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It is entitled:
Examining the Effects of Combining Interdependent Group Contingency and Self-Monitoring Procedures on the Classroom Behavior of Students with Emotional and Behavioral Disorders

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Examining the Effects of Combining Interdependent Group Contingency and Self-Monitoring Procedures on the Classroom Behavior of Students with Emotional and Behavioral Disorders

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Abstract
Evidence-based classroom management procedures that effectively promote student engagement and decrease disruptive behavior are essential in classrooms serving students with emotional and behavioral disorders (EBD). A withdrawal design replicated across two classrooms was used to analyze the influence of a self-monitoring intervention component on the overall effectiveness of a randomized interdependent group contingency on the classroom behavior of students with EBD. Target behaviors included student engagement and disruptive behavior and teacher positive and negative statements. This study was implemented in an alternative school setting and 11 students participated. Visual analysis of data indicated an increase in student engagement and a decrease in disruptive behaviors upon introduction of interdependent group contingency procedures, though there was no observable impact on student behavior following the addition of self-monitoring procedures. No functional relationship was demonstrated between intervention procedures and teacher positive and negative statements. Discussion focuses on the contributions of this study to the current literature, limitations, the implications for school psychology practice, and recommendations for future research.
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Introduction

In order for students to reach their academic potential, it is crucial that they remain engaged during academic tasks in the classroom (Christensen et al., 2008; Greenwood, 1991; Higgins, Williams, & McLaughlin, 2004). It is well documented that disruptive behaviors negatively impact student academic success, as they impede students from engaging in academic assignments and activities (Canter, Paige, Roth, Romero, & Carroll, 2004; Ling, Hawkins, & Weber, 2011; McKissick, Hawkins, Lentz, Hailley, & McGuire, 2010; Otten, 2004). It is frequently more difficult for students with emotional and behavioral disorders (EBD) to engage in academic tasks than it is for their typical peers. In addition, students with EBD are more likely to exhibit disruptive behaviors than their peers, as they often have not yet developed critical academic skills central to the task and/or behavioral skills, such as emotional regulation and self-control (Haydon et al., 2012; Rock & Thead, 2009). Therefore, effective and efficient procedures for increasing academic engagement and decreasing disruptive behaviors in students with EBD must be identified in order to aid this group of students in the development and maintenance of behaviors that enable them to be successful in the classroom.

Strategies that have been successful in increasing positive student behaviors and decreasing disruptive behaviors in students with EBD include statements of praise, positive reinforcement, and acknowledgement of rule following behavior (Moore-Partin, Robertson, Maggin, Oliver, & Wehbly, 2010; Sugai & Horner, 2002). Such support provided by teachers is critical in classrooms serving students with EBD (Haydon et al., 2010). One category of effective interventions that addresses low academic engagement and high levels of disruptive behavior by incorporating statements of praise, positive reinforcement and acknowledgement of rule following behavior is the group contingency (Jones, Boon, Fore, & Bender, 2008; Litow &
Pumroy, 1975; McKissick et al., 2010). In order to investigate ways to increase the impact of group contingencies on behavior, researchers have examined the combined effect of self-monitoring procedures and group contingency interventions (Coogan, Kehle, Bray, & Chafouleas, 2007; Davies & Witte, 2000; Trevino-Maack, 2011).

While research has demonstrated the effectiveness of group contingencies, these types of interventions primarily rely on teachers and other school personnel monitoring student behavior, which may not promote students’ self-regulation of their own behavior. By adding a self-monitoring component to group contingency interventions, educators can provide students with supports targeting the development of self-regulatory skills, which are especially critical for high school students with EBD. Furthermore, the addition of self-monitoring procedures may positively influence the maintenance and generalization of skills targeted by the group contingency intervention. To date, three studies have analyzed the combined effects of group contingencies and self-monitoring procedures on student behavior (Coogan et al., 2007; Davies & Witte, 2000; Trevino-Maack, 2011). The present study is among the first to examine the additive influence of a classwide self-monitoring procedure on the effectiveness of an existing interdependent group contingency intervention with randomized components.

**Group Contingencies**

Group contingency intervention procedures have demonstrated positive effects on student behavior (Barrish, Saunders, & Wolf, 1969; Darveaux, 1984; Davies & Witte, 2000; Gresham & Gresham, 1982; Ling et al., 2011; Maggin, Johnson, Chafouleas, Ruberto, & Berggren, 2012; Stage & Quiroz, 1997). Furthermore, they have been found successful for use with students with EBD (Coogan et al., 2007; Davies & Witte, 2000; Maggin et al., 2012; Popkin & Skinner, 2003; Theodore, Bray, Kehle, & Jenson, 2001; Trevino-Maack, 2011). Researchers have described
three group contingency types – independent, dependent, and interdependent (Coogan et al., 2007; Cooper, Heron, & Heward, 2007; Gresham & Gresham, 1982; Litow & Pumroy, 1975; Stage & Quiroz, 1997). At the core, each group contingency type involves providing students within a group reinforcement contingently upon their having met predetermined criteria that is the same for each member of the group. In an independent group contingency, reinforcement is delivered to individual students contingent upon their meeting predetermined criteria. While the opportunity to receive the reinforcer is available to each student in the group, it is only delivered to those who meet the predetermined criteria. Dependent group contingencies involve delivering a reinforcer to an entire group of students contingent upon one student in the group (or a small subset of the group) having met the predetermined criteria. Interdependent group contingencies involve allowing an entire group of students access to a reinforcer contingent upon certain criteria having been met by the group as a whole (Cooper at al., 2007). Due to the fact that they reinforce students for engaging in desired behaviors, group contingency interventions increase the likelihood that students engage in such behaviors in the future (Cooper et al., 2007; Ling et al., 2011; Litow & Pumroy, 1975; Stage & Quiroz, 1997).

**Interdependent Group Contingencies**

Interdependent group contingencies allow educators to reinforce an entire classroom of students at one time, rather than individually reinforcing specific students at multiple times. For this reason, they are especially appropriate in classroom environments when more than one student is exhibiting unwanted behaviors (Davies & Witte, 2000). Furthermore, by implementing an interdependent group contingency intervention, educators are encouraging students to work toward a common goal as a group and to hold one another accountable for exhibiting positive behaviors (Theodore et al., 2001). Interdependent group contingency
interventions have successfully addressed the unwanted behaviors of a variety of populations, including high school students (Christ & Christ, 2006; Jenson, 1978; Kelshaw-Levering, Sterling-Turner, Henry, & Skinner, 2000; Murphy, Theodore, Aloiso, Alric-Edwards, & Hughes, 2007).

The Good Behavior Game (Barrish et al., 1969) is a classic example of an interdependent group contingency intervention. When implementing The Good Behavior Game, teachers separate their students into groups and publically tally the number of unwanted behaviors exhibited by students in each group. Each group of students that demonstrates the unwanted behavior below a predetermined level is provided with reinforcement at the end of the class period (Barrish et al., 1969). The Good Behavior Game has been shown to effectively decrease out of seat and talking out behaviors (Barrish et al., 1969).

There are some potential drawbacks to the use of interdependent group contingencies, such as the potential for one student to sabotage the group’s chance to access a reward (Skinner, Cashwell, & Dunn, 1996). Furthermore, when the criteria for reinforcement is made public, it is possible that students will “give up” by displaying undesired behaviors if they are aware that they are no longer eligible to earn the reward (Popkin & Skinner, 2003; Skinner et al., 1996). In addition, it is possible that students who are meeting the criteria necessary to access the reward do not receive it as a result of the groups’ overall behavior. The converse to this scenario, in which students who are not meeting the necessary criteria access the reward as a result of the groups’ behavior, is also a negative side effect that could occur (Skinner et al., 1996). When the group perceives that the reward is not being accessed as a result of the behavior of certain students, it is possible that the group will react negatively toward these students (Skinner et al., 1996). Finally, it is possible that the reward that the group accesses is not reinforcing to all
students in the class (Skinner et al., 1996). Despite these potential drawbacks, interdependent group contingencies are a strong option for use in classrooms serving students with EBD, as they promote prosocial behaviors and can save teachers time by allowing them to address the behavior of the entire group at once (Popkin & Skinner, 2003).

There are few studies to date that have examined the influence of classic interdependent group contingency interventions on the behavior of students with EBD. Studies utilizing methods based on interdependent group contingency interventions, such as interdependent group contingencies with randomized components and interdependent group contingency and self-monitoring intervention packages, have been conducted with this population.

Randomizing Contingency Criteria

By randomizing contingency components, researchers can help to ameliorate some of the previously described potential negative side effects common to interdependent group contingencies and increase overall intervention effectiveness. Components within an interdependent group contingency that are often randomized include types of reinforcers, reinforcement criteria, and target behaviors (Coogan et al., 2007; Kelshaw-Levering et al., 2000; Popkin & Skinner, 2003; Skinner et al., 1996; Theodore et al., 2001). Theoretically, randomization of contingency components increases overall intervention effectiveness because it encourages students within the group to exhibit target behaviors throughout intervention implementation by keeping students unaware of the critical contingency elements (Coogan et al., 2007).

Randomizing reinforcers increases the likelihood that at some point the group will have access to a reward that is highly reinforcing for each student, thereby increasing student motivation to display appropriate behavior (Popkin & Skinner, 2003). When contingency
criteria are randomized and not made public, students are unable to determine when and if they reach a point where it is no longer possible for the group to earn the reward. Therefore, it is less likely that students will give up on the possibility of earning a reward and begin to display higher rates of unwanted behavior (Popkin & Skinner, 2003). Finally, when target behaviors are randomized, it is less likely that the group will be able to detect which students are responsible if the group does not earn access to the reward (Popkin & Skinner, 2003). This form of randomization also encourages students to display all behaviors appropriately, as they do not know for which behavior they may be rewarded.

To date, three studies have examined the influence of an interdependent group contingency intervention with randomized components on the behavior of students with EBD in a classroom setting. Firstly, the effects of an interdependent/dependent group contingency intervention with randomized reinforcement criteria and rewards on the disruptive behavior of high school students with EBD were analyzed by Theodore et al. (2001). Before intervention implementation, classroom rules were established. At the beginning of the class period, the teacher informed the students that the intervention would be implemented. The teacher was provided with a list of student names and during the class period he placed a check by a student’s name if they were observed breaking a class rule. Students were informed that in order to receive a reward, they must have five or fewer checks by their name at the end of the class period. At the end of the class period, the teacher selected a slip of paper from a “criteria” jar. Possible criterion levels that were used to determine whether or not the class earned the reinforcer included the performance of the whole group, the average of all performances, a single randomly selected student, the student with the highest performance, and the student with the lowest
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performance. If the selected criterion was met, then the teacher selected a reinforcer from a “reinforcer” jar.

