Enhancing Effects of Check-in/Check-out With Function-Based Support

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ABSTRACT: Targeted interventions (also called Tier 2 interventions or secondary interventions) are implemented within a comprehensive three-tiered system of support consisting of universal interventions (for all students), targeted interventions (for students exhibiting mild behavioral difficulties), and intensive interventions (for students requiring individualized support). Check-in/check-out is a targeted intervention designed to reduce incidences of disruptive behavior and increase prosocial behavior. Although check-in/check-out has been shown to be effective in a number of published articles, studies are still needed documenting (a) the utility of this intervention when implemented by educators as part of the larger school system of support and (b) guidelines for increasing the likelihood the intervention is matched to students most likely to benefit. In the current study, the authors address both of these needs by evaluating effects of a school's implementation of check-in/check-out with two typically developing students in the school. When the intervention did not produce significant effects, the authors modified the intervention slightly based on outcomes of functional behavior assessments conducted prior to beginning the intervention; this resulted in positive outcomes for both students. These results demonstrate the utility of considering the function of problem behavior prior to implementing a targeted intervention such as check-in/check-out. Implications for other targeted interventions are discussed.

■ Three-tiered models of support are increasingly used to address both the academic and social behavior needs of students in schools. The goal is to meet the needs of all students in a school by providing a continuum of support such that the intensity of the intervention matches the needs of students. These models typically consist of universal supports (also called primary prevention and Tier 1 support), in place for all students and successful with approximately 80% to 85% of students; supplemental targeted (secondary or Tier 2) interventions for students not responsive to universal interventions and generally successful for 90% to 95% of students who did not respond to universal interventions; and intensive, individualized interventions (tertiary or Tier 3) for those 1% to 10% of students who did not respond to universal or targeted interventions (Walker et al., 1996). In academics, for example, the universal intervention for reading might consist of evidence-based grade-level curricula delivered using appropriate instructional strategies, the secondary intervention might consist of small-group reading delivered in addition to the universal intervention, and intensive interventions would be individualized to match the needs of each student.

Schoolwide positive behavior support uses the three-tiered logic to provide behavioral support to all students in a school (Anderson & Kincaid, 2005; Sprague & Horner, 2006; Sugai & Horner, 2002). To create a predictable and positive school climate, a universal system consisting of explicitly teaching and reinforcing prosocial behavior, responding consistently to inappropriate behavior and using data to guide decision making, is implemented in all settings and across all staff in the school. A growing body of research supports the utility of the universal level of schoolwide positive behavior support for reducing office discipline referrals, suspensions, and expulsions (e.g., Colvin, Kameenui, & Sugai, 1993; Lewis, Sugai, & Colvin, 1999; Nelson & Carr, 1996; Nelson, Martella, & Marchand-Martella, 2002; Taylor-Greene et al., 1997), increasing attendance, and enhancing academic gains (Colvin et al., 1993; Kellam, Mayer, Rebok, & Hawkins, 1998; McIntosh, Chard, Boland, & Horner, 2006; Taylor-Greene et al., 1997). Within schoolwide positive behavior support, targeted interventions are in place to support students who do not respond to the universal intervention and who are at risk for developing more significant behavior problems. These interventions are implemented similarly across

students, require minimal staff time or materials to implement, and can be put into place soon after a need is identified (Crone, Horner, & Hawken, 2004). Examples of targeted group interventions include check-in/check-out systems and—for academics—small-group reading instruction. Finally, for students who do not respond to targeted group interventions, intensive, individualized supports are put in place. These interventions are typically designed based on results of a functional behavior assessment, are comprehensive in nature, and require significant personnel time and resources. A robust body of research supports functionally derived interventions (e.g., Brooks, Todd, Tofflemoyer, & Horner, 2003; Chait, 2003; English & Anderson, 2006; Hoff, Ervin, & Friman, 2005; Kamps, Wendland, & Culpepper, 2006; Northup & Gulley, 2001).

Although most research in schoolwide positive behavior support focuses on universal interventions or on intensive supports, researchers recently have turned their efforts toward developing and evaluating targeted group interventions within the context of schoolwide positive behavior support. This is a needed endeavor because although many schools are using group interventions such as homework clubs and social skills trainings, few schools have invested in building the systems needed to implement these group interventions systematically; schools typically do not have data-based decision rules for determining which intervention a given student will receive, and desired outcomes are not objectively defined or measured. For example, a student who often picks on others and argues may be assigned into a social skills group. If the student actually lacks appropriate social skills (e.g., compromising, turn taking), this might be a good match; however, if the student is teasing others and not getting along with peers, not because of a lack of skills but for some other reason (perhaps behaving in this way gets the student what he or she wants, such as access to preferred activities or getting to play a game in the way the student wants), then a skills-training group likely will not be beneficial. Even if the group might be useful, outcomes often are not defined or measured, so there is no way to know if participating in this group is actually having an effect on any important outcomes (e.g., decreasing the number of conflicts reported by peers, decreasing office referrals during recess, increasing the number of positive acknowledgments the student earns in a week).

