

Progress Monitoring Using Direct Behavior Rating Single Item Scales in a Multiple-Baseline Design Study of the Daily Report Card Intervention

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Abstract

Direct behavior rating (DBR) may be a viable assessment for documenting current areas of impaired functioning and progress monitoring students' response to a behavioral intervention. Challenging behaviors are often addressed in general education settings using interventions such as the daily report card (DRC). To best implement and monitor such interventions, effective progress monitoring tools are needed. The present study reports on the results of a multiple-baseline design across three elementary school children who had a DRC implemented to address academic engagement and social behaviors. The DRC and systematic direct observation (SDO) were compared with teacher-completed DBR to investigate the correspondence between these two measures of progress monitoring. Relative to SDO, results indicated that DBR was generally an effective means of monitoring progress for most cases and most target behaviors. The results of the present study support using DBR to monitor progress following the use of a behavioral intervention such as the DRC.

Keywords

elementary, interventions, social-emotional

Direct behavior ratings (DBRs) are completed by an individual following a predetermined observation period, often for a prespecified, operationally defined behavior or group of behaviors (see Briesch, Chafouleas, & Riley-Tillman, 2016). For instance, a teacher might complete a DBR after a math class period or after morning activities to rate how academically engaged a student was during the lesson(s). DBR Single Item Scales (DBR-SIS) ask the rater to indicate the percentage of time during the interval the child exhibited specific behaviors including academic engagement, disruptive behavior, or respectful behavior. Ratings range from 0% to 100% along a zero- to 10-point rating scale. The DBR has been rigorously evaluated in numerous studies to support its use as a reliable, valid, defensible, flexible, efficient, and repeatable assessment of school behavior (Briesch, Chafouleas, & Riley-Tillman, 2010; Chafouleas et al., 2010; Kilgus, Chafouleas, Riley-Tillman, & Welsh, 2012; Miller et al., 2015). A recent study illustrated that the DBR-SIS items of Academically Engaged, Disruptive, and Respectful completed by teachers were effective at identifying students at risk of behavioral challenges as measured by more lengthy rating scales (Johnson et al., 2016). Converging evidence, therefore, supports DBR-SIS items as effective screeners in schools.

Importantly, because DBRs are repeatable and efficient, they are also a potential candidate for behavioral progress monitoring in schools (Chafouleas, Sanetti, Kilgus, & Maggin, 2012; Fabiano et al., 2009). Presently, there is a need to develop, implement, and evaluate effective progress monitoring measures for youth with challenging behaviors in schools to complement the existing cache of progress monitoring measures for academic targets (Hosp, Hosp, & Howell, 2007; Shinn, 2004; Shinn & Shinn, 2002). It is important to acknowledge that the approach to progress monitoring likely needs to diverge from academic approaches, underscoring the need for additional development and evaluation. This is because progress monitoring for academic outcomes can occur weekly or even monthly, given that the goal of most interventions are to improve skills to reach a preestablished benchmark. Behavioral targets, in contrast, may require more

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frequent progress monitoring (i.e., daily, by class period), given the contextual effects that can contribute to behavioral outcomes on a daily basis. Targets of progress monitoring may include reductions in behavioral variability (i.e., fewer interruptions per class period), increases in behavioral variability (i.e., responding with behaviors other than a temper tantrum following frustration), meeting behavioral benchmarks (completing 80% or more of class assignments), or multidimensional goal attainment (i.e., passing academic classes, improvement in peer interactions, and development of improved organizational skills). Thus, practical and effective measures such as the DBR-SIS hold promise for this purpose. Additional research is needed to determine how a DBR-SIS can be used in combination with typical interventions for challenging behaviors within schools as a progress monitoring tool (Chafouleas, 2011).

For example, a daily report card (DRC) is a best practice intervention for youth with challenging behaviors within educational settings (Kelley, 1990; O'Leary, Pelham, Rosenbaum, & Price, 1976; Pfiffner, Villodas, Kaiser, Rooney, & McBurnett, 2013; Vannest, Davis, Davis, Mason, & Burke, 2010; Volpe & Fabiano, 2013). A DRC is a clearly defined list of behavioral goals for the child to meet each day, including specific criteria for meeting each behavioral goal (e.g., completes assigned worksheet with 80% accuracy or better, has no more than two interruptions during science lessons). Throughout the class periods within the school day, teachers provide feedback to the child regarding progress made toward the goals. At the end of the day, the DRC is reviewed with the child and sent home for the parents to review as well. Parents review the DRC with the child, provide praise for meeting behavioral goals, and they also provide home-based privileges (e.g., screen time, extended bedtime) contingent on meeting DRC goals. The DRC intervention (Fabiano et al., 2010) was recently favorably evaluated within a clinical trial meeting What Works Clearinghouse standards for rigorous design and effectiveness (What Works Clearinghouse, Institute of Education Sciences, U.S. Department of Education, 2012), and reviewed as an effective intervention on the National Center on Intensive Intervention website (<http://www.intensiveintervention.org/chart/behavioral-intervention-chart>).

The DRC is also potentially a DBR for monitoring outcomes in the child's important areas of psychosocial functioning (Cheney, Flower, & Templeton, 2008; Fabiano, Vujnovic, Naylor, Pariseau, & Robins, 2009; Pelham, Fabiano, & Massetti, 2005). Thus, in addition to producing acute behavioral effects, the DRC may be used as a data-driven monitoring device for schools to use to evaluate the child's behavioral progress on a daily basis. The work of Pelham and colleagues has illustrated how the DRC is sensitive to changes in medication and behavioral intervention dosing, highlighting its merit as a measure of behavioral change due to treatment (Fabiano et al., 2007; Pelham et al.,

2001; Pelham et al., 2005). Yet, when used as an intervention, there is a potential for confounding or bias in using the tool as both an intervention and as a progress monitoring assessment. This is because the criteria on the DRC may be changed over time, such as when a child begins to routinely meet established goals and the target is modified. Efficient progress monitoring tools for behavior are needed during baseline assessments, with the DBR-SIS being a logical candidate for this role. Thus, combining a DRC with an ongoing DBR-SIS progress monitoring assessment may be a means of aligning intervention and assessment.

