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Combining Tier 2 and Tier 3 Supports for Students with Disabilities in General Education Settings

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Abstract

Secondary level or Tier 2 interventions such as the Check-in Check-out (CICO) intervention effectively reduce problem behaviors of students who are non-responsive to school-wide interventions. However, some students will not be successful with Tier 2 interventions. This study investigated the effects of adding individualized function-based support for four students with disabilities who were not successful in general education settings while receiving only a secondary level intervention. Results indicated that the combination of secondary and individualized function-based interventions effectively decreased problem behavior for all participants. Teachers and students rated the interventions as acceptable and effective. Research and practice implications are discussed.

Keywords: Positive behavior supports, Check-in/check-out, Function-based behavioral supports, Behavioral interventions, Multi-tiered systems of supports

1. Introduction

For nearly two decades researchers and school personnel have developed and implemented a variety of prevention and intervention strategies to address severe problem behavior in schools based on a three tiered continuum of positive behavior support (Walker et al., 1996). This continuum begins with a universal or primary (*i.e.*, Tier 1) intervention such as implementing a school-wide discipline plan (Colvin, Kame'enui, & Sugai, 1993; Sugai, Horner, & Gresham, 2002; Walker et al., 1996). Approximately 10-15% of the student population will need additional behavior support (Horner, Sugai, Todd, & Lewis-Palmer, 2005), which can be provided by a secondary level or Tier 2 intervention such as social skills training or a check-in, check-out intervention (Crone, Hawken, & Horner, 2010). An estimated additional 1-5% of the student population may need intensive, tertiary level behavior support (Tier 3; Horner et al., 2005; McIntosh, Chard, Boland, & Horner, 2006). Tier 3 behavior support typically involves conducting a functional behavioral assessment and implementing an individualized behavior support plan (Crone, Hawken, & Horner, 2015; O'Neill, Albin, Storey, Horner, & Sprague, 2014).

As is expected in a multi-tiered system of support, students may move through different levels of support based on their needs and behavioral performance. Therefore, some students who are not successful with general school-wide Tier 1 support can be successful when they receive appropriate Tier 2 support, such as the Check-in/ Check-out (CICO) intervention (Crone et al., 2010). CICO, which is also referred to as the Behavior Education Program (BEP), builds on school-wide expectations by providing frequent feedback on classroom social behavior and positive reinforcement of appropriate behavior. CICO is structured around a daily check-in and check-out system. Students begin the school day by checking in with the CICO coordinator and return in the afternoon for check-out. The coordinator is usually a paraprofessional who spends 10 to 15 hours a week implementing the intervention. During check-in, the CICO coordinator ensures that students have pencils, paper, and their homework, and supplies them with a Daily Progress Report (DPR), which lists behavioral expectations for students. Teachers rank how well the students followed the expectations during periods of the school day. At check out, the CICO coordinator calculates each

student's points earned for the day, provides praise and encouragement, and gives each student a small reward such as a sticker or candy based on their individual performance. The CICO coordinator gives each student a copy of the DPR to take home for parent signature, and sends the parents monthly graphs indicating their child's progress in the program. Behavior support team members meet weekly or every 2 weeks to evaluate student progress and determine if the program needs to be modified, or if students are ready to transition from CICO to a self-monitoring program (Crone et al., 2010).

Research has shown CICO to be effective in reducing problem behavior with elementary and middle school students (Bruhn, Lane, & Hirsch, 2014; Cheney et al., 2009; Fairbanks, Sugai, Guardino, & Lathrop, 2007; Filter et al., 2007; Hawken, 2006; Hawken, Bundock, Kladis, O'Keeffe, & Barrett, 2014; Hawken & Horner, 2003; Hawken, MacLeod, & Rawlings, 2007; March & Horner, 2002; McCurdy, Kunsch, & Reibstein, 2007; Miller, Dufrene, Sterling, Olmi, & Bachmayer, 2015; Todd, Kaufman, Meyer, & Horner, 2007). In a recent review of 28 studies evaluating CICO, the intervention was found to decrease observed problem behavior, improve academic engagement or work completion, improve the percentage of DPR points, and reduce Office Discipline Referrals (ODRs; Hawken et al., 2014). The 20 single subject studies evaluated in this review had an overall median percentage of non-overlapping data points (PND) of 68%, indicating that the intervention is approaching the effectiveness criteria of 70% established by Scruggs and Mastropieri (1998) (Hawken et al., 2014). Seven of the eight group design studies reviewed had small to large effect sizes favoring the intervention (Hawken et al., 2014). There is also evidence that CICO reduces referrals to special education or Tier 3 behavior support (Hawken & Horner, 2003; Hawken et al., 2007). However, CICO is not always universally effective. In their review, Hawken et al. (2014) reported that of 20 single subject studies for which individual data were available, approximately 35 of 77 participants (45%) were considered responsive to the intervention, and an additional 17 students (22%) were considered to be questionably responsive to the intervention, based on their median PND scores.