Although any intervention implemented similarly across students could become a targeted intervention, there are a number of other important characteristics of targeted interventions that result in these interventions being more likely to be sustained over time and more likely to result in beneficial outcomes. First, targeted interventions are familiar to all staff and students within a school, and any materials needed to implement them are available immediately. Because everyone in the school is familiar with the intervention and because needed items are accessible, targeted interventions are implemented for a given student within no more than a week after a need is identified. Second, data are used to guide decision making in two ways: Data-based decision rules are used to identify students most likely to benefit, and once a student is receiving an intervention, frequent progress monitoring occurs to assess outcomes. Together, these features make it more likely that the intervention will be matched to the needs of the student and that interventions will continue to be used only if there is documentation that the intervention is having the desired effect. Check-in/check-out (CICO) is a frequently used targeted intervention and is the focus of this study.

Check-in/check-out was developed based on a long history of research on behavior report cards (e.g., Davies & McLaughlin, 1989; Schumaker, Hovell, & Sherman, 1977). Although similar in many ways to behavior report cards, CICO differs in several important ways. First, CICO is designed to be implemented within a comprehensive and proactive system of behavior support (e.g., School-wide Positive Behavior Support, SWPBS). As a result, data collected across the school (e.g., office discipline referral patterns, teacher-completed requests for assistance in working with a student) are used to identify students in need of a targeted intervention, and student outcomes are defined objectively and monitored frequently (i.e., progress monitoring) to determine whether the student is succeeding on the targeted intervention. Second, whereas most behavior report card programs emphasize contingencies implemented outside of school by a student's parents, CICO uses school-based contingencies. Third, CICO most often is delivered in a similar manner across all students: It can be individualized to meet the

needs of specific students, for example, by adding more checks throughout the day; however, this determination is made on data suggesting a modification is needed. In contrast, there is no one standard way to implement behavior report cards, target behaviors, how often a student earns points, or the schedule with which points may be redeemed, and consequences for appropriate and inappropriate behavior typically are determined on a case-by-case basis.

Briefly, CICO consists of the following components: (a) a short, positively focused meeting with the CICO coordinator at the beginning and end of the day to set goals for the day and then to review how the day went; (b) a point card on which, at predetermined times (e.g., three times per day), teachers allot points for meeting defined behavior goals and also provide feedback to the student; and (c) tangible and intangible rewards for earning a predetermined number of points (Crone et al., 2004). Check-in/check-out has been shown to decrease classroom problem behavior and increase academic engagement for elementary- and middle school–aged children. For example, several studies have found that upon implementation of CICO, overall rates of office discipline referrals at the school decreased and that students on CICO received fewer office discipline referrals than they had prior to implementation of CICO (Filter et al., 2006; Hawken & Hess, 2006). Furthermore, other researchers have found that CICO reduced problem behavior during classroom observations (e.g., Fairbanks, Sugai, Guardino, & Lathrop, 2007; Hawken & Horner, 2003; March & Horner, 2002; Todd, Kauffman, Meyer, & Horner, in press).

Recent research on CICO suggests that, as is the case with any intervention, it will not be effective with all students. Because CICO focuses on providing adult attention for appropriate behavior, it likely will be most successful for students whose problem behavior is maintained by adult attention and/or students who enjoy positive interactions with adults; CICO likely would be less effective for students whose problem behavior was maintained by task avoidance. For this reason, schools might have more success supporting all students if, prior to beginning CICO with a given student, an assessment was conducted to determine if CICO is contraindicated. An assessment of the reason(s) why a student is engaging in a problematic behavior rather than a more appropriate alternative behavior is referred to as a functional behavior assessment. Functional behavior assessment has a long and robust history of use in developing effective, individualized interventions (e.g., Carr, 1977; Durand & Carr, 1991; Iwata, Dorsey, Slifer, Bauman, & Richman, 1982/1994; Wacker et al., 2005); however, the conceptual logic of functional behavior assessment—that intervention components should be matched to the variables evoking and maintaining problem behavior—has not been applied systematically to selection of targeted interventions.

To date, two studies have been conducted with nonresponders to CICO and have shown that a functional behavior assessment can be used to modify CICO and enhance outcomes (Fairbanks et al., 2007; March & Horner, 2002). In both studies, students who did not respond to CICO (four students in Fairbanks et al. and three students in March & Horner) then participated in a functional behavior assessment consisting of a teacher interview (March & Horner) or a teacher interview and descriptive observations (Fairbanks et al.). Results of the assessment were used to modify CICO; for example, for the three students whose behavior was found to be sensitive to peer attention, Fairbanks et al. modified recess and point-trading times such that if students earned a predetermined number of points, they could spend time with friends. In both studies, these modifications resulted in improvements for all students. Although Fairbanks et al. and March and Horner provide preliminary evidence supporting a consideration of function when implementing CICO, more research is needed. The functional behavior assessments in both studies were conducted after implementation of CICO, and no information about behavioral function was gathered prior to the intervention. It is conceivable that the function of problem behavior changed as a result of CICO, and it thus is not clear whether a preintervention functional behavior assessment would have indicated that CICO was contraindicated.

