A Systematic Review of Function-Modified Check-In/Check-Out

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Abstract

Check-in/Check-Out (CICO) is widely used as a Tier II intervention within school-wide positive behavior interventions and supports. Evidence suggests that traditional CICO is primarily effective for students demonstrating problem behavior maintained by adult attention. A growing body of research has investigated function-modified CICO to address behaviors maintained by other consequences. The purpose of this review was to examine the evidence-base for function-modified versions of CICO to identify (a) the procedures used to assess students' behavior function and (b) the types of modifications and additions to CICO that have been empirically evaluated. We systematically reviewed 11 studies that examined the effects of function-based CICO. Researchers determined behavior function using a combination of direct observations and indirect assessments. These methods were more involved than a brief behavior screening. The modifications and additions to traditional CICO included changes that were functionally relevant and functionally independent. Based on the results of this review, more research is needed before function-based CICO can be considered an evidence-based practice. Moreover, the extent to which educators can implement function-based CICO without researcher support is also unknown. The implications of this review are discussed in terms of future research and practice.

A Systematic Review of Function-Modified Check-In/Check-Out

Positive Behavioral Interventions and Supports (PBIS; Sugai & Horner, 2006) is an application of multi-tiered systems of support logic that establishes interventions to address student behavior within the school. PBIS is a popular intervention framework used in more than 20,000 schools across 45 states (Bradshaw, Waasdorp, & Leaf, 2015; Simonsen, Myers, & Briere, 2011). At the Tier I level, a school-wide PBIS system is implemented in which all students are taught basic behavioral expectations and are rewarded for meeting those expectations (Sugai & Horner, 2006). At Tier II, Check-in/Check-Out (CICO; Hawken & Horner, 2003), is perhaps the most common intervention strategy within a PBIS framework (Bruhn, Lane, & Hirsch, 2014; Debnam, Pas, & Bradshaw, 2012) and is thought to bridge the gap between Tier I and Tier III services (Wolfe et al., 2016).

Description of CICO

CICO is a mentor-based behavioral intervention that is comprised of five core treatment components. Specifically, CICO includes (1) a daily check-in meeting with an adult, during which behavioral expectations are introduced and defined, (2) the use of a daily progress report (DPR) that the student carries throughout the day to monitor behavior, (3) teacher feedback on the DPR about student behavior at regularly scheduled intervals, (4) a daily check-out which often includes reinforcement contingent upon appropriate behavior, and (5) home-school communication, typically using the DPR (Crone, Hawken, & Horner, 2010; Mitchell, Adamson, & McKenna, 2017). CICO has been identified as highly effective for reducing problem behavior and somewhat effective in increasing appropriate behavior in multiple recent systematic reviews (e.g., Maggin et al., 2015; Wolfe et al., 2016). Yet, Maggin et al. (2015) and Wolfe et al. (2016) noted that CICO was less effective or ineffective for students whose problem behavior was

maintained by a function other than attention, a finding that has been reported in previous CICO research. For example, McIntosh and colleagues (2009) found that CICO produced large, desirable effects on problem behaviors (d = 1.04), office discipline referrals (d = .78), and prosocial behavior (d = .99) for students reinforced by teacher-attention; however, for students reinforced by escape, the associated effect sizes were d = .05, d = .19, and d = .42 respectively.

Importance of Behavior Function within CICO

The concept of behavior function refers to the idea that specific types of stimuli serve as maintaining consequences (i.e., reinforcement) for the behavior of an individual. Put another way, inquiring about the function of an individual's behavior asks the question: "What consequences cause this individual to continue engaging in this particular behavior?" In schools, functional behavior assessments (FBA) refer to a range of techniques that are designed to answer this question regarding a student's problem behavior (Steege & Watson, 2009). Although it is outside the scope of this paper to describe the gamut of functional assessment methodology used in classrooms and school systems, it is critical to highlight that these assessments are very frequently recommended for the development of Tier III interventions strategies for students who did not respond appropriately for Tier II interventions (McIntosh, Bohanon, & Goodman, 2010). The FBA process has been described as being "comparable to a Tier 3 assessment for reading" (Fairbanks, Sugai, Guardino, & Lathrop, 2007, p. 290) when it is considered within the context of PBIS. Delaying FBAs until Tier III within a PBIS framework is a curious strategy, considering the widespread use of CICO and the accumulating evidence suggesting that it is differentially effective depending on the function of a student's problem behavior. To alleviate this, McIntosh and colleagues (2009) offered the following:

> A promising approach includes a quick screening for function of problem behavior, such as the FACTS for students in general education…and then one of two options: (a) select the best match from a number of ongoing tier two interventions in the school, or (b) modify the intervention to provide effective support for students with escape-maintained behavior. (p. 90)

There is a growing body of literature investigating the second option presented by McIntosh and colleagues (2009); that is, investigating the effectiveness of modifications made to standard CICO components that are designed to account for behavior functions other than attention. This includes investigations of function-modified CICO after traditional CICO procedures were ineffective. For example, Campbell and Anderson (2008) used results of a brief FBA to modify standard CICO for two non-responders. Providing target students with access to peer attention contingent upon CICO goal attainment resulted in improved CICO effectiveness over the standard paradigm.

Although recent reviews of CICO have called attention to the differential effect of CICO based on behavior function (e.g., Maggin et al., 2015; Wolfe et al., 2016), the reviews provided minimal information regarding the function-based modifications that were made. Functional modifications to CICO may vary greatly across studies and it could be useful for researchers and practitioners to be able to identify the different components of CICO that have been modified, and in which way. To date, there are no systematic reviews identifying and describing the specific modifications made to CICO in order to make it more effective for behavior functions other than access to attention.

Purpose

Researchers have increasingly recognized the need for Tier 2 interventions that are aligned with the hypothesized function of student behavior (McDaniel, Bruhn, & Mitchell, 2015; Mitchell, Bruhn, & Lewis, 2016; Reinke, Stormont, Clare, Latimore, & Herman, 2013). CICO is one of the most common Tier 2 interventions, with evidence supporting its use for students motivated by adult attention (Hawken et al., 2014; Maggin et al., 2015; Mitchell et al., 2017; Wolfe et al., 2015). Several studies have demonstrated that CICO can be modified based on the hypothesized function of student behavior, but previous reviews have dedicated little attention to the specifics of these function-based modifications. Function-based modifications to CICO should be informed by empirical guidance whenever possible. The purpose of this study was to systematically review the research on CICO programs that were explicitly modified based on the function of student behavior. A systematic review was chosen over a quantitative synthesis because the modifications made to CICO differed markedly across the studies and the studies were inconsistent in whether they compared function-modified CICO to a baseline condition or traditional CICO. The following research questions guided this study:

1. What modifications or additions were made to the CICO procedures and were modifications standardized across participants or individualized?
2. For who, in what settings, and for which types of behaviors have researchers empirically evaluated function-modified CICO?
3. To what extent do empirical evaluations of function-modified CICO meet guidelines for experimental rigor?
4. What methods did researchers use to determine behavior function and what were the hypothesized behavior functions for participants in studies of modified CICO?