For students who fail to respond to Tier 2 supports, implementing additional Tier 3, function-based interventions is effective in decreasing problem behavior (Campbell & Anderson, 2008; Carter & Horner, 2007; Carter & Horner, 2009; Fairbanks et al., 2007; Lane et al., 2007; Lane, Kalberg, & Shepcard, 2009; March & Horner, 2002; Nahgahgwon, Umbreit, Liaupsin, & Turton, 2010; Trussell, Lewis, & Stichter, 2008). Function-based interventions involve conducting a functional behavioral assessment to determine why the student is engaging in problem behavior and using the information to develop a behavior support plan (O'Neill et al., 2014; Umbreit, Ferro, Liaupsin, & Lane, 2007). Researchers often conduct FBA evaluations in more restrictive settings such as self-contained classrooms (Kern, Hilt, & Gresham, 2004; Scott et al., 2004; Trussell, Lewis, & Stichter, 2008), and outside experts rather than classroom personnel develop the corresponding behavior support plans (Kern et al., 2004; Scott et al., 2004). Relatively few studies demonstrate the effectiveness of behavior support plans developed and implemented collaboratively by teams (e.g., classroom personnel and a behavior support specialist) (Scott et al., 2004; Crone, Hawken, & Bergstrom, 2007).

A small number of studies have evaluated the effectiveness of adding function-based tier 3 supports for students non-responsive to CICO (Campbell & Anderson, 2008; Fairbanks et al., 2007; March & Horner, 2002). March and Horner (2002) found that function-based additions to CICO for three sixth and seventh grade students helped reduce their observed rates of problem behavior and improved their academic engagement. However, this study did not involve assessment of intervention fidelity, and the participating educators did not play active roles in either the FBA process or development of the behavior support plans. Fairbanks et al. (2007) expanded on this topic by evaluating the addition of function-based elements to CICO with four second-grade students. While the participating students had reductions in rates of problem behaviors, this study was implemented in only two classrooms, as opposed to on a school-wide level. Campbell and Anderson (2008) conducted a similar study in which function-based supports were added to CICO for two 10-year old boys. Each of the participants showed a reduction in problem behaviors following the function-based CICO intervention. Similar to Fairbanks et al. (2007), this study was conducted in only one classroom. The authors of all three of these studies call for more research to be conducted on the addition of function-based supports to CICO for non-responders, specifically to determine the level of teacher involvement possible in the development and implementation of function-based supports, and to broaden the populations with which this procedure is implemented (Campbell & Anderson, 2008; Fairbanks et al., 2007; March & Horner, 2002).

The purpose of this study was to replicate and extend previous research on adding function-based behavior support to Tier 2 interventions to support students with high incidence disabilities in general education settings. While three studies have previously investigated function-based CICO (Campbell & Anderson, 2008; Fairbanks et al., 2007; March & Horner, 2002), replication of the findings of these studies is needed in order to establish function-based CICO as an evidence-based practice. According to the criteria suggested by Horner et al. (2005), in order for a practice to be established as evidence-based through the use of single-subject methodology, there must be replication of experimental effects across a minimum of five studies and at least 20 participants must be included across the studies. Each of the studies must also meet standards for quality single-subject research and be "conducted by at least three different researchers across at least three different geographical locations" (Horner et al., 2005, p. 176). This study also improves the external validity of function-based CICO by broadening the population with which it was implemented.

2. Methods

2.1 Setting and Participants

The study was conducted in an urban elementary school in the intermountain west, with a student population of 655 (grades K-6), 66% of whom qualified for free or reduced lunch and 38% of whom were from ethnic minority backgrounds. The elementary school had been implementing school-wide behavior support efforts for over four years. The School-Wide Evaluation Tool (SET; Horner et al., 2004) was administered during the spring of the school year prior to the current study and results indicated that, on average, the school was

implementing their school-wide behavior support plan (Tier 1) with 88% fidelity. Data for all participants were collected in their general education classrooms during activities identified as most problematic during the functional behavioral assessment interviews (see below).

The participants in this study were five students between the ages of 7 and 12 years old in grades 1 through 6. The students were selected based on the following criteria: (a) the student had participated in the CICO intervention for at least three weeks; (b) the student was demonstrating inconsistent progress in meeting his daily DPR goal; (c) the student had received at least one office discipline referral; (d) the student had been present in the school for at least two months prior to starting CICO; (e) the student had been referred by the school's behavior support team; and (f) the student and his parents had given consent to participate in the study. All five students initially included in the study were Caucasian males. One of the students moved to another school before the intervention phase of the study; therefore no data are reported for him. All four remaining participants had individualized education programs (IEPs), received special education services and spent a portion of their day in resource settings.