Importantly, conducting a functional behavior assessment, even a relatively brief functional behavior assessment (e.g., interviewing the teacher and observing the student briefly), would require a significant investment of time and thus would reduce a key benefit of targeted interventions: that they can be implemented quickly. In addition, targeted interventions are, by definition, designed to be

implemented similarly across students; hence, individualizing the intervention based on the results of an assessment is not congruent with the logic of targeted interventions. Although a full-blown functional behavior assessment should not be conducted prior to implementing a targeted intervention, we contend that it may be beneficial to consider the function of problem behavior in identifying an appropriate intervention. For example, a student would benefit from participation in a social skills training group focused on turn-taking and compromise only if the student lacked those skills; if the student was able to perform these behaviors but chose not to do so because behaving in other ways (e.g., pushing in line) was reinforced, then the group intervention would not be effective. Preliminary information about function can be gleaned in a variety of ways such as by asking the student's teacher what often happens after the problem behavior occurs or by including such information in a request-for-assistance form or an office discipline referral form. Guidelines for using forms such as these to make preliminary decisions about targeted information are provided in the Discussion section.

In this article, we investigate the importance of considering function prior to implementing CICO. We conclude by providing directions for future research and providing practical suggestions for embedding functional behavior assessment within the context of targeted interventions.

Method

Participants and Setting

Two 10-year-old typically developing boys, Joe and Kyle, participated. Joe, a Caucasian male, and Kyle, an African American male, received all instruction in a general education setting. On statewide academic tests, Joe met state standards and Kyle exceeded state standards in the reading and math at the end of the academic year. Both boys attended the same public elementary school in the Pacific Northwest and were in most classes together. They were referred to their school's behavior support team by their classroom teacher, who reported several problem behaviors, including talking to peers during instruction, disruption, and noncompliance. The team decided that CICO would be an appropriate intervention and nominated the boys to participate in the study. Consent from parents and teachers and assent from the students was obtained prior to initiating the study.

The study took place in a rural elementary school (K-5) with 201 students. On statewide testing, 86% of students in the school met the reading benchmark, 94% met the math benchmark, 54% met the writing benchmark, and 92% met the science benchmark. All observations took place in the general education classroom during reading and math, and approximately 30 other students were present. Reading and math were chosen for intervention because teacher report and office discipline referral data suggested that problem behavior occurred most often during these class periods. During reading, the classroom teacher and a student teacher provided all instruction. During math, the same classroom teacher and student teacher provided instruction, and a classroom aide provided instructional assistance as well. All components of the intervention were implemented by school staff (i.e., teachers, instructional aids).

Measurement, Response Definitions, and Interobserver Agreement

Problem behavior. The primary dependent variable was student problem behavior. Data were collected using pen and paper across 20-min observations using a 10-s partial-interval recording system. Problem behaviors included noncompliance, disruption, negative verbal or physical interaction, and out of seat. Noncompliance was defined as verbally or nonverbally refusing to follow an adult direction within 10 s of request. Disruption included talking out (vocalizations not preceded by raised hand/or not initiated by adult), talking to peers (conversing with peer when the expectation is to not be talking), and emitting other behavior that disrupted instruction (e.g., banging objects, making faces at peers, making odd noises). Out of seat was defined as leaving the assigned work area without permission from an adult. Negative verbal and physical interactions were defined as any form of physical aggression or derogatory verbal statements to adults or peers (e.g., ''this sucks,'' ''you are stupid'').

Data were collected as well on contextual variables and environmental responses. Contextual variables included large-group instruction, defined as eight or more students involved in a teacher-led activity; small-group

instruction, defined as two to seven students involved in a teacher-led activity; independent work, scored when the expectation was that individual students work independently on an assigned task; group work, defined as student completing task with at least one other student but without the teacher directly leading the activity; and transition, defined as a teacher-led change in an activity. Environmental responses included teacher attention, defined as a teacher verbally or physically interacting with the student; peer attention, scored when peers verbally or physically interacted with the student; and escape from activity, scored when an assignment or task was removed or a student ceased to work on a task for at least one complete interval.

