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# Utilizing students as behavior change agents : an example using check-in/check-out

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UTILIZING STUDENTS AS BEHAVIOR CHANGE AGENTS:  
AN EXAMPLE USING CHECK-IN/CHECK-OUT

A Dissertation

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## **ABSTRACT**

While there is no shortage of evidence-based interventions designed to address the academic and behavioral difficulties of students in schools, it can be difficult to find adults that are available to implement them consistently. To remedy this problem, students' peers have often been utilized effectively as academic interventionists in the schools and as behavioral interventionists for students with disabilities. Two studies were designed to investigate the effectiveness of a peer-mediated intervention for students at-risk for developing behavioral disorders. Check-in/Check-out (CICO), a mentor-based intervention traditionally implemented by adults, was modified so that it could be easily implemented by elementary school students. Using a reversal design, Study 1 examined the effectiveness of peer-mediated CICO utilizing elementary school students as interventionists for their behaviorally at-risk peers. Study 2 compared the relative effectiveness of adult and peer interventionists in a CICO framework using an alternating treatments design.

## **LITERATURE REVIEW**

### **Disruptive Behavior in the Schools**

Students who engage in disruptive behavior at school not only jeopardize the learning environment of their peers, but are themselves at-risk for a host of negative outcomes (Walker, Ramsey, & Gresham, 2004). Specifically, engaging in disruptive behavior has been linked to poor academic performance, which can further exacerbate the problem (Hinshaw, 1992). Also, engaging in disruptive behavior at school has been identified as a major correlate of future antisocial behavior (Mayer, 1995). While it is in a school's best interest to address disruptive behavior, implementing interventions and other remediation strategies require valuable personnel resources that are oftentimes needed elsewhere. Furthermore, these strategies often require schools to use diminishing fiscal resources (Colvin et al., 1993).

Disruptive behavior in schools has historically been managed through the use of punitive tactics, which is problematic because punishing students who engage in antisocial and aggressive behavior has been shown to increase the frequency with which they do so (Mayer & Sulzer-Azaroff, 1990). Furthermore, punishment procedures have been linked with several undesirable side effects (Newsom, Favell, & Rincover (1983).

Despite the negative outcomes associated with punishment, zero tolerance policies were adopted by many school districts in the 1990s leading to the suspension and expulsion of students for even minor infractions (Skiba & Peterson, 1999). Skiba and Peterson (2000) argued that these types of punitive policies not only damage the educational environment but also serve to remove problem students from the school, reducing the probability they will receive the assistance they need. More troubling, however, is the fact that punitive tactics such as office discipline referrals, suspension, and expulsion have been shown to be implemented

disproportionately. Skiba and colleagues (2000) aggregated data from nine studies investigating the rate of minority disproportionality in punishment procedures and found that African Americans were being suspended and expelled in much greater proportions than students of other ethnicities. It is clear that punitive tactics to address disruptive behavior in school can be used inappropriately; however even the appropriate use of punishment is associated with detrimental effects.

The American Psychological Association (APA) commissioned the APA Zero Tolerance Task Force in an effort to synthesize the literature on the effectiveness of zero tolerance policies. A report published by the taskforce in 2008 provides a comparison between five major assumptions regarding zero tolerance policies and the data that was available to support them (Reynolds, Skiba, Graham, Sheras, Conoley, & Garcia-Vazquez, 2008). First, the assumption that school violence is increasing, requiring stringent punitive strategies, was refuted, as data indicated that physical violence in schools has actually decreased slightly since 1985. Second, it is assumed that zero tolerance policies will result in a more consistent use of discipline. Again, the available evidence contested this claim, indicating that suspension and expulsion rates were inconsistent among schools and were shown to be tied as much to school characteristics as they were to actual student behavior. A third assumption posits that the removal of students by such a discipline policy will result in a safer and more effective educational environment. However, the data indicated that schools with high numbers of suspensions and expulsions were rated lower on school climate measures. Also, a negative correlation was found between suspension/expulsion and academic achievement. Fourth, it is assumed that the harshness of zero tolerance policies acts as a deterrent to disruptive behavior, resulting in a student body that behaves appropriately. Again, the literature suggests that this is not the case, as students that are suspended or expelled

are more likely to become repeat offenders and have a higher likelihood of dropping out of school. Evidence for the final assumption, that the support for zero tolerance policies is widespread, was mixed. The report concludes with recommendations on how to improve school-based discipline strategies with a focus on evidenced-based preventative measures.

### **Positive Behavior Support**

Carr and Durand (1985) first discussed the use of less punitive tactics when treating individuals exhibiting self-injurious behavior and stressed the importance of positive alternatives such as teaching appropriate replacement behaviors. Colvin et al. (1993) expanded on this idea and promoted an instructional approach to school-wide discipline that focused on more positive preventative strategies, rather than punishment. Similarly, Walker and colleagues (1996) suggested using proactive, positive, school-wide tactics to address disruptive behavior by utilizing incentives and reward systems. Under this system, Walker and colleagues (1996) encouraged schools to provide positive behavior support (PBS) in a three-tiered framework to students engaging in disruptive behavior. The authors stated that the first tier should be universal, comprised of reward systems and education programs that every student in the school would contact. The second tier, targeted, should utilize more powerful interventions that are indicated for students identified as at-risk for antisocial behavior. The third tier, intensive, is saved for the most problematic students and involves the most powerful intervention techniques. This notion of positive behavior supports came to fruition with the amendments made to the Individuals with Disabilities Education Act (IDEA, 1997), which mandated the use of positive behavior interventions for students with emotional and behavioral problems.

The effectiveness of positive behavior programs has received considerable attention in the literature. Predating the school-wide PBS movement, O'Leary and colleagues (1969)

attempted to address disruptive behavior in the classroom using a token economy to reward appropriate behavior. Instead of punishing a student's behavior, the authors created a set of classroom rules for the students to follow. The classroom teachers were instructed to praise expected behavior and ignore disruptive behavior. Seven 2<sup>nd</sup> graders were observed throughout the day and their behavior was recorded using direct observation. Twice per day, students were rated on their behavior and given points based on their performance, which were redeemable for small reinforcers at the end of the day. Using a reversal design, the authors found that the disruptive behavior of the participants was significantly reduced when the token economy was in place.

Taylor-Greene and colleagues (1997) evaluated the effects of a school-wide positive behavior support system that was designed for implementation in a rural middle school that was having difficulty managing its students' disruptive behavior. A year prior to implementation, the school recorded 2,628 office discipline referrals. The authors developed a school-wide system that focused on six elements in line with a PBS framework. First, teachers at the school were trained to be proactive by giving reminders of behavioral expectations to students and providing regular precorrection during transitions. Second, a school-wide reinforcement system was implemented whereby students were rewarded with tickets for following behavioral expectations which could then be exchanged for prizes. Next, the importance of consistency was explained to faculty and staff, specifically in regards to implementing the reinforcement system. A list of acceptable consequences was also developed, starting with a verbal reprimand and escalating to an office discipline referral. Additionally, certain times of the year in which more office referrals occurred were identified. The school-wide reinforcement system was arranged so that new rewards became available during these time periods in an effort to better incentivize appropriate

behavior. Finally, near the end of the school year, those students who were still engaging in high rates of disruptive behavior were placed in a self-contained classroom to receive additional behavioral support. Although this practice is no longer considered effective, it demonstrates the experimenters' effort to target those students who were identified as non-responders. A year following the implementation of this program, office discipline referrals dropped 42% school-wide. Although the results are correlational, the study provides an effective model for assessing school-wide change, which may be the most effective way to accurately assess a positive behavior support program.

Scott (2001) conducted the first experimental evaluation of a school-wide positive behavioral support system, which was implemented in a low-achieving elementary school in central Kentucky. Scott worked with the school staff to develop and implement a system in which students would earn reinforcement for complying with school expectations. Using the previous year's data as a baseline comparison, in-school suspensions were decreased by 61% and out-of-school suspensions were decreased by 75%.

Similarly, a study conducted by Turnbull and colleagues (2002) examined the implementation of a PBS system in an urban middle school. A complete three-tiered positive behavior support system was implemented to address behaviors of every severity. In addition to a universal token economy system, a Tier 2 social skills group was implemented to engage students who did not respond to the first tier. The most intensive interventions involved teaching academic skills, manipulating the environment, and changing the curriculum to suit an individual student's needs. After implementing this system, the authors compared data from the previous year and found that office discipline referrals decreased 19%, time-outs decreased 30%, in-school suspensions decreased 12%, and out-of-school suspensions decreased 60%.

## **Check-In/Check-Out**

As mentioned previously, a successful PBS framework requires targeted interventions to address the behavior of students who do not respond to universal behavior interventions and may be at-risk for developing a behavioral disorder. Gresham and colleagues (1998) suggested that 10 – 15% of students will not respond appropriately to universal interventions. It is imperative, then, that effective Tier 2 interventions are identified to address these students' difficulties. One intervention that has garnered attention as an effective second tier strategy in the positive behavior support literature is a mentor-based intervention called Check-In/Check-Out (CICO).