Disruptive behaviors were measured using a 15-s partial interval recording method. Results indicated that the level of disruptive behaviors observed decreased immediately upon introduction of the intervention and continued to remain at low levels throughout intervention implementation (Theodore et al., 2001). While this study demonstrates the effectiveness of an interdependent group contingency intervention with randomized components in decreasing the disruptive behavior of high school students with EBD, it did not combine interdependent group contingency procedures with a self-monitoring component. Therefore, conclusions regarding whether or not intervention effects could have been strengthened through the addition of self-monitoring procedures cannot be made.

Popkin and Skinner (2003) investigated the influence of an interdependent group contingency intervention with randomly selected target behaviors, criteria, and reinforcers on the spelling, math, and English performance of middle school students with EBD. Prior to intervention implementation, the teacher, teaching assistant, and experimenter reviewed baseline spelling, math, and English independent seatwork assignment scores and spelling was selected as the first target assignment. Next, possible criteria levels of percent of items correct were selected and included scores of 25%, 50%, 70%, 80%, 85%, 90%, 95%, and 100%. At the end of each school day, the teacher selected a target goal from a “goals” box. If the class average on that day’s spelling assignment was above the selected percentage, a reinforcer was randomly selected and announced (Popkin & Skinner, 2003). After nine school days, researchers added math as a possible target assignment. At the end of the day, the teacher selected which type of assignment would be used to determine whether or not the class would be receiving a reinforcer along with
the required criterion level. After nine school days of spelling and math as possible target assignments, English assignments were added. Intervention effects were measured using the class’ average percent of items answered correctly on spelling, math, and English assignments.

Results demonstrated increases in spelling and math performance after the introduction of the intervention. English performance remained variable throughout baseline and intervention phases (Popkin & Skinner, 2003). Although intervention procedures demonstrated a positive effect on the percent of items correct on independent seatwork assignments completed by middle school students, conclusions regarding the influence of interdependent group contingency procedures with randomized components cannot be generalized to other target variables, such as disruptive behavior or engagement, or other age groups.

Finally, using an alternating treatments design, Theodore, Bray, and Kehle (2004) compared the effects of independent, dependent, and interdependent group contingency procedures, each with randomized reinforcers, on the disruptive behavior of high school students with ED. Participants included three 17-year-old high school students identified as having EBD. Throughout each type of group contingency condition, classroom rules were posted on the chalkboard and a “reinforcers” jar containing five pieces of paper stating possible rewards sat on the teacher’s desk. The teacher had a list of the names of each student, and during each intervention condition he was instructed to place a check mark by the name of each student who broke a classroom rule. If the criteria for receiving reinforcement were met during the class period, then the teacher drew a piece of paper from the jar and delivered the selected reinforcer to those who had met contingency criteria. During the independent group contingency conditions, reinforcement was delivered to each student who had five or less check marks next to their name at the end of the class period. During the interdependent group contingency
conditions, reinforcement was delivered to the group if all students met the criteria. Finally, during the dependent group contingency conditions, reinforcement was delivered to the group if a selected student met the criteria. This student was selected from a “names” jar that contained the name of each student listed on pieces of paper (Theodore et al., 2004).

Disruptive behavior was measured using 15-s partial interval recording. Results indicated that all three types of group contingency procedures effectively decreased disruptive behavior data for all three students, with dependent group contingency procedures being very slightly more effective than independent or interdependent procedures (Theodore et al., 2004). However, as a self-monitoring component was not included in intervention procedures, it is unknown how the combined influence of group contingency and self-monitoring procedures may have influenced the disruptive behavior of the high school students with EBD.

**Self-Monitoring**

Along with group contingencies, self-monitoring is a positive behavior intervention that has been proven to positively affect student behavior (Hughes et al., 2002; McCurdy & Shapiro, 1988; Sheffield & Waller, 2010; Smith, Nelson, Young, & West, 1992), including those identified as EBD (Kern & Dunlap, 1994; Mooney, Ryan, Uhing, Reid, & Epstein, 2005; Otten, 2004; Sheffield & Waller, 2010). By definition, self-monitoring involves an individual observing their own behavior and systematically recording whether or not they have demonstrated a specific target behavior. Though it was first used simply as a method of data-collection, self-monitoring came to be considered an effective intervention procedure, as reactive effects (i.e., effects observed in an individual’s behavior as a result of assessment or measurement) in client behavior as a result of self-monitoring were observed by clinicians (Cooper et al., 2007). According to Cooper et al. (2007), the more obtrusive data collection
procedures are in an individual’s environment, the more likely reactive effects in the individual’s behavior are to occur. Although reactive effects are also observed in an individual’s behavior as a result of measurement procedures conducted by an obtrusive observer, effects are often greater when the individual is the one measuring their own behavior, as this method of data collection is the most obtrusive for the individual (Cooper et al., 2007).

Self-monitoring procedures have been implemented to address a variety of target variables, including off-task behaviors, engagement, and disruptive behaviors (Mooney et al., 2005; Rock & Thead, 2007; Shapiro & Cole, 1999; Sheffield & Waller, 2010). By teaching self-monitoring procedures, educators are promoting students taking responsibility over their own behavior. This is a critical skill, as it can generalize across settings, thus increasing the likelihood that students engage in appropriate behavior in other locations (Davies & Witte, 2000). Students with EBD frequently struggle with managing their own conduct in the classroom. If able to self-manage their own behavior while at school, students are more likely to be engaged in academic tasks, and thus are more likely to succeed academically (Levendoski & Cartledge, 2000). Therefore, skills relating to self-management must be taught explicitly to this group of students (Mooney et al., 2005).

Self-monitoring interventions can be used to increase desired behavior in students with EBD because they are designed to support students in correcting undesired behaviors and maintaining positive alternative behaviors (Kern & Dunlap, 1994; Martella, Nelson, & Marchand-Martella, 2003). It is important to remember that in order for a student to monitor whether or not they are engaging in target skills, they must first be able to identify and demonstrate the target skills. Therefore, in order for self-monitoring interventions to be effective,
it must first be demonstrated that students have the target skill in their repertoire (Martella et al., 2003).

**Classwide self-monitoring procedures in classrooms serving students with EBD.**

Self-monitoring procedures are often implemented as a classwide intervention to address the behavior of a group of students (Kern & Dunlap, 1994; Mitchem & Young, 2001; Otten, 2004). To date, two studies have analyzed the influence of classwide self-monitoring procedures on the behavior of students with EBD (Kern & Dunlap, 1994; Otten, 2004). Firstly, Kern and Dunlap (1994) examined the effects of a classwide self-monitoring program on disruptive behavior exhibited by middle school students with EBD. For each student, the intervention targeted on-task behavior as well as an individual target disruptive behavior selected by the teacher. During intervention implementation, a bell was set to ring on a 5-min variable interval time schedule and students were given a sheet on which they responded to questions regarding whether or not they were on-task and had engaged in the appropriate alternate behavior each time the bell rang. Data collectors utilized a partial interval recording system to measure the effects of the intervention on on-task and disruptive student behaviors. Intervention data demonstrated an increase in the percent of intervals in which students were on-task from baseline levels and a decrease in target disruptive behaviors to near-zero levels (Kern & Dunlap, 1994).

The influence of a classwide self-monitoring intervention on student disruptive behaviors was also analyzed by Otten (2004). Target students included three Kindergarten through third grade students with EBD. Each student was required to exhibit universal target behaviors and one individual target behavior. Universal target behaviors were defined as being on-task and following directions and individual target behaviors included being respectful, having a positive attitude, and responding appropriately to anger. The intervention included three phases and was
implemented during a 90-min morning instructional period. During phase one, the researcher guided the students in self-monitoring procedures. In this phase, a timer was set to a fixed 15-min time schedule and students were asked to indicate on a self-monitoring pointcard whether or not they had demonstrated their target behaviors each time the timer went off. After the students self-monitored, the researcher discussed the self-recordings with each student. If the students’ self-assessments agreed with the researcher’s, the student received a point. If the assessments disagreed, then the researcher led students through a problem-solving process. If students did not indicate that they had demonstrated a target behavior during a 15-min period, but did demonstrate it during the subsequent 15-min period, then they were awarded a point. In addition, during this phase the researcher provided intermittent verbal encouragement and reminders to students regarding their target behaviors (Otten, 2004).

During phase two, self-monitoring procedures were semi-guided by the researcher. This phase was identical to phase one, with the exception that after they discussed their self-recordings with the researcher, the students decided when and if they earned points. Finally, during phase three, the classroom teacher semi-guided the students in self-monitoring procedures. During this phase, the students discussed their self-recordings with the teacher rather than the researcher. Target behaviors were measured using a 15-s interval recording method. Results were mixed, indicating that the intervention procedures had a positive effect on target behaviors for some students, and variable effects on target behaviors for others (Otten, 2004). Although results of both the studies examining the influence of classwide self-monitoring procedures on the behavior of students with EBD (Kern & Dunlap, 1994; Otten, 2004) found that intervention procedures had positive effects on student behavior. Conclusions regarding the effects of such procedures on the behavior of students with EBD from other age groups cannot be made.
Combining Group Contingency and Self-Monitoring Procedures

Self-monitoring procedures have been added to group contingency interventions in order to increase the likelihood that intervention effects maintain after the intervention has been withdrawn and generalize across settings (Coogan et al., 2007; Davies & Witte, 2000; Trevino-Maack, 2011). In addition, adding self-monitoring procedures to group contingency intervention packages increases the obtrusiveness of intervention procedures in the student’s environment, thus increasing the likelihood that reactivity is observed in student behavior. Therefore, adding self-monitoring procedures to group contingency interventions should, theoretically, increase the likelihood of strong intervention effects being demonstrated (Cooper et al., 2007). Three research teams have examined the combined influence of group contingency and self-monitoring intervention procedures on unwanted student behavior.