Interobserver agreement was assessed for 29% of the observations for each participant. We calculated occurrence-only agreement by dividing intervals in which both coders scored a response by intervals in which either scored a response, nonoccurrence-only agreement was calculated by dividing intervals in which both coders agreed a response did not occur by intervals in which either coder did not score a response, and total agreement was calculated by summing intervals in which observers agreed a response did or did not occur and dividing the sum by the total number of intervals. All were multiplied by 100 to obtain a percentage agreement score. For Joe and Kyle, respectively, agreement coefficients were as follows: occurrence agreement, 92% (range, 90%–100%) and 86% (range, 71%–95%); nonoccurrence agreement, 96% (range, 94%–100%) and 92% (range, 91%–100%); and total agreement, 98% (range, 91%–100%) and 94% (range, 83%–100%).

Functional behavior assessment. A functional behavior assessment consisting of a teacher interview (we used the Functional Assessment Checklist for Teacher and Staff; March et al., 2000) and direct observations were conducted with both students. Direct observations were conducted after the interview and during the baseline phase (CICO had been in place for approximately two weeks when observations were conducted in math). Observations consisted of an antecedent-behavior-consequence (ABC) recording of environment-behavior relations scheduled at random times during math and reading class. A total of five observations were conducted in each setting, reading and math. Ten-second partial-interval recording was used to record contextual variables More specifically, each time a target problem behavior occurred, environmental events that preceded problem behavior including large-group instruction, small-group instruction, independent work, group work, and transition and events that followed the response including teacher attention, peer attention, and escape from activity were scored. Events were scored only if they occurred within 10 s of the problem behavior.

Further information regarding the possible function of behavior was obtained via school office discipline referral forms. In this school, referral forms asked teachers to select one or more possible motivations (functions) for the referring behavior from a list of possibilities, including avoid work, obtain attention from peers, obtain attention from adults, and avoid interaction. For both boys, the majority of office referral slips indicated that teachers believed problem behavior to be occurring to gain access to peer attention.

Fidelity of implementation. To assess the extent to which the intervention was implemented with integrity, we collected fidelity of implementation data using a checklist completed by data collectors for 34% of observations across all phases of the study. The checklist contained 10 key features of the intervention implementation (e.g., the student checked in during the morning, the student's teacher rated the card at appropriate times, the student checked out in the afternoon). Observers were present during check-in and check-out times to assess whether the features were implemented. A fidelity index was then created by dividing the total number of features present for the observation by 7 and finally multiplying by 100. Fidelity of implementation was assessed for 34% of days the intervention was in place. Fidelity of implementation was 100% for each participant, with the exception of one observation, for which the teacher neglected to provide feedback at a scheduled check period (she did provide that feedback a bit later, however).

Design and Procedures

Design

The intervention was implemented in two settings, reading and math, for both participants. In reading, an ABCBC reversal design with the following phases was used: baseline (A), CICO (B), and the function-based adapta-

tion (C). During math, the same design was used with the exception of the initial baseline phase (i.e., a BCBC reversal design). The baseline phase was omitted as students were not reported as engaging in problem behavior during math until CICO was already in place: As CICO is implemented across the day, collecting baseline data would have necessitated a return to baseline in all settings. Although the resulting BCBC design did not allow us to evaluate effects of intervention relative to no intervention, we were able to document functional control over the function-based addition—the focus of the current study. (Note that, when asked, the teacher stated that both boys had engaged in high levels of problem behavior during math prior to implementing CICO; thus, anecdotal data suggest that CICO did not result in deterioration of behavior during math.)

Baseline

During baseline, both participants took part in the universal component of their school's schoolwide positive behavior support program. Thus, students had been explicitly taught behavioral expectations and rules for specific settings including the classroom. In addition, students participated in a token economy within which students earned paper slips (Good Citizen Bucks) delivered by staff contingent on appropriate behavior that could be turned in for a monthly drawing for tangible items. Finally, major behavior infractions (e.g., physical aggression, noncompliance of an adult request, stealing, etc.) resulted in an office discipline referral and a meeting with an administrator who decided on various consequences such as detention, missing recess, and so forth. They continued to participate in this intervention throughout the study; thus, both boys earned Good Citizen Bucks and received office discipline referrals across all phases of the study.

Intervention: Check-in/Check-out

Check-in/check-out had been implemented in the school for more than 2 years and was in place across the school day for both participants (and for all students in the school). In addition, CICO was implemented entirely by school staff: Researchers played no role in implementation of the intervention for either participant. A team within the school identified students who might benefit from CICO using data (e.g., office referrals, requests for assistance from teachers) and met with students and staff to initiate the program. Before the school day began, participants checked in with the CICO coordinator (the school counselor). At check in, the coordinator provided the daily point card, collected the previous day's home report, and interacted positively with the participant. In addition, the CICO coordinator provided a verbal prompt for the student to display appropriate behavior during the day by reviewing student expectations, reviewed the student's target number of points, and provided points for appropriate behavior during the check in time. All students on CICO, including the study participants, earned tangible (e.g., small trinkets, popcorn) and intangible (extra recess time for their class, movie day for their class) rewards for earning 80% or more of their goal points within a given week. Behavioral expectations for CICO matched the school's universal program expectations and thus were ''be safe,'' defined in the classroom as keeping hands and feet to self; ''be respectful,'' defined as using an inside voice and raising your hand before speaking; and ''be responsible,'' which was defined as being prepared for class, bringing needed materials, and being on time.