Also known as the Behavior Education Program (BEP; Crone, Horner, Hawken, 2001), CICO is an intervention that relies on constant feedback from a student's teacher about his or her behavioral performance. The student's teacher is responsible for rating the student's behavior multiple times throughout the day by assigning points to specific behavioral goals, typically at the end of each class period. The intervention also incorporates a mentorship aspect in which an adult meets with the student at the beginning and end of the day to provide encouragement, monitor behavioral goals, and provide reinforcement. At the morning "check-in", the adult interventionist is responsible for communicating the daily goals to the student, including the amount of points required to obtain reinforcement. The student is then sent to class until the end of the day when they meet the adult mentor for the afternoon "check-out". During this time, the interventionist is responsible for calculating the student's performance based on teacher ratings, communicating this performance to the student, and providing a reward if the student met his or her goals. The student is then sent home with the monitoring form and instructed to have his or her parents review and sign the form before bringing it back to the mentor the next day. This

process repeats itself daily, and behavioral goals may be changed based on the student's performance.

Since its development, CICO has been researched extensively. Hawken and Horner (2003) initially investigated the effectiveness of CICO in a rural middle school in the Pacific Northwest. Four students were selected to participate based on high rates of office discipline referrals as well as nomination by school staff. Using the standard CICO procedure described above, the authors implemented the intervention with high fidelity for roughly eight weeks with each participant. Using direct observation, the authors concluded that CICO was effective at reducing disruptive behavior while simultaneously increasing the academic engaged time of the participants. Additionally, the intervention was rated acceptable by both teachers and parents. These results suggest that CICO is an effective and acceptable strategy for reducing the disruptive behavior of students in schools.

In a similar study, Filter and colleagues (2007) examined the effectiveness of CICO across three elementary schools. The purpose of this study was to examine how well school personnel could be trained to implement CICO and if they could do so with acceptable rates of fidelity. The total number of office discipline referrals of twelve students was used as the primary outcome measure of intervention effectiveness. The results of the study indicated that school personnel across all three schools were able to implement the intervention with a high degree of fidelity. Furthermore, office discipline referrals were significantly reduced across the twelve students.

Kauffman (2008) examined the effectiveness of CICO with elementary school students using one important modification. Typically, CICO requires several feedback meetings with the target student's teacher throughout the day. Kauffman (2008) attempted to completely remove

the teacher feedback portion of the intervention by methodically fading the frequency with which the student and teacher met throughout the day. CICO was found to be equally effective across every condition in which a student met with and received feedback from his or her teacher. However, completely removing teacher feedback and the behavior monitoring form significantly reduced the effectiveness of the intervention. The results of this study indicate that a single teacher feedback session is sufficient to produce positive results. Because there was no additional benefit demonstrated by multiple teacher feedback meetings, it has become common practice to implement CICO using a single feedback session.

Fairbanks, Sugai, Guardino, and Lathrop (2007) examined the effectiveness of CICO within a PBS framework based on response to intervention (RTI) in an elementary school in the Pacific Northwest. Ten students who were unresponsive to the school's universal PBS system were identified as needing Tier 2 services and participated in the CICO intervention. The authors found that the disruptive behavior of four of the participants was significantly reduced while the intervention was in place. Of the six students that were not responsive to CICO, four went on to receive more intensive function-based supports that were effective at reducing the level of their disruptive behavior. This study highlights the effectiveness of CICO as a Tier 2 targeted intervention and demonstrates the need for more intensive supports under a PBS framework for those students who do not respond to the typical CICO intervention strategy.

Because CICO involves constant contact with adults and may provide students with contingent attention, Todd, Campbell, Meyer and Horner (2008) investigated the effectiveness of CICO on attention-maintained problem behavior. The authors found that CICO was effective at reducing the disruptive behavior and office discipline referrals of four students whose behavior was hypothesized to be maintained by attention; however, because no other behavioral functions

were examined, it is difficult to determine if CICO is differentially effective based on the function of problem behavior. In a similar study, McIntosh, Campbell, Carter, & Dickey (2009) compared the effectiveness of CICO on the problem behavior and office discipline referrals of 34 elementary school students who were nonresponsive to universal SW-PBS. The problem behavior of 18 of the students was hypothesized to be attention-maintained, while the problem behavior of the other 16 students was hypothesized to be escape-maintained. The authors found that CICO was differentially effective at reducing the problem behavior, as measured by a rating scale, and office discipline referrals based on behavior function. Specifically, CICO was effective at reducing both outcome variables for attention-maintained problem behavior while only office discipline referrals were reduced for students who engaged in escape-maintained behavior. Also, teacher ratings of problem behavior were higher at the end of the intervention for students who engaged in escape-maintained problem behavior. Together, the results of these studies suggest that CICO may not be effective for students engaging in escape-maintained problem behavior. Furthermore, the results highlight the importance of conducting some type of functional assessment as soon as students are identified as in need of additional support so that accurate treatment recommendations may be made.

Most recently, Turtura (2011) investigated the effectiveness of CICO on the academic behavior of students who were identified as needing additional support. In this study, CICO was modified by targeting academic behaviors such as attentiveness, work completion, and preparedness instead of more traditional behavioral goals. All four participants exhibited an increase in homework and classwork completion and accuracy when the intervention was implemented. This is important because it demonstrates that CICO is a versatile intervention that can be adapted to target many behaviors while still remaining effective.

To summarize, CICO has been shown effective at reducing disruptive behavior and office discipline referrals with a variety of elementary and middle school populations including minorities, regular education students, and special education students (Fairbanks et al., 2007; Hawken & Horner, 2003; Todd et al., 2008). It is also effective at increasing the on-task behavior and academic engagement of students when these types of behaviors are selected as performance goals (Kauffman, 2008; Turtura, 2011). The literature suggests that CICO is a fairly versatile intervention that can be adapted to target very specific behaviors. However, CICO has not been as effective, either academically or behaviorally, for students who engage in escape-maintained problem behavior (Todd et al., 2008; McIntosh et al., 2009). Therefore, it is important to consider the function of a student's problem behavior before implementing CICO. Finally, it is important to consider the wide range of behaviors that can effectively targeted by CICO. That is, CICO is a flexible intervention that can be adapted to a variety of settings and situations based on the needs of the target student.

### **Peers as Change Agents**

One difficulty associated with implementing CICO, or any school-based intervention, lies in identifying an adult who is able to consistently act as the target student's mentor. Strain, Cooke, and Apolloni (1976) noted that while school personnel typically act as interventionists, teachers and staff do not usually have enough time available to implement complex interventions that require contingency management and goal setting. Therefore, it may be more time-efficient to utilize peers as interventionists for school-based interventions. In doing so, school personnel would be able to contact more students while using fewer resources (Bowman & Myrick, 1987). This is similar to the idea behind school-based behavioral consultation as a means of service delivery, which focuses on increasing consultee capacity so that he or she may deal with similar

problems in the future without the need of a consultant's resources (Erchul & Martens, 2002). Similarly, by training classroom peers to implement basic interventions, one member of school personnel would be able to supervise multiple student interventionists simultaneously, making more efficient use of his or her time. Furthermore, if school-based consultants adopted the practice of regularly teaching peer-mediated strategies to consultees, the compound effect of both tactics would greatly optimize the use of classroom resources.

Benard (1990) also advocated heavily for the use of peers as classroom resources, calling for a move to a "peer resource model of education" (p. 1), and suggested that students as young as preschoolers can provide services to each other. Although utilizing peer interventionists might benefit teachers and school staff by requiring less time and fewer resources, Benard (1990) described several benefits peer-mediated interventions may offer students. First, it has been shown that peer relationships are crucial for children's social development. By arranging interventions that place students in frequent contact with each other and oftentimes require them to cooperate, peers are given an excellent opportunity to develop social skills and practice appropriately engaging in social situations. Second, there is evidence in the literature to suggest that social support is a protective factor against a host of negative outcomes (Benard, 1990). By implementing peer-mediated academic or behavioral interventions, students are able to establish and maintain social support networks that may be vital to their academic success. There is also evidence to suggest that peer-mediated interventions increase academic achievement and reduce drug and alcohol use among involved students.

The use of students as interventionists may provide two major benefits. First, training students to conduct interventions typically implemented by adults can reduce the need for school personnel to provide one-on-one intervention for students with academic and behavior problems.

Also, participating in peer-mediated interventions, from either perspective, has been shown to provide benefits above and beyond the scope of the intervention. For example, in peer tutoring interventions, students typically have the opportunity to act as both tutor and tutee. Research has indicated that acting in either role conveys some academic benefit to both participants. (Menesses & Gresham, 2009) It is this reciprocity that makes the idea of peer-mediated interventions appealing from an effectiveness standpoint.

Peer interventionists may also be preferred over adults when considering the generalization and maintenance of the effects of an intervention. Because an adult interventionist might only make contact with a student once a day in a restricted setting, the effects of the intervention may not spread across environments or maintain once the intervention is discontinued. Students, however, typically come into contact with each other multiple times a day in several different settings. Peer interventionists, therefore, have a greater chance of promoting generalization across settings and maintenance of effects over time (Strain et al., 1976).

The use of peers as interventionist is not a novel idea, however, as peers have been effectively utilized in a variety of mentorship roles for over 50 years (Tindall, 1995). Peers have acted effectively as mentors in vocational training and performance, as well as elementary, high school, and university student programs (Twomey, 1991; Good, Halpin & Halpin, 2000; Ensher, Thomas, & Murphy, 2001). Due to their effectiveness, students have also gained considerable attention in the literature as peer interventionists.