5. Were modifications made to CICO before or after a student was non-responsive to the traditional CICO program and what core components of traditional CICO were maintained within the modified versions?
6. To what extent were the function-modified CICO procedures delivered with fidelity?

Method

Search Procedures

A systematic search of the literature was conducted to identify peer-reviewed studies or dissertations for inclusion in the review. We searched five scholarly databases (PsycInfo, Academic Search Premier, Google Scholar, ERIC, ProQuest) using a standardized set of terms and procedures. Search terms included "Check in check out", "CICO", "Check-in Check-out", "Targeted intervention", "Behavior Education Program", "PBIS", "Positive behavior interventions and supports", and "Tier II intervention". We supplemented this search with a search of references in four review articles (Hawken et al., 2014; Maggin et al., 2015; Mitchell et al., 2017; Wolfe et al., 2015) and references in all culled articles. A total of 48 articles were screened for inclusion in the review.

Inclusion criteria. We included empirical studies that were unpublished dissertations or peer-reviewed journal articles written in English. For doctoral dissertations that were also published in a peer-reviewed journal, only the peer-reviewed publication was retained. There were no requirements regarding the research design, participant or setting characteristics, or year of publication. In order to be included in this review, the study had to investigate a modified version of CICO where the changes made to CICO were explicitly linked to the hypothesized function of the participants' problem behavior. The first and second author independently reviewed each article to determine whether it met inclusion criteria. There was 1 disagreement

(97% agreement) on whether a study (Barber, 2013) met these criteria. After further discussion, the article was excluded as the modifications were not explicitly linked to a behavior function.

Previous systematic reviews of CICO have diverged on the inclusion of related programs such as Check, Connect, and Expect (CCE; Cheney et al., 2009). CCE is a package of programs that spans what is typically considered Tier II and Tier III supports. The Basic level of CCE is similar to CICO, whereas the Basic Plus provides additional social skills or academic support. Students who are not responsive to Basic or Basic Plus may be referred to the Intensive level of support which includes function-based modifications. Therefore, studies of CCE that included the intensive levels were relevant to the current study.

Exclusion rationale. We excluded studies of traditional CICO procedures (n = 13) and studies that examined the moderating role of behavior function on the effects of traditional CICO (n = 6). Studies of CCE that did not include the Intensive level of supports were also excluded (n = 2). Additionally, we excluded studies in which the authors modified CICO as part of a component analysis (n = 3) and studies of modified CICO that were unrelated to behavior function (n = 3). We also excluded studies that modified CICO to target social skills (n = 2) or internalizing problems (n = 3) because these modifications were not explicitly linked to a hypothesized behavior function. Finally, we excluded studies that used peer interventionists to deliver CICO (n = 4)[1] if the modification was not made to target problem behavior maintained by peer attention. Studies of CICO that layered on academic supports were included, if the supports were tied to the student's behavior function (i.e., escape from difficult tasks). Altogether, a total of 11 studies were systematically reviewed.

[1] The four studies of peer-delivered CICO included a study targeting social skills and a study targeting internalizing behavior. Therefore, the numbers do not sum to 48.

Article Coding

The first and third author coded each of the 11 articles that met inclusion criteria on 28 items related to setting, participant, and intervention characteristics. Setting information included the urban-centric locale (i.e., rural, suburban, urban, not reported) and school type (i.e., elementary, middle, high, other). Participant information included the number of participants receiving function-modified CICO, participants' grade, whether the student was identified as receiving special education services, and the hypothesized behavior function. We also coded the methodological rigor of the designs specific to the evaluation of the function-modified CICO. We did not rate the rigor of Cheney et al. (2009) because only a subset of participants received the intensive level of Check, Connect, and Expect. The remaining studies all used single-case designs and were rated using the WWC pilot standards (Kratochwill et al., 2010). Briefly, each study was rated on (a) whether the independent variable was systematically manipulated, (b) whether each variable was measured systematically by more than one assessor and interobserver agreement data were collected on at least 20% of all sessions, (c) whether there were at least three attempts to demonstrate an intervention effect, and (d) the number of data points per phase. The first three items were coded dichotomously while the fourth was coded as meets standards, meets standards with reservations, or does not meet standards.

The remaining codes pertained to the intervention characteristics. First, we coded whether traditional CICO was delivered prior to a function-modified version, and if so, we coded the treatment fidelity for traditional CICO. Second, we coded the methods of determining the hypothesized behavior function. This included whether teacher or student interviews were conducted (and the type of interview), whether record reviews were conducted, whether systematic direct observations were used, and the number and duration of each interview. Third,

we coded whether the modified CICO was a standardized program or whether it was individualized for each participant. Fourth, we coded whether any of the five core components of CICO (i.e., check in, use of a daily progress report, teacher feedback, check-out, and home-school communication) were included, and the average treatment fidelity for the modified CICO procedures. Finally, dependent variables were coded as one of four categories. Academic engagement included measures such as time-on-task, compliance, organization, homework completion, requests for help, or participation. Problem behavior included time off-task, noncompliance, talking out, being out-of-seat, not completing work assignments, forgetting required materials, fidgeting or attending to non-instructional materials, and other behaviors that would disrupt learning or teaching. The final two categories were social skills (e.g., positive social interactions, prosocial behaviors) or academic skills (e.g., standardized tests, curriculum-based measures).

The first and third author coded each of the 11 studies independently. Interobserver agreement (i.e., agreements / agreements + disagreements) was 95.57%. Items with the most disagreements related to the reported fidelity for traditional and function-modified versions of CICO. All disagreements were discussed by the two reviewers, and a final code was agreed upon and used in the analysis.

Modifications to CICO. The first and second authors jointly reviewed the specific details about the modifications made to CICO. Table 1 includes information about the modifications and additions to the traditional CICO program that were included in the function-modified versions. We presented this information at the individual level whenever possible. Modifications were organized by the core components of traditional CICO. Additions to the

CICO procedures (i.e., modifications that added to the five core CICO components) were coded separately.