Davies and Witte (2000) investigated the influence of an intervention package including an interdependent group contingency and a self-monitoring procedure on the frequency of inappropriate verbalizations demonstrated by third graders with ADHD. Students were divided into groups and each group was given a chart made of laminated construction paper that was one-half green, one-fourth red, and one-fourth blue. Groups were also given five laminated Velcro dots that were placed on the green side of the chart at beginning of each session. If a student exhibited a disruptive behavior, they were required to move one of the group’s dots to the red side of the chart. If they did not move the dot themselves, then the classroom teacher moved a dot to the blue side of the chart. In addition, the students were given a self-monitoring sheet that required them to (a) place a check mark in one column if they caught themselves exhibiting a disruptive behavior and moved a dot themselves or (b) place a check mark in a separate column if the teacher had to move the dot for them. If there was still one dot left on the
green side of the chart at the end of the session, the entire group was rewarded. Rewards were chosen based on a rotating schedule of reinforcers that the students identified as being desirable (Davies & Witte, 2000). Inappropriate verbalizations were measured through event recording. Results demonstrated that intervention procedures resulted in a decreased amount of inappropriate verbalizations emitted not only by targeted students, but by their peers, as well (Davies & Witte, 2000).

Coogan et al. (2007) examined the effects of interdependent and dependent group contingency intervention procedures with randomized reinforcers paired with self-monitoring procedures on the inappropriate behavior demonstrated by five sixth-grade students. Similar to the study conducted by Davies and Witte (2000), students were divided into groups and each group was provided with a monitoring board that was half green and half blue, along with five pushpins. Students were directed to move one of the groups’ pushpins when they engaged in an inappropriate behavior that the teacher corrected. If a student did not move the pin on their own, then the teacher moved it for them. In addition, students were provided with their own self-monitoring sheet and were instructed to place a checkmark on their sheet when they exhibited a behavior that resulted in moving one of the groups’ pins. At the end of each session, the teacher randomly selected from three jars to determine the criteria for reinforcement and the reinforcer. Jar one contained tokens that indicating either performance of all groups or performance of one student. Jar two contained tokens with the names of each student in the class and jar three contained tokens for possible reinforcers. If an individual student’s name was drawn, the class earned the reward if the selected student had less than two checks on their self-monitoring sheet. If the entire group was drawn, then the class earned the reward if each group still had one pin remaining on the green side of their monitoring boards (Coogan et al., 2007). Inappropriate
behavior was measured using a 15-s partial interval recording method. Similar to the outcome of the study by Davies and Witte (2000), results indicated that the intervention procedures effectively decreased the inappropriate behaviors exhibited by all five students (Coogan et al., 2007).

The influence of an interdependent group contingency and self-monitoring intervention package on secondary students’ class-work and active responding was examined by Trevino-Maack (2011). Intervention procedures involved awarding students points for carrying out specific tasks required in order to complete writing assignments. Students were provided with a self-recording data sheet on which they could tally the points that they earned in a separate column for each day of the week. Rewards were given in exchange for 5 tickets (small reward), 10 tickets (medium reward), and 12 tickets (large reward). In addition, the teacher randomly raffled additional rewards to students earning tickets each day. Each student was given a timer set to vibrate every six minutes. When their timers went off, the students were required to write notes on designated sections of reading assignments (Trevino-Maack, 2011). Results indicated that the total amount of words written in student journals increased from baseline, as did academic responding, which was measured using a 30-s momentary time sampling procedure (Trevino-Maack, 2011).

Despite the fact that the three previously described studies (Davies & Witte, 2000; Coogan et al., 2007; Trevino-Maack, 2011) all examined the combined effects of these two types of intervention procedures, there have been no studies conducted with the goal of analyzing the actual additive effect of self-monitoring procedures on group contingency interventions. The results of a component analysis examining the effects of self-monitoring procedures on a group contingency intervention would provide valuable information to practitioners considering the
most efficient intervention procedures that produce maximum positive benefits to students with minimal teacher drain (Trevino-Maack, 2011). Furthermore, of the studies that have examined the combined influence of self-monitoring and intervention procedures on student behavior, none have examined this influence on the behavior of high school students with EBD. Finally, none of the studies that have analyzed the combined influence of these intervention procedures have examined their effects on teacher behaviors such as positive and negative statements, which can be critical to positive student outcomes.

**Current Study**

Research examining the combined influence of interdependent group contingency and self-monitoring intervention procedures on student behavior is expanding. However, a gap in the current literature is present when it comes to analyzing the extent to which self-monitoring components influence the overall effects of interdependent group contingency interventions (Trevino-Maack, 2011). The purpose of the current study is to examine the degree to which the addition of a self-monitoring intervention component influences the effects of an interdependent group contingency intervention. The current study expands the few existing studies that exist combining self-monitoring on interdependent group contingency intervention procedures. In addition, the study expands upon the existing literature examining the effects of interdependent group contingency and self-monitoring intervention procedures on the behavior of high schoolers with EBD. Finally, the current study adds to the current literature by examining the influence of interdependent group contingency and self-monitoring interventions on positive and negative teacher statements. Specifically, the current study addressed the following research questions:

1. What are the effects of adding a self-monitoring intervention component to an interdependent group contingency intervention with randomized components
designed to increase on-task behaviors and decrease off-task and disruptive behaviors for high school students with EBD?

2. Does an interdependent group contingency intervention with randomized components or an interdependent group contingency with randomized components and self-monitoring intervention package influence the amount of positive teacher statements and/or negative teacher statements observed in a high school classroom for students with EBD?

3. Do students and teachers prefer an interdependent group contingency intervention with randomized components or an interdependent group contingency with randomized components and self-monitoring intervention package?

Method

Participants and Setting

The participants in this study included 11 students from two 9th grade high school classrooms in an urban alternative school serving students with EBD. Students ranged in age from 13-17, and had clinical diagnoses including bi-polar disorder, oppositional defiant disorder, disruptive behavior disorder, and post-traumatic stress disorder. In addition, all students had met the criteria necessary to receive special education services under the educational category of emotional disturbance (ED). One student switched placement over the course of the study, thus withdrawing from the study.

Some students had been placed in this alternative setting by their general education service providers as a result of their extremely challenging behavior. Other students were placed in this setting from more restrictive, residential educational facilities in order that they may continue to develop and maintain appropriate skills in a smaller, highly structured environment.
before transitioning back to the general education setting. In this placement, students received supports such as School-Wide Positive Behavioral Interventions and Supports (SWPBIS); daily instruction in social skills, affective education, and communication skills; targeted behavioral interventions; and intensive behavioral interventions through a functional behavior assessment process.

In order to learn material presented in the classroom, research has shown that students must be academically engaged at least 80% of the time (Gettinger & Seibert, 2002). Therefore, the original selection criteria for classrooms to be included in this study were referrals from the school psychologist and teachers and the demonstration of low levels of on-task behaviors, defined as below 70% of observed intervals, and/or high levels of off-task and disruptive behaviors, defined as at least 35% of observed intervals through baseline data collection. The school psychologist and teachers referred both classrooms included in this study. However, neither classroom met the original selection criteria of on-task behavior below 70% and/or disruptive behavior above 35%. It was decided that both classrooms would still be included in the study due to the fact that they were referred by the school psychologist and teachers as having a need for classwide services. Information sheets describing the purpose of the study were sent home with all students in the class and parents or legal guardians were given the option to sign the sheet and return it if they did not want data to be collected on their child. In addition, all participating students gave assent for data to be collected on their behavior by signing a student assent form that described the purpose of the study.

The lead classroom teachers, both males, implemented intervention and measurement procedures. The lead teacher in Classroom A was 49 years old and had been teaching for 25 years, though this was his first year teaching in this setting. He held a bachelor’s degree in
secondary English education, a master’s degree in literacy, and was a licensed intervention specialist. The lead teacher in Classroom B was 32 years old, had been teaching for two years, and this was his second year working in this setting. He held a bachelor’s degree in special education, and was also a licensed intervention specialist. A female educational assistant was also present in each classroom throughout the study, and implemented intervention procedures when the lead classroom teachers were absent.

The principal investigator, a fourth-year doctoral student in school psychology, and first- and second- year school psychology graduate students directly observed and recorded student behavior. The principal investigator trained graduate students in direct observation and adherence data recording methods. During training sessions, the principal investigator modeled the behavior observation code and answered questions from data collectors regarding the code. In addition, the principal investigator co-observed with each data collector on their first scheduled observation session in order to ensure that inter-observer agreement (IOA) was at or above 90%. If IOA fell below 90%, then additional training would be provided. However, this was not required, as IOA was at or above 90% for each data collector.

**Materials**

Materials included time sampling devices used by data collectors when recording student behavior, frequency counters (i.e., pitch counters) used by lead classroom teachers to record student disruptive behaviors, brown paper bags for reinforcer criteria and reinforcers, and data collection sheets for lead teachers, students, and data collectors. In addition, rewards used during the intervention phases included pencils, pens, candy bars, $5 gift cards, homework passes, and points for the school store.
Research Design

An ABCABC withdrawal design (Kennedy, 2005) replicated across two classrooms was used to evaluate the effects the interdependent group contingency and self-monitoring intervention components had on disruptive behaviors. The first baseline phase (BL1) was comprised of data representing the initial engagement (i.e., on-task and off-task behavior) and disruptive behavior rates of students and positive and negative teacher statements. During the first intervention phase (IGC I), the interdependent group contingency was implemented. During the second intervention phase (IGC + SM I), the self-monitoring procedure was added to the interdependent group contingency. During the second baseline phase (BL II), all intervention procedures were withdrawn. During the following intervention phase (IGC II), the interdependent group contingency intervention was implemented once again. Finally, during the last intervention phase (IGC + SM II), the self-monitoring component was reinstated. The decision rules guiding when changes were made between phases included (a) when a minimum of five data points had been collected and a steady state (or trend in the desired direction) was observed in overall on-task behavior data, or (b) when ten data points had been collected during the phase. Due to the nature of the applied setting, the team consulted on a phase by phase basis regarding deviations from the decision rules.

By using an ABCABC withdrawal design, the additive effect of the self-monitoring component on the interdependent group contingency on student behavior was analyzed. By adding the self-monitoring intervention component during the first and second C phases, researchers were able to examine the degree to which the addition of the self-monitoring component influenced the overall effects of the interdependent group contingency intervention. Implementing the intervention procedures, withdrawing them, and then reinstating them allowed
for analysis of the role of any extraneous variables. However, a limitation to this design is that it required a potentially beneficial intervention to be withdrawn (Kennedy, 2005).