**School-based peer-mediated interventions.** Kohler and Strain (1990) discussed the demonstrated and potential effectiveness and feasibility that the utilization of students as interventionists provides in a school setting. The authors note that while peers are traditionally

viewed as same-age or same-rank individuals, students in a single school building could be identified as peers because they are of the same standing, i.e., elementary school students. The authors went on to identify four types of peer intervention programs that have been used successfully to change behavior in a school environment. The first, peer tutoring, involves students providing instruction and feedback to their peers that enable them to accurately perform an academic task. Peer tutoring programs can be implemented between pairs of students or within entire classrooms. Peer modeling, the second type, involves a student demonstrating appropriate or acceptable behavior or responses in the hope that his or her peer will also exhibit the behavior. With this technique, it is common to arrange a situation whereby the target student is able to observe the peer model contacting reinforcement after engaging in the desirable behavior. The third peer intervention technique involves group-oriented contingencies. Most commonly implemented as class-wide contingencies in schools, peers are typically not trained to engage in any specific behavior but instead will do whatever they can to assist struggling students to ensure their group meets the contingency. The final technique, peer management, involves peer prompting and contingency management to change the nonacademic behavior of a student. These strategies usually involve one-on-one contact between the peer and target student.

**Peer tutoring.** Students have been used to tutor their peers in academic skills such as reading and math for years. Pigott, Fantuzzo, and Celement (1986) conducted a study examining the effects of peer tutoring and group contingencies, replicating an earlier study conducted by Pigott, Fantuzzo, Heggie, and Clement (1984). Twelve fifth grade students identified as low achieving in mathematics were placed into groups of four across three classrooms. Every week each of the four students assumed one of four duties involved in implementing a peer tutoring intervention. One student acted as a coach and was responsible for stating the daily performance

goals and reminding groupmates of strategies for successful performance. Another student acted as scorekeeper and kept track of the number of math problems the group solved correctly. The third student, the referee, checked the scorekeeper's records for accuracy. The fourth student acted as team manager and was responsible for calculating the group's total performance and deciding whether they had met their goal for the day. The intervention was implemented each day during the classroom arithmetic drill session, which required students to complete as many mathematics problems as they could in seven minutes. Prior to implementation, the groups of targeted students performed well below their class average. Once implemented, however, the mathematics performance of the peer tutoring groups increased, rising to at or near the classroom average and the effects remained throughout a 12-week maintenance phase. As an additive effect, the authors found that the target students were rated as more desired by their peers in group activities following implementation.

A meta-analysis conducted by Mathes and Fuchs (1994) also found peer tutoring to be moderately effective for students with disabilities, including learning and intellectual disabilities. Rohrbeck, Ginsburg-Block, Fantuzzo, and Miller (2003) conducted another meta-analysis in which they suggested that peer tutoring provides moderate gains in academic achievement and that it may be more effective for urban, low-income, minority students. Fuchs, Fuchs, Mathes and Simmons, (1997) further investigated the effectiveness of peer tutoring on students with learning disabilities by comparing them to low-achieving nondisabled students and average students. In a group design study conducted between twenty-two elementary and middle schools, class-wide peer tutoring in reading was shown to provide small increases in oral reading fluency and moderate gains in reading comprehension across all three groups.

Traditionally, peer tutoring involves a high performing student providing aid to a lower performing student during some academic task. On the other hand, reciprocal peer tutoring provides both participants with an opportunity to act as tutor by allowing the low performing student and high performing student to switch roles. Menesses and Gresham (2009) examined the relative efficacy of these interventions on elementary school students' mathematics performance. Both types of peer tutoring produced large effect sizes over the waitlist control and the results were maintained after a 3-week follow-up. The results of this study demonstrate that peer-mediated interventions may be effective regardless of what role the target student is playing and that there may be some benefit conferred just by interacting with one's peers in this way.

Although peer tutoring is not traditionally used to target student behavior, there is some evidence to suggest it may be effective at doing so for certain populations and behaviors. DuPaul, Ervin, Hook and McGoey (1998) utilized a class-wide peer tutoring intervention to address the on-task and academic behavior of elementary school students diagnosed with attention deficit hyperactivity disorder (ADHD). Reciprocal class-wide peer tutoring (CWPT) was implemented around four days a week across eighteen classrooms between two elementary schools over the course of two years. To examine the effects of the intervention, twenty-one students diagnosed with ADHD were observed three times per week during instructional time. Using a reversal design, the authors were able to demonstrate a functional relationship between the CWPT intervention and a significant reduction in the target students' fidgeting and off-task behavior. Also, the students' academic engaged time was increased when the CWPT intervention was implemented.

Similarly, Locke and Fuchs (1995) investigated the effects of a common peer-mediated reading intervention on the social interactions and on-task behavior of three fifth grade special

education students. Selected for their high frequency off-task behavior and low reading achievement, the participants were paired with higher performing students to engage in reciprocal peer tutoring in reading for fifteen minutes each day. Using a reversal design, the authors demonstrated a functional relationship between the peer-mediated reading intervention and an increase in both on-task behavior and positive social interactions in the target students. The intervention was also found to possess high social validity.

The available literature suggests that peer tutoring is an effective and feasible technique for increasing the academic competency of students, regardless of the role in which the student participates. Peer tutoring has also been shown to confer collateral behavioral benefits, even when they are not specifically targeted by the intervention.

**Peer modeling.** Training students to act as exemplars or models of appropriate behavior has been effectively used to alter the behavior of their peers. The majority of the peer modeling literature investigates the techniques' effectiveness for students with autism and other developmental disabilities. Egel, Richman, and Koegel (1981) trained typically developing preschoolers to model appropriate responding for their developmentally disabled peers in a discrete trial training setting. During baseline, the developmentally disabled preschoolers were engaged in idiosyncratic tasks in a discrete trial training format. When the intervention was implemented, each task trial was preceded by an appropriate response demonstrated by a typically developing peer model. An ABAB reversal design was used to demonstrate experimental control. When the peer model was present, the target students' trial accuracy increased to near 100% and remained high even after the models were withdrawn.

More recently, Werts, Caldwell, and Wolery (1996) trained typically developing elementary school students to act as peer models in an effort to teach a response chain (e.g. using

a calculator to solve a simple addition problem, spelling a word using tiles) to their developmentally disabled peers. Peer modeling involved a step-by-step description and demonstration for the target student. Results of the study indicate that peer modeling was an effective procedure for training response chains to developmentally disabled elementary school students. Furthermore, the classroom teachers reported that the intervention was acceptable and that they would be more likely to utilize peer modeling to teach skills in the future.

**Group-oriented contingencies.** One of the most widely recognized group-oriented peer-mediated interventions is the Good Behavior Game (GBG; Barrish, Saunders, & Wolf, 1969; Medland & Stachnik, 1972; Tingstrom, Sterling-Turner, & Wilczynski, 2006). Although there are a number of variations, the basic intervention splits a whole classroom into two teams that compete to earn a reward or privilege based on their behavior. In the first GBG investigation, Barrish and colleagues (1969) divided a fourth grade classroom into two teams during a math period. During this period, any student engaging in out-of-seat or talking behavior would earn a point for their team. At the end of the math period, whichever team had fewer points would be allowed to wear victory badges, line up first for lunch, and receive a 30-min free period at the end of the day. If both teams had accumulated five points or less the entire class earned the reward. The authors reported a large reduction in both target behaviors following intervention implementation. While a full literature review is beyond the scope of this paper, Embry (2002) provides a detailed review of the history and efficacy of the GBG as well as an argument for its consideration as a behavioral vaccine.

Another well-researched peer-mediated intervention that utilizes a group-oriented contingency known as positive peer reporting has been demonstrated as an effective technique to reduce disruptive behavior in the classroom (Skinner, Cashwell, & Skinner, 2000; Morrison &

Jones, 2007; Cihak, Kirk, & Boon, 2009). The intervention typically trains students to generate praise statements based on the behavior of their peers and was developed in response to the criticism generated from traditional peer-reporting interventions that rely on students to “tattle” on their peers. Skinner and colleagues (2000) trained a classroom of fourth grade students to report positive peer interaction by writing down the behavior they observed on index cards and depositing them into a shoebox in the classroom. At the end of each day the number of positive reports, or “tootles”, were totaled and reported to the class. Once the students reached 100 total reports they earned a 30-min free recess. When the group contingency was in place, the students reported an increased number of observed positive interactions than during baseline.

Kohler, Strain, Hoyson, Davis, Donina, and Rapp (1995) utilized a similar group contingency to facilitate social interactions between students with developmental disabilities and their typically developing peers. Three preschool students with developmental disabilities and six typically developing preschool peers were placed in organized play groups each day. All nine students were instructed that they were able to earn points for engaging in specific social behaviors such as sharing and facilitating group play. The students were also told that they could help each other earn points by completing the behaviors together. To arrange the group contingency, the students were informed that no student would be able to receive a reward for earning all of their points unless every student in the play group earned all of their points as well. Following baseline, the typically developing peers were trained in a social skills curriculum that focused on initiating and prolonging positive social interactions. Using a reversal design wherein the play group contingency was repeatedly implemented and withdrawn, the authors were able to demonstrate a relationship between the intervention and an increase in social interaction for all three preschoolers with developmental disabilities.

**Peer management.** While all four peer assisted strategies have been identified as effective means for addressing the academic and behavioral concerns of students in schools, peer management may be the most relevant when considering student implementation of Check-in/Check-out. Because CICO requires an interventionist to manage a reward contingency, it is important to examine the extent to which students have been given the opportunity to do so when implementing peer management interventions. Similar to peer monitoring, much of the peer management literature focuses on teaching social skills to students with developmental disabilities (Bass & Mulick, 2007; Chan, Lang, Rispoli, O'Reilly, Sigafos, & Cole, 2009). However, while the bulk of the research in this domain is limited to a specific population, peer management interventions demonstrate the greatest variety of applications in the literature.

