studies to protect the rights and welfare of research participants.

These privacy and confidentiality protections will not apply in only a few instances. If there is suspicion or observation of abuse of a child, project personnel are mandated to report these concerns to the appropriate authorities, including district administration. If there is an indication that you might harm yourself or others, project personnel are mandated to report these concerns to the appropriate authorities, including district administration.

Can I stop being in the study and what are my rights?

You do not have to participate in this study if you do not want to participate. If you provide your assent to participate in the study, but later change your mind, you may withdraw at any time. There are no penalties or consequences of any kind if you decide that you do not want to participate. We will notify you of all significant new findings during the course of the study's activities that may affect your willingness to continue.

Who should I contact if I have questions about the project?

Research personnel, including the principal investigator, welcome the opportunity to answer any question you have about this project. If you have further questions about this project or if you have a research-related problem, you may contact the principal investigator, Ashley Donham (apfen001@ucr.edu). If you have any questions concerning your child's rights as a research participant, you may contact the University of California, Riverside Institutional Review Board (IRB) at 951-827-4802 during business hours, or contact them by email at irb@ucr.edu.

Kindly,

Ashley Donham, M.A
Graduate Student in School Psychology
University of California, Riverside