The CICO daily point card was a 4″ × 5″ piece of paper that included the participant's name, date, daily CICO schedule, columns for recording points earned for each of the three behavioral expectations at the various check times, the goal for total points, and a place to record the total points earned. At each of 5 specified times of the day (check in, before morning recess, before lunch, end of the day, and check out), participants could earn up to three points for each behavioral expectation; thus, a total of nine points could be earned for each specified check time. A rating of 3 indicated the participant did a ''great job,'' a 2 indicated ''I did okay,'' and a 1 indicated ''had a hard time.'' When the student entered the classroom each day, he gave his point card to his teacher. Then, at three scheduled times throughout the day (the remaining two checks were with the coordinator upon arriving at school and leaving school at the end of the day), the participants approached the classroom teacher and received a rating for each of the behavior expectations. The teacher then provided either verbal praise for appropriate behavior or a prompt to improve behavior for

the next check time. If a student earned all 3s for example, the teacher might point out specific behaviors the student engaged in that resulted in those ratings (e.g., ''You listened quietly when I gave instructions and you participated very well in your group this morning, taking turns and working hard, so you earned a 3 for all your expectations''). If a student struggled, the teacher might say something like, ''You had a lot of trouble following my instructions today, and it was difficult for you to work in your group, so you just earned 1s this morning. I am sure you will do better after lunch.'').

At the end of the day, participants checked out with the CICO coordinator. The coordinator recorded the total number of points and completed the home report. The home report was an 8″ × 11″ paper that included the student's name, date, and whether the student met his goal and had room for additional comments. At check out, the coordinator provided positive feedback to the student for meeting the goal (as set by the school, 90% of possible points) or encouraged the student to meet the goal the following day (e.g., ''Today was a really hard day but I bet tomorrow will go better. When you come in tomorrow, let's spend a few minutes talking about things you can do to make the day go right.'').

Function-Based Adaptation

Participants continued to participate in all components of the standard CICO program. Reading occurred just prior to lunch, and to improve behavior in reading, morning lunchroom seat choice was contingent on earning all possible points prior to the before-lunch check-in (this goal was determined by the boys' teacher and the CICO coordinator in the school). Thus, if participants earned their morning points, they could sit where they chose during lunch, but if they failed to do so, they were required to sit in an assigned seat, away from peers. Prior to this modification, students were required to sit next to whomever they happened to be near in line when entering the cafeteria. Teachers and lunchroom staff reported that the participants sat with preferred peers on approximately 50% of days. Thus, earning all points prior to lunch resulted in a significant improvement over baseline conditions, as the boys could sit anywhere they chose during lunch and most often chose to sit together.

To address problem behavior in math, which occurred after both lunch and recess, two modifications were made. First, if the boys earned 90% or more of their points at the last check-in with the teacher (determined by the CICO coordinator and the boys' teacher), then they could check out with the CICO coordinator together that afternoon. In addition, they could sit together in math class the next day. If the participants did not earn at least 9 of the 10 points, however, they had to check out separately and were seated in assigned seats—apart from one another and from other friends—the following day. Prior to implementing this component, both participants checked out alone and during math were in assigned seats, away from preferred peers.

Data Analysis

For the functional behavior assessment, conditional probabilities were calculated to examine behavior-consequence relations. This was necessary because we did not control the occurrence of environmental events in any way, and this calculation provided some idea of the relation between problem behavior and environmental events. Proportions were calculated by dividing the number of intervals in which a problem behavior was followed by a given consequence by the total number of intervals in which problem behavior was scored. Proportions closer to 1 indicate a richer schedule of consequence delivery. We calculated conditional probabilities across all antecedent conditions and also separately for each antecedent. Thus, we conducted conditional probabilities under the following conditions: (a) during large-group instruction, (b) during small-group instruction, (c) when independent work was occurring, (d) during group work, and (e) during transitions. Because problem behavior occurred only during instructional activities (large- or small-group instruction, independent work) and never during transitions, and because results did not differ greatly across different antecedent conditions, we combined data across instructional antecedents and report the proportion of problem behavior followed by adult attention, peer attention, or escape across antecedent variables (to obtain the proportion of problem behavior followed by each consequence in the presence of specific antecedents, contact the first author).