James was a 10-year-old student in third grade receiving special education services under the classification of learning disability. He engaged in disruptive and off-task behavior such as playing with objects at his desk, making faces, and throwing school-work away. He had difficulty with spelling and writing tasks, particularly in his general education classroom.

Seth was an 11-year-old student in fourth grade with a special education classification of emotional disturbance. He engaged in disruptive problem behavior in his general education classroom. Examples of these behaviors included playing with objects, being out of his seat without permission, and asking the teacher questions unrelated to the immediate activity.

Carlos was an 8-year-old student in second grade receiving special education services under the classification of emotional disturbance. He exhibited several problem behaviors in the general education classroom including following the teacher around the classroom when he was expected to be in his seat working, wandering alone, and playing with objects during instruction.

Eric was a 7-year-old student in first grade receiving special education services under the classification of learning disability. He engaged in talking out of turn or shouting out comments or questions without permission from his teacher. He also talked to peers during instruction and independent seat-work activities. Eric tended to rush through independent assignments, which resulted in work of poor quality.

2.2 Measurement

2.2.1 Functional Assessment Interview & Observations

The principal investigator conducted a functional behavioral assessment interview to identify the antecedents, behaviors of concern, maintaining consequences and a hypothesis for the occurrence of problem behavior for each participant in the study. To narrow down the time of day that was most problematic for each student, the researchers tallied scores from the

student's Daily Progress Reports and noted times of the day when students received the lowest scores. The researchers used this information to guide the teacher interviews. The researchers interviewed each student's teacher using a 20-30 minute semi-structured interview which has been used in previous research (Murdock, O'Neill, & Cunningham, 2005). Following the teacher interviews, the researchers performed 20-minute classroom observations two to three times per week for two weeks for each student to obtain antecedent-behavior-consequence data (A-B-C; Bijou, Peterson, & Ault, 1968), to operationally define problem behaviors, and to confirm or disconfirm hypotheses developed from the interviews (O'Neill et al., 2014). The researchers summarized the information from the interviews and observations, and used this information to develop, in collaboration with the students' teachers, each student's function-based intervention.

2.2.2 Direct Observations of Problem Behavior

Problem behavior was defined as engaging in behaviors unrelated to academic engagement in the classroom. Problem behavior included being out of seat, yelling out an answer without being called upon by the teacher, playing with objects or talking to another student during instruction, or continuing with a nonacademic activity after the teacher gave instructional directions. A partial interval recording procedure was used to collect data on the percentage of intervals during which students displayed problem behavior.

Each 20-minute observation session was divided into 120, 10-second intervals. A taped signal on portable tape recorders cued observers to record data at the end of each 10-second interval. Problem behavior was scored if it occurred at any time during the interval. Researchers conducted observation periods in the students' general education classrooms during times of the day students were identified as engaging in the highest rate of problem behavior as determined by the functional assessment interview. To provide a normative comparison, researchers also collected data during baseline and intervention phases on randomly selected, same-gender peers in each participant's classroom. These comparative peers were not participating in CICO or receiving other interventions.

2.2.3 Interobserver Agreement Observations

A second independent observer collected data on the occurrence of problem behavior during an average of 28% of the sessions distributed across baseline and function-based intervention phases. Observers were considered to be in agreement if they independently recorded the occurrence or nonoccurrence of problem behavior within each 10-second interval. The percentage of total interval agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100 (Kazdin, 2010). Observer agreement data were collected during 30% of the baseline and intervention sessions for James and averaged 87 % (range of 71% to 100%). Agreement data for Seth were collected during 28% of the baseline and intervention sessions and averaged 95% (range of 85% to 100%). Agreement data for Carlos were collected during 33% of the baseline and observation sessions and averaged 92% (range of 82% to 99%). Observer agreement data for Eric were collected during 19% of the baseline and intervention sessions and averaged 91% (range of 79% to 95%).

2.2.4 Office Discipline Referrals (ODRs)

Researchers obtained office discipline referral data from the participants' school, which employed the Discipline Tracker program (EduSoft Solutions, 2007). This is a computer-based program that summarizes and organizes both minor and major referrals. Office discipline referral data for each student were collected and major and minor referrals were combined. Major office discipline referrals were for behaviors that were extreme or dangerous such as property damage, harassment, physical aggression or major noncompliance. Minor office referrals involved lower level chronic behaviors such as minor disruption, non-serious physical contact, and brief or low-intensity failure to respond to adult requests.

2.2.5 Daily Progress Report (DPR)

As part of the students' CICO intervention, the DPR included the list of the school-wide expectations along with periods of the day that teachers were required to rate student behavior as either 0 = did not meet expectation, 1 = somewhat met the expectation, or 2 = met the expectation for that period. Scores are summarized at the end of the day as the percentage of points obtained. Researchers collected these data during the baseline and function-based intervention phases.