Thus, for educators interested in collecting baseline information, progress monitoring measures that are distinct from the DRC such as DBR may be used to provide a running record of behavioral functioning prior to and following intervention. Furthermore, DRCs are idiographic indicators of functioning, and they require effort to construct and implement. Measures of progress monitoring that can be more readily deployed are needed to inform a practitioner whether more intensive DRC development is needed. DBR measures such as a DBR-SIS completed by the teacher may provide justification for DRCs if there is impairment in functioning, and they require modest effort at the screening level where use of DRCs as a first-line assessment tool is unlikely.

A final consideration in any measure of progress monitoring relates to the efficiency of the measure. For example, although systematic direct observations (SDOs) are considered to be an effective observational tool in school settings (Volpe, DiPerna, Hintze, & Shapiro, 2005), they are costly and are, therefore, difficult to administer repeatedly at the rate typically needed in behavioral progress monitoring assessments in schools. Thus, there is a need to investigate how teachers might use DBR-SIS prior to and during intervention, and obtain information on their satisfaction with the approach to progress monitoring.

The present investigation reports on the effectiveness of DBR within authentic school settings as a method of progress monitoring students' response to intervention. Using a multiple-baseline design across participants in independent classrooms, DBR was used as an indicator of baseline functioning and as a mechanism to evaluate intervention effectiveness. Specific research aims were to (a) investigate the effectiveness of the DBR-SIS as a measure of progress monitoring relative to comparison measures including SDO and the DRC percentage of goals met and (b) investigate the social validity of the DBR-SIS as a measure of progress monitoring via teacher report. It was specifically hypothesized that the DBR would be an effective progress monitoring measure as it would be sensitive to the initiation of the DRC intervention, the DBR would be comparable with more costly measures such as observations of behavior, and that the DBR would be a feasible and palatable progress monitoring measure for teachers to complete.

Method

Participants

Participants were enrolled at elementary schools, located in Western New York. Participants were referred to the study through flyers sent home to parents by the school counselors. Parents then self-referred a child to the study, and following the completion of parental permission, child assent, and teacher consent, a child was enrolled in the project. Interested parents contacted the study investigators and signed an informed consent form with children signing an informed assent. Teachers within the study also signed a consent form. All procedures were approved by the University Institutional Review Board. Inclusion criteria included (a) enrolled in grade kindergarten through eighth, (b) attending school at a public or parochial school setting (i.e., the child is not home schooled), and (c) the teacher reported the presence of behaviors that could be targeted on a DRC and was willing to attempt the DRC intervention to address the behaviors. Each of the students included within the study, who attended three separate schools, are briefly described.

Case 1. Andrew was a 9-year 5-month-old Caucasian male attending a fourth-grade general education class at a public school. Although Andrew did not have a formal special education plan, he did receive a number of academic supports, including small-group, pull-out classes for math (every other day) and reading (every day). Andrew was initially referred to the behavioral consultant for poor class work and homework completion, and a need for extensive prompting to stay on task. Andrew's teachers noted that in one-on-one interactions, he would ask questions and appear to do the work without extensive struggling, but that in class he would often fall asleep, fail to follow directions, and turn in incomplete seatwork, especially in Math. At the beginning of the study, Andrew had not completed any homework, except for those assignments completed with the teacher at school.

Andrew's math class was targeted for the purposes of the study. Following an interview with his teacher, targeted behaviors for Andrew's DRC included (a) returning completed homework, (b) completing class assignments within the time provided, and (c) attending to the lesson without extensive prompting. Home-based rewards included time on his electronic devices, including videogames, and being able to choose weekend activities, such as renting a new game or movie.

Case 2. Stephen was an 11-year 9-month-old Caucasian male attending a fifth-grade general education class at a private Catholic school. Due to his poor academic performance and behavioral problems in class, the committee on special

education created a 504 Accommodation Plan for Stephen, which gave him several accommodations, including small-group classes for English (every other day), math (once a week), and reading (once a week). Stephen also regularly met with counselors at the school. Stephen was initially referred to the behavioral consultant because of disruptive classroom behavior, difficulty initiating and completing seatwork, and a need for extensive prompting to stay on task. Stephen's teacher reported frequently taking him aside and working with him one-on-one, to ensure that his work was completed by the end of class. In these one-on-one interactions, he seemed capable of doing the work, but in a group setting, would often refuse to open his book or would joke loudly with his friends while the teacher was speaking.

Following an interview with his teacher, Stephen's English and math classes were targeted for the purposes of the study. His targeted behaviors included (a) interrupting other students, (b) seatwork completion, (c) attending to the lesson, and (d) raising his hand and answering a question correctly. A home-based reward menu was created in collaboration with Stephen's mother. The rewards included small tangibles, such as snacks and toys, quality time with mom, and time on his videogame devices.

Case 3. John was a 9-year 10-month-old Hispanic male attending a fourth-grade general education class at a private Catholic school. Prior to the beginning of the study, John had been enrolled in an Academic Intervention Support (AIS) class for reading; however, at the beginning of the study, John "graduated" from this class and was re-enrolled in the general reading class. John was initially referred to the behavioral consultant for disruptive behaviors, including wrestling in class, and a need for multiple prompts to stay on task. John's teachers noted that his behaviors tended to be more severe when he was around his friends, especially during transitions and small-group class work. When he was removed from peers who may respond to his behaviors and reinforce them, he tended to complete more seatwork and engage in fewer disruptive behaviors.