Results

Joe

On the functional assessment interview, Joe's teacher reported that problem behavior occurred almost exclusively during academic activities and in particular during independent work when he was seated close to Kyle and during group activities when Joe and Kyle were in the same group in groups that were in close physical proximity. This was true in all academics, including both reading and math. Joe's teacher reported that when he engaged in problem behavior, the most frequent response was attention (e.g., laughing, verbal encouragement) from Kyle. Thus, the results of the interview suggested that Joe's problem behavior occurred most often during academic activities when Kyle was close by and was maintained by attention from Kyle—social positive reinforcement. This outcome matched the possible motivation selected most frequently when either boy was referred to the office for problem behavior—that behavior was occurring to obtain peer attention. Results of the ABC observations are depicted in the top panel of *Figure 1*. The ABC observations conducted with Joe suggest that problem behavior was most likely maintained by peer attention, as this was the most frequently occurring consequence for problem behavior. To illustrate, in both reading and math, peer attention followed 54% of intervals scored with problem behavior. In contrast, escape and adult attention were scored as consequences 26% of the time or less in both classes.

Results obtained from CICO and the function-based adaptation are depicted in the middle and bottom panels of *Figure 1*. Results in reading are in the middle panel and math the bottom panel. During reading, problem behavior was observed to occur more frequently as observations went on. When CICO was implemented, no discernable effect was noted; responding appeared somewhat more variable; however, this variability could have been due to instructional variation (e.g., on some days, activities only loosely related to reading occurred in the class) rather than to features of the intervention. When the function-based adaptation was implemented, problem behavior was observed in significantly fewer intervals, and less variability was observed. After a brief return to CICO only to establish functional control—during which responding returned to levels observed prior to modifying the lunch contingency—the function-based adaptation was reintroduced. In this final phase, problem behavior occurred in only 7% of intervals on average.

Baseline data were not collected during math. Under CICO, Joe emitted problem behavior in an average of 31% of intervals. When the function-based adaptation was implemented, reductions were observed almost immediately for both participants and were sustained over time. After a brief return to CICO alone to establish functional control, the modification was reintroduced, and response suppression again was observed. In the final phase of the function-based adaptation, problem behavior occurred during an average of 10% of intervals.

Kyle

The functional assessment interview conducted with Kyle's teacher revealed virtually identical information as was obtained for Joe. Problem behavior occurred primarily during academic tasks when they were close to one another, and when Kyle engaged in problem behavior, Joe typically provided encouraging attention. Thus, Kyle's problem behavior also appeared to be maintained by social positive reinforcement. As was the case with Joe, data from office discipline referrals supported this hypothesis. Results of the ABC observations conducted with Kyle are shown in the top panel of *Figure 2*. The ABC data supported the results of the interview indicated that problem behavior most likely was maintained by positive peer attention. In math, 56% of all problem behavior was followed by peer attention. In contrast, adult attention followed problem behavior only 17% of the time, and task avoidance followed problem behavior only 27% of the time. This pattern was repeated in reading, although adult attention followed problem behavior more often in reading than in math.

Intervention results for Kyle are depicted in the middle and bottom panels of *Figure 2*; results in reading are shown in the middle panel, and results obtained during math are in the bottom panel. In reading, Kyle's problem behavior was variable in baseline, and this variability continued when CICO was implemented. As was the case with Joe, CICO did not seem to have any effect on problem