2.2.6 Social Validity Assessment

Following the completion of the study, teachers and students completed a questionnaire assessing intervention acceptability and effectiveness. The questionnaire consisted of 7 items, and teachers and students rated each item on a Likert type scale from 1 to 6 (disagree to agree). The items addressed: the effectiveness of the intervention for reducing problem behaviors, ease of implementation, and likelihood that they would recommend the intervention to others. Higher scores indicated a more favorable impression of the intervention and its outcomes.

2.2.7 Fidelity of Function-Based Intervention Implementation

Researchers evaluated the extent to which participating teachers implemented each function-based intervention with fidelity. The interventions were task analyzed into a series of steps. During each observation, observers counted the number of steps correctly implemented by the teacher without prompting and calculated a percentage of steps implemented correctly. Researchers assessed fidelity for each teacher via observation on three occasions that were randomly distributed throughout the intervention phase for each student.

2.3 Experimental Design

A multiple baseline design across the four students was used to assess the relationship between the occurrence of problem behavior and the addition of individualized function-based interventions to each participant's existing CICO intervention (Kazdin, 2010). Once baseline data were relatively stable, a function-based intervention was first introduced for James. Function-based interventions were subsequently introduced in a staggered fashion for Seth, Carlos, and Eric.

2.3.1 Initial Steps and Functional Assessment Procedures

The principal investigator contacted the school principal and, in consultation with the school's behavior support team, selected students who met the criteria for possible participation. Once parent, teacher, and student consent were obtained, researchers conducted the functional behavioral assessment interview with each student's teacher, and developed hypotheses regarding the function of each student's problem behavior. Then researchers conducted the A-B-C observations in each student's general education classroom setting. Researchers summarized these observation data compared them with the interview information to develop a final functional hypothesis for each student, which served as the basis for the development of the function-based interventions. These hypotheses were developed and confirmed in collaboration with the classroom teachers.

2.3.2 Baseline Procedures

The baseline phase consisted of classroom observations of each student in his general education classroom during the most problematic situations identified by the teachers during the FBA interviews. Teachers conducted class activities as they typically did. Example situations included independent reading activities and language arts instruction. Researchers observed the students for 20-minute periods using the partial interval system described above. The lengths of the baseline phases were determined by the level, trend, and variability of the students' problem behavior. It is important to note that during the baseline phase students continued to participate in CICO as described by Crone, Hawken, and Horner (2010).

2.3.3 General Intervention Development and Student and Teacher Training

Each intervention was individually tailored to address the hypothesis for problem behavior identified during the functional behavior assessment process. Researchers developed the function-based interventions in consultation with each student's teacher and implemented the interventions in the individual student's general education classroom during the identified time period. During the consultation process, the teachers and researchers discussed which function-based intervention components would be feasible, efficient, and acceptable for use in the classroom. The principal investigator initially implemented the interventions, followed by the classroom teacher then implementing the interventions independently. Researchers did not conduct classroom observations while each student was being initially exposed to the intervention during the first one to two sessions. The interventions involved different combinations of modifications of antecedent variables, teaching appropriate replacement behaviors, and consequences for appropriate (*e.g.*, staying on task, raising hand) and inappropriate behavior (*e.g.*, being out of seat, being off task).

Once the interventions were agreed upon, the principal investigator met individually with students and teachers to provide necessary training on intervention procedures. This training involved verbal explanations and discussion, modeling of particular strategies as needed, and practice by the teachers and students with feedback by the investigator. This training took place during 1-2 sessions for each participant. In addition, for two of the teachers (Carlos and Seth) the investigator provided a written list of the steps to follow for the interventions. For

one student (Carlos) the investigator provided additional prompts in the classroom on three occasions to redirect him to attend to his self-monitoring sheet.

2.3.4 Intervention Development: James

The FBA interview and A-B-C data indicated that James's problem behaviors were primarily maintained by escape from academic tasks. Antecedent strategies were directed at improving James's spelling skills in his general education classroom. For this intervention, James was prompted by his special education teacher to request his spelling words for the week from his general education teacher. He then practiced spelling in the resource setting to improve his fluency on this task, thereby potentially reducing his motivation to escape from it.

James's function-based intervention also included a strategy to increase reinforcement for on-task behavior and reduce his motivation to escape from task demands. This strategy involved a self-monitoring program using a preset vibrating timer called "the MotivAider®" (Behavioral Dynamics, Thief River Falls, MN) which cued James at 1-minute intervals to note when he was working in class. The principal investigator taught James how to use the timer and mark a self-monitoring form depending on whether he was on-or off-task. James was able to earn a reinforcer for demonstrating a certain level of on-task behavior. For example, he was able to read the book of his choice for approximately five minutes at the end of class after demonstrating on-task behavior for at least 80% of the intervals within a 20-minute period. He was also able to earn a new book or purchase an inexpensive book from the school library after five days (cumulative) of meeting his on task goal of 80%.