According to Crone et al. (2010), traditional CICO should include consideration of student preferences for reinforcement. Preference assessments do not necessarily capture functional data. Instead, preference assessments typically provide topographical information about potentially reinforcing stimuli that would not be used to hypothesize behavior function in isolation; however, student choice of reinforcement was considered a function-based modification if (a) the list of reinforcers was developed based on the results of an FBA and (b) the student had an opportunity to choose a reinforcer contingent upon desired behavior. Therefore, we collected information on the types of reinforcement provided in each study (Table 1).

Results

Descriptive Information

There were nine peer-reviewed studies and two unpublished dissertations included in the systematic review. As shown in Table 2, geocentric locale was unreported in five studies, three studies were conducted in urban settings, two in suburban settings, and one in a rural setting. More studies were conducted in elementary school (n = 6) than middle school (n = 3), high school (n = 1), or residential educational settings (n = 1).

Function-modified versions of CICO were studied with 41 total participants across the 11 studies (range = 2 to 9). Student level information is shown in Table 1. Student level data provided in all studies except Cheney et al. (2009). Of the 41 participants, 11 were receiving special education services while participating in function-modified CICO. Disability categories were not reported for four participants in two studies (March & Horner, 2002; Swain-Broadway,

2009). There were three participants identified as meeting criteria for specific learning disabilities, two participants identified as meeting criteria for emotional/behavioral disorders, and one participant identified as meeting criteria for Other Health Impairment or Developmental Delay respectively.

Design. Information regarding study design and rigor is shown in Table 2. Cheney et al. (2009) evaluated the Check, Connect, and Expect program using a clustered randomized controlled trial; however, schools were assigned to use the entire program rather than just the intensive level (i.e., function-modified) of supports. All other studies used a single-case design to evaluate the effectiveness of function-modified CICO. Multiple-baseline designs across participants (n = 5) and reversal designs (n = 4) were the most common, with one study using an alternating treatment design (Kilgus et al., 2016).

Most single-case design studies met What Works Clearinghouse Standards with (n = 5) or without reservations (n = 3). Swain-Broadway (2009) used a non-concurrent multiple-baseline design which does not meet standards. Moreover, Swoszowski et al. (2013) evaluated a function-modified version of CICO for one participant within a multiple-baseline design study of traditional CICO. Although the overall evaluation of CICO presented in Swoszowski et al. (2013) may have met What Works Clearinghouse standards, the criteria were not met when applied solely to their investigation of a function-modified CICO.

Dependent variables. All 11 studies investigated the effects of function-modified CICO on problem behavior. Researchers often aggregated multiple behaviors into one problem behavior category. Generally, definitions of the dependent variable included noncompliance, passive off-task behavior, out-of-seat behavior, or talking at inappropriate times. More severe behaviors were included in the definitions of problem behavior in three studies (Campbell &

Anderson, 2008, March & Horner, 2002; Swain-Broadway 2009). Thus, the modified versions of CICO were used to address problem behaviors consistent with the logic of traditional CICO (e.g., Crone, Hawken, & Horner, 2010).

Researchers investigated the impact of function-modified CICO on measures of academic engagement in six studies. As with disruptive behavior, researchers often defined academic engagement as an aggregate of several behaviors including: orientation to the teacher or instructional materials, compliance with teacher requests, task completion, or appropriate verbalizations (e.g., answering questions or requesting help). Whereas, Boyd and Anderson (2013) measured the frequency of requests for breaks and requests for teacher assistance. Turtura et al. (2014) compared the amount of classwork and homework completed between phases, but not in a manner that allowed for a demonstration of a functional relation. More distal measures of academic competence, social skills, or academic skills were only included in Cheney et al. (2009).

Methods of Determining Behavior Function

Data regarding whether traditional CICO was used prior to a modified version, the methods used to assess behavior function, and the core components of CICO that were maintained in the modified version are shown in Table 3. Some clear trends emerged in the methods researchers used to determine the hypothesized behavior function. Researchers included a teacher interview in their FBAs in all 11 studies. In fact, the Functional Assessment Checklist for Teachers (FACTS; March et al., 2000) was used all but one study (MacLeod et al., 2016). Student interview data were also collected, using semistructured interviews, in three studies (Cheney et al., 2009; March & Horner, 2002; Swain-Broadway, 2009). Only Swain-Broadway

(2009) used an indirect approach to hypothesize behavior function with the other ten studies incorporating direct observational data.

Researchers reported using direct observation data collected during traditional CICO in two studies (Fairbanks et al., 2007; March & Horner, 2002). Swoszowski et al. (2013) reported observations were conducted but did not indicate the number or duration. In the remaining seven studies, the number of direct observations ranged between 3 and 6 (M = 4.86) with each observation occurring for 15 to 20 minutes (M = 19.17). Therefore, approximately 90 minutes of systematic direct observations were conducted, on average, to assess participants' behavior function.

Behavior function. Information about participants behavior function is shown in Table 1. Hypothesized behavior functions were reported for 31 of 40 students (i.e., all studies but Cheney et al., 2009). Multiple behavior functions were hypothesized for 6 of the 31 students. Escape from tasks or demands was most frequent hypothesized behavior function (n = 21), followed by access to peer attention (n = 9) and access to adult attention (n = 7). Behavior functions such as escape from other stimuli (e.g., adult or peer attention), access to edibles or tangibles, sensory stimulation or automatic reinforcement were not hypothesized for any students.

Incorporation of Traditional CICO

Traditional CICO was delivered prior to a function-modified version in 8 of the 11 (72.7%) studies. In 3 of these 8 studies, researchers modified CICO for a subset of participants who did not respond to traditional CICO (Cheney et al., 2009, March & Horner, 2002; Swoszowski et al., 2013). Participants were not exposed to traditional CICO in three studies, all of which investigated modified versions of CICO designed to address behaviors maintained by

escape from tasks or demands (Boyd & Anderson, 2013; Swain-Broadway, 2009; Turtura et al., 2014).

Within the function-modified CICO protocols, the intervention procedures (excluding reinforcers) were standardized across participants in 8 of the 11 studies (Table 3). Researchers made individualized modifications to the procedures based on student FBA data in three studies (Fairbanks et al., 2007; MacLeod et al., 2016; March & Horner, 2002). Across all studies, however, the function-modified CICO interventions appeared to maintain the core components of traditional CICO. That is, participants continued to check-in and check-out, carry a daily progress report card, receive structured feedback throughout the day, and bring the daily report card home to be reviewed by a caregiver. Only Fairbanks et al. (2007) did not report any information about home-school communication procedures for the modified version of CICO. We discuss further modifications to the core CICO components and additions to the traditional CICO procedures further in the next sections.