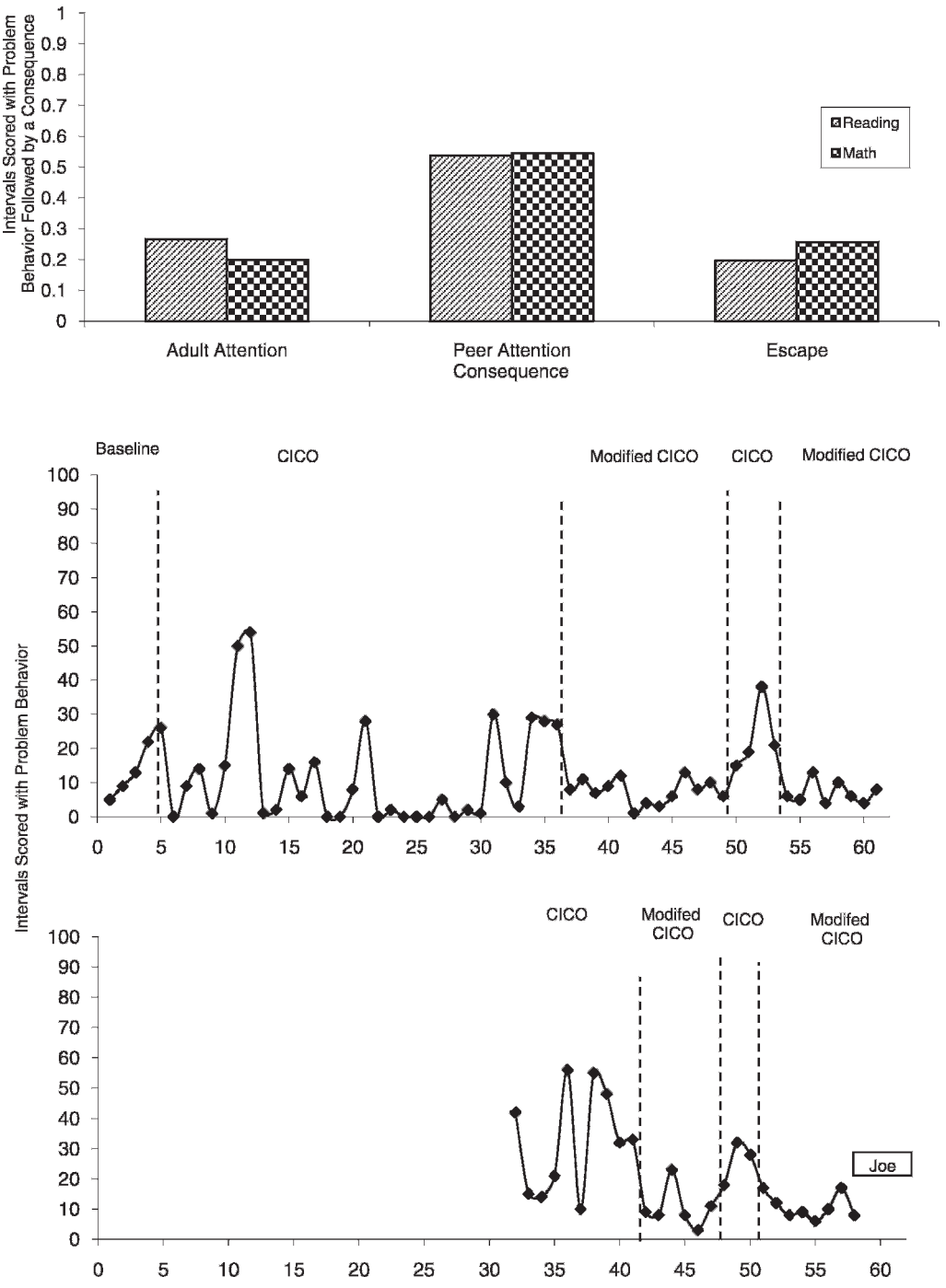

Figure 1. Results obtained with Joe. Results of ABC observations are in the top panel. Outcomes from the intervention are depicted in the middle panel (reading) and bottom panel (math).

behavior; variability in responding was most likely due to variations in instruction and classroom activities. When lunchtime seating was made contingent on the percentage of points earned throughout the morning, an immediate and sustained reduction in problem behavior was noted. The function-based adaptation was removed briefly to establish