2.3.5 Intervention Development: Seth

The FBA interview and A-B-C data for Seth indicated that his problem behaviors were primarily maintained by teacher attention. The antecedent component of his intervention involved a Spiderman book Seth received from his teacher at the beginning of the silent reading period to encourage him to read. The number of words on each page was indicated, and Seth was asked to keep track of the number of words he read each period. This intervention gave him opportunities for teacher attention in the classroom for participating in the reading activity. This part of the intervention had to be discontinued after approximately 5 sessions because the teacher contended that the additional attention to Seth was unfair because other students were not receiving similar feedback. Seth's function-based intervention also included a preset vibrating timer to cue him to mark a self-monitoring form when he was on- or off-task during the silent reading period. This strategy was implemented to allow him to earn points that could be used to gain adult attention at the end of the day with a favorite teacher and play basketball in the gym on Friday with the teacher. The principal investigator initially implemented the intervention, followed by teacher implementation after training.

2.3.6 Intervention Development: Carlos

The FBA interview and A-B-C data for Carlos indicated that his problem behaviors were primarily maintained by teacher attention. Antecedent interventions for Carlos consisted of pre-correction and curricular modification procedures, including (a) the teacher telling Carlos

that she would help him with the first question (thereby providing adult attention), (b) reminding him that he could raise his hand if he had a question, and (c) giving him easier math problems first followed by more difficult problems. Carlos was also taught to use a self-monitoring procedure involving a preset vibrating timer. This involved Carlos marking a self-monitoring form indicating whether he was on- or off-task. He was also taught to raise his hand when he had a question or needed help from the teacher. Carlos used the preset vibrating timer during the independent seat-work activity. When Carlos was on task, the teacher would periodically provide praise and individual attention. At the end of the work period, the teacher would review his self- monitoring sheet and praise him if the goal was met. Carlos was taught the intervention by the principal investigator in his general education classroom in an area separate from the rest of the class. His teacher began implementing the intervention after the second training session.

2.3.7 Intervention Development: Eric

The FBA interview and A-B-C data indicated that Eric's problem behavior was primarily maintained by peer attention during independent journaling activities. Eric's antecedent strategies included his teacher reminding him that he could raise his hand if he had a question rather than talking to his peers, and providing him with a short checklist of steps to prompt him to finish his work at an acceptable level of quality. If he completed all three steps on the checklist, he was able to talk to or play a computer game with a peer. Eric was taught how to use the checklist in the classroom by the principal investigator, and the classroom teacher then implemented the procedure.

3. Results

3.1 Fidelity of Function-Based Intervention Implementation

Researchers observed each teacher on three occasions using a checklist with the components specific to each individual student's function-based intervention. This assessment indicated that James' and Seth's teachers both completed an average of 83% of the necessary steps of the intervention across the 3 days. The fidelity checks for Carlos indicated that his teacher completed an average of 78% of the necessary steps, and Eric's teacher completed an average of 83% of the steps with fidelity. Three of the four teachers averaged above 80% intervention fidelity across the observations.

3.2 Occurrence of Problem Behavior

The percentage of intervals with the occurrence of problem behavior is displayed in Figure 1. Overall, the baseline phases demonstrated high levels of problem behavior (more than 40%) and high variability for three of the students (James, Seth, and Carlos). Eric exhibited a somewhat lower level of problem behavior during baseline (average of 25% of the observed intervals). All four students showed immediate reductions in problem behaviors following the implementation of the function-based interventions. These decreases remained stable throughout the intervention phases.