**Dependent Variables and Measurement**

Student engagement and disruptive behaviors were measured directly using an observation code developed by the principal investigator and similar to the Behavioral Observation of Students in Schools (Appendix A; BOSS; Shapiro, 2004). Teacher positive and negative statements were also measured directly using this observation code. Definitions used to describe target student behaviors were adapted from the BOSS and all target variable definitions are described below. Measures of student engagement included on-task active, on-task passive, off-task passive, off-task motor, and off-task verbal behaviors. All on-task and off-task behaviors were measured using 15-s momentary interval recording (Shapiro, 2004). Disruptive behaviors, teacher positive statements, and teacher negative statements were measured using 15-s partial interval recording.

When collecting data, observers began with a student at the front of the room and then continued moving clockwise through the students, choosing a new student for each interval. At the beginning of each interval, observers determined whether the student was on-task active, on-task passive, off-task passive, off-task motor, or off-task verbal and placed a check in the appropriate box on the observation code. If any disruptive behaviors were demonstrated by any student at any time during the interval, then the observers placed a check in the “disruptive behaviors” box on the observation code. Once all students had been observed, observers began again with the original student and continued moving clockwise through class. If any positive or negative teacher statements were made during the interval, then observers placed a check in the “positive teacher statement” box or the “negative teacher statement” box.
Observation sessions occurred five days per week and lasted for the duration of the class period (i.e., 20-45 min). At least two participating students had to be present in the classroom in order for data collectors to record student behavior. Due to the unique setting and population, participating students from Classroom A were often present during observations that took place in Classroom B, and vice versa. Data collectors were instructed to include all students present in the classroom from whom consent had been obtained when measuring student behavior, regardless of whether or not the students were typically present in Classroom A or Classroom B. In other words, classes were defined by teachers rather than by students.

At the end of each observation session, observers calculated totals for the number of times each target variable was recorded during an observed interval and divided that by the total number of intervals that were observed. Totals for overall on-task and overall off-task variables were also calculated by adding the totals for all on-task variables (i.e., on-task active and on-task passive) and dividing by the total number of intervals observed and then adding the totals for all off-task variables (i.e., off-task passive, off-task motor, and off-task verbal) and dividing by the total number of intervals observed. All percentages were rounded to the tenth decimal place. In this way, the percentage of intervals in which target variables occurred was calculated.

**On-task active.** On-task active behaviors were defined as any instance when a student was raising their hand, working with manipulatives in the manner assigned, participating in choral responding, responding to questions asked during the lesson, reading aloud, getting out or putting away materials related to the assigned task, talking to a teacher or peers about the assigned task, and flipping through pages of a text book to find a definition or correct page number.
On-task passive. On-task passive behaviors were defined as any instance when a student was listening to the lesson, making eye contact with the teacher, looking at an assignment, reading an assignment silently, looking at the board during instruction, listening to peers respond to the questions asked during the lesson, as well as going to the bathroom, sharpening their pencil, getting a tissue, etc., with teacher permission. In addition, students were considered passively on-task when they were finished with their assigned seatwork and sitting at their desk not displaying disruptive behaviors.

Off-task passive. Off-task passive behaviors were defined as any instance when a student was looking around the classroom, listening to other students talk about topics not relating to assigned work, and staring at their desk. In addition, students who were in time out were also considered off-task passive.

Off-task motor. Off-task motor behaviors were defined as any instance when a student was manipulating objects not related to the assigned task at their desk, touching another student, turning around in seat, and engaging in repetitive movements that lasted for at least 3-s.

Off-task verbal. Off-task verbal behaviors were defined as any instance when a student was talking to other students about topics not related to the assignment; talking, singing, or rapping to themselves; and shouting out to get the teacher’s attention rather than raising their hand.

Disruptive behaviors. Disruptive behaviors were defined as any instance when a student was out of their seat without permission, engaged in any type vocalization without teacher permission, or making noises with their bodies or classroom materials that were audible to those around them. When collecting data, observers sometimes coded these behaviors simultaneously with off-task motor and off-task verbal behaviors.
Positive teacher statements. Positive teacher statements were defined as any statement of praise made by the teacher addressed toward a single student, a group of students, or the entire class regarding rule following behaviors.

Negative teacher statements. Negative teacher statements were defined as any reprimand given by the teacher addressed toward a single student, a group of students, or the entire class.

Inter-Observer Agreement

IOA was assessed throughout each phase of the study with an independent observer (i.e., principal investigator or research assistant) in order to ensure that observers were accurately recording student and teacher behaviors. Interval by interval agreement was calculated for each target variable using the following formula: Total Agreement = Agreements/(Agreements + Disagreements) x 100% (see Table 1). IOA was measured for 20.00% – 40.00% of observation sessions across phases in Classroom A (BL I – 37.50%, IGC I – 40.00%, IGC + SM I – 33.33%, BL II – 33.33%, IGC II – 20.00%, IGC + SM II – 20.00%) and 16.67% – 42.86% of observation sessions across the first four intervention phases in Classroom B (BL I – 33.33%, IGC I – 42.86%, IGC + SM I – 16.67%, BL II – 16.67%). Across target variables, average IOA was high and ranged from 90.91%-100.00% in Classroom A and from 90.00-100.00% in Classroom B.

In addition, IOA between the frequency of disruptive behaviors recorded by the lead teachers and data collectors was calculated during 30.00% – 60.00% of observation sessions across all intervention phases in Classroom A (IGC I – 60.00%, IGC + SM I – 33.33%, IGC II – 60.00%, IGC + SM II – 60.00%) and 33.33% – 100% (IGC I – 42.86%, IGC + SM I – 33.33%, IGC II – 100%) of observation sessions across all intervention phases in Classroom B. When observing during these sessions, data collectors also recorded the frequency of disruptive
behaviors in order to determine if they recorded the same number of disruptive behaviors as the lead classroom teacher. If IOA dropped below 90%, then data collectors reviewed the disruptive behavior definition and recording methods with the lead teachers. The average disruptive behavior IOA score across intervention phases was 84.77% for Classroom A and 84.19% for Classroom B.

**Procedures**

Intervention procedures were implemented in two 9th grade classrooms. All students were 9th graders, though some were working on classes for 10th grade credit at the time. Classroom A was a language arts class, and Classroom B was a math class. Daily activities in the language arts class typically consisted of reading books and plays out loud as a group, discussing readings, completing vocabulary assignments, and watching movies that were relevant to current reading assignments. Daily activities in the math class typically consisted of brief teacher directed lessons and worksheet completion. Both class periods occurred during the morning, and were approximately 45 min in length. Intervention implementation and data collections only occurred during these two class periods, which were selected based on referrals made by the school psychologist and teachers. The lead classroom teachers and educational assistants implemented all intervention procedures.

**Bl. I.** During baseline, data collectors recorded student engagement (i.e., on-task active, on-task passive, off-task passive, off-task motor, and off-task verbal behaviors) and disruptive behaviors and teacher positive and negative statements using the behavioral code. In addition, the lead teachers recorded the frequency of disruptive behaviors. During this phase, the lead teachers and principal investigator consulted to identify three to five positively stated classroom rules that would be reviewed with students during intervention phases. Observation sessions
lasted throughout the duration of the class. The teacher addressed disruptive behaviors using their typical classroom management techniques. Eight to nine data points were collected across classrooms until overall on-task behavior data demonstrated a steady state or a digressing trend.

**Reinforcer Assessment.** Also during the baseline phase, the primary investigator administered a reinforcer assessment in order to determine what types of items to use as group rewards during the intervention phases. Students were asked to write down three to five possible rewards that they would like to have the opportunity to earn. Before reinforcers were purchased, the principal investigator consulted with the lead teachers in order to insure that the items identified by students were appropriate and to ensure that something identified as preferable by each student was included in the pool.

**Training.** Over the course of time that baseline data were being collected, the principal investigator met with both lead teachers and one educational assistant to review and discuss intervention procedures and data collection procedures. Follow-up meetings were conducted individually with the lead classroom teachers. During these sessions, scripts (Appendices B and C) for each intervention phase were provided to and reviewed with the lead teachers. The principal investigator modeled intervention procedures for the teachers, allowed the teachers the opportunity to practice the intervention procedures, and provided them with feedback. Teachers were provided with the opportunity to ask questions during these trainings, as well as throughout each phase of the study. Classroom teachers explained intervention procedures to the students as a group on the first day of each intervention phase. Students were provided with the opportunity to ask questions about intervention procedures following these explanations. Rules for the “game” were reviewed with the class during interdependent group contingency phases and rules plus self-monitoring procedures were reviewed during interdependent group contingency plus
self-monitoring phases. Throughout each intervention phase, classroom teachers and present data collectors answered any questions that arose from students.

**IGC I.** During the first intervention phase, the classroom teacher implemented an interdependent group contingency with randomized reinforcers based loosely upon the Good Behavior Game (Barrish et al., 1969). At the beginning of the class period, the lead teacher reviewed the classroom rules that were identified during the baseline phase with the students. The lead teacher explained to the students that he would be counting each of their disruptions using a frequency counter, and that at the end of the class period a goal level of classroom disruptions for that day would be selected from a brown paper bag. Possible target levels of disruptive behavior included in the brown paper bag were determined through the review of baseline levels of disruptive behaviors and consultation with lead teachers. Possible target levels of disruptive behaviors were not higher than the median baseline data point or lower than the first quartile. Before the intervention began each day, the teacher reminded the students to encourage one another to follow the classroom rules, as they would be more likely to win the reward if everyone worked together. At the end of the class period, the lead classroom teacher selected a goal level of disruptive behaviors from a brown paper bag. If as a group the class exhibited less disruptive behaviors than the goal level selected from the bag, then they earned a mystery reward. The teacher then selected a possible reward from a separate brown paper bag. Possible rewards included both tangible and intangible reinforcers (e.g., chips, candy bars, gift cards, and bonus points for the school store) based on student preferences identified through the reinforcer assessment conducted during baseline. If the class did not exhibit less disruptive behaviors than the goal level for that day, then they were reminded that they would have the opportunity to earn a reward the following day.
When a disruptive behavior was exhibited by one of the participants, the teacher recorded the behavior using a frequency counter. Data collectors continued to observe and record student behavior using the behavioral code. During this phase, 7-10 data points were collected across classrooms until overall on-task behavior data demonstrated a steady state.