Strain, Kerr, and Ragland (1979) examined the effects of a peer-mediated social skills intervention which targeted students with developmental disabilities. In this study, an 11-year-old was trained to engage in social behavior with four same-aged peers with developmental disabilities. By initiating social interaction with statements such as “come play” or “let’s play blocks” and prompting the target students to play with each other, the peer interventionist was able to increase the social behavior of the participants. Both social initiation and prompting were found to be equally effective and socially valid; however, neither technique resulted in generalization outside of the experimental setting.

In a similar study, Odom and Strain (1986) compared the differential effectiveness of a peer-mediated social initiation procedure and a teacher prompting technique. In one condition, peer interventionists were trained to initiate social interactions with three students diagnosed with autism. In the other condition, teachers were trained to prompt the participants to play with the peer interventionists. Peer interventionists were able to earn rewards through a token

economy if the target student reciprocated the peer's initiation or if the peer reciprocated a teacher-prompted initiation. Both techniques increased the social responses exhibited by the participants, suggesting that peer-mediated intervention may be equally effective as traditional adult interventionists when attempting to increase social reciprocation in students diagnosed with autism.

Goldstein and Wickstrom (1986) also examined the effects of a peer-mediated intervention designed to increase the social interactions of preschoolers with developmental disabilities. Two preschool students were trained to use a variety of communicative techniques such as making eye contact, establishing joint attention, describing play, and prompting, to socially engage three same-aged peers diagnosed with behavioral disorder and developmental delays. During free time, one or both of the peer interventionists were instructed to use any of the strategies to promote the social behavior of the target students. Both social initiations and reciprocations of the participants were significantly increased following intervention implementation. Furthermore, the results were maintained for up to eight weeks after the intervention was withdrawn. The results of this study support the use of students as young as preschoolers in a school-based interventionist role and suggest that peer-mediated interventions provide effects that may maintain even after the intervention has ceased.

Bowman and Myrick (1987) utilized students in a mentor-based intervention with typically developing elementary school students. In this study, 54 5<sup>th</sup> graders were trained using the Children Helping Children program (Myrick & Bowman, 1991), which is designed to teach social skills such as effective listening, clarifying, summarizing, and selective responding. Once trained, each 5<sup>th</sup> grader met weekly with a 3<sup>rd</sup> grade student who was recruited because he or she engaged in high levels of disruptive behavior. Each weekly meeting was structured so that the 5<sup>th</sup>

grade mentor was able to utilize the skills learned in training by discussing issues such as appropriate school behavior and making friends with their 3<sup>rd</sup> grade mentee. After twelve weeks of intervention, the distractibility and disruptive behavior of the 3<sup>rd</sup> grade students was significantly reduced compared to a control group. Furthermore, this significant reduction in problem behavior was maintained after an 8-week maintenance phase.

Guevremont, Macmillan, Shawchuck, and Hansen (1989) also implemented a peer-mediated intervention targeting typically developing students. Two elementary school girls who were identified as socially isolated were targeted by the intervention. Five same-aged female classmates were selected to act as peer interventionists and were trained to initiate social interactions with the target students. The peer interventionists were able to earn rewards for every attempt they made to engage the participants on the playground. Using a reversal design, the authors demonstrated a functional relation between the intervention and increases in social interaction by the target students. Although the results of the study did not generalize to settings other than the playground, they were maintained four months after the withdrawal of the intervention. The results suggest that peer-mediated interventions can increase the social engagement of typically developing students.

Peer management interventions have also been utilized in middle school classrooms. Arceneaux and Murdock (1997) trained a typically developing eighth grade student to utilize a prompting procedure every time the target student, an eighth grade student with a developmental disability, engaged in disruptive vocalizations during their sustained silent reading period. After every instance of disruptive vocalization, the student interventionist was trained to prompt the target student by pointing at his reading material until he began reading again. Using a reversal design, the peer prompting intervention was shown to reduce disruptive vocalizations to near

zero levels. Furthermore, the results of the intervention were maintained at three- and five-week follow-up sessions.

Brown, Topping, Henington, & Skinner, (1999) utilized a reciprocal peer monitoring intervention called “Checking Chums” to increase the academic goal completion of typically developing elementary school students. An entire classroom of students were paired and trained to act as student interventionists for each other. At the beginning of each day, all of the students met with their partner to review individualized academic goals that had been created by their teacher for that specific day. Throughout the school day, each student was required to check with their partner following the completion of a daily goal to ensure that it was completed correctly. Additionally, students were trained to provide encouragement and feedback to assist their partner in completing goals. If both students in a pair completed all of their goals by the end of the day, they were able to earn a reward. A pre-post design was used to assess the results of the intervention. After thirteen weeks of treatment, the on-task behavior of target students increased between 20 – 50%. Furthermore, the intervention was successfully transported to other classrooms in the school and was identified as acceptable to teachers using anecdotal evidence.

Mathur and Rutherford (1991) conducted a systematic review of the literature, analyzing studies that specifically promoted social skills for students with behavior disorders through the use of peer-mediated interventions. The twenty-one articles included in the review were summarized and several issues regarding peer-mediated interventions were identified. First, the methods for systematic peer training were not adequately described in most studies. Second, the majority of the studies did not distinctly program for generalization of the effects of the intervention. Third, the cost-effectiveness of the training was not evaluated for any of the studies.

In summary, peer interventionists have been effectively utilized to remediate the academic and behavioral problems of a variety of populations, including preschool, elementary, and middle school students, as well as those students with ADHD, learning, and developmental disabilities. However, there have been no studies investigating the effectiveness of peer-mediated interventions to address the behavior of students identified as at-risk for developing behavioral disorders.

### **Purpose of the Present Studies**

As more school districts adopt a PBS framework to address the disruptive behavior of students, it becomes increasingly important to develop interventions that are effective at doing so. Check-in/Check-out has over a decade of literature supporting its use in this capacity; however, finding available adults to act as interventionists might not be a viable option in some school districts. Furthermore, schools that are able to designate excess staff members as interventionists might prefer to utilize those personnel in a more managerial capacity, requiring less direct, individual involvement and ultimately less personnel, allowing those employees to spend time implementing other aspects of the PBS model. Therefore, identifying positive behavioral interventions that students are capable of implementing under the supervision of school personnel may be vital to the future success of a PBS framework. Check-in/Check-out, due to its mentorship component, is a familiar and effective strategy that can be intuitively adapted into a peer management intervention. To this end, two single-case studies have been designed to answer the following questions:

- (a) Is Check-in/Check-out effective when it is implemented by an elementary school student?

(b) Is Check-in/Check-out more effective when implemented by an adult interventionist or a student interventionist?

Study 1 aimed to investigate the effectiveness of student interventionists implementing Check-in/Check-out. Study 2 examined the relative effectiveness of student and adult interventionists, also implementing Check-in/Check-out.

## GENERAL METHODS

### Participants

Twelve elementary school students were recruited from a public school district located in the Southeastern United States. Six students participated as target students, with three students in Study 1 and two students in Study 2. Six different students participated as student interventionists, with three students in each of the two studies. One graduate student also participated as an adult interventionist in Study 2.

**Target Students.** Elementary school students in second through fourth grade were screened for participation as target students. Across both studies, a daily rating of the student's disruptive behavior served as the target of the Check-in/Check-out intervention. Therefore, only those students exhibiting rates of disruptive behavior significant enough to place them at-risk for developing behavioral disorders were considered for participation as target students. A three-step multiple gating procedure was utilized to determine student eligibility. First, teachers were solicited for referrals of any student engaging in disruptive behavior in the classroom. Next, the teachers were asked to complete the Student Risk Screening Scale (SRSS; Drummond, 1994) for each student referred. The SRSS was chosen because it is an efficient and psychometrically sound behavioral screener that can detect students at risk for developing emotional and behavioral disorders (EBD) (Lane et al., 2009). A score of nine or higher on the seven-item screener indicates that a student is at "high risk" for developing EBD. This cut score was used as the second eligibility criterion for potential target students. Third, because CICO has been shown relatively ineffective for students engaging in escape-maintained behavior, a questionnaire designed to determine behavior function was completed by each teacher of a potential participant. Students identified as engaging in escape-maintained behavior were no longer

eligible to participate and were provided alternative intervention services unrelated to the current studies. Those students engaging in disruptive behavior serving any other behavioral function were deemed eligible to participate as target students.

**Student interventionists.** Elementary school students in fourth and fifth grade were screened for participation as student interventionists using a two-step process. Initially, fourth and fifth grade teachers were asked to identify any students they believed possessed the capacity to act as a mentor and interventionist. When nominating students, teachers were reminded to keep in mind certain qualities that might lend themselves to an effective mentor and interventionist such as motivation, academic achievement, and responsibility. The teachers were then asked to complete the Teacher form of the Social Skills Improvement System – Rating Scale (SSIS-RS; Gresham & Elliott, 2008) to ensure that the nominated students possessed adequate social skills. If the student was not identified as at-risk for social skills deficits, he or she was considered eligible for participation as a student interventionist.

## **Measures**

**Student Risk Screening Scale (SRSS).** The SRSS was completed by teachers to identify students in need of additional behavioral support in the classroom. Comprised of seven items, teachers were asked to rate each of their students on a four-point Likert-type scale for behaviors such as lying and aggression.