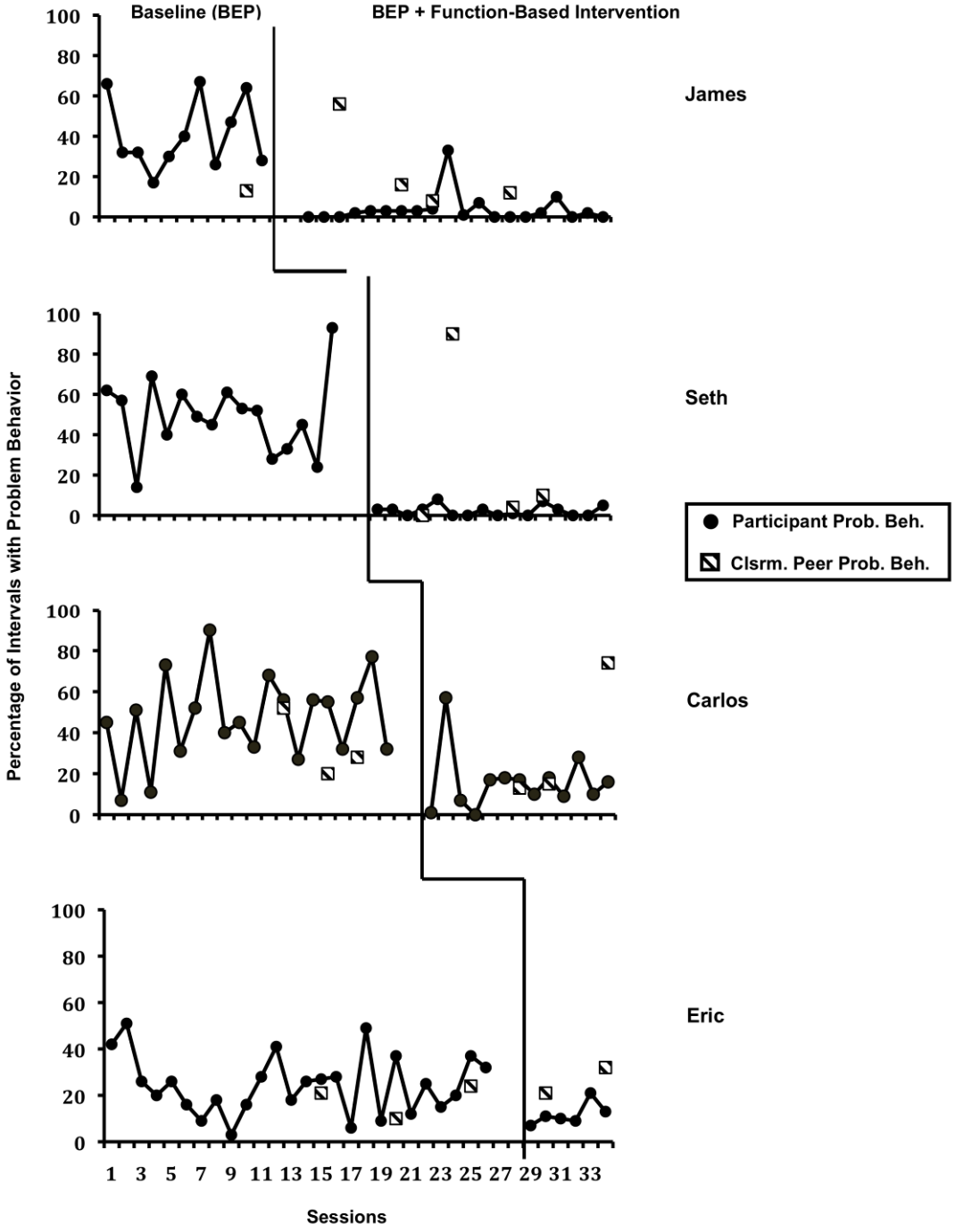

Figure 1. The percentage of intervals with problem behavior during the baseline (BEP) and BEP + function-based intervention phases

Note. The unconnected square symbols represent data from classroom peers.

Baseline data for James indicated that problem behavior occurred in an average of 41% (range from 17% to 67%) of the observed intervals. Following implementation of the function-based intervention, the level of problem behaviors decreased substantially to a mean

of 4% (range from 0 to 33%) of the observed intervals. In comparison, same-gender peers displayed a mean occurrence of problem behavior of 23% of the intervals in the intervention phase. During one session (#22) James's percentage of intervals with problem behavior reached baseline levels of 33%. It should be noted that this event appeared to be related to James receiving books as a reward for working from his special education teacher in a prior class period, thereby possibly impacting his motivation to work during the intervention session.

Seth demonstrated the highest average level of problem behavior during the baseline phase with problem behavior occurring in a mean of 49% (range from 14% to 93%) of the observed intervals. Following implementation of the function-based intervention, problem behavior decreased to a mean level of 2% (range from 0% to 8%) of the intervals. Peer comparison data indicated that during baseline peers were at 0% and had levels generally consistent with Seth during the intervention phase.

Carlos exhibited substantial levels of problem behavior during baseline, averaging an occurrence of problem behavior in 45% of the observed intervals (range from 1% to 90%). Following implementation of the function-based intervention, the level of problem behavior decreased to an average of 14% (range from 0% to 28%) of the observed intervals. Following intervention implementation, Carlos's performance was consistent with or below the level of his peers.

Eric exhibited the lowest average level of problem behavior during baseline, with problem behavior occurring in 24.5% (range from 3% to 51%) of the observed intervals. During the function-based intervention phase, the level of problem behavior dropped to a mean of 12% (range from 7% to 21%) of the intervals. Peer comparison data demonstrate that the frequency of Eric's problem behavior was consistent with typical peers during baseline, and lower than his peers during the function-based intervention.