John's DRC was tracked in the morning, during the lunch-time transition, and in the afternoon. Following an interview with his teacher, targeted behaviors for John's DRC included (a) keeping his hands and feet to himself with one or fewer reminders, (b) turning and talking to others two or fewer times during lessons, (c) making smart choices about who to line up with, and (d) making smart choices about partners for small-group class work. Making "smart choices" was operationally defined as needing no feedback to follow rules during the classroom activities targeted. Home-based rewards included small tangibles, including a sticker or pencil, extra screen time, including TV and iPod use, and quality time with parents, including reading books at bedtime.

		Math	
1. Returns completed math homework		Y	N
2. Reads for 20 minutes and has chart initialed		Y	N
3. Attends to lesson with 1 or fewer prompts		Y	N

OTHER

1. Returns signed Daily Report from yesterday YES NO

Total Number of Yeses _____ Total Number of Nos _____ Percentage of Yeses _____

Comments: _____

Parent: Please record reward provided _____

Parent: Please sign and return to teacher _____

Figure 1. Daily report card.

Procedure

The primary purpose of this study was to evaluate how DBR-SIS scores might be used to monitor how students respond to behavioral supports. All children in the study had behavior assessed during a baseline phase and subsequent intervention phase where the teacher implemented a DRC and other behavioral supports. Behavior was constantly monitored using the DBR to evaluate the results of the intervention.

Within this study, a multiple-baseline design across participants was used. The design used was rigorous (overlapping, concurrent baseline phase initiation, multiple phase manipulations across participants, sufficient data collected in each phase to evaluate level, trend, variability, and stability) and the design was consistent with best practice and What Works Clearinghouse guidelines for single case design (Fabiano, Chafouleas, Weist, Sumi, & Humphrey, 2014; Riley-Tillman & Burns, 2009; What Works Clearinghouse, Institute of Education Sciences, U.S. Department of Education, 2014). Consultants and the supervisor reviewed the DBR-SIS ratings each day they were completed, and a decision to move to the intervention phase was made if there was a downturn in the DBR-SIS for at least two of the three ratings, or there were 3 days of stable data collected (e.g., no more than 10% difference between any of the three ratings).

The independent variable within the multiple-baseline design study was the initiation of a DRC (Chafouleas,

Riley-Tillman, Sassu, LaFrance, & Patwa, 2007; Fabiano et al., 2010; O’Leary, Pelham, Rosenbaum, & Price, 1976; Volpe & Fabiano, 2013). A DRC is an operationalized list of target behaviors that the teacher monitors and provides feedback on throughout the school day. Children are rewarded with school or home privileges or tangibles when goals are met. Figure 1 illustrates a sample DRC similar to those used in the study.

The study procedures were implemented within the school setting through consultation with the children’s teacher. Consultants were two women, an advanced graduate student in school psychology and a school counselor, who were trained in the research protocol and intervention procedures by a PhD clinical psychologist. Training included didactic instruction, role-playing, and practice with other school cases not included within the study. Weekly supervision meetings were also conducted to promote adherence to the protocol, consistent implementation of procedures across consultants, and to address any clinical or practical issues that arose during the consultation process.

In the present study, consultants met with teachers for an initial meeting and conducted a Problem Identification Interview. During this interview, teachers were asked about current behavior management approaches, they identified target behaviors, and potential antecedents and consequences for target behaviors were explored. Procedures to collect baseline information were also explained to the teacher. Baseline data were then collected via a DBR-SIS,

and then consultants met with the teachers for a Problem Analysis Interview. Consultants then constructed a DRC and worked with the parents to establish rewards for meeting DRC goals. The DRC was then explained to the child and the teacher implemented the intervention. DBR-SIS data were continually collected throughout the duration of the study. An independent observer collected observational data on the child's behavior during the baseline and intervention phases.

Measures

Direct behavior rating. DBRs are brief ratings of student behavior (Briesch et al., 2016; for more information, see www.directbehaviorratings.org). All teachers within the study completed a 40-min video training to orient them to the DBR measurement approach and to practice completing DBR ratings. DBRs served as the ongoing, progress monitoring measure in this study. The DBR-SIS is a tool that involves a brief rating of a target behavior following a specified observation period (Chafouleas, Riley-Tillman, & Sugai, 2007). For example, following group instruction in reading, the teacher might circle a number on a scale from 0 to 10 to indicate the degree to which the student was actively engaged. The school-based personnel completed the DBR-SIS for Academic Engagement (AE), Disruptive Behavior (DB), and Respectful Behavior (RS) at the end of each targeted intervention session for each student (see <http://directbehaviorratings.com>). AE was defined as "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." DB was defined as "student action that interrupts regular school or classroom activity. For example: out of seat, fidgeting, playing with objects, acting aggressively, talking/yelling about things that are unrelated to classroom instruction." RS was 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."

SDO. To provide a comparison for the DBR data collected, three SDOs were completed during each participants' baseline and intervention phases. A protocol for conducting SDOs was created using momentary time sampling procedures in a 15-min observation period. Modeling after procedures used within the State-Event Classroom Observation System (SECOS; Saudargas & Lentz, 1986), the interval was set at 10 s, and observers marked the occurrence of target behaviors at the beginning of each interval. Target behaviors and associated definitions mapped onto those

used within the DBR-SIS scales to include AE, DB, and RS. Observers were independent from the consultant and did not have knowledge of the study hypotheses or the particular phase of intervention. Observers were trained through didactic instruction, practice during role-plays, and then viewed and coded a series of videos until three videos were coded with 90% interobserver agreement with a master code. Interrater reliability was calculated by dividing the number of agreements by the number of intervals observed. Reliability assessments occurred on at least two occasions for each case, at least once during the baseline phase and once during the intervention phase (50% of observations for Case 1 and 33% of observations for Cases 2 and 3). Average percent agreement was 97% and all interrater agreement values across the academic engagement, respectful, and disruptive behavior categories were greater than 90%.