**Daily Behavior Report Card (DBRC).** Student outcome was quantified by an individualized DBRC completed by the target student's teacher. Each student's DBRC consisted of five target behaviors generated collaboratively by the student's teacher and the experimenter. Each behavior was rated daily by the target student's teacher on a five-point Likert-type scale to assess behavioral performance. A sample DBRC is provided in Appendix A.

**Social Skills Improvement System – Rating Scale (SSIS-RS).** As previously mentioned, the SSIS-RS was completed by teachers to identify student interventionists. It was also administered in an effort to assess the effects of CICO on the social skills of both the target students and the student interventionists. The Teacher form of the SSIS-RS was completed before the beginning and immediately following the conclusion of Study 1 for each participating student.

**Treatment Integrity.** A combination of self-report and direct observation was used to monitor the extent to which adult and peer interventionists implemented the Check-in/Check-out intervention as intended. Peer and adult interventionists were given a checklist before the start of each check-in and check-out that listed the essential components of implementation. They were asked to complete the checklist after each implementation of the intervention, noting which steps were completed. Graduate students not otherwise involved in the study acted as observers to ensure that the mentors were accurately reporting treatment integrity. Their observations served as reliability checks and allowed an opportunity to provide performance feedback to the mentors in the event of low treatment integrity. Performance feedback has been shown effective in maintaining high levels of treatment integrity (Noell et al., 2005). The specific components used to monitor treatment integrity can be found in Table 1.

Table 1  
Components of Check-In/Check-Out

Check-in Components	(1) Collect previous day's form (2) Review daily goal and expectations (3) Provide positive encouragement
Check-out Components	(1) Calculate daily performance (2) Manage reward contingency (3) Remind student to return form with parent signature

**Functional Assessment Checklist; Teachers and Staff (FACTS).** The FACTS is a semi-structured interview designed to determine the function of a student's problem behavior (March, Horner, Lewis-Palmer, Brown, Crone, Todd, et al., 2000). Because the present studies purposefully excluded students that engage in escape-maintained behavior, it was conducted with the teachers of potential target student participants.

### **Analyses**

The primary outcome measure, student DBRC data, was interpreted using a combination of visual analysis, a standardized mean difference effect size (SMDES; Cohen, 1988), and a calculation of points exceeding the median (PEM; Ma, 2006). Due to the nature of the reversal design, the SMDESs for Study 1 were calculated by dividing the difference between the mean of all treatment days and the mean of all baseline days (including reversal phases) by the standard deviation of the first baseline phase. The reversal design used in Study 1 also required the PEM analysis to be conducted differently. In Study 1, the points in each treatment phase were compared to the median of the baseline (or reversal) phase that immediately preceded it. In other

words, the first treatment phase of each participant was compared to the median of the initial baseline and the second treatment phase was compared to the median of the reversal phase immediately preceding it. The number of points exceeding the median in each of a participant's two treatment phases was then aggregated to generate a single PEM effect size.

## STUDY 1

### Participants

**Target Students.** Three students deemed eligible using the target student identification procedure previously described participated as target students in the Check-in/Check-out intervention. Each student’s SRSS data can be found in Table 2. Relevant demographic information can be found in Table 3. Ethan, a 3<sup>rd</sup> grade student, was referred for participation because he was engaging in disrespectful verbal behavior towards his teacher and peers and was also frequently caught taking his peers’ belongings. Hank, a 4<sup>th</sup> grade student, was referred for his frequent defiance when given instruction and often engaged in inappropriate verbalizations in class. Andrew, a 3<sup>rd</sup> grade student, was referred because he was disrespectful towards his teacher and peers and frequently exhibited a negative attitude in the classroom. These behaviors served as the basis for creating each student’s individual DBRC and were explicitly targeted by CICO.

Table 2  
Study 1 and 2 Target Student SRSS Data

Participant	Study	Stealing	Cheating, Sneaking, Lying,	Behavior Problems	Peer Rejection	Low Academic Achievement	Negative Attitude	Aggressive Behaviors	Total
Ethan	1	0	1	2	2	2	3	1	<b>11</b>
Hank	1	3	3	2	0	3	3	1	<b>15</b>
Andrew	1	0	1	3	0	3	2	0	<b>9</b>
Michael	2	0	1	3	2	3	3	1	<b>13</b>
Angela	2	0	3	3	2	0	3	3	<b>14</b>
Pam	2	0	3	3	2	3	3	3	<b>17</b>

Table 3  
Study 1 Participant Demographic Information

<b>Participant</b>	<b>Ethnicity</b>	<b>Age</b>	<b>Grade</b>	<b>Role</b>
Ethan	African American	9	3 <sup>rd</sup>	Target
Hank	African American	10	4 <sup>th</sup>	Target
Andrew	African American	9	3 <sup>rd</sup>	Target
Dave	African American	11	5 <sup>th</sup>	Interventionist
Nick	Caucasian	11	5 <sup>th</sup>	Interventionist
Stephen	Caucasian	11	5 <sup>th</sup>	Interventionist

**Student Interventionists.** Three students deemed eligible using the identification procedure previously described participated as interventionists using the Check-in/Check-out intervention. Relevant demographic information can be found in Table 3.

### **Design**

The current study employed a reversal design embedded within a concurrent multiple baseline across participants. The reversals are ABAB designs wherein treatment is implemented following baseline, subsequently removed, and then re-implemented to demonstrate experimental control.

### **Procedures**

After obtaining parental consent and child assent for all participants, each student interventionist was assigned randomly to a same-gendered target student. To isolate the effects of the intervention from any incidental contact between students, student interventionists were assigned to target students that were at least one grade level below him or her. During baseline, each target student's behavior was monitored by the DBRCs completed by his or her teacher. The baseline data was then used to create reward contingencies for each student individually. That is, the average performance of each target student during baseline became his or her first

goal during the treatment phase. For example, if the student's average behavioral performance during baseline was fifteen, the student had to score a fifteen or higher on the first day of treatment to receive a reward for that day. After three successive days of meeting his or her goal, a new goal was set based on the median of the previous three days. Throughout the baseline phase the student interventionist and target student were not made aware of their pairing and had no contact with each other outside of any incidental contact that would occur naturally in the school environment.

**Student interventionist training.** During the baseline phase, the student interventionists were trained to conduct the Check-in/Check-out intervention over a span of at least three days. They were pulled from their physical education period for 10 minutes during each training day. Two graduate students, one acting as target student, the other as interventionist, modeled CICO for the student interventionists. Each student interventionist was then asked to model the intervention one-by-one for the graduate interventionist using the second graduate student as intervention recipient. An intervention components checklist was provided to the students to aid in implementation during training. The graduate trainer provided individual corrective feedback as needed. Each day, the students were trained in this way until each one demonstrated mastery of the intervention procedures. Treatment integrity during training was monitored by the graduate trainer using the components checklist. A student interventionist was considered sufficiently trained after three consecutive days of implementation with 100% integrity. All of the necessary materials were provided to the student during training and intervention implementation. None of the student interventionists required additional training beyond the minimum three day period required by each studies.

**Check-in.** Following at least five days of baseline, the target students entered the initial treatment phase in which the peer-led Check-In/Check-Out intervention was implemented. The intervention was implemented in two phases each day. During Check-in, all three student interventionists were pulled from their classrooms by a graduate student immediately after the first morning bell but before class had begun. Simultaneously, all three target students were pulled from their classrooms by another graduate student. All six participants were brought to a quiet, unused room in the school. At the first meeting, after introducing themselves, each target student and student interventionist were instructed to collaboratively develop a list of preferable reinforcers to be used for the duration of the study. Next, the student interventionists provided their target students with the current daily monitoring sheet, reviewed the listed behaviors, and provided them with their first behavioral goal. Finally, after providing statements of encouragement, each interventionist handed their target student the DBRC and dismissed them to class for the school day. For every meeting after the first, the student interventionist also collected the signed DBRC from the previous day. If the DBRC was not returned the following day, the interventionist encouraged the target student to bring it next time. All student participants were then escorted back to their respective classrooms. The entire Check-in process was completed over a three minute span. Although Check-in/Check-out was originally designed to utilize multiple ratings of behavior throughout the day, the target students' teachers were only required to complete one behavior rating at the end of the day, as this has been shown equally effective as multiple ratings (Kauffman, 2008). Each participating teacher was instructed to complete the DBRC given to their student immediately before the end of the final class period. Because the DBRCs only required seconds to complete, this step was usually signaled by the arrival of the graduate student to escort the target students to Check-out.

**Check-out.** Similar to Check-in, all student participants were escorted to a quiet, unused room in the school for Check-out. The student interventionists were responsible for implementing three components at this stage. First, they were responsible for totaling their target student's DBRC score, comparing it to the daily goal, and explaining the results to their target student. Second, the student interventionist had to manage the reward contingency by delivering a reinforcer if their target student achieved his or her goal or withholding reinforcement otherwise. Finally, the student interventionist was responsible for giving the completed DBRC to their target student and reminding him or her to get it signed by their parents to return the next day. The entire Check-out process was completed over a three minute span.

During every Check-in and Check-out, a graduate student observer was present to supervise student interactions and to conduct integrity checks. The graduate student had no contact with either student participant until the intervention components were complete. Once the student interventionists sent the target students away, the graduate student observer collected the integrity checklist.

Following at least five days of treatment, the intervention was withdrawn and the initial reversal phase began. During this time, the student participants had no contact other than any incidental contact that would occur naturally. Additionally, the student interventionist was instructed not to discuss anything related to the intervention with the target student. DBRCs were completed by the target students' teachers throughout the reversal phase and collected by the experimenter.