**Training for IGC + SM I phase.** On the last day of data collection during the initial interdependent group contingency phase, the principal investigator provided students with the opportunity to practice skills in self-monitoring, in order to insure that participating students were able to demonstrate self-monitoring skills. Students were provided with the self-monitoring sheets that they would be required to use during the next intervention phase (Appendix D). The principal investigator explained to the students that they would be required to record their own behavior during the last 10 min of class by placing an X on their self-monitoring sheet each time that they caught themselves exhibiting a disruptive behavior. As the students were self-monitoring, the primary investigator also recorded the number of disruptions exhibited by each student. In order to be included in the following phase, IOA between the number of disruptions observed by the principal investigator and the number of disruptions recorded by students on self-monitoring sheets had to be greater than 80%. Each participating student met this criterion.

**IGC + SM I.** During this phase, students were provided the same data-recording sheet that they had used when practicing their self-monitoring skills, and were asked to check a box each time that they exhibited a disruptive behavior. The lead teacher provided the students with examples and non-examples of disruptive behaviors, and students were provided the opportunity to ask questions for further clarification. If the lead classroom teacher observed a disruptive behavior and the student did not record it, then they reminded the student to place a check in a
box on their data-recording sheet. All interdependent group contingency intervention procedures remained constant during this phase. When a disruptive behavior was exhibited by one of the students, the teacher recorded the behavior using a frequency counter. Data collectors continued to observe and record student behavior using the behavioral code. During this phase, 8 data points were collected in Classroom A and nine in Classroom B until overall on-task behavior data demonstrated a steady state.

**BL II.** During this phase, all intervention procedures were withdrawn. Data collectors continued to record student and teacher behavior until a total of six data points had been collected and overall on-task behavior data demonstrated a return toward baseline levels.

**IGC II.** After the second baseline phase, interdependent group contingency procedures were reinstated in the same manner as described in the IGC I phase. Due to environmental variables out of the control of the research team, it was decided that the final intervention phase would be implemented after five data points had been collected in Classroom A, although a steady state had not been demonstrated in overall on-task behavior data. Only one data point was collected in Classroom B during this phase due to limitations of the classroom setting and changes in environmental variables. At this point, intervention implementation and data collection ended in this classroom.

**IGC + SM II.** During this final intervention phase, self-monitoring procedures were added to the existing interdependent group contingency intervention, as described in the IGC + SM I phase. Data collection continued in this phase for the duration of the end of the school year, and a total of five data points were collected during this phase.
**Procedural Adherence**

Procedural adherence was measured every day during each intervention phase. The data collectors recorded adherence through direct observation with procedural checklists correlating to the intervention scripts provided to the teachers (Appendices B and C). The data collectors checked off each component of the intervention as they observed it being accurately implemented. If at any point adherence fell below 100%, the data collectors reviewed the intervention script with the teacher at the end of the class period and clarified any questions. The average percent of components accurately implemented across intervention phases was 94.87% in classroom A and 73.76% in classroom B (see Table 2 for breakdown of average percentages for each intervention phase).

**Social Validity**

Social validity was formally addressed at the end of the study through the use of a questionnaire adapted from Martens, Witt, Elliot, and Darveaux (1985). Both the teacher and the students filled out social validity questionnaires (see Appendices E and F). Each social validity questionnaire contained 7 items. Teachers and students were asked to respond to each item by indicating that they strongly disagreed (1), disagreed (2), were not sure (3), agreed (4), or strongly agreed (5) with the statement. Items on the teacher questionnaires included (a) I had adequate input in developing the intervention scripts, (b) I liked the procedures used in this intervention, (c) The intervention was easy to include in my daily routine, (d) The intervention helped my students follow classroom rules, (e) I think that the self-monitoring sheets used by the students made the intervention more successful, (f) I would use just the group contingency component of this intervention in the future, and (g) I would use the group contingency component of this intervention, along with the self-monitoring component, in the future. Items
on the student questionnaires included, (a) I liked it when my teacher used a clicker to monitor my class’ disruptions, (b) When my teacher used a clicker to monitor my class’ disruptions, it helped me remember to follow the classroom rules and not be disruptive, (c) The rules for when my teacher used the clicker and when my class earned prizes were easy for me to understand, (d) The rules for when I was supposed to monitor my own behavior by placing an “X” on the worksheets were easy for me to understand, (e) I liked using the worksheets to monitor my own behavior, (f) I think that using the worksheets to monitor my own behavior helped me do better in class, and (g) I liked the prizes that my class earned when we had less disruptions than the number that was pulled from the bag. In addition, social validity was informally addressed throughout the study through discussions with the teachers regarding their opinions on intervention procedures.

**Results**

The present study examined the effects of an interdependent group contingency with randomized reinforcers on student and teacher behavior, as well as the effects of an interdependent group contingency with randomized reinforcers and self-monitoring procedures on student and teacher behavior, in two high school classrooms serving students with EBD. Furthermore, the research design allowed for the examination of the influence of the self-monitoring procedure on the effects of the interdependent group contingency with randomized reinforcers. Direct observation data obtained on student engagement and disruptive behaviors and teacher positive and negative statements are displayed in Figures 1 through 8. Overall, results indicate that upon introduction of interdependent group contingency intervention procedures, there was an increase in student on-task behavior and a decrease in student off-task and disruptive behavior. No significant changes were observed in student behavior upon
introduction of self-monitoring procedures in either classroom, and no intervention effects were observed in teacher behavior. Summary statistics for each target variable across phases are displayed in Tables 3 through 8.

**Student Engagement**

**Classroom A.** Figure 1 displays the overall on-task behavior (i.e., active and passive combined) data and overall off-task behavior (i.e., passive, motor, and verbal combined) data across phases in Classroom A. The two data paths are mirror images of one another because, when combined, on-task and off-task behavior data points obtained during an observation session made up the total percent (100%) of intervals observed during that observation session, as students were either coded as being on-task or off-task during each interval. Since the two data paths mirror each other, visual analysis will focus on the on-task behavior data path. During baseline data collection, on-task behavior data were variable and reflected a decreasing trend. There were several observation sessions during baseline data collection in which on-task behavior levels were very high (\(M = 80.81\%, \ SD = 16.66\); Table 3). There was an immediate increase in the level of on-task behavior upon introduction of the IGC I phase. Data remained fairly stable throughout this phase, resulting in a higher overall level of on-task behavior as compared to baseline (\(M = 94.62\%, \ SD = 8.21\)). Due to the fact that high levels of on-task behavior were observed at the beginning of baseline data collection, a moderate amount of overlap was observed between the first interdependent group contingency phase and baseline. The addition of self-monitoring procedures during the IGC + SM I phase did not result in an observable impact on student on-task behavior data. However, the majority of data remained above baseline level, with the exception of two outliers. The overall level of on-task behavior
remained relatively consistent with the level observed during the first experimental phase ($M = 91.24\%, SD = 16.01$).

The withdrawal of all intervention procedures resulted in an immediate decrease in on-task behavior levels ($M = 82.28\%, SD = 21.94$). Data observed during this second baseline phase were once again variable, but the overall level was consistent with that observed during the initial baseline phase. The re-introduction of interdependent group contingency intervention procedures following the withdrawal did not result in an increase in on-task behavior. In fact, the overall level of on-task behavior was lower than that observed during both baseline phases ($M = 80.63\%, SD = 21.39$). Several environmental changes were occurring in the classroom at this time, which could have, in part, influenced the high variability observed during this phase. Finally, the addition of self-monitoring procedures during the last experimental phase also did not result in an immediate increase in on-task behavior. However, the overall level of on-task behavior during this final phase was higher than that observed during baseline ($M = 92.84\%, 7.94$).

Overall, improvements in student on-task behavior were observed immediately following the introduction of interdependent group contingency procedures and remained relatively consistent leading up to the withdrawal of intervention procedures, during which on-task behaviors returned to baseline levels. However, intervention effects observed during subsequent phases were not as strong or as clear, with the data reflecting a slight increase in level during the IGC + SM II phase as compared to the second interdependent group contingency phase.

Summary statistics for specific types of on-task (active and passive) and off-task (passive, motor, and verbal) behaviors across phases are displayed in Tables 3 and 4, respectively, for Classroom A.
**Classroom B.** Figure 2 displays the overall on-task behaviors (i.e., active and passive combined) and overall off-task behaviors (i.e., passive, motor, and verbal combined) across phases in Classroom B. Due to environmental variables occurring in Classroom B toward the close of the school year, data collection ended during the second interdependent group contingency phase. Once again, the data paths are mirror images of one another, and thus overall on-task behavior data will be described. Baseline data were variable, initially demonstrated a decreasing trend, and then improving leading into the first interdependent group contingency phase ($M = 78.96\%, SD = 15.11$; Table 5). Upon introduction of interdependent group contingency procedures, overall on-task behavior data became less variable, and were at consistently high levels throughout the duration of the phase ($M = 95.03\%, SD = 3.50$), with the majority of data points above the baseline level. After the addition of self-monitoring procedures, data became slightly more variable, although, overall, they were at a level similar to that observed during the previous phase ($M = 93.33\%, SD = 4.32$). The withdrawal of all intervention procedures resulted in an immediate decrease in overall on-task behavior to levels below the first baseline phase ($M = 69.62\%, SD = 19.45$). Unfortunately, only one data point was obtained during the second interdependent group contingency phase before changes in the classroom environment resulted in a termination of intervention implementation and data collection. Based upon the one data point collected, the re-introduction of intervention procedures did not result in an immediate positive impact on student behavior.

Overall, an immediate decrease in variability and increase in level of on-task behavior was observed upon introduction of interdependent group contingency procedures, which continued with the addition of self-monitoring procedures, and an immediate decrease in on-task behavior was demonstrated following the withdrawal of all intervention procedures. However,
there were no observable differences in on-task behavior during interdependent group
contingency and interdependent group contingency plus self-monitoring phases. Summary
statistics for specific types of on-task (active and passive) and off-task (passive, motor, and
verbal) behaviors across phases are displayed in Tables 5 and 6, respectively, for Classroom B.