Modifications to CICO Procedures

Researchers made several modifications to the CICO procedures. To organize the modifications, we coded changes as related to one of the five core components of traditional CICO. Changes to the check-in procedures included reviewing whether homework was completed (Harrison, 2013), teaching or reminding students about the routine to request a break (Boyd & Anderson, 2013), or incorporating check-in into a morning seminar (Swain-Broadway, 2009).

A variety of changes were made to the DPR forms in the function-modified CICO studies. Two studies (Fairbanks et al., 2007; Harrison, 2013) modified the goals on the DPR form to align with the expected replacement behaviors. Similarly, Boyd and Anderson (2013)

modified CICO to teach students to request breaks. Teachers rated if the student requested a break appropriately on the modified DPR form. Other changes included requiring students to track homework assignments on the DPR form (Harrison, 2013; Turtura et al., 2014), or providing visual or written cues on steps students had to complete (Boyd & Anderson, 2013).

Few modifications were made to how performance feedback was delivered throughout the day. However, researchers incorporated self-monitoring to provide more frequent performance feedback in two studies. MacLeod et al. (2016) required 3 of 4 participants to self-monitor their on-task behavior. March and Horner (2002) required a student who was motivated by escape from aversive tasks to monitor his own work completion throughout the day with additional reinforcement provided for work completion. In both studies this self-feedback was in addition to the structured feedback delivered by the teachers. Another modification of performance feedback included having teachers review whether the student recorded homework assignments correctly and providing praise or corrective feedback (Turtura et al., 2014).

The most frequent modifications to the traditional CICO program addressed some aspect of check-out. Changes to the daily check-out procedures included more frequent check-outs to increase access to contingent reinforcement (Campbell & Anderson, 2008; Swoszowski et al., 2013) or allowing students to check-out with a peer (Campbell & Anderson, 2008). In MacLeod et al. (2016) participants could earn reinforcers aligned with the hypothesized behavior function contingent upon appropriate behavior over a 20-min period. Although it was unclear whether participants still could earn additional reinforcers at the end of the day. Four studies made modifications to check-out procedures that related to homework completion. This included simple reminders about homework during check-out (Fairbanks et al., 2007) to more involved modifications such as reviewing students' homework trackers (Harrison, 2013) or allowing

students to earn DPR points for correctly tracking homework (Turtura et al., 2014). March and Horner (2002) allowed a student to ask the mentor for help with an assignment. Kilgus et al. (2016) used a unique modification that was linked to hypothesized escape-maintained behavior. The authors added a supplemental math assignment to the daily check-out, but the student was allowed to skip the assignment if the goal was met. This provided access to escape without reducing the amount of classwork or homework assignments. Harrison (2013) modified the home-school communication component. A parent was asked to indicate on the student's DPR form whether or not any assigned homework was completed.

Modifications to Reinforcers

We present information regarding reinforcers in Table 3. The provision of incentives based on appropriate behavior is an essential part of traditional CICO (Crone et al., 2010). Only Boyd and Anderson (2013) did not appear to modify the incentives from the traditional CICO program used in the school where the study took place. Notably, two studies reported surveying student preferences for incentives, but did not always provide information regarding whether the incentives addressed the hypothesized behavior function (March & Horner, 2002; Swain-Broadway, 2009). In the studies using modified incentives, reinforcers generally addressed adult attention, peer attention, or escape. This includes studies where researchers provided access to reinforcers that were linked to the behavior function along with reinforcers that were not linked to the behavior function.

Adult attention. In order to increase adult attention, some researchers increased the frequency of meeting with the mentor, thereby increasing the amount of adult attention received (Fairbanks et al., 2007; MacLeod et al., 2016; Swoszowski et al., 2013). Researchers also increased the frequency of verbal praise delivered contingent on appropriate behavior (Cheney et

al., 2009; Fairbanks et al., 2007; MacLeod et al., 2016, Turtura et al., 2014). Students were also allowed to earn extra time with adults (e.g., lunch, extended check-out) contingent upon appropriate behavior (Fairbanks et al., 2007; MacLeod et al., 2016; Swain-Broadway, 2009).

Peer attention. Researchers used a variety of reinforcers to provide access to peer attention. For example, researchers allowed students to sit with peers during instruction or complete academic work with a peer contingent upon appropriate behavior (Campbell & Anderson, 2008; Fairbanks et al., 2007; Swain-Broadway, 2009). In other studies, students were allowed to earn extra free time with peers engaging in a desired activity (Campbell & Anderson, 2008; Harrison, 2013; MacLeod et al., 2016; March & Horner, 2002). In Campbell and Anderson (2008), students could sit next to a preferred peer during lunch if their morning goal was met and check-out with a preferred peer if their afternoon goal was met. Finally, Cheney et al. (2009) reported modifying CICO to include the good behavior game when function was peer attention.

Escape. Multiple studies included reinforcers that addressed escape maintained behavior. Four studies allowed students to access a desired task contingent upon academic task completion (Cheney et al., 2009; Fairbanks et al., 2007; MacLeod et al., 2016; March & Horner, 2002). Other studies allowed students to request breaks, earn passes to take breaks, or finish assigned work at home (Fairbanks et al., 2007; Harrison, 2013; Turtura et al., 2014). Kilgus et al. (2016) allowed students to escape a supplemental math task that was scheduled to occur during check-out. In addition to escaping the task, students were allowed to spend that time engaging in a desired activity.

Additions to CICO Procedures

Along with the modifications to CICO procedures or incentives provided contingent upon appropriate behavior, several studies layered on additional supports. That is, researchers

combined modified CICO procedures with supports that may be more commonly provided within more intensive behavior support plans. For example, the modified CICO programs often included precorrection of inappropriate behaviors (Fairbanks et al., 2007; MacLeod et al., 2016; March & Horner, 2002). In studies targeting escape-maintained behaviors, some researchers modified or shortened assignments, modified task difficulty, or provided structured time to complete homework during the school day (Fairbanks et al., 2007; Harrison, 2013; MacLeod et al., 2016; March & Horner, 2002; Swain-Broadway, 2009; Turtura et al., 2014). Other studies also incorporated preferential seating near peers or adults, depending on the hypothesized behavior function (Fairbanks et al., 2007; March & Horner, 2002). Although less common, two studies incorporated supplemental academic instruction when the behavior function was escape (MacLeod et al., 2016; Swain-Broadway, 2009).

Treatment Fidelity

The last research question examined the extent to which the function-based CICO procedures were delivered with fidelity (Table 3). Eight studies reported fidelity data for the function-modified CICO procedures (four presented data at the individual student level). When using the study-level aggregate, the average treatment fidelity for function-based CICO was 86.16% (range = 59.92% to 100%). Fidelity data for traditional CICO was reported in six studies. The average treatment fidelity in those studies was 89.41% (range = 56% to 100%). Only four studies reported treatment fidelity for both traditional CICO and function-modified CICO. Fidelity was 100% in both conditions in Campbell & Anderson (2008). Fidelity was slightly higher in the traditional CICO condition compared to function-modified CICO in two studies (Fairbanks et al., 2007; Kilgus et al., 2016) and higher in the function-modified condition in a third study (Harrison, 2013).