Usage Rating Profile—Intervention Revised (URP-IR). The URP-IR is a self-report measure for collecting information about the factors influencing use of an intervention across the following six factors: acceptability, understanding, home-school collaboration, feasibility, system climate, and system support (Briesch, Chafouleas, Neugebauer, & Riley-Tillman, 2013). The recently revised measure consists of 29 items to which participants respond regarding their level of agreement using a six-point Likert-type scale (1 = *strongly disagree* to 6 = *strongly agree*). Strong support has been provided for the factor structure using both exploratory and confirmatory procedures.

Approach to Data Analysis and Interpretation

The purpose of this study was to evaluate the DBR as a measure of progress monitoring for a commonly employed Tier 2 intervention, the DRC. Thus, the DBR-SIS scores for AE, DB, and RS are presented for each of the three cases. Visual analysis was used to evaluate the correspondence between DBR, SDO, and DRC scores with regard to trend, level, variability, degree of overlap, and immediacy of effect as described in contemporary guidelines for evaluating single-subject design research (What Works Clearinghouse, Institute of Education Sciences, U.S. Department of Education, 2014). Furthermore, the percent of nonoverlapping data for the median (PND-M) and Tau (nonoverlap due to the lack of positive baseline trend) or Tau-U (when an adjustment for positive baseline trend was indicated) were used as a means of quantifying the intervention effect through a comparison of baseline and intervention phase DBR-SIS values on primary outcomes (Parker, Vannest, & Davis, 2011; Vannest, Parker, Gonen, & Adiguzel, 2016). Primary outcome domains on the DBR-SIS were identified for each participant based on the teacher interview report of referring problems and deviation from DBR-SIS norms (Johnson et al., 2016). For Andrew, the primary outcome

domain was DBR–Academic Engagement (DBR-AE); for Stephen, the primary outcome domains were DBR-AE and DBR–Disruptive Behavior (DBR-DB); and for John, the primary outcome domain was DBR-DB.

Results

Results are presented graphically for each case for the three DBR behaviors. To help with interpretation, average scores for DBR-SIS and DRC targets were calculated to produce a single daily score. Furthermore, for the graphs of the disruptive behavior DBR-SIS, the DRC was rescaled to indicate a lower score is better, as is the case with the DBR and SDO scoring. DRC scores were also rescaled from a 100-point to a 10-point scale to permit easier comparison between the DBR-SIS, SDO, and DRC. Graphical displays are presented in Figures 2, 3, and 4 for Academic Engagement, Disruptive Behavior, and Respectful Behavior, respectively. Each graph also includes information on SDO probes and the percentage of DRC targets met during the intervention phase.

Consultation integrity was assessed by calculating the steps completed on the Problem Identification Inventory, Problem Analysis Inventory, and Problem Evaluation Inventory by the consultant with the teacher. For all cases, 100% of the steps were completed. High rates of integrity were likely obtained because consultants had a checklist that guided the completion of each step in the consultation process. Intervention adherence was assessed by collecting completed DRCs each day. Completed DRCs were typically implemented at rates consistent with other studies (e.g., Fabiano et al., 2010; Murray, Rabiner, Schulte, & Newitt, 2008; Owens, Murphy, Richerson, Girio, & Himawan, 2008), as illustrated in Figures 2 to 4.

Academic Engagement

DBRs for Academic Engagement for Andrew, Stephen, and John corresponded consistently with the DRC and SDO probes based on visual analysis. During baseline and intervention phases, SDO probes approximated DBR-SIS ratings as there were no significant differences between DBR-SIS and SDO, on Tau-U contrasts during baseline or intervention phases for Andrew, Stephen, or John ($p > .05$). A review of AE DBR-SIS ratings during intervention and DRC percentage of goals met illustrates comparable levels of overall functioning across Andrew and Stephen; these were domains of primary outcome for these two cases.

Disruptive Behavior

DBR-SIS for DB for Andrew corresponded consistently with the DRC and SDO probes as there were no significant

differences between DBR-SIS and SDO, on Tau-U contrasts during baseline or intervention phases for Andrew or Stephen ($p > .05$). The DBR-SIS and SDO for John yielded inconsistent results. During baseline, there was evidence of correspondence between the DBR-SIS DB and SDO as the Tau value was not significant. However, during intervention, the DBR-SIS indicated more disruptive behavior than the SDO through visual analysis and Tau-U ($p < .05$). A review of DBR-SIS ratings and DRC percentage of goals met illustrates comparable levels of overall functioning across Stephen's case where this was a measure of primary outcome ($p > .05$) but not for John ($p < .001$). In general, the DBR-SIS ratings for DB appear to illustrate a moderate treatment effect, with increased ratings prior to the initiation of the DRC, and reductions in ratings of disruptive behavior on the DBR-SIS, following the initiation of intervention for Stephen and John where DB was identified as a primary outcome.

Respectful Behavior

The results for respectful behavior were less clear, perhaps because this was not identified as a primary outcome for any case. DBR-SIS and SDO outcomes were divergent for John, though it is important to note his scores on both measures indicated generally respectful behavior. For Andrew and Stephen, there was correspondence between the DBR-SIS and SDO as indicated by nonsignificant Tau scores (see Table 1). Comparisons of DBR-SIS RS with the DRC indicated no significant difference for Andrew and Stephen, but a significant difference for John—the meaningfulness of these outcomes is unclear given RS was not a primary outcome targeted on the DRC for any of the participants.

Treatment Effect of DRC

Individually, for all three cases, there is evidence of a treatment effect on the DBR-SIS when the intervention condition is compared with baseline (see Table 1). Figures 2 to 4 illustrate the degree to which DBR data were nonoverlapping. For Andrew, the PND-M was 67% for AE (primary outcome), 0% for DB, and 60% for RS. For Stephen, the PND-M was 68% for AE (primary outcome), 90% for DB (primary outcome), and 74% for RS. For John, the PND-M was 96% for AE, 96% for DB (primary outcome), and 52% for RS.