Following at least five days in the reversal phase, the Check-in/Check-out intervention was re-implemented. This phase was conducted exactly like the initial treatment phase and continued for at least five days until the completion of the study. For most participants, phase

changes were delayed until the data in the current phase was stable or trending in the appropriate direction for at least three days. However, due to time limitations, this was not possible for all participants. In these cases, phase changes were conducted after the current phase had been in place for eight days.

## **Results**

**Peer-mediated CICO on behavior.** Study 1 investigated the effectiveness of the peer-mediated CICO intervention. As shown in Figure 1, Ethan's behavior rating in the absence of the CICO intervention averaged 17.7. On days in which the CICO intervention was implemented, Ethan's behavior rating averaged 21. This increase is associated with a SMDES of 1.51 and a PEM of 80%. Hank's behavior ratings averaged 13.4 across all baseline days. During the treatment phases, Hank's behavior ratings increased to an average of 19.5. This increase is associated with a SMDES of 1.85 and a PEM of 91%. Andrew's behavior ratings averaged 14.1 across both baseline phases. This average increased to 15.1 during the days on which treatment was implemented and is associated with an effect size of .18 and a PEM of 67%.

Cohen (1988) suggested guidelines for interpreting mean difference effect sizes. According to these guidelines, an effect size of .2 suggests a small effect, an effect size of .5 suggests a moderate effect, and an effect size of .8 suggests a large effect. Similarly, Ma (2006) suggested guidelines for interpreting the PEM effect size. According to these guidelines, a treatment phase with 90% or greater nonoverlap with the median of its associated baseline phase suggests a large effect. Nonoverlap between 70% and 90% suggests a moderate effect and anything less suggests a small or questionable effect.

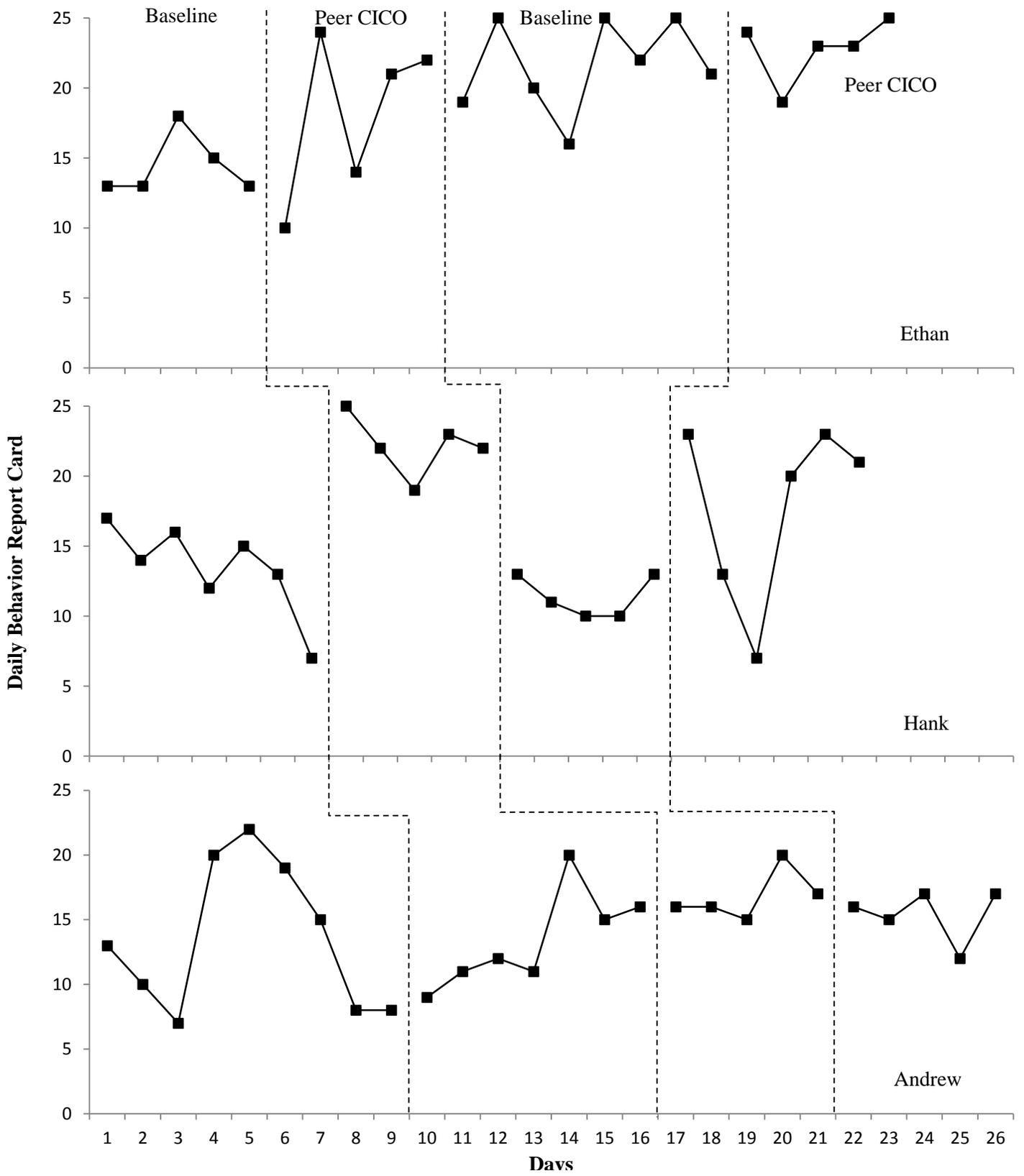


Figure 1. Peer-mediated CICO on Daily Teacher Rating of Behavior.

Based on these guidelines, Ethan's data yielded a large SMDES (1.51) and a moderate PEM (80%). A visual inspection of Ethan's data corresponds to the obtained effect size estimates. In the initial baseline phase, Ethan's behavioral performance as rated by his teacher consistently earned him roughly half of his total DBRC points. Once the intervention was implemented the data become somewhat variable but demonstrate a distinct upward trend. During the reversal phase, Ethan's DBRC data does not return to baseline levels, remaining consistently high through the final treatment phase.

Hank's data yielded a large SMDES (1.85) and PEM (91%). A visual inspection of Hank's data corresponds to the obtained effect size estimates. A distinct downward trend in DBRC ratings is observed in the initial baseline phase followed by a large and consistent increase following initial implementation of the intervention. When the intervention is discontinued in the reversal phase, DBRC ratings return immediately to baseline levels. The final treatment phase demonstrates another large, albeit more variable, increase in behavior ratings.

Andrew's data yielded a small SMDES (.18) and a questionable PEM (67%). A visual inspection of Andrew's data corresponds to the obtained effect size estimates. The initial baseline phase does not demonstrate any discernible pattern. However, once treatment is implemented a small but consistent increase in behavioral ratings is observed. Upon removal of the intervention the ratings plateau and do not demonstrate an increase comparable to the first treatment phase during the implementation of the second treatment phase.

**Peer-mediated CICO on social skills.** Table 4 depicts the social skills, problem behavior, and academic competence ratings of all six Study 1 participants. The SSIS-RS Teacher form was administered prior to the beginning of Study 1 and immediately following its completion. As shown in Table 4, all six participants' social skills were rated higher by their

respective teachers following the completion of the study. Ethan, whose social skills were rated over a full standard deviation higher, showed the most improvement in that domain. Generally, teacher ratings of academic competence and problem behaviors did not significantly change. Andrew’s problem behavior rating demonstrated the greatest change, increasing nearly one standard deviation.

Table 4  
Pre-Post Social Skills Ratings by Participants’ Teachers from Study 1

<b>Participant</b>	<b>Role</b>	<b>Social Skills</b>	<b>Problem Behaviors</b>	<b>Academic Competence</b>
Ethan	Target			
Pre		62	115	79
Post		80	109	73
Hank	Target			
Pre		75	110	67
Post		83	111	69
Andrew	Target			
Pre		64	126	95
Post		70	139	91
Dave	Interventionist			
Pre		118	84	122
Post		119	83	122
Nick	Interventionist			
Pre		121	83	122
Post		123	83	122
Stephen	Interventionist			
Pre		103	85	103
Post		105	85	103

**Treatment Integrity.** Throughout the duration of the study, the student interventionists’ treatment integrity averaged 100%

## STUDY 2

### Participants

**Target Students.** Three students deemed eligible using the target student identification procedure previously described participated as target students in the Check-in/Check-out intervention. Each target student's SRSS data can be found in Table 2. Relevant demographic information can be found in Table 5. Michael, a 4<sup>th</sup> grade student, was referred because he was disrespectful towards his teacher and peers and often refused to participate in academic assignments. Angela, a 3<sup>rd</sup> grade student, was referred because she was disrespectful towards her teacher and peers and engaged in aggressive behavior in the classroom. Pam, a 4<sup>th</sup> grade student, was referred because she frequently engaged in inappropriate verbalizations and aggressive behavior. These students were recruited from a separate elementary school than the participants of Study 1.

Table 5  
Study 2 Participant Demographic Information

Participant	Ethnicity	Age	Grade	Role
Michael	African American	13	4 <sup>th</sup>	Target
Angela	African American	9	3 <sup>rd</sup>	Target
Pam	African American	10	4 <sup>th</sup>	Target
Ethan	African American	11	5 <sup>th</sup>	Interventionist
Kimberly	African American	11	5 <sup>th</sup>	Interventionist
Molly	African American	11	5 <sup>th</sup>	Interventionist

**Student Interventionists.** Three students deemed eligible using the identification procedure previously described participated as interventionists in the Check-in/Check-out intervention. Also, one graduate student acted as an adult interventionist. Relevant demographic information can be found in Table 4.