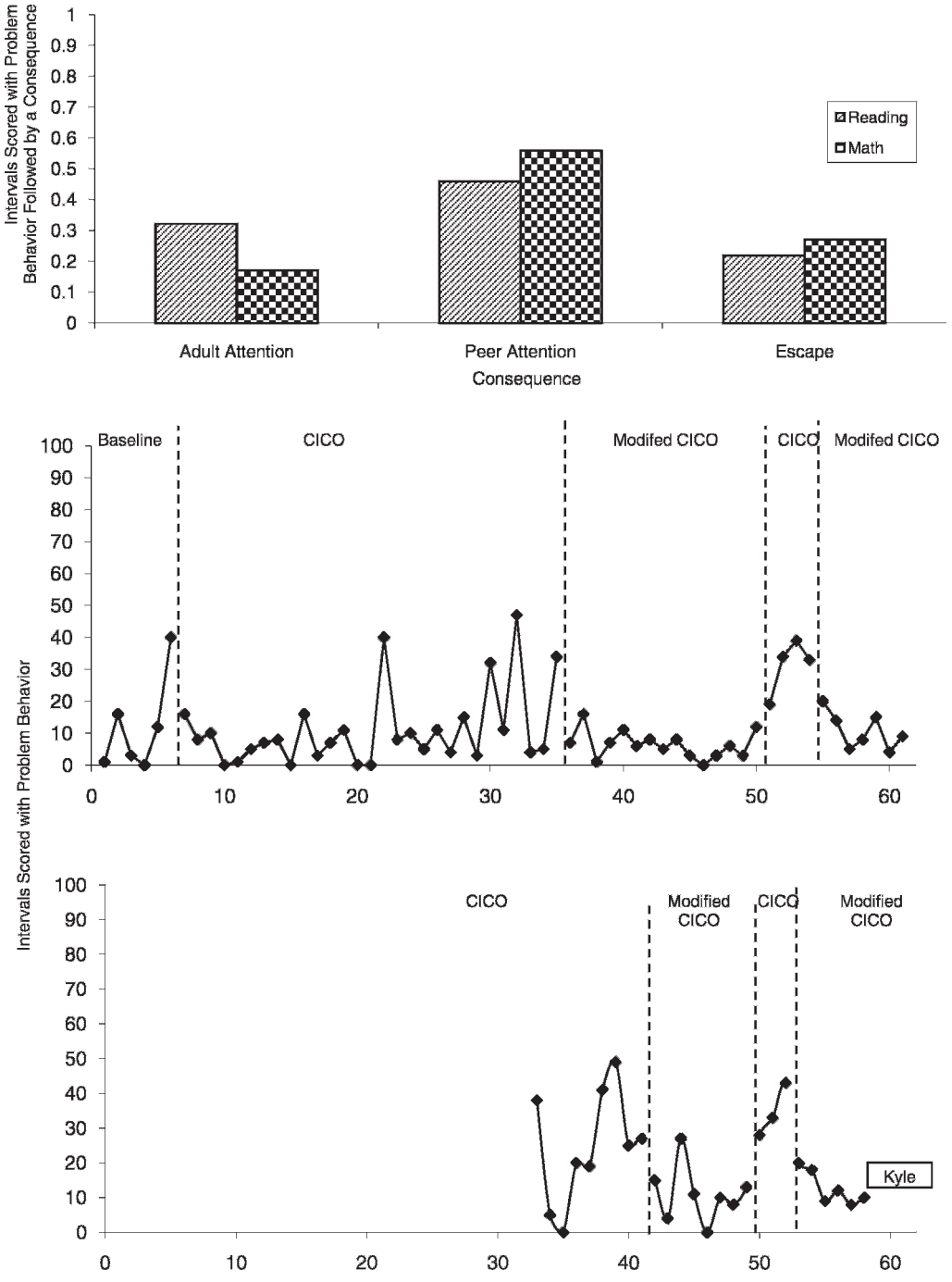

Figure 2. Results obtained with Kyle. Results of ABC observations are in the top panel. Outcomes from the intervention are depicted in the middle panel (reading) and bottom panel (math).

functional control, and when reinstated, the problem behavior again was suppressed.

In math, the function-based adaptation resulted in a significant reduction in Kyle's problem behavior; during CICO, he emitted problem behavior in an average of 27% of intervals and during only 12% of intervals during the final phase of the function-based adaptation.

Discussion

The present study adds to the current literature on the contributions of considering the function of problem behavior prior to development of effective interventions in schools. For targeted interventions, this information can be used to determine (a) whether a given intervention is likely to succeed and (b) whether minor modifications to the intervention prior to implementation might be useful. In this study, if function had been considered prior to implementing CICO, modifications might have been made from the outset (i.e., using access to peer attention as a reinforcer for appropriate behavior) that would have improved effectiveness of the intervention.

The current study focused on CICO, a targeted intervention that has significant advantages for school teams as it (a) is low cost, in terms of staff time and resources; (b) has been demonstrated to be effective when implemented by typical school staff; and (c) can be modified rather easily to address behavior function (as shown in the current study). Although the results of this study are promising, they should be regarded as tentative, as responding was highly variable across phases. This variation likely was due, at least in part, to variations in instructional activities that we had no control over; however, this was not measured explicitly. Future researchers might consider either controlling contextual variables more precisely—although this may detract from the external validity of findings—or measuring the relation between those variables and problem behavior.

In the current study, relatively low levels of problem behavior were observed in all phases, including baseline. This is a typical pattern observed for students receiving targeted interventions for social behavior as these interventions are not designed for students with intense, very frequent challenging behavior—such students will benefit more from an individualized, intensive intervention. Instead, targeted interventions such as CICO are implemented for students emitting low to moderate levels of problem behavior, and the goal is to implement supports designed to make it less likely that an intensive, individualized intervention will become necessary.

Although preliminary, we believe that the results of this study, especially when considered with the large body of research on functional behavior assessment, suggest that educators should consider the function of problem behavior prior to implementing any targeted intervention. In this study, we conducted a rather involved functional behavior assessment consisting of both an indirect teacher interview and multiple descriptive observations with conditional probabilities to analyze data. As noted earlier, requiring such intensive functional behavior assessment as a prerequisite for targeted interventions would detract greatly from the efficiency of these interventions. We recommend instead that educators consider gathering preliminary information about behavioral function via request-for-assistance forms and from office discipline referral forms. First, if a school provides behavior support to teachers, then the request-for-assistance form (used by teachers to ask for additional assistance with a specific student) could be modified such that the teacher is asked to identify what a student might be gaining or avoiding by engaging in problem behavior. Similarly, schools might modify office discipline referral forms—used when a teacher sends a student to the office for violating a school rule—so that teachers indicate not just the behavior exhibited and when and where the behavior occurred but also provide their best guess about the function of the behavior. This best guess might then be used to guide the initial choice of a targeted intervention. For more details regarding systems for implementing function-based targeted interventions, see Anderson and Scott (in press). Future research is needed to investigate the extent to which such preliminary information about behavioral function can be used to guide decisions about targeted interventions. In this study, office discipline referral data suggested that the problem behavior of both students was maintained by access to peer attention; however, the study was conducted with only two students and in only one school. Research is needed to determine whether similar results would be obtained in other settings.

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