Table 1 includes Tau values for the DBR-SIS and SDO across baseline and intervention phases. Andrew demonstrated improvement in the primary targeted area of AE, Stephen evinced a modest but nonsignificant outcome for one primary domain (AE) and a significant improvement for another (DB), and John evinced clear improvements in the areas targeted for primary outcomes (DB). The DBR-SIS ratings within specific, impaired areas of classroom

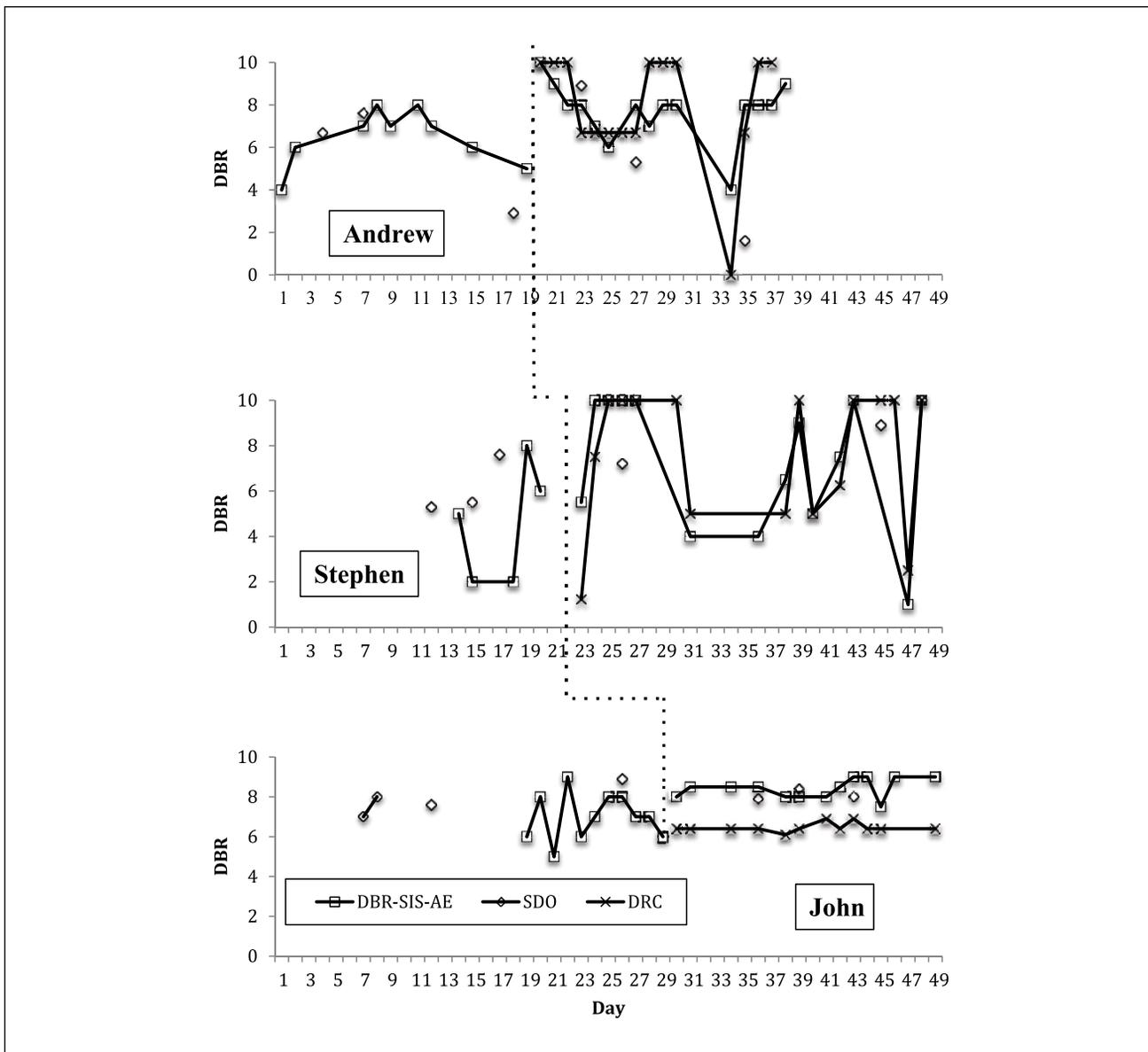


Figure 2. Academic engagement.

Note. DBR = direct behavior rating; DBR-SIS-AE = DBR Single Item Scales–Academic Engagement; SDO = systematic direct observation; DRC = daily report card.

functioning, completed daily by the teacher, appear to be, in general, good representations of changes in behavior following the implementation of the DRC intervention (there was a nonsignificant difference between DBR-SIS and SDO/DRC within phases for Andrew and Stephen).

Interestingly, the DBR data appear to provide different estimates of response to intervention than the observations at times. For Andrew, there appears to be a small effect of improved AE, DB, and RS on the teacher-completed DBR-SIS following intervention, but the three, brief observations suggest the child was *less* academically engaged and respectful and *more* disruptive

following the initiation of the DRC intervention. For Stephen and John, the observational data vary in the same direction as DBR-SIS. Thus, for two out of three cases, observational data provided consistent information with the DBR, whereas for a third case results were inconsistent. The correspondence of the DBR-SIS ratings and the DRC percentage of goals met during the intervention phase for the three cases appeared to align, in general. In all cases, the level for DBR-SIS and DRC percentage of goals met were similar, suggesting that the DBR-SIS adequately approximates the child’s success at meeting intervention goals.