## **Design**

The current study employed an alternating treatments design embedded within a concurrent multiple-baseline across subjects. That is, following the completion of a baseline phase, each participant entered a treatment phase that rapidly and randomly cycled between an adult and peer interventionist.

## **Procedures**

Study 2 followed the exact same procedures as Study 1 with one major exception. On any given intervention day, the target student did not know prior to Check-in whether he or she would be meeting with the adult or student interventionist. To reduce sequence effects, the alternating treatments design was randomized in such a way so that each target student met with their adult and student interventionist the same number of days throughout the intervention phase but could not anticipate which one they would be meeting with the following day. However, in an effort to make the stimulus of alternating interventionists more salient, each one was associated with a different color wristband that was given to the target student during Check-in to wear throughout the day. On every adult interventionist day, the target student was given a gold wristband to wear. On every student interventionist day, the target student was given a purple wristband to wear. The wristband was returned to the interventionist during Check-out at the end of the day. The wristband served to remind the student which interventionist they would be meeting with for Check-out in an effort to maximize any difference in student behavior either interventionist elicited. During days in which the student interventionist was implementing CICO, an adult observer not otherwise involved in the study was present to monitor treatment integrity. Social skills data was not collected for Study 2 since it would have been difficult to

make statements about any corresponding changes on pre-post SSRS-Teacher Forms due to the rapid cycling of interventionists.

## **Results**

Figure 2 displays the results from Study 2, which investigated the relative effectiveness of CICO when conducted by an adult and peer interventionist. As shown in Figure 2, Michael's behavior ratings in baseline averaged 10.25. Under the effect of the adult-led CICO intervention, Michael's behavior ratings increased to an average of 15, which is associated with a SMDES of .84 and a PEM of 71%. When the peer-led intervention was in place, Michael's behavior ratings increased to an average of 19.8, which is associated with a SMDES of 1.68 and a PEM of 92%. While the SMDESs suggest that both the peer- and adult-led interventions produced large effects, the PEM indicates that the adult-led intervention produced a moderate effect and the peer-led intervention produced a large effect. Visual inspection of Michael's data also suggests that peer-mediated CICO was more effective than the adult led intervention.

Angela's behavior ratings in baseline averaged 7.9. When the adult-led intervention was implemented, Angela's behavior ratings increased to an average of 8.2, which is associated with a SMDES of .06 and a PEM of 33%. Angela's behavior ratings also increased under the effect of the peer-led intervention to an average of 14.8, resulting in a SMDES of 1.58 and a PEM of 75%. The SMDES and PEM suggest that the adult-led CICO intervention produced a minimal effect. The SDMES suggest that the peer-led CICO intervention produced a large effect on Angela's behavior ratings while the PEM suggest only a moderate effect. Visual inspection of Angela's data highlights the variability in the treatment phase, even during the peer-only runoff, which may be more consistent with the PEM effect size.

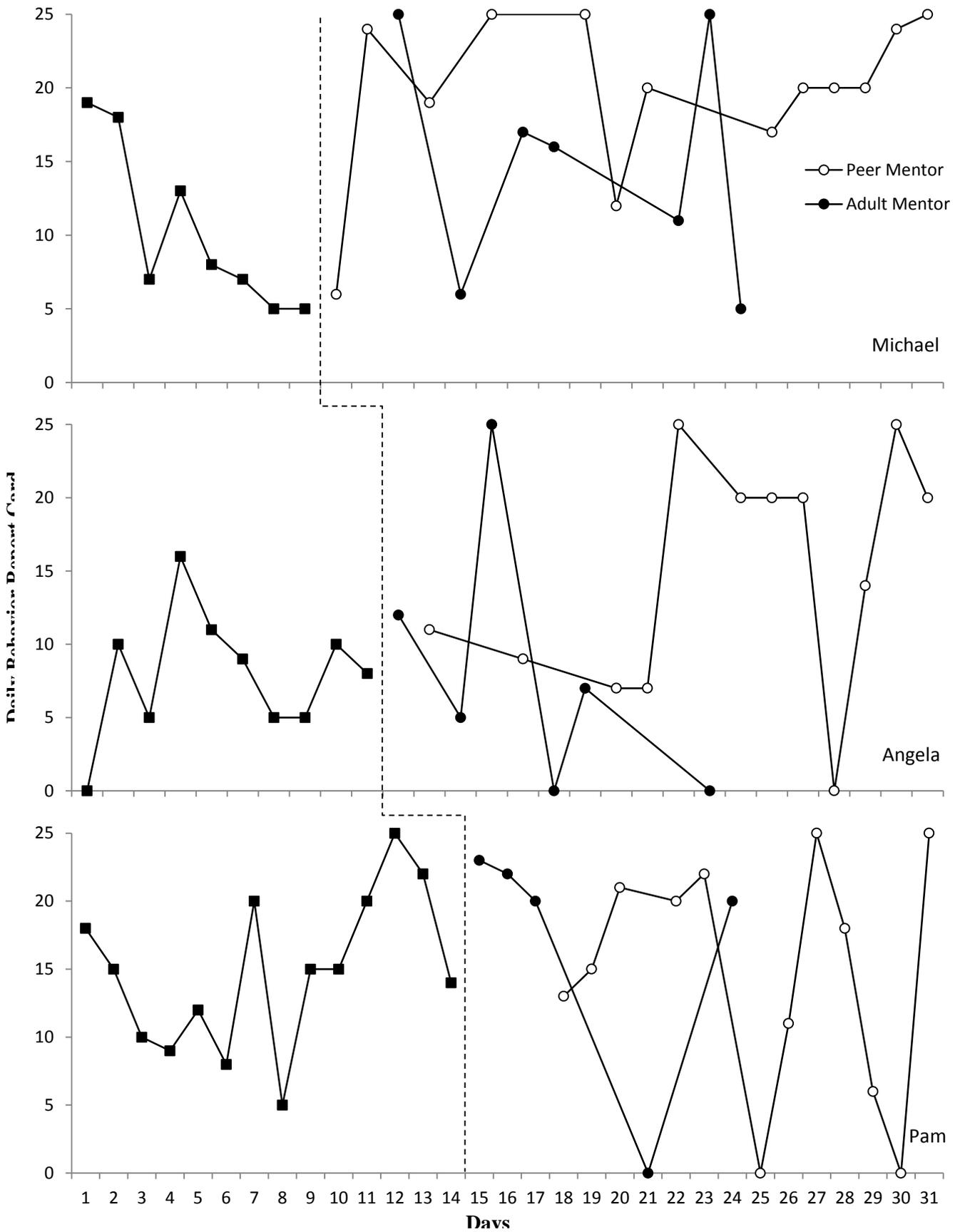


Figure 2. Relative Effectiveness of Peer- and Adult-led CICO on Teacher Ratings of Behavior.

Finally, Pam's behavior ratings averaged 14.9 throughout baseline. When the adult-led intervention was implemented Pam's behavior ratings increased to an average of 17, resulting in a SMDES of .37 and a PEM of 80%. Under the effect of the peer-led intervention, Pam's behavior ratings averaged 14.67 resulting in a SMDES of -.03 and a PEM of 50%. The SMDES suggests that the adult-led intervention provided a small effect, while the PEM suggest a moderate effect. Both effect size metrics conclude that the peer-led intervention provided a negligible or questionable effect. A visual inspection of Pam's data reveals extreme variability throughout baseline and treatment phases, making it difficult to describe the intervention as effective for this participant.

**Treatment Integrity.** Throughout the duration of the study, the treatment integrity of the adult and student interventionists averaged 100%.

## **DISCUSSION**

The present studies utilized elementary school students as behavior interventionists, allowing them to function as mentors using the Check-in/Check-out intervention. The results of the studies supported the notion that students can be trained to act as effective interventionists for their peers with minimal adult supervision. Furthermore, the results provide initial evidence that peer interventionists may be at least as effective as their adult counterparts.

### **Implications**

These findings have several potential implications that are of interest to the field of school psychology. First, the results provide more evidence for the effectiveness of CICO in reducing the problem behavior of elementary school students at risk for developing behavioral disorders. Although CICO already has a wealth of literature supporting its effectiveness, the results of the current studies promote a novel application of the intervention's core components, bolstering their value.

A second potential implication stems from the demonstration that students were able to assume the role of behavioral interventionist, accurately implementing a strategy normally reserved for adult interventionists. While this is not a novel concept, it is important because it promotes the use of elementary school students as an efficient, low cost approach to address disruptive behavior in the classroom.