3.3 Office Discipline Referrals

All four students showed a decrease in the average rate of office discipline referrals received per week between the baseline and intervention phases. James exhibited an average rate of 0.03 ODRs per week prior to receiving the function-based intervention; ODRs decreased to zero following the intervention. Seth had the highest rate of ODRs prior to the function-based intervention with an average of 0.52 per week. A slight drop (from 0.52 to 0.50) was observed in the rate of ODRs following the function-based intervention phase. ODRs for Carlos dropped from an average rate of 0.34 per week during baseline to a rate of 0.25 per week during intervention, reflecting a decrease of approximately 25%. Eric had the lowest average rate of ODRs during baseline (.18), which dropped to 0 following implementation of the function-based intervention.

3.4 Social Validity Assessment

All teachers completed the social validity assessment and gave ratings of 5 or 6 (6-pt. scale) concerning the ease of implementation of the function-based interventions, their suitability for the classroom culture, and ease of fit for teachers' schedules. Teachers gave ratings of 4 or

greater with regard to whether or not they would recommend the intervention approach to others. When asked whether the intervention improved the students' behavior teachers gave a mean rating of 4.3 (range 4-5). The teachers gave an average rating of 4.7 for the items regarding improvement in academic performance and student grades. These scores were influenced by the lower ratings of Seth's teacher; however, she also noted that his intervention was not necessarily designed to improve academic performance.

All four students completed social validity ratings for their individual interventions. Overall, all students gave ratings of 5 or higher (6-pt. scale) regarding whether the interventions improved their work in class, whether they would do the intervention again, and whether the intervention was good for kids who needed support. On average most students gave higher ratings regarding whether the intervention was easy to do, fit into their schedule and was worth the time and effort. However, James disagreed that the intervention was easy to do (rating of 1) and Carlos disagreed that his intervention was worth his time and effort (rating of 1). All students gave ratings of 5 or higher as to whether the intervention improved their behavior, and their ratings regarding improvements in grades were a 4 or higher with the exception of Carlos (rating of 1).

4. Discussion

This study evaluated the combined effects of Tier 2 and Tier 3 interventions on reducing problem behavior of students with high incidence disabilities who were not successful with a Tier 2 intervention alone. As such, it adds to the small but growing number of recent investigations which have examined gradually increasing levels of support in school settings based on student needs (*e.g.*, Campbell & Anderson, 2008; Carter & Horner, 2007, 2009; Fairbanks et al., 2007; Lane et al., 2007). The current study provides additional evidence of the effectiveness of such approaches with students receiving special education services who were also included in general education classrooms. Additionally, this study provides evidence of the effectiveness of this procedure with students in grades 1-4, whereas previous research documented the effectiveness of this procedure only with 10-year old students (Campbell & Anderson, 2008), students in second grade (Fairbanks et al., 2007), and students in sixth and seventh grades (March & Horner, 2002).

A critical issue in providing school-based behavior support is whether this can be done with effectiveness and efficiency by school staff in typical settings (Anderson, Horner, Rodriguez, & Stiller, 2013; Ellingson, Miltenberger, Stricker, Galensky, & Garlinghouse, 2000). This study provides evidence that function-based interventions can be developed and implemented efficiently and effectively by school-based personnel to support students who did not respond to Tier 2 behavior supports. The function-based interventions in this study, developed in consultation between the principal investigator and the teachers of the participating students, were first implemented by the principal investigator and then by the students' teachers with the principal investigator providing support and feedback. It is worth noting that positive results were obtained for the student participants with relatively minimal investment of time and training for the teachers involved (Noell et al., 2000; Noell et al., 2005). The results of the direct observations of fidelity of teacher implementation and the social validity

questionnaires indicate that the interventions had good contextual fit in the students' general education classrooms.

5. Implications for Practice

The current study adds to the literature demonstrating that some students will require additional support beyond Tier 2 interventions (*e.g.*, Carter & Horner, 2009), and that adding on function-based interventions can effectively provide such support. One of the main priorities within school-wide behavior support systems is not only efficiently providing evidence-based supports, but also ensuring that interventions are appropriately matched to the intensity of students' problem behavior (Anderson et al., 2013). This study demonstrates that function-based components can be added to Tier 2 interventions to more appropriately match students' needs while maintaining efficiency. A critical issue in this regard is the need for empirically-based decision rules to guide staff in deciding when students require additional supports beyond the Tier 1 or 2 levels (Hawken, Vincent, & Schumann, 2008; Walker, Cheney, Stage, Blum, & Horner, 2005). Some decisions could be made based on DPR data. For example, changes in a student's DPR data while on CICO may indicate a problem in the classroom before the student receives an ODR (Hawken et al., 2008). The team may decide to lower the student's goal and monitor the data (Crone et al., 2010). If the student still fails to make progress based on the DPR, then further intervention may be needed in the form of modifications to CICO for the individual student. These might include modifications with regard to additional peer or adult attention, or academic/curricular changes to reduce aversive properties of school activities (Crone et al., 2010). If such modifications do not produce the desired outcomes then consideration of additional Tier 3 assessment and intervention procedures could be warranted.