Disruptive Behavior

Classroom A. Disruptive behavior data obtained from Classroom A are presented in
Figure 3. Baseline data were variable, although they did not reflect an overall high level of
disruptive behavior ($M = 9.22\%$, $SD = 7.05$; Table 7). Due to the fact that no disruptive
behaviors were observed on two occasions during baseline data collection, there were no data
points in subsequent phases that did not overlap with baseline data. However, with the exception
of two outliers, data obtained following the introduction of the IGC I phase reflect an even lower
overall level of disruptive behavior ($M = 4.11\%$, $SD = 5.72$). Once again with the exception of
two outliers, disruptive behavior levels further decreased after the self-monitoring procedure was
added ($M = 3.73\%$, $SD = 7.21$). However, after all intervention procedures were withdrawn, a
return to baseline levels of disruptive behavior was not observed, though data became more
variable toward the end of the phase. Although there was an initial increase in disruptive
behavior level during the IGC II phase, data were below initial baseline levels and demonstrated
a decreasing trend, resulting in near zero levels at the end of the phase ($M = 5.40$, $SD = 5.33$).
Finally, disruptive behavior data returned to zero or near zero levels during the IGC + SM II
phase ($M = 0.98\%$, $SD = 1.63$). The overall magnitude of disruptive behavior data collected in
Classroom A was not high. Summary statistics for disruptive behavior are presented in Table 7
for Classroom A.
Classroom B. Disruptive behavior data obtained from Classroom B are displayed in Figure 4. During baseline, disruptive behavior data were variable and at a relatively high overall level ($M = 32.89\%, SD = 20.65$; Table 7). Data demonstrated a decreasing trend upon introduction of the IGC I phase, reaching near zero levels toward the end of the phase. Although there was a moderate amount of overlap between baseline data and data obtained during this phase, there was a decrease in level as compared to baseline ($M = 15.82\%, SD = 13.20$). Upon introduction of the self-monitoring procedures, disruptive behavior data were less variable, displayed less overlap with baseline data, and reflected lower levels as compared to baseline and the previous phase ($M = 7.20\%, SD = 7.95$). After the withdrawal of all intervention procedures, disruptive behavior data increased in level and variability, although data were neither as high nor as variable as demonstrated in the initial baseline phase ($M = 52.63\%$). Though significantly limited, the initial data point taken after the reintroduction of interdependent group contingency procedures does not demonstrate an immediate decrease in disruptive behavior. Summary statistics for disruptive behavior in Classroom B are presented in Table 7.

Teacher Statements

Data obtained on positive teacher statements through direct observation are displayed in Figures 5 and 6 for Classrooms A and B, respectively. No functional relationship was observed between intervention procedures and positive teacher statements, as levels remained low throughout each phase of the study. Direct observation data obtained on negative teacher statements are displayed in Figure 7 for Classroom A and Figure 8 for Classroom B. The teachers in Classroom A made no negative statements throughout the duration of the study. Negative statements made by teachers in Classroom B during baseline data collection also occurred at a very low level ($M = 1.19\%, SD = 2.04$; Table 8), though data were slightly more
variable. Upon introduction of the interdependent group contingency procedures, negative statements further decreased ($M = 0.58\%$, $SD = 1.24$) and remained at zero levels throughout each additional phase of the study. Summary statistics for positive and negative teacher statements are presented in Table 8 for Classrooms A and B. Summary statistics mirror the pattern of behavior observed in Figures 5 – 8, indicating no significant change in teacher behavior in either classroom throughout each phase of the study.

**Social Validity**

The average teacher social validity rating in Classroom A was 3.86 (not sure – agree), with a mode of 4 (agree). The average teacher social validity rating in Classroom B was 3.64 (not sure – agree), with a mode of 4 (agree). When asked if they thought that the self-monitoring sheets used by the students made the intervention more successful, the lead teacher from Classroom A indicated that he was not sure, and the lead teacher from Classroom B indicated that he disagreed. Lead teachers from both classrooms agreed that they would use the group contingency component of the study in the future, but that they were not sure if they would use the group contingency component, along with the self-monitoring component.

Nine out of eleven students who participated in the study completed the student social validity questionnaire. One student was absent each day the questionnaire was presented, and another student left the school during the course of the study. Student social validity ratings were analyzed as one group rather than by class because some were filled out anonymously, and students from Classroom A were often present in Classroom B, and vice versa. Therefore, it was not possible to determine whether students who filled out the social validity forms anonymously were from Classroom A or Classroom B.
The average student social validity rating was 3.27 (not sure – agree), with a mode of 4 (agree). Individual student social validity averages ranged from 1 – 7, demonstrating a wide range in student intervention acceptability. Overall, when asked if they felt that their teacher’s use of a clicker to monitor their class’ disruptions helped them remember to follow classroom rules and not be disruptive, six out of nine students indicated that they agreed or strongly agreed. When asked if they thought that using worksheets to monitor their own behavior helped them do better in class, only three out of nine students agreed or strongly agreed.

**Discussion**

The present study examined the effects of interdependent group contingency procedures and interdependent group contingency plus self-monitoring procedures on student engagement and disruptive behavior and teacher positive and negative statements in an alternative high school setting serving students with EBD. It addresses the gap in the existing literature that analyzes the combined effectiveness of interdependent group contingency and self-monitoring procedures by exploring the influence of a self-monitoring component on the effectiveness of an interdependent group contingency intervention. Various studies have examined the combined influence of interdependent group contingency and self-monitoring procedures on student behavior. However, this is among the first to examine the degree to which the overall effectiveness of an existing interdependent group contingency intervention is affected by an added self-monitoring component. By using an ABCABC withdrawal design, the influence of the self-monitoring intervention component on the existing interdependent group contingency was analyzed. Though this design did not account for potential carryover effects between the B and C phases, it allowed for the examination of the degree to which the self-monitoring procedures affected the efficacy of the already established interdependent group contingency
intervention. It was the aim of the current study to gather information regarding how self-monitoring procedures influence the effectiveness of a group contingency intervention in order to provide details to practitioners regarding the benefit of including self-monitoring procedures in interdependent group contingency behavior plans. In doing so, the current study contributed evidence that can be used to guide the design and implementation of effective and efficient group contingency intervention procedures. Furthermore, this study adds to the current body of literature investigating the use of positive behavior interventions such as group contingencies and self-monitoring procedures in alternative high school settings with students with EBD.

Overall, the changes observed in student behavior as a result of interdependent group contingency and self-monitoring procedures support those of previous studies that have examined the combined influence of interdependent group contingency and self-monitoring interventions. The results of this study align with results of others that found that combined interdependent group contingency and self-monitoring procedures effectively addressed student behaviors (Coogan, et al. 2007; Davies & Witte, 2000; Jones, et al. 2008). More specifically, upon introduction of intervention procedures, increases in student engagement and decreases in disruptive behaviors were observed in both Classroom A and Classroom B. It is possible that ceiling and floor effects were demonstrated in student engagement and disruptive behavior data, thus influencing the interpretation of the data. Although less phases of the study were completed in Classroom B, data obtained from this classroom provide the strongest support of intervention effects, with some preliminary evidence to suggest that the self-monitoring procedure increased the effectiveness of the interdependent group contingency intervention in decreasing disruptive behaviors. In addition, the data suggest a very slight increase in student engagement during the second interdependent plus self-monitoring phase, as compared to the second interdependent
group contingency only phase in Classroom A. However, based on visual analysis of the data, results do not suggest that the self-monitoring component altered the effectiveness of the interdependent group contingency on student engagement or disruptive behavior in either classroom.

**Limitations**

Over the course of this study, several environmental variables may have limited the effectiveness of intervention procedures and the interpretability of the data. Firstly, the lead teacher in Classroom A often was not present during intervention implementation and data collection, as he was a team leader in the school and frequently had to be present in other areas of the school to assist in de-escalating problem situations. As a result, the educational assistant in Classroom B often implemented intervention procedures. However, this assistant was not present during the original intervention training provided to teachers. Therefore, intervention adherence levels in this classroom were low on the first few days of intervention implementation. The educational assistant was then promptly trained in the procedures following intervention implementation. However, despite that fact that additional training was provided to the assistant, intervention adherence continued to be lower on days when procedures were implemented by the assistant teacher due to the fact that her theoretical model of practice (e.g., excessive attention to disruptive and off-task behavior, inconsistent behavioral expectations) did not align with the procedures dictated in the intervention protocol. Therefore, adherence data remained more variable in this classroom than in Classroom A.

Perhaps the most significant environmental factor in Classrooms A and B that limited intervention effectiveness was the fact that students from Classroom A were often present during data collection in Classroom B, and vice versa, during the second half of the study. In other
words, students whose behavior was being recorded in Classroom A during later observation sessions were originally students from Classroom B. This was occurring because many students from the original Classroom B group had homeroom in Classroom A, and chose not to transition to class at the end of the homeroom period. Therefore, they were present during the Classroom A observation session. On most occasions, this was occurring because the general expectation from teachers was that students could remain in their homeroom classroom as long as they were completing assignments from all of their classes and these students preferred to remain in Classroom A. While this method appropriately addressed issues regarding student work completion and prevented many unwanted student behaviors resulting from transition periods, it limited the level of experimental control that had been obtained during the initial phases of the study.

Though students from Classroom B had been introduced to intervention procedures for the entirety of the study, they had not received the intervention from the same teacher. Due to the fact that adherence levels were sometimes lower in Classroom B than Classroom A, it cannot be stated that both original groups of students had received the same intervention throughout the course of the study. Furthermore, baseline rates of disruptive behavior and on-task behavior were higher and lower, respectively, in Classroom B than in Classroom A. Therefore, when students from Classroom B began to be present in Classroom A during the final two phases of the study, data from Classroom A became more variable.

Around the same time that students from Classroom B began deciding to remain in Classroom A after homeroom, it became increasingly difficult to collect data in Classroom B. Difficulties in data collection in both Classroom A and Classroom B originally began to arise as a result of state-mandated standardized testing, spring break, and students taking extra days off.
during the weeks before and after spring break. However, after spring break, difficulties in collecting data in Classroom B continued, as all students were frequently absent, students were doing their work in other classes, or only one student was present. These factors also inhibited the collection of IOA during the final phases of the study in Classroom B, as students were not present on the days when IOA was scheduled to be collected. This pattern continued until the final few weeks in the school year, when the lead teacher from Classroom B informed the principal investigator that students would not be present in the classroom through the end of the year. Therefore, data collection in Classroom B ceased after the first data point in the second interdependent group contingency phase was obtained.

A final environmental limitation to the present study was the time of year in which the study was conducted. Due to the fact that it began in January, classroom rules and procedures had already been established and enforced for half of the school year, and students had a strong learning history in relation to the expectations and consequences that been in place since late August. Furthermore, because the study occurred during second semester, spring break and state-mandated standardized testing required that data collection cease for a total of nearly three weeks. Unfortunately, because the study was wrapping up over the final days of the school year, time did not allow for maintenance data to be collected. Therefore, it is unknown whether or not changes in behavior observed during intervention implementation would have carried over after procedures were withdrawn. Had the study began at the beginning of the school year, it is possible that some or all of these environmental challenges could have been avoided.