Discussion

CICO is one of the most commonly used Tier II behavior interventions in schools. Given evidence that CICO is generally ineffective for reducing problem behavior maintained by escape (e.g., McIntosh et al., 2009), there have been an increasing number of studies on function-modified versions of CICO. The purpose of this study was to systematically review studies investigating modified versions of CICO in which the traditional intervention was modified based on the hypothesized function of a student's problem behavior. Researchers primarily evaluated function-modified CICO using single-case designs. The majority of studies in this review met What Works Clearinghouse single-case design standards.

Our first question related to the participant and setting characteristics within empirical evaluations of function-modified CICO. The majority of evidence supporting function-modified CICO came from studies conducted in elementary schools with students in general education. Both of these findings were consistent with program developers' guidance regarding the use of traditional CICO (Crone et al., 2010). There is more evidence that function-modified CICO can be used in middle school settings than high school settings, although more research is needed in both contexts. Results from this review provide initial evidence that function-modified CICO could be included as part of more comprehensive behavioral supports for students with disabilities. Still, more research is needed before function-modified CICO could be considered an evidence-based practice for students with disabilities.

Our second research question pertained to the methods used to identify the function of students' problem behavior and the types behavior functions identified. In 10 of the 11 studies (90.9%), a combination of direct (i.e., observations) and indirect (i.e., interviews or rating scales) methods were used to hypothesize a behavior function. Although some problem behavior

exhibited by participants was identified as being maintained by more than one function, function-modified versions of CICO were more commonly used with students who engaged in problem behavior to escape from academic task demands. Modified versions of CICO were also implemented for students reinforced by access to peer attention and access to adult attention. Given that the problem behavior exhibited by the participants in these studies was maintained by some combination of these three behavior functions, this review provides no evidence that function-modified CICO can address problem behavior maintained by other functions such as escape from adult attention or access to edibles or tangibles. If function-based CICO is going to be used as a standard Tier II intervention, researchers should endeavor to determine if CICO can be effective for other common functions of problem behavior exhibited by students.

The third question guiding this review asked whether functionally-relevant modifications were made to CICO prior to or following a trial of traditional CICO. In the majority of studies (i.e., 75%), students participated in traditional CICO before the modified versions were implemented. This pattern is consistent with recommendations made by Crone and colleagues (2010), who suggested that traditional CICO be implemented for two-to-three weeks before determining whether modifications are necessary. But, the use of traditional CICO and the amount of time dedicated to the FBA procedures warrants further discussion.

Effective Tier II interventions should be continuously available and relatively quick to implement (i.e., within three to five days; Crone et al., 2010; Mitchell et al., 2015). A reasonable estimate for the functional behavior assessments used in the majority of the reviewed studies may be approximately 2 hours (i.e., 30 minutes for a teacher interview and 90 minutes of direct observation). For schools to follow the guidance of McIntosh et al. (2009) and others, and differentiate tier 2 interventions based on behavior function, some important questions remain

unanswered. The results of this study do not provide evidence regarding the feasibility of conducting a direct, descriptive FBA for all students requiring Tier II level supports. Moreover, it is unclear whether an indirect FBA (as recommended by McIntosh et al., 2009) would be sufficient to allow educators to (a) determine appropriate modifications for traditional CICO or (b) select whether traditional CICO or a function-modified version (e.g., Breaks Are Better; Boyd & Anderson, 2013) is more appropriate for a student. On the other hand, implementing CICO for approximately three weeks for all students identified as appropriate candidates for Tier II behavioral support may not be much more efficient, given the evidence that traditional CICO will not be effective for all students. It may be less time consuming to conduct a brief FBA at the Tier II level of a PBIS framework to determine whether CICO is appropriate for a student than to implement traditional CICO for two-to-three weeks as a de facto FBA.

The fourth and fifth questions asked which components of traditional CICO had been added, removed, or modified to address the function of students' problem behavior. One promising finding is that researchers implemented modified versions of CICO that were standardized across participants in seven studies. This suggests that function-modified versions of CICO may allow for similar implementation across groups of students, which is a desirable feature of Tier II interventions (Mitchell et al., 2015).

Across all 11 studies, researchers included modifications of all five core CICO components in some fashion; however, these modifications did not always directly address the identified function of a student's problem behavior. For example, Campbell and Anderson (2008) doubled the number of times students could earn contingent rewards each day. Although this modification is likely to be responsible for improved behavior change it is not functionally relevant to the consequence of peer attention that was identified as maintaining the students'

problem behavior. Another modification allowed target students to check-out with a peer if they met their daily goal (Campbell & Anderson, 2008). This modification is functionally relevant to the identified consequence of peer attention and because it was delivered contingent on goal attainment, it was likely to drive improved response. Examples like these are seen throughout the other 11 studies identified in this review.

Modifications made to the reinforcement component of CICO also varied widely across studies. Once again, some of the modified reinforcement procedures were linked to an identified behavior function yet others were not. For example, Fairbanks and colleagues (2007) used verbal praise from an adult as reinforcement contingent upon the absence of problem behavior that was hypothesized to be maintained by adult attention. Thus, a functionally-equivalent replacement behavior (i.e., meeting CICO goal; Cook et al., 2007) allowed target students to continue to accessing a reinforcing consequence. Other reinforcement modifications were function adjacent, such as March and Horner's (2002) tangible reinforcer (i.e., baseball cards) that represented a shared interest between the target student, whose problem behavior was maintained by access to peer attention, and a peer. The tangible reinforce presumably increased the reinforcing value of the peer attention and facilitated appropriate social interaction. The last set of modifications to reinforcement were not at all related to behavior function. These modifications include studies that increased the frequency with which reinforcement was available (Fairbanks et al., 2007; MacLeod et al., 2016).

Our last question examined the reported treatment fidelity for function-modified CICO. Treatment fidelity was reported in eight studies and the overall average (86%) exceeded the generally used criterion of 80%. Swain-Broadway (2009) reported low overall treatment fidelity and even lower for the CICO component in particular. This is notable as it was the only

investigation of function-modified CICO in a high-school setting. There were only four studies that allowed for comparisons between the fidelity with which the traditional and function-modified CICO were delivered with somewhat divergent results. Taken together, evidence that suggests function-modified CICO can be implemented with fidelity. However, most of the studies had a high level of researcher involvement in the creation or implementation of the function-modified versions of CICO. Further evidence is needed to establish whether practitioners can effectively implement function-modified CICO (e.g., Kratochwill & Shernoff, 2004). Evidence comparing the feasibility of the approach in comparison to traditional CICO, particularly when implemented without the assistance of researchers, also seems warranted.