One of the components of the interventions similar across all participants in this study was self-monitoring. The results of this study suggest that function-based interventions that include a self-monitoring component may help reduce students' observed problem behavior. This is a significant finding, as self-monitoring interventions are low-cost and efficient for teachers to implement (Bruhn, McDaniel, & Kreigh, 2015). Previous studies on CICO have evaluated the effectiveness of using self-monitoring to fade students off of the intervention after they successfully reach their goals of reduced problem behaviors (Miller et al., 2015; Stage, Cheney, Lynass, Mielenz, & Flowe, 2012). One of the participants' behavior support plans in March and Horner';s (2002) study included a self-monitoring intervention, but the details of this intervention were not discussed in depth. The self-monitoring components of the interventions implemented in this study were aligned with CICO and each individual's needs. The results of this study demonstrate that it may be possible to increase the intensity of CICO by providing students with training in self-monitoring procedures specifically aligned with the expectations listed on the DPR

6. Limitations

As with most related studies in the literature, the Tier 2 CICO and Tier 3 function-based interventions were implemented in combination with each of the participants. The experimental design did not involve manipulations of these interventions that would allow

any conclusions about their potential independent effects. It is also possible that the participating teachers may have been implementing CICO and the function-based interventions more consistently due to the periodic presence of the principal investigator and observers in the classroom. These reactive effects may have contributed to fidelity of implementation and improvements in student behavior.

Another limitation was that researchers did not conduct experimental functional analyses of student problem behavior. The principal investigator, in collaboration with participating teachers, developed the function-based interventions based on hypotheses derived from teacher interviews and classroom observations. Research on outcomes from descriptive versus experimental functional analyses suggests that errors in identifying the function of problem behaviors could have occurred (McComas, Vollmer, & Kennedy, 2009; Thompson & Iwata, 2007). However, the fact that problem behaviors decreased from baseline levels for the four participants after function-based interventions provides evidence that the correct function(s) were identified.

7. Directions for Future Research

In this study, researchers identified students in need of additional support beyond the Tier 2 level based on the students receiving at least one ODR, consistently not reaching their DPR daily point goal, and being referred to the behavior support team. Some previously reported research regarding Tier 2 and Tier 3 strategies have employed a variety of standardized behavioral and academic measurement tools for broad screening to identify eligible students (*e.g.*, Cheney et al., 2010; Lane et al., 2007; Walker et al., 2005). These have included such measures as the Systematic Screening for Behavior Disorders (SSBD; Walker & Severson, 1992), the Social Skills Rating System (SSRS; Gresham & Elliott, 1990), and the Behavior Assessment System for Children-Second Edition (BASC-2; Reynolds & Kamphaus, 2004). While they can be effective, such broad screening measures require significant investments of time and resources on the part of school personnel, which may make them less likely to be used on an ongoing basis. The screening measures used to identify participants in this study are more efficient, which may allow students in need of support to receive interventions faster than they would using broad screening measures. Research should be conducted to develop and evaluate decision rules and criteria within Tier 2 systems using ODR and DPR data (Stage et al., 2012; Walker et al., 2005). Such approaches would involve simpler and more readily available data for school personnel. Evaluation should focus on (1) whether school teams can be trained to apply criteria and rules in a consistent manner, and (2) whether their use results in effective and efficient interventions for students.

The only dependent variables measured in this study were observed problem behavior and ODRs. Additional research in this area should involve broader outcome measures, including academic and other skill acquisition achievement in various relevant core subject areas for participants (*e.g.*, reading/language arts, mathematics, functional skills). Other relevant outcomes could include impact on referrals for special education services, and ultimately qualification for such services (Cheney et al., 2010).

One limitation of this study is that data were not collected on the longer-term maintenance of reductions in problem behavior. Additional research should evaluate longer-term maintenance of reductions in problem behavior following function-based interventions in combination with Tier 2 strategies. Skill based interventions with consistent reinforcement of new behaviors may increase the likelihood of the maintenance of the effects.

Finally, for tiered/combined approaches to be effective, additional research is needed to document training procedures that can lead to the *independent* implementation of functional behavioral assessment and function-based interventions by school personnel (*i.e.*, school-based teams). This study indicates that typical teachers can implement function-based interventions, with training and support. To date there have been reports involving small numbers of typical teachers indicating that, with training and support, they could conduct functional behavioral assessments and implement function-based interventions (Ellingson et al., 2000; Watson, Ray, Turner, & Logan, 1999). However, there have been few reports of effective training and outcomes for school-based teams (Crone et al., 2007). Research should continue to evaluate the importance of particular school personnel, skills, and knowledge in the team-based development process (Benazzi, Horner, & Good, 2006).

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