There were two other limitations to this study that were not the result of environmental changes in Classroom A or Classroom B. Firstly, it was discovered during an IOA data collection session that two data collectors were using a 15-s momentary and partial interval
recording method, as indicated in the protocol, whereas the third was using a 20-s momentary and partial interval recording method. Though this mistake could pose a threat to the interpretability of the data, these data points were not thrown out because data obtained across intervention sessions were consistent, indicating that an accurate sample of student and teacher behavior was obtained during sessions in which 15-s and 20-s intervals were used.

Secondly, the fact that student on-task behavior data were demonstrating an increasing trend and disruptive behavior data were demonstrating a decreasing trend toward the end of baseline data collection in Classroom B limits the meaningfulness of claims that intervention procedures produced the observed increases in student engagement and decreases in disruptive behaviors. However, the fact that on-task behavior data demonstrated increased variability during the second baseline phase supports the conclusion that a functional relationship between intervention procedures and student engagement was observed.

The challenging environmental variables encountered in this study are common obstacles encountered by researchers who conduct investigations in school-based settings. Despite the fact that these concerns presented limitations to intervention effectiveness, future researchers attempting to conduct investigations in this setting and with this population can use the results of this study to inform their research methodologies in order to avoid similar obstacles. Furthermore, as these environmental challenges are common in school-based settings, it is important for researchers to be aware of them and analyze how they can influence intervention effectiveness when similar procedures are applied in natural settings.

**Implications for Practice**

The purpose of applied research in the field of school psychology is to develop effective procedures to address and/or prevent students concerns that can be implemented in the classroom
setting. The present study provides several implications for practitioners to take into consideration when designing and implementing interdependent group contingency and self-monitoring intervention procedures in high school classrooms serving students with EBD.

Throughout the duration of this study, classroom teachers in the classroom setting implemented all intervention procedures. Therefore, it serves as a feasible example of how interdependent group contingency and self-monitoring procedures can be implemented in high school settings to address the behavior of students with EBD. Furthermore, by highlighting the challenges that can arise when implementing such procedures in alternative high school settings, it offers practitioners information regarding what obstacles they may face when applying these procedures to their classrooms. By providing practitioners with such information, the present study can aid them in better preparing for intervention implementation.

In addition, the present study provides practitioners information regarding the influence of specific interdependent group contingency and self-monitoring procedures on teacher behavior. Though future research should be done to further examine the effects of such intervention procedures on teacher behavior, the present study informs practitioners that these types of intervention procedures alone may not sufficiently alter the types of statements that teachers make toward students or increase the amount of positive statements made in the classroom setting. Taking this into consideration, practitioners may choose to include steps pertaining to the use of positive statements when creating intervention scripts for teachers.

The information obtained through teacher and student social validity questionnaires can be used to inform practitioners of what aspects of the present study were well-received by teachers and students. Social validity data indicates that both lead classroom teachers liked the interdependent group contingency intervention components and planned to use them again in the
future. However, the questionnaires also revealed that neither the lead teachers nor the majority of students felt as if self-monitoring procedures were beneficial. It is possible that the opinions shared by teachers and students regarding self-monitoring procedures can, in part, be contributed to the fact that the self-monitoring procedures implemented in this study were not adequately engaging or salient for students. Practitioners can take into consideration this information when making decisions regarding when and how to implement both interdependent group contingency and self-monitoring procedures. One could glean from this social validity data that self-monitoring procedures can simply be an extra step that teachers and students may not consider useful. However, practitioners and future researchers could also interpret from this data that more socially valid and engaging forms of self-monitoring could be created and implemented in conjunction with group contingency interventions.

**Recommendations for Future Research**

The current study demonstrated that interdependent group contingency intervention procedures can effectively increase student engagement and decrease disruptive behaviors demonstrated by high school students with EBD. Though limited, results from Classroom B demonstrated evidence of the increased effectiveness of interdependent group contingency intervention procedures when they were combined with a self-monitoring component. With the goal of using the most efficient and effective methods available to support students in need of positive behavior interventions in mind, future researchers should continue to examine the influence of self-monitoring procedures on the overall effectiveness of interdependent group contingency interventions.

Though there are rich existing bodies of literature examining the effectiveness of group contingency and self-monitoring intervention procedures, there is room yet for exploration for
future researchers interested in examining the influence of self-monitoring procedures and other positive behavior supports on the effectiveness of group contingency interventions. When planning such investigations, future researchers should consider examining the influence of different methods of self-monitoring on the various forms of group contingencies designed to be implemented in different settings, with different populations, and to address different types of target behaviors. Furthermore, future researchers should take into consideration the degree to which self-monitoring procedures implemented in future studies are engaging for students, and focus on ways that these procedures can be designed to be both relevant and appealing to students. It is possible that students and teachers may find self-monitoring procedures that incorporate technology to be more engaging and therefore, successful. Through further research in this area, future researchers can come closer to understanding the influence that different forms of self-monitoring procedures have on the various types of group contingency interventions. In doing so, they may also discover certain target variables that are particularly sensitive to the combined influence of these two types of positive behavior supports.

In order to investigate the degree to which the addition of self-monitoring procedures to interdependent group contingency interventions influences the maintenance of target variables, it could be meaningful for future research teams to compare maintenance phases following interdependent group contingency only phases and interdependent group contingency plus self-monitoring phases. By making this the focus of their study, future researchers could collect more information regarding the degree to which self-monitoring procedures increase the overall effectiveness of the interdependent group contingency over time.

While further investigating the influence of self-monitoring procedures on the effectiveness of group contingency interventions, future researchers should continue to examine
their influence on positive and negative teacher statements. Though results of this study indicated that intervention procedures did not reinforce positive teacher statements, it would be interesting to explore whether or not other types of self-monitoring and group contingency procedures demonstrated effects on teacher behavior. Positive behavior supports are designed to teach and reinforce appropriate student behaviors. Thus, it is theoretically possible that the implementation of such supports would promote teacher statements that focus on positive student behaviors and discourage the use of negative statements. Therefore, future researchers could observe an increase in positive statements and a decrease in negative statements upon the introduction of intervention procedures. Furthermore, future researchers may want to include steps in intervention scripts provided that explicitly require interventionists to specific verbal praise, as this could amplify intervention effects. Finally, future researchers should plan for maintenance data collection in order that they may examine the effects of intervention procedures on student behavior after the withdrawal of such supports.

Conclusions

At present, professionals in the field of education have a variety of resources available to them that can be put to use to increase student engagement and decrease disruptive behavior in classrooms serving students with EBD. However, in order to continue to provide teachers and other educational professionals with the tools they need in order to advocate for and support the students whom they serve, school psychology researchers must continue to explore the most efficient and effective behavioral techniques that can be used to address the concerns presented by students with EBD. The current study contributed to the existing literature documenting effective intervention procedures that can be implemented in order to increase levels of engagement and decrease levels of disruptive behavior demonstrated by students with EBD. By
examining the influence of self-monitoring procedures on an existing interdependent group
contingency intervention, the current study provided information regarding the value of adding
self-monitoring procedures to interdependent group contingency behavior plans in order to guide
the practitioners’ decision making as they develop and implement classwide behavior
intervention procedures targeted toward challenging student populations.
References


Tables

**Average Inter-Observer Agreement across Target Variables**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Classroom A</th>
<th>Classroom B</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-Task Active</td>
<td>98.24%</td>
<td>97.87%</td>
</tr>
<tr>
<td>On-Task Passive</td>
<td>97.78%</td>
<td>97.97%</td>
</tr>
<tr>
<td>Off-Task Passive</td>
<td>99.62%</td>
<td>99.73%</td>
</tr>
<tr>
<td>Off-Task Motor</td>
<td>100.00%</td>
<td>99.53%</td>
</tr>
<tr>
<td>Off-Task Verbal</td>
<td>100.00%</td>
<td>98.50%</td>
</tr>
<tr>
<td>Disruptive Behavior</td>
<td>98.17%</td>
<td>96.40%</td>
</tr>
<tr>
<td>Teacher Positive</td>
<td>99.68%</td>
<td>100.00%</td>
</tr>
<tr>
<td>Teacher Negative</td>
<td>100.00%</td>
<td>98.89%</td>
</tr>
</tbody>
</table>

**Adherence across Experimental Conditions**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Classroom A</th>
<th>Classroom B</th>
</tr>
</thead>
<tbody>
<tr>
<td>IGC</td>
<td>82.50%</td>
<td>82.50%</td>
</tr>
<tr>
<td>IGC+SM</td>
<td>96.97%</td>
<td>96.97%</td>
</tr>
<tr>
<td>IGC II</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>IGC + SM II</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>
### Table 3

**Classroom A On-Task Behavior Summary Statistics**

<table>
<thead>
<tr>
<th>Summary Statistic</th>
<th>BL I (N = 8)</th>
<th>IGC I (N = 10)</th>
<th>IGC + SM I (N = 9)</th>
<th>BL II (N = 6)</th>
<th>IGC II (N = 5)</th>
<th>IGC + SM II (N = 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>On-Task Active</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>14.66%</td>
<td>46.37%</td>
<td>39.64%</td>
<td>22.30%</td>
<td>48.69%</td>
<td>31.36%</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>11.16</td>
<td>17.71</td>
<td>29.53</td>
<td>12.88</td>
<td>20.41</td>
<td>16.67</td>
</tr>
<tr>
<td><strong>On-Task Passive</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>66.15%</td>
<td>48.25%</td>
<td>51.59%</td>
<td>59.98%</td>
<td>31.93%</td>
<td>61.48%</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>19.41</td>
<td>19.60</td>
<td>31.66</td>
<td>31.25</td>
<td>13.91</td>
<td>22.87</td>
</tr>
<tr>
<td><strong>On-Task Active and On-Task Passive Combined</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>80.81%</td>
<td>94.62%</td>
<td>91.24%</td>
<td>82.28%</td>
<td>80.63%</td>
<td>92.84%</td>
</tr>
</tbody>
</table>