Kohler & Strain (1990) called for all future studies investigating peer-mediated interventions to report the amount of time and effort required by adults to train students to act accurately and independently as interventionists for their peers in an effort to standardize the efficiency of utilizing students in this way. In the present studies, all student interventionists were sufficiently trained to implement CICO as a group by one adult over three days for ten

minutes each day. Following training, all student interventionists implemented CICO with 100% integrity for the duration of their respective studies. In an attempt to quantify this information, a student interventionist training efficiency (SITE) metric was created so that future studies examining peer-mediated interventions will be able to compare the feasibility and effectiveness of the procedures required to train the student interventionists with previous efforts. The formula for this metric is expressed as  $\frac{n \times t}{s \times i}$  where  $n$  is the number of adults required for training each day,  $t$  is the total time required for training in minutes,  $s$  is the total number of students trained, and  $i$  is the mean treatment integrity across the duration of the study for all interventionists trained in this way (100% = 1.00). Although there is currently no standardization for SITE scores, fewer adults quickly training more students to implement interventions with high treatment integrity will result in a lower SITE score. Using this metric, Study 1 yielded a SITE of 10, and Study 2 yielded a SITE of 15. To provide some perspective on the meaning of these specific scores a meta-analytic study could be conducted to calculate SITE scores for all previously published peer-mediated intervention articles. Because such a study is outside the scope of this project, two scenarios have been fabricated to provide extreme anchors of potential SITE scores. If one adult was able to train an entire classroom of students ( $n = 25$ ) to implement an intervention in a single 5 minute session and each student went on to implement the intervention with 100% integrity, the resulting SITE score would be 0.20. Conversely, if two adults were able to train a single student to implement an intervention over five 30 minute training sessions and the resulting treatment integrity was 50%, the resulting SITE score would be 300. Although these examples are entirely fabricated, they are certainly not implausible scenarios, depending upon which intervention was selected for training. A final point to consider when conceptualizing the SITE metric is the tradeoff between efficiency, effectiveness, and

social validity. In any case, the effectiveness of an intervention and the acceptability of those effects may far outweigh any time and effort required to produce them. Therefore, it is important to consider each case individually before dismissing a peer-mediated intervention as inefficient.

Besides efficiency and accuracy in implementation, the student interventionists also afforded measurable behavior change in their peers, suggesting that their implementation of CICO was effective as well. Across both studies, peer-mediated CICO resulted in positive effect sizes for all but one target student's disruptive behavior. Furthermore, only one of the three participants' behavior ratings demonstrated a return to baseline levels during the reversal phase of Study 1. Two interesting potential implications stem from this fact. First, the resistance to return to baseline levels suggests that the effects of CICO may be strong enough to endure for a period of time even after the intervention is no longer being implemented. However, additional research must be completed before any statements could be made about what role, if any, the type of interventionist plays in this effect. Second, due to the way the effect sizes were computed, the reversal phases in Study 1 were included as part of the baseline average, leading to much lower effect sizes than would have been generated using the initial baseline and treatment phases alone. These results suggest that the benefit of increased efficiency that accompanies utilizing student interventionists may not require a trade off in effectiveness. Also, all students participating in Study 1 demonstrated an increase in social skills as evidenced by the pre-post SSRS-Teacher Form. While the social skills ratings of the student interventionists did increase following the conclusion of the study, they exhibited very little growth. This could be potentially due to ceiling effects since the student interventionists' social skills ratings were already very high prior to the beginning of the study. Target student social skill improvement averaged .71 standard deviations across all three participants.

Finally, the results of Study 2 suggest that peer interventionists are at least as effective as their adult counterparts when implementing CICO. Two of the three target students demonstrated greater response to the intervention when it was implemented by a student. The third target student demonstrated little behavioral change regardless of which interventionist was implementing CICO.

### **Limitations and Future Directions**

There are some limitations that must be taken into consideration before the results can be accurately disseminated. First, because peer and adult interventionists were rapidly cycled in the second study, the presence of carryover and sequence effects may have unduly influenced the results. To address sequence effects, the order in which interventionists were cycled was randomized so that there was no discernible pattern throughout the duration of the study. Carryover effects were minimized naturally, as the differential presence of an adult or peer interventionist served as a discriminative stimulus between each condition. Additionally, colored wristbands served to further discriminate between different conditions. Also, this rapid cycling is not indicative of how CICO is implemented in naturalistic settings; however, it was the most methodologically sound single-case design available for the purpose of directly comparing student and adult interventionists. To address these limitations, future research attempting to examine the relative effectiveness of adult and peer interventionists should employ a group design that is not constrained by sequence and carryover effects.

A second limitation that must be considered is the fact that only one intervention was used to demonstrate a principle that may be applicable to many interventions. That is, it would be tenuous to generalize these studies' findings by suggesting that students are effective interventionists across all behavioral interventions. Therefore, the present results should be

cautiously interpreted and future research should strive to replicate them using a variety of different interventions before broad statements about peer interventionist effectiveness can be made.

Another limitation stems from the use of teacher ratings of student behavior as the primary outcome variable in each study. Although systematic direct observation would have been a more accurate measure of student behavior, teacher ratings provided a quick and feasible method of capturing an entire day's worth of behavior without having to conduct an equal number of hours of direct observation. Also, because daily ratings of behavior were already being used as part of the CICO intervention they provided a convenient permanent product of the intervention that could be used for both purposes. However, future studies should examine the effectiveness of student interventionists using a more rigorous behavioral outcome measure.

A separate limitation of the use of behavior rating scales arose due to the design of Study 1. During the reversal phases in Study 1, the target students were no longer being removed from class at the beginning and end of the day. An observant teacher may have associated this with a withdrawal of the intervention and allowed that knowledge to influence his or her ratings even in the absence of an actual change in student behavior. A similar effect in the other direction could have taken place once the intervention was re-implemented. Again, future studies should attempt to use more objective measures of behavior or control for teacher expectancy effects by using interventions that allow for indeterminable reversals.

A final limitation involved the school-home component of the CICO intervention. Throughout both studies, this component, which asked parents to review, sign, and return their child's DBRC, was not systematically controlled. Therefore, it is plausible that differences in component integrity resulted in differential treatment outcomes. Conversely, this component may

not offer any additional benefit above and beyond the elements implemented at school. Future research should conduct an experimental component analysis of the intervention to provide insight into the necessity of each part.

## **Conclusions**

In an environment where it is difficult to find available and dedicated interventionists, it is important for school psychologists to have academic and behavioral intervention strategies that are feasible to implement using minimal adult personnel resources. The current studies provide additional evidence for the general use of students as interventionists in the schools and present initial evidence for a novel application of students as behavioral interventionists for their typically developing, behaviorally at-risk peers. The results give credence to a long-term solution to the personnel availability issue that has typically limited the extent to which otherwise effective interventions can be implemented in the schools. For these purposes it may be beneficial to conceptualize students as an abundant of the classroom. As long as there are students in need of an intervention, academic, behavior, or otherwise, there will be a student that is willing to take on the role of interventionist. It should be the goal of future research to identify in what situations they will be effective.

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**APPENDIX A  
SAMPLE MATERIALS**

Behavior	Never	Sometimes	Often	Very Often	Always	Points
Completed classwork						___/5
Paid attention						___/5
Respected adults						___/5
Followed rules						___/5
Got along with peers						___/5
Points Total						___/25

**APPENDIX B  
IRB APPROVAL FORM**

**ACTION ON PROTOCOL APPROVAL REQUEST**



Institutional Review Board  
Dr. Robert Mathews, Chair  
131 David Boyd Hall  
Baton Rouge, LA 70803  
P: 225.578.8692  
F: 225.578.6792  
[irb@lsu.edu](mailto:irb@lsu.edu) | [lsu.edu/irb](http://lsu.edu/irb)

**TO:** Frank Gresham  
Psychology

**FROM:** Robert C. Mathews  
Chair, Institutional Review Board

**DATE:** November 30, 2011  
**RE:** IRB# 3223

**TITLE:** Utilizing Peers as Change Agents: An Example Using Check-in/Check-out

**New Protocol/Modification/Continuation:** New Protocol

**Review type:** Full  Expedited  **Review date:** 11/18/2011

**Risk Factor:** Minimal  Uncertain  Greater Than Minimal

**Approved**  **Disapproved**

**Approval Date:** 11/30/2011 **Approval Expiration Date:** 11/29/2012

**Re-review frequency:** (annual unless otherwise stated)

**Number of subjects approved:** 12

**Protocol Matches Scope of Work in Grant proposal:** (if applicable) \_\_\_\_\_

**By:** Robert C. Mathews, Chairman 

**PRINCIPAL INVESTIGATOR: PLEASE READ THE FOLLOWING –  
Continuing approval is CONDITIONAL on:**

1. Adherence to the approved protocol, familiarity with, and adherence to the ethical standards of the Belmont Report, and LSU's Assurance of Compliance with DHHS regulations for the protection of human subjects\*
2. Prior approval of a change in protocol, including revision of the consent documents or an increase in the number of subjects over that approved.
3. Obtaining renewed approval (or submittal of a termination report), prior to the approval expiration date, upon request by the IRB office (irrespective of when the project actually begins); notification of project termination.
4. Retention of documentation of informed consent and study records for at least 3 years after the study ends.
5. Continuing attention to the physical and psychological well-being and informed consent of the individual participants including notification of new information that might affect consent.
6. A prompt report to the IRB of any adverse event affecting a participant potentially arising from the study.
7. Notification of the IRB of a serious compliance failure.
8. SPECIAL NOTE:

*\*All investigators and support staff have access to copies of the Belmont Report, LSU's Assurance with DHHS, DHHS (45 CFR 46) and FDA regulations governing use of human subjects, and other relevant documents in print in this office or on our World Wide Web site at <http://www.lsu.edu/irb>*

## **VITA**

Evan Henry Dart received his bachelor's and master's degree from Louisiana State University in 2007 and 2011, respectively. He recently completed his pre-doctoral internship as a school psychologist in Tangipahoa Parish School System. He will receive his doctoral degree in August 2013 and has accepted a faculty position in the University of Southern Mississippi's Department of Psychology.