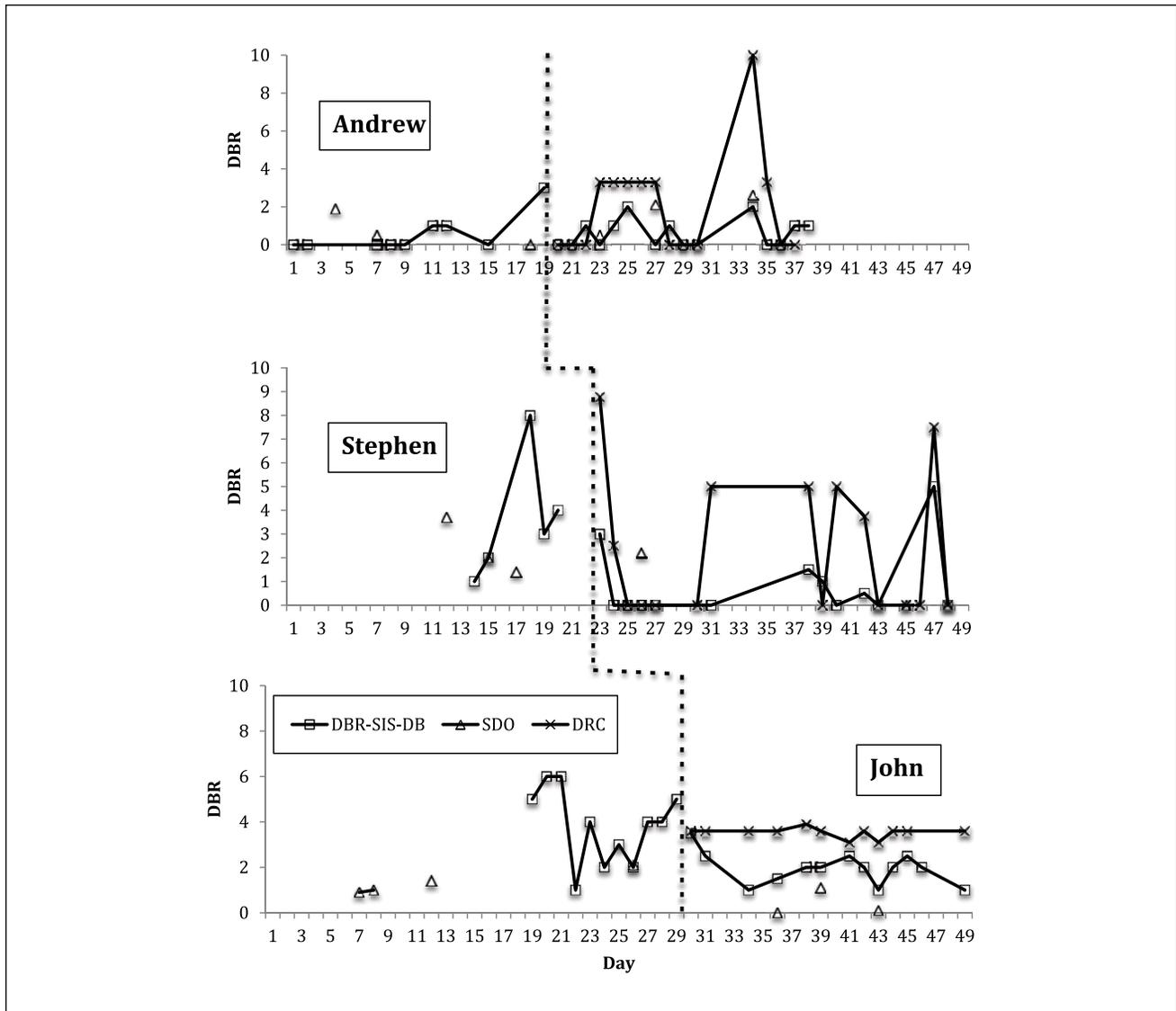


Figure 3. Disruptive behavior.
 Note. DBR = direct behavior rating; DBR-SIS-DB = DBR Single Item Scales–Respectful Behavior; SDO = systematic direct observation; DRC = daily report card.

URP-IR

The three teachers in the study rated the DRC intervention as acceptable. Across teachers, scores were 4.9 or greater for acceptability, understanding, home–school collaboration, feasibility, and system climate.

Discussion

The present investigation utilized a multiple-baseline design across participants to demonstrate the sensitivity of the DBR-SIS as a progress monitoring tool for a behavioral intervention (i.e., a DRC). Across three different children within three different school settings, the DBR-SIS progress

monitoring data provided evidence of correspondence with other indicators of intervention results, and yielded comparable reports of progress and current functioning. Furthermore, the DRC intervention with companion progress monitoring via the DBR-SIS was well received by the teachers, who reported it as feasible and conferring other advantages such as enhancing school–home collaboration. Each of these findings will be discussed in turn.

The What Works Clearinghouse guidelines (What Works Clearinghouse, Institute of Education Sciences, U.S. Department of Education, 2014) describe components of single case design that are required to make judgments about the efficacy of a treatment. These components include at least five data points per phase and three independent