Implications

This review holds several potential implications for researchers and practitioners. First, the current results support the notion that empirically valid practices (e.g., differential reinforcement) can be layered onto traditional CICO to increase the program's effectiveness for more students. Still, there appears to be a great deal of work to be done in identifying which of the identified modifications made to CICO are necessary and sufficient for reducing problem behavior maintained by functions other than adult attention. Often, CICO was modified heavily to address behavior function (e.g., Cheney et al., 2009; Fairbanks et al., 2007; March & Horner, 2002) and it is impossible to determine which of the additional or modified components resulted in behavior change. Future researchers should attempt to identify the minimal necessary changes to CICO that enable it to drive behavior change for students whose problem behavior is maintained by escape from academic task demands or access to peer attention.

Second, research is needed to clearly distinguish modifications that capitalize on information gleaned from functional assessment data and those that are made irrespective of

function. Both types stand to improve the effectiveness of CICO; one by capitalizing on function (e.g., providing peer attention contingent on CICO goal attainment) and another by overpowering behavior function (e.g., drastically increasing the frequency of reinforcement). Often, the two types of modifications have been used in combination but only one (i.e., function irrelevant modifications) can be made without conducting an FBA.

Third, the FBA methods used were substantially more involved than conducting a brief screening of behavior function suggested by McIntosh et al. (2009). Thus, these results provide no support for the notion that CICO can be modified effectively based on a quick screening alone. Some versions of function-modified CICO such as Breaks are Better (Boyd & Anderson, 2013), Academic Behavioral CICO (Harrison, 2013; Tutura et al., 2014), or CICO Task Escape (Kilgus et al., 2016) are relatively packaged interventions that appear feasible for use alongside traditional CICO. But, more evidence is needed to evaluate whether schools can integrate function-modified versions of CICO into their MTSS. In the meantime, practitioners must entertain the idea that function-based CICO may not suitable for Tier II purposes if resources are unavailable to conduct FBAs or functional assessments.

Limitations

There are a number of limitations that must be considered in light of this study's findings. First, because the review did not involve a quantitative synthesis, results do not permit inferences regarding how effective these specific modifications were over traditional CICO. As mentioned previously, the diverse nature of modifications made across and within these studies did not make this body of literature amenable to quantitative synthesis; however, the effects for some of the included studies were quantified in other recent reviews (Maggin et al., 2015; Wolfe et al., 2016). Second, we included peer-reviewed articles and dissertations but other unpublished

studies of function-based CICO may exist. Given evidence that researchers may be less likely to submit single-case design studies with small visual effects (Shadish, Zelinsky, Vevea, & Kratochwill, 2016), these results may be positively biased.

Third, none of the studies incorporated functional analysis (FA; e.g., Iwata, Dorsey, Slifer, Bauman, & Richman, 1994), which is concerning given the less than robust agreement between FA and non-experimental methods of functional assessment (e.g., Stage et al., 2008). If researchers or educators are to identify necessary changes to make CICO effective for different functions of behavior it seems critical to ensure that problem behavior is in fact maintained by a specific function. Trial-based FAs have gained popularity within a classroom setting, can be successfully implemented by educators, and may offer a promising alternative to the indirect and direct FBA methods commonly used in schools (Bloom, Lambert, Dayton, & Samaha, 2013; Flynn & Lo, 2016; Hanley, 2012). Future research could consider validating the function of behavior using trial-based FAs before modifying CICO.

Conclusion

We reviewed 11 studies that evaluated modified versions of CICO that were based on the student's hypothesized behavior function. Evidence for these function-modified versions of CICO is certainly promising. Researchers were able to layer on well-established behavioral modification strategies to the core components of CICO to increase its effectiveness for students reinforced by escaping from academic tasks, peer attention, or adult attention. These promising findings require additional replication before function-modified versions of CICO can be considered evidence-based practice. Additional research regarding the feasibility of including such approaches within schools tiered intervention frameworks is needed.

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Table 1

Student demographic information, hypothesized behavior functions, and modifications to CICO

Authors (Year)	Student	Grade	SPED (Disability)	Behavior Function	Modifications/Additions Intervention Procedures	Modifications/Additions Reinforcer
Boyd & Anderson (2013)	Alex	3	No	Escape	1. During check-in, teacher taught routine for requesting break, what to do if request was denied, and prompted the participant to name a time they may request a break. 2. Teacher indicated whether a break was appropriate nonverbally (thumbs-up/thumbs-down) 3. When approved by teacher, student allowed to take 2 min break. After student could request another break or go back to the task. 4. Modified DPR - Teachers indicated whether the participant took breaks appropriately after each feed-back session 5. Visual and verbal prompts on how to request a break provided on the back of each DPR card	• None. The reinforcers were delivered consistent with the traditional CICO procedures being used in the school.
Boyd & Anderson (2013)	Diego	5	No	Escape	Same for all participants	Same for all participants
Boyd & Anderson (2013)	Gregg	5	No	Escape	Same for all participants	Same for all participants
Campbell & Anderson (2008)	Joe	5	No	PA	1. Student was allowed to attend Check-Out with peer if daily goal was met 2. Contingent reinforcement delivered more frequently (morning and afternoon)	• Student could sit next to preferred peer during lunch if he met his morning goal. Otherwise, student sat in assigned seat away from peers.

Authors (Year)	Student	Grade	SPED (Disability)	Behavior Function	Modifications/Additions Intervention Procedures	Modifications/Additions Reinforcer
						• Student could check-out with preferred peer if he met his afternoon goal • Student allowed to sit with preferred peer during Math the following day
Campbell & Anderson (2008)	Kyle	5	No	PA	Same for both participants	Same for both participants
Cheney et al. (2009)[a]	9 students	1-3	NR	NR	1. Incorporated the good behavior game if the function of appropriate behavior was peer attention. 2. If function was unclear, used a multicomponent intervention (no other detail provided).	• Differential reinforcement (when function was teacher attention) • Differential reinforcement: provided free time after completing work tasks (when function was escape)
Fairbanks et al. (2007)	Marcellus	2	No	PA, Escape	1. Preferential seating by desired peer during Math (removed if demonstrating problem behavior) 2. Modified amount and/or difficulty of work (i.e., could choose to do less work and finish remaining work at home) 3. Precorrection: Reminded him of requirements to sit near peer and take work home 4. Reminded student of remaining work during check-out	• Added end-of-period activity choice • Teacher praise (1 statement/10 min) • Continued to earn usual CICO reinforcer (group contingency)
Fairbanks et al. (2007)	Blair	2	No	PA, AA	1. Modified DPR to list three specific behaviors under second goal (i.e., stay in seat, talk when it is okay, follow directions first time) 2. Taught specific social skills 3. Asked to take 10 second break when non-compliant.	• Rewards delivered more frequently (based on morning or afternoon behavior) • Contingent verbal praise • Earned morning recess and reward time at end of day • Continued to earn usual CICO reinforcer (group contingency)