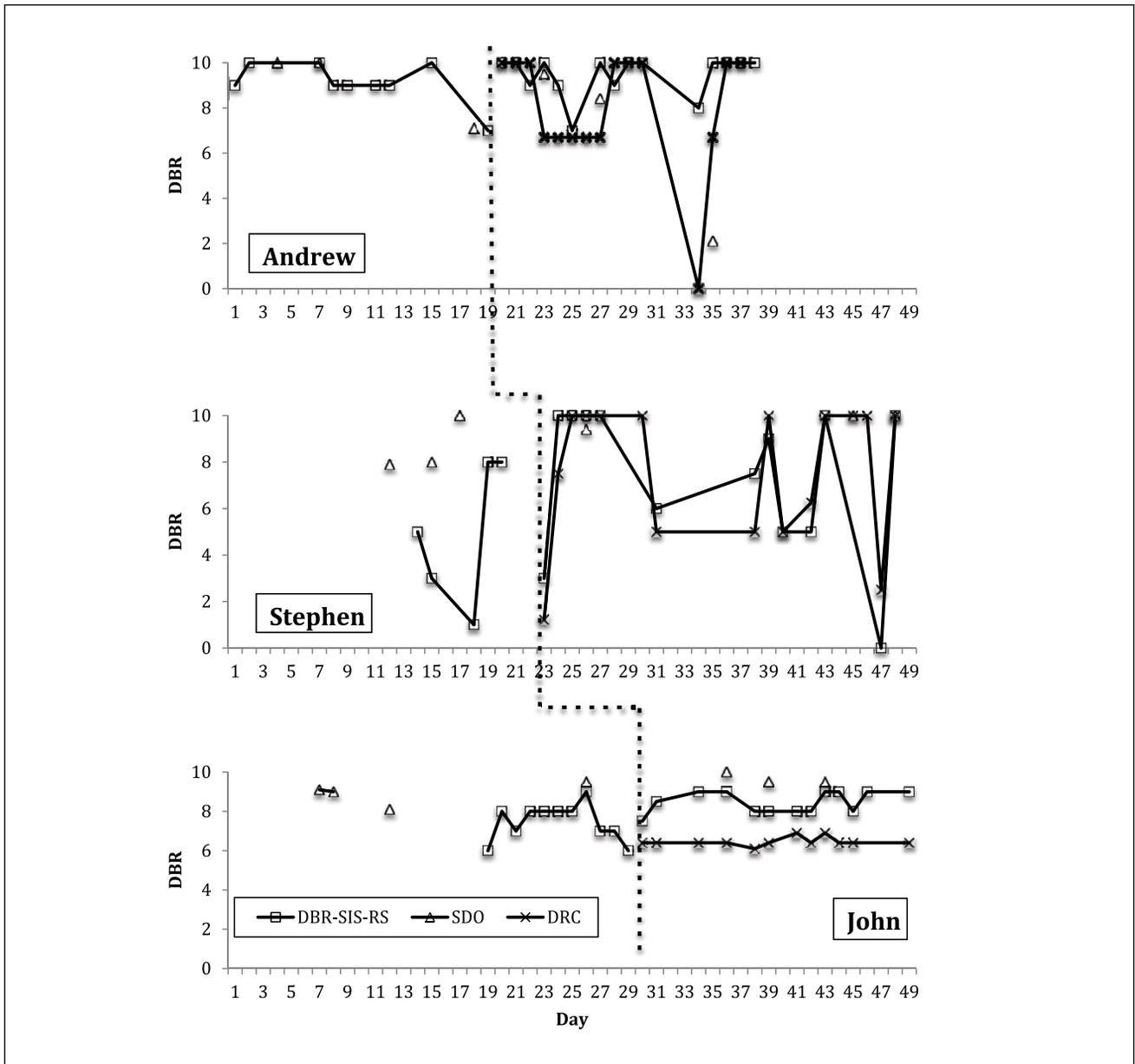


Figure 4. Respectful behavior.

Note. DBR = direct behavior rating; DBR-SIS-RS = DBR Single Item Scales–Respectful Behavior; SDO = systematic direct observation; DRC = daily report card.

manipulations of the independent variable (i.e., six phases). In the present multiple-baseline design, there are at least five data points per phase, and there are six phases. Furthermore, interrater reliability met accepted thresholds, and it was collected throughout both phases. Based on these factors, the study could meet What Works Clearinghouse guidelines for single case designs without reservations. Interrater reliability was collected across phases, and it met acceptable thresholds (greater than 90% interobserver agreement) and was collected for greater than 20% of observations in each phase. Overall, the design was rigorous and

consistent with current recommendations in the field for single-subject design.

The children and teachers involved in the study were from three different schools, representing public and parochial settings, and multiple grade levels. Furthermore, the nature of the referring problems were varied, with Case 1 evidencing predominantly academic engagement and persistence difficulties, and Cases 2 and 3 exhibiting more varied behavioral challenges. Across two of the three cases, immediate improvement was observed with the initiation of the DRC intervention on at least one DBR-SIS. This

Table 1. Comparison of Different Metrics for Illustrating Intervention Effect.

Participant	Phase	DBR <i>M</i> (<i>SD</i>)	SDO <i>M</i> (<i>SD</i>)	Tau DBR (baseline/ intervention)	Tau SDO (baseline/ intervention)	Tau DBR/SDO (baseline)	Tau DBR/SDO (intervention)	Tau DBR/DRC
AE								
Andrew	Baseline	6.80 (1.69)	57.33 (24.95)	.56	-0.11	-0.19	-0.42	0.14
	Intervention	7.27 (1.71)	52.67 (36.50)					
Stephen	Baseline	4.60 (2.61)	61.33 (12.74)	.53	0.78	0.33	0.14	0.09
	Intervention	7.79 (3.14)	87.00 (14.11)					
John	Baseline	7.17 (1.27)	78.75 (7.97)	.78*	0.25	0.40	-0.54	-1.00*
	Intervention	8.40 (0.58)	81.00 (2.65)					
DB								
Andrew	Baseline	0.50 (0.97)	8.00 (9.85)	.11	0.67	0.25	0.69	0.19
	Intervention	0.73 (0.80)	17.33 (10.97)					
Stephen	Baseline	3.80 (2.59)	23.77 (11.81)	-.72*	-0.56	-0.27	-0.03	0.04
	Intervention	0.84 (1.64)	7.33 (12.70)					
John	Baseline	3.67 (1.67)	13.50 (5.45)	-.64*	-1.17*+	-0.68	-0.84*+	0.97*
	Intervention	1.96 (0.93)	4.00 (6.08)					
RS								
Andrew	Baseline	9.20 (0.92)	90.33 (16.74)	.29	-0.56	0.19	-0.65	-0.29
	Intervention	9.33 (0.98)	66.67 (39.93)					
Stephen	Baseline	4.80 (3.27)	86.33 (11.85)	.49	0.56	0.60	0.39	0.07
	Intervention	7.37 (3.40)	98.00 (3.46)					
John	Baseline	7.58 (1.00)	89.25 (5.91)	.61*	0.83	0.93*	1.00*	-1.00*
	Intervention	8.44 (0.59)	96.67 (2.89)					

Note. DBR = direct behavior rating; SDO = systematic direct observation; DRC = daily report card; AE = academic engagement; DB = disruptive behavior; RS = respectful behavior.