Authors (Year)	Student	Grade	SPED (Disability)	Behavior Function	Modifications/Additions Intervention Procedures	Modifications/Additions Reinforcer
Fairbanks et al. (2007)	Ben	2	No	PA, AA	Same as Blair	Same as Blair
Fairbanks et al. (2007)	Olivia	2	Yes (SLD)	AA	1. Preferential seating near adult 2. Modified DPR to list four specific behaviors under third goal (i.e., say nice things or no things, look at teacher during instruction, be a good listener, have empty hands) 3. Precorrection: Taught/reviewed expectations at beginning of small group intervention.	• Contingent verbal praise • Received tokens when respectful to teacher. Tokens could be turned in for: lunch with teacher, art activity with counselor, play a game with a peer in the counselor's office, receive treat from principal or counselor. • Continued to earn usual CICO reinforcer (group contingency)
Harrison (2013)	Donovan	7	No	Escape	1. Homework completion checked at check-in. 2. Provided time to complete homework if not finished. 3. Daily goals linked to academic behavior. • Student taught to track homework throughout the day. Earned additional daily points if homework tracked correctly. 4. Facilitator checked if homework was recorded. 5. Parent indicated if child completed homework on daily point card.	• Students could earn points that were used in the school's token economy. • Reinforcers included snacks, passes which could be turned in for breaks in class, tickets for reduction in work, or incentives for extra time with peers. • No information on which reinforcers were selected.
Harrison (2013)	Jessica	7	No	Escape	Same for all participants	Same for all participants
Harrison (2013)	Thomas	7	No	Escape	Same for all participants	Same for all participants
Kilgus et al. (2016)	Student 1	4	No	Escape	1. Negative reinforcement bonus exercise during check out. Student had to complete a supplemental math task during check-out. But, could skip the exercise contingent upon appropriate behavior.	• Able to earn escape from a supplemental task based on points earned during the day. • Student was given free time in the computer lab when there was no

Authors (Year)	Student	Grade	SPED (Disability)	Behavior Function	Modifications/Additions Intervention Procedures	Modifications/Additions Reinforcer
						supplemental math task to complete. • Student still could earn points toward rewards that were listed on a reward menu (present during CICO)
Kilgus et al. (2016)	Student 2	3	No	Escape	Same for both participants	Same for both participants
MacLeod et al. (2016)	James	3	Yes (LD)	Escape	1. Antecedent academic instruction in Spelling. 2. Self-monitored on-task behavior (prompts delivered by MotivAider every minute).	• More frequent contingent reinforcement (access to 5-minute preferred activity after Spelling class) based on self-monitoring data. • Access to larger reinforcer (new book) every 5 days he met goal.
MacLeod et al. (2016)	Seth	4	Yes (EBD)	AA	1. Access to preferred instructional material (Spiderman book). 2. Tracked words read during silent reading time. 3. Self-monitored on-task behavior	• Function-based reinforcement, contingent upon self-monitoring data. • Daily reinforcer earning adult attention from favorite teacher at the end of the day • Access to larger reinforcer (playing basketball with the teacher) at the end of the week.
MacLeod et al. (2016)	Carlos	8	Yes (EBD)	AA	1. Pre-correction: teacher offered to assist him with first math problem 2. Pre-correction: Carlos taught to raise hand when he needed help, teacher reminded him to raise his hand to gain her attention if he had a question. 3. Decreased difficulty of math problems. 4. Self-monitored on-task behavior	• Teacher provided more frequent attention, contingent on his on-task behavior, during math instruction. • Teacher provided more frequent feedback, including contingent praise, by reviewing self-monitoring data at the end of the math instruction.
MacLeod et al. (2016)	Eric	7	Yes (LD)	PA	1. Pre-correction: teacher reminded Eric to raise hand if he had a question, rather than talk to a peer.	• Contingent access to reinforcer based upon completion of the checklist.

Authors (Year)	Student	Grade	SPED (Disability)	Behavior Function	Modifications/Additions Intervention Procedures	Modifications/Additions Reinforcer
					2. Pre-correction: gave three step checklist reminding him of steps to complete work.	• Reinforcers included time to talk with, or play a computer game, with a peer.
March & Horner (2002)	Andy	7	Yes (NR)	PA	1. Changed seating to minimize contact with peers 2. Provided clear directions 3. Limit frequency of seatwork 4. Match task difficulty to student's skills 5. Teacher interrupted peer responses to student's problem behavior	• Student could use DPR points to earn basketball time with peers
March & Horner (2002)	Bill	7	No	Escape	1. Sat student near teacher 2. Match task difficulty to student's skills 3. Define smaller units of work during seatwork (i.e., shorten task length) 4. Institute self-monitoring system for work completion	• Earned option to select from menu of small rewards based on DPR points • Points could be applied to toward larger reinforcer • Earned coupons toward self-management program
March & Horner (2002)	Cathy	6	Yes (NR)	PA, Escape	1. Match task difficulty to student's skills 2. Decreased number of tasks required during seatwork 3. Access to peer-tutor 4. Could request mentor assistance with homework 5. Added social skills instruction 6. Moved seat away from certain peers	• Earned tangible reinforcer based on DPR points (i.e., baseball cards that were a shared interest between student and preferred peers). • Earned access to computer for work completion
Swain-Broadway (2009)	Donovan	10	No	Escape	1. Direct instruction in study and organizational skills via semi-scripted lessons 2. Added 45-min academic seminar which provided study skill instruction or time to complete homework each morning (Check-in was incorporated to this session)	• Reinforcers were based on a preference assessment. No data on which rewards were chosen or delivered. • Example reinforcer menu (p. 142) does not suggest that the rewards targeted escape. Majority of options provided access to tangibles; with fewer options providing adult attention (e.g., lunch with teacher),

Authors (Year)	Student	Grade	SPED (Disability)	Behavior Function	Modifications/Additions Intervention Procedures	Modifications/Additions Reinforcer
						or peer attention (e.g., work with peer on homework).
Swain-Broadway (2009)	Joy	11	Yes (NR)	Escape	Same for all participants	• Reinforcers were based on a preference assessment. No data on which rewards were chosen or delivered.
Swain-Broadway (2009)	Malcolm	9	No	Escape, PA	Same for all participants	• Reinforcers were based on a preference assessment. No data on which rewards were chosen or delivered. • Reinforcer menu did include options to increase peer attention.
Swain-Broadway (2009)	Lee	9	Yes (NR)	Escape	Same for all participants	• Reinforcers were based on a preference assessment. No data on which rewards were chosen or delivered.
Swain-Broadway (2009)	Travis	10	No	Escape	Same for all participants	• Reinforcers were based on a preference assessment. No data on which rewards were chosen or delivered.
Swain-Broadway (2009)	Ricky	9	No	Escape	Same for all participants	• Reinforcers were based on a preference assessment. No data on which rewards were chosen or delivered.
Swoszowski et al. (2013)	Lance	1	Yes (DD)	AA	1. Added a mid-day meeting with mentor (i.e., “check-up”) to increase access to adult attention.	• Increased frequency of reinforcer delivery. • Student was able to earn the reinforcer used during traditional CICO (i.e., token economy) based on morning performance and afternoon performance independently.
Swoszowski et al. (2013)	Marissa	1	Yes (OHI)	AA	Same for Both Participants [Marissa referred for other intervention before modified CICO began]	

Authors (Year)	Student	Grade	SPED (Disability)	Behavior Function	Modifications/Additions Intervention Procedures	Modifications/Additions Reinforcer
Turtura et al. (2014)	Toby	8	No	Escape	1. During check-in, student showed the coordinator whether they completed all homework that was due for the day. 2. If homework was not completed, the student was allowed to attend study hall to complete the assignment during a nonacademic period that day. 3. During check-in, student earned bonus points on DPR by having all necessary materials and completing all homework. 4. Homework tracker was attached to the DPR. Student recorded all assignments, due dates, and materials needed. 5. During each teacher feedback session, the teacher reviewed if assignment was recorded correctly each feedback session. Contingent verbal praise or corrective feedback was provided. 6. During check-out, student could earn bonus points during check-out for having all homework tracked correctly.	• Students could use points to purchase incentives such as homework passes, additional 2 min. "break cards", or passes to access to desired activities during breaks.
Turtura et al. (2014)	Katie	7	No	Escape	Same for all participants	Same for all participants
Turtura et al. (2014)	Nick	6	No	Escape	Same for all participants	Same for all participants

Note. a = modifications reported for CCE intensive level; PA = peer attention; AA = adult attention; all Escape functions represented escape from tasks or demands.

Table 2

Characteristics of Modified CICO studies

Authors (Year)	*n*	Locale	Setting	Design	What Works Clearinghouse Design Rating	Dependent Variables
Boyd & Anderson (2013)	3	Suburban	Elementary School	Reversal	Meets with Reservations	AE, PB
Campbell & Anderson (2008)	2	Rural	Elementary School	Reversal	Meets with Reservations	PB
Cheney et al. (2009)	9	NR	Elementary School	Group	Not Rated	AE, PB, SS, AS
Fairbanks et al. (2007)	4	Suburban	Elementary School	MBD	Meets with Reservations	AE[b], PB
Harrison (2013)	3	Urban	Middle School	Reversal	Meets with Reservations	AE, PB
Kilgus et al. (2016)	2	Suburban	Elementary School	ATD	Meets Standards	AE, PB
MacLeod et al. (2016)	4	Urban	Elementary School	MBD	Meets Standards	PB
March & Horner (2002)	3	NR	Middle School	MBD	Meets Standards	AE, PB
Swain-Broadway (2009)	6	NR	High School	Non-concurrent MBD	Does Not Meet	AE, PB
Swoszowski et al. (2013)	2	NR	Alternative, Residential School	MBD	Does Not Meet[a]	AE, PB
Turtura et al. (2014)	3	NR	Middle School	Reversal	Meets with Reservations	PB

Note. ATD = Alternating Treatment Design, MBD = multiple baseline design; NR = not reported; AE = academic engagement; PB = problem behavior, SS = Social Skills, AS = Academic skills; [a] = design for the study of a modified version of Check-in/Check-out; [b] = Fairbanks et al., (2007) reported assessing AE but did not provide any AE data.

Table 3

Methods of Determining Student Function, Use of Traditional CICO, Treatment Fidelity

Authors (Year)	Method of Determining Function		Traditional CICO Delivered First	Average Treatment Fidelity - Traditional CICO	Standardized/ Individualized Modifications	Core CICO components Included in the Modified Version	Average Treatment Fidelity - Modified CICO
	Interviews	Observations (Length)					
Boyd & Anderson (2013)	FACTS	Six (20 min)	No	N/A	Standardized	1, 2, 3, 4, 5	93.4%
Campbell & Anderson (2008)	FACTS	Five (NR)	Yes	100%	Standardized	1, 2, 3, 4, 5	100%
Cheney et al. (2009)	FACTS SGFAI	Five (NR)	Yes	92.0%	Standardized	1, 2, 3, 4, 5	NR
Fairbanks et al. (2007)	FACTS	Summarized Extant Observational Data (NR)	Yes	94.0%	Individualized	1, 2, 3, 4	80.8%
Harrison (2013)	FACTS	Three to Five (20 min)	Yes	56.0%	Standardized	1, 2, 3, 4, 5	89.5%
Kilgus et al. (2016)	FACTS	Three (20 min)	Yes	100%	Standardized	1, 2, 3, 4, 5	92.0%
MacLeod et al. (2016)	Semi-structured FBA Interview	Four to Six (20 min)	Yes	NR	Individualized	1, 2, 3, 4, 5	81.8%
March & Horner (2002)	FACTS SGFAI	Used Baseline Observations (15 min)	Yes	NR	Individualized	1, 2, 3, 4, 5	NR
Swain-Broadway (2009)	FACTS Student FACTS	Not Conducted	No	N/A	Standardized	1, 2, 3, 4, 5	59.9%
Swoszowski et al. (2013)	FACTS	Yes, Number Not Stated (NR)	Yes	94.4%	Standardized	1, 2, 3, 4, 5	NR
Turtura et al. (2014)	FACTS	Six (20 min)	No	N/A	Standardized	1, 2, 3, 4, 5	92.0%

Note. Core components: 1 = daily check-in; 2 = used DPR or behavior report card; 3 = teacher provided feedback at regular intervals; 4 = daily check-out; 5 = home-school communication component. FACTS = Functional Assessment Checklist for Teachers; FBA = functional behavioral assessment, SGFAI = student guided functional assessment interview