+Corrected for baseline trend.

* $p < .05$.

Table 2. Usage Rating Profile—Intervention Revised.

Factor	Case 1	Case 2	Case 3
Acceptability	5.8	5.8	4.9
Understanding	6	5	5.3
Home-school collaboration	6	6	5
Feasibility	5.3	5.3	5.2
System climate	5.8	5.4	5.2
System support	2.3	4.3	1.3

Note. A low score on system support is preferable as it indicates a low need for additional supports to successfully use the intervention.

replicates within a single-subject design the findings from other studies of DRC efficacy that illustrate it is a useful approach for remediating school-based impairments (e.g., Atkins, Pelham, & White, 1989; Fabiano et al., 2010; Owens et al., 2008). In this study, prior results were extended to youth with milder levels of disruptive and academic engagement problems, suggesting the DRC may be a viable Tier 2 intervention for children in elementary school settings.

One of the main goals of this study was to investigate effective progress monitoring tools for illustrating the

effects of the DRC intervention. Two main approaches were used—the DBR-SIS and the SDO. The graphs in Figures 2 to 4 illustrate that the DBR was an effective means of demonstrating intervention effectiveness; importantly, this was only for DBRs that were tied to the areas of impairment the child exhibited during baseline. For instance, the DBR for Andrew was an effective measure of progress monitoring when focused on AE. The DB DBR-SIS was less informative due to a floor effect. Results were mixed for the SDO measure. The SDO was mostly consistent with the DBR-SIS for Andrew and Stephen. However, for John, there was evidence of inconsistency across measures when Tau values are considered.

The inconsistent results for Andrew require additional discussion as they suggest potential advantages of the DBR-SIS approach relative to SDO. First, the DBR-SIS provides information on the entire class period, whereas the SDO as implemented in this study represented only 15 min. As such, this approach to SDO was susceptible to influence by short periods of increased negative behavior or academic disengagement (the opposite is also the case—SDO can also be influenced by short periods of appropriate behavior, sometimes due to reactivity based on an observer being in

the classroom). The longer period of observation represented by the DBR-SIS may result in increased reliability for assessment of behavior as it includes a greater sampling of time. Second, the DBR-SIS is less costly than the SDO. The DBR-SIS can be completed by the teacher, and in this study, it required only three checkmarks. In contrast, the SDO required an additional adult to schedule a time and enter the classroom to conduct the observation. If this were a typical school setting, and a school psychologist was required to complete multiple SDOs on multiple children, it is not hard to see how this would quickly become an impractical approach for progress monitoring. Finally, the DBR-SIS generally provided comparable information to the SDOs conducted, suggesting that this approach to measurement was comparable with one of the gold standard approaches in the field.

In addition to improving the behavior of the children within the study, the present report also provides evidence that the DRC is a feasible and palatable approach to intervention. The URP-IR data indicate that the intervention could be conducted effectively by the teachers, the approach improved home-school collaboration, and there was not a need for additional school support, in general, to effectively implement the program. With the advent of tiered problem-solving approaches in schools, there are increased expectations for general education teachers to implement Tier 2 strategies (Vujnovic, Fabiano et al., 2014; Vujnovic, Holdaway, Owens, & Fabiano, 2014). The present results suggest that the DRC is a viable Tier 2 strategy for general education teachers to implement to reduce problematic behavior in the classroom and they align with a larger literature supporting the DRC as a first-line intervention for youth with challenging behaviors in educational settings (Fabiano et al., 2010; Pelham et al., 2016).

This study is not without limitations. The study included all boys from elementary school in general education settings. As such, it is not known how results would generalize to different cases with more diverse demographic characteristics, or to other settings such as middle school or special education classes. Furthermore, for most cases, the school year ran out, so long-term follow-up data of the intervention could not be collected. An additional limitation is that the DRC was established by consultants from a university setting—future research should replicate these findings using internal school personnel such as school psychologists or special educators. In addition, the SDO and the DBR-SIS were completed based on different time frames, with DBR scores averaged across daily ratings in some cases, which reduces the ability of the SDO to serve as a precise criterion for the DBR-SIS. Rather, it can be viewed as a practical criterion (e.g., an observation completed by an independent observer during a specified period compared a DBR-SIS completed by a teacher for a specified period). Finally, all

children in the study had parents who provided home-based rewards for the DRC, and it is, therefore, not clear how these results would generalize to situations without parent involvement and collaboration.

In conclusion, the DRC intervention was efficacious as evidenced by systematic study within a multiple-baseline design. The DBR-SIS was an effective progress monitoring measure that illustrated improvement following the initiation of the intervention. Together, these two approaches (i.e., DRC and DBR-SIS) represent an effective intervention and progress monitoring assessment approach, consistent with current school-based, tiered, problem-solving models. Future research should focus on the utility and effectiveness of using DBR-SIS as a mechanism to progress monitor other Tier 1 and Tier 2 behavioral interventions (e.g., check-in, check-out; Crone, Hawken, & Horner, 2010) as ultimately it may have value as an evaluation tool within school-based problem-solving models.

Authors' Note

The opinions expressed are those of the authors and do not represent views of the Institute of Education Sciences or the U.S. Department of Education.

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