*Note.* N = Number of data points within phase.
Table 4

Classroom A Off-Task Behavior Summary Statistics

<table>
<thead>
<tr>
<th>Summary Statistic</th>
<th>BL I (N = 8)</th>
<th>IGC I (N = 10)</th>
<th>IGC + SM I (N=9)</th>
<th>BL II (N=6)</th>
<th>IGC II (N=5)</th>
<th>IGC + SM II (N=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off-Task Passive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>15.83%</td>
<td>2.68%</td>
<td>7.92%</td>
<td>13.78%</td>
<td>14.16%</td>
<td>4.86%</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>15.41</td>
<td>3.62</td>
<td>12.20</td>
<td>14.34</td>
<td>20.02</td>
<td>5.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Off-Task Motor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>1.38%</td>
<td>0.76%</td>
<td>0.15%</td>
<td>0.14%</td>
<td>0.00%</td>
<td>0.45%</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>1.22</td>
<td>1.20</td>
<td>0.44</td>
<td>0.34</td>
<td>0.00</td>
<td>1.02</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Off-Task Verbal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>1.97%</td>
<td>1.94%</td>
<td>1.57%</td>
<td>3.81%</td>
<td>5.22%</td>
<td>1.85%</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Off-Task Passive, Off-Task Motor, and Off-Task Verbal Combined</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>19.19%</td>
<td>5.38%</td>
<td>8.76%</td>
<td>17.72%</td>
<td>19.37%</td>
<td>7.16%</td>
</tr>
</tbody>
</table>

Note. N = Number of data points within phase.
Table 5

*Classroom B On-Task Behavior Summary Statistics*

<table>
<thead>
<tr>
<th>Summary Statistic</th>
<th>BL I (N = 9)</th>
<th>IGC I (N = 7)</th>
<th>IGC + SM I (N = 6)</th>
<th>BL II (N = 6)</th>
<th>IGC II (N = 1)</th>
<th>IGC + SM II</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>On-Task Active</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>38.95%</td>
<td>34.17%</td>
<td>39.21%</td>
<td>31.05%</td>
<td>14.04%</td>
<td>N/A</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>19.63</td>
<td>22.07</td>
<td>21.05</td>
<td>7.07</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>On-Task Passive</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>40.00%</td>
<td>60.86%</td>
<td>54.12%</td>
<td>38.57%</td>
<td>46.61%</td>
<td>N/A</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>18.81</td>
<td>22.14</td>
<td>19.40</td>
<td>22.84</td>
<td>N/A</td>
<td>N/A</td>
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<tr>
<td><strong>On-Task Active and On-Task Passive Combined</strong></td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Mean</td>
<td>78.96%</td>
<td>95.03%</td>
<td>93.33%</td>
<td>69.62%</td>
<td>59.65%</td>
<td>N/A</td>
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<tr>
<td>Standard Deviation</td>
<td>15.11</td>
<td>3.50</td>
<td>4.32</td>
<td>19.45</td>
<td>N/A</td>
<td>N/A</td>
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</table>

*Note.* N = Number of data points within phase.
Table 6

Classroom B Off-Task Behavior Summary Statistics

<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BL I (N = 9)</td>
<td>IGC I (N = 7)</td>
<td>IGC + SM I (N = 6)</td>
<td>BL II (N = 6)</td>
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<tr>
<td>Mean</td>
<td>9.04%</td>
<td>1.41%</td>
<td>2.79%</td>
<td>17.69%</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>9.05</td>
<td>1.02</td>
<td>2.48</td>
<td>12.00</td>
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<tr>
<td></td>
<td>4.65%</td>
<td>1.12%</td>
<td>1.13%</td>
<td>3.40%</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>3.94</td>
<td>2.13</td>
<td>1.87</td>
<td>6.26</td>
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<tr>
<td></td>
<td>7.97%</td>
<td>2.44%</td>
<td>2.75%</td>
<td>9.29%</td>
</tr>
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<td>Standard Deviation</td>
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<td>2.94</td>
<td>2.91</td>
<td>10.43</td>
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<td></td>
<td>21.04%</td>
<td>4.97%</td>
<td>6.67%</td>
<td>30.38%</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>15.11</td>
<td>3.50</td>
<td>4.32</td>
<td>19.45</td>
</tr>
</tbody>
</table>

Note. N = Number of data points within phase.
Table 7

*Disruptive Behavior Summary Statistics*

<table>
<thead>
<tr>
<th>Classroom A</th>
<th>Summary Statistic</th>
<th>BL I (N = 8)</th>
<th>IGC I (N = 10)</th>
<th>IGC + SM I (N = 9)</th>
<th>BL II (N = 6)</th>
<th>IGC II (N = 5)</th>
<th>IGC + SM II (N = 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td></td>
<td>9.22%</td>
<td>4.11%</td>
<td>3.73%</td>
<td>4.47%</td>
<td>5.40%</td>
<td>0.98%</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td></td>
<td>7.05</td>
<td>5.72</td>
<td>7.21</td>
<td>9.39</td>
<td>5.33</td>
<td>1.63</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Classroom B</th>
<th>Summary Statistic</th>
<th>BL I (N = 9)</th>
<th>IGC I (N = 7)</th>
<th>IGC + SM I (N = 6)</th>
<th>BL II (N = 6)</th>
<th>IGC II (N = 1)</th>
<th>IGC + SM II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td></td>
<td>32.89%</td>
<td>15.82%</td>
<td>7.20%</td>
<td>21.30%</td>
<td>52.63%</td>
<td>N/A</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td></td>
<td>20.65</td>
<td>13.20</td>
<td>7.95</td>
<td>29.81</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

*Note.* N = Number of data points within phase.
Table 8

*Teacher Statements Summary Statistics*

<table>
<thead>
<tr>
<th>Summary Statistic</th>
<th>BL I (N = 8)</th>
<th>IGC I (N = 10)</th>
<th>IGC + SM I (N=9)</th>
<th>BL II (N=6)</th>
<th>IGC II (N=5)</th>
<th>IGC + SM II (N=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Positive Teacher Statements</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>0.52%</td>
<td>1.02%</td>
<td>0.71%</td>
<td>0.00%</td>
<td>0.25%</td>
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</tr>
<tr>
<td>Standard Deviation</td>
<td>0.91</td>
<td>1.74</td>
<td>1.46</td>
<td>0.00</td>
<td>0.56</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>Negative Teacher Statements</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Classroom A

<table>
<thead>
<tr>
<th>Summary Statistic</th>
<th>BL I (N = 9)</th>
<th>IGC I (N = 7)</th>
<th>IGC + SM I (N = 6)</th>
<th>BL II (N = 6)</th>
<th>IGC II (N = 1)</th>
<th>IGC + SM II</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Positive Teacher Statements</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>1.08%</td>
<td>0.13%</td>
<td>0.28%</td>
<td>0.25%</td>
<td>0.00%</td>
<td>N/A</td>
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<tr>
<td>Standard Deviation</td>
<td>1.24</td>
<td>0.34</td>
<td>0.68</td>
<td>0.60</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Negative Teacher Statements</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>1.19%</td>
<td>0.58%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>N/A</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>2.04</td>
<td>1.24</td>
<td>0.00</td>
<td>0.00</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

*Note: N = Number of data points within phase.*
Figure 1. Percent of Intervals in which On-Task and Off-Task Behaviors were Observed across Phases in Classroom A
Figure 2. Percent of Intervals in which On-Task and Off-Task Behaviors were Observed across Phases in Classroom B
Figure 3. Percent of Intervals in which Disruptive Behaviors were Observed across Phases in Classroom A
Figure 4. Percent of Intervals in which Disruptive Behaviors were Observed across Phases in Classroom B
Figure 5. Percent of Intervals in which Positive Teacher Statements were Observed across Phases in Classroom A
Figure 6. Percent of Intervals in which Positive Teacher Statements were Observed across Phases in Classroom B
Figure 7. Percent of Intervals in which Negative Teacher Statements were Observed across Phases in Classroom A
Figure 8. Percent of Intervals in which Negative Teacher Statements were Observed across Phases in Classroom B
Appendix A: Observation Code

Date:_________   # of students present:_________   Time:_________ to _________

Observer(s):_________________________   Last interval #_______   IOA? Y N

<table>
<thead>
<tr>
<th>Momentary</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
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<th>13</th>
<th>14</th>
<th>15</th>
<th>Totals</th>
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<tbody>
<tr>
<td>On-A</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>On- P</td>
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<tr>
<td>Off- P</td>
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<tr>
<td>Off-M</td>
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<tr>
<td>Disruptive Behavior</td>
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</tr>
<tr>
<td>Teacher Positive</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
Total Occurrences of Target Variables:

<table>
<thead>
<tr>
<th></th>
<th>Total Intervals in which Behavior Occurred</th>
<th>Total Intervals Observed</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>On- A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On- P</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Off-P</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Off- M</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Off- V</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disruptive Behavior</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher Positive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher Negative</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Occurrences of On-Task and Off-Task Variables:

<table>
<thead>
<tr>
<th></th>
<th>Total Intervals in which Behavior Occurred</th>
<th>Total Intervals Observed</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-Task Variables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Off-Task Variables</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Directions and Definitions:
15-second Momentary and Partial Interval Recording, 20-45 minute observation

Coding Directions:
Begin randomly with a student in the room, and then continue moving clockwise through the students, choosing a new student for each new interval. A timing device should be set for a 15 second interval duration prior to the observation session. At the beginning of each interval, whether the student is engaged (active or passive), or off-task (passive, motor, or verbal) should be determined using a momentary time sampling recording method, and a slash should be placed in the appropriate box to indicate what behavior is occurring during that moment. If any disruptive behaviors, positive teacher statements, or negative teacher statements occur at anytime during the interval, then a slash should be placed in the “disruptive behaviors” box. Once all students have been observed, begin with the original student and continue moving clockwise through class again.

At the end of each observation session the observer should calculate totals for the number of times each target variable occurred and divide that by the total number of intervals was observed. Totals for overall on-task and overall off-task variables should also be calculated. These will be calculated by adding the totals for all on-task variables and dividing by the total number of intervals observed, and then adding the totals for all off-task variables and dividing by the total number of intervals observed. All percentages will be rounded to the tenth decimal place. This will result in a percentage of intervals that a particular behavior occurred.

Code Definitions:

Momentary Variables:

**On-Task Active (On-A)** Whether or not the child is actively engaged in the assigned task is determined using momentary time sampling. At the beginning of each interval the observer looks at the child and in that moment determines whether or not the child is actively engaged. Some examples of actively engaged behaviors are:

- writing
- raising hand
- working with manipulatives in manner assigned
- choral responding
- reading aloud
- talking to a teacher or peers about the assigned task
- flipping through pages of a text book to find a definition or correct page number
**On-Task Passive (On-P)** Whether or not the child is passively engaged in the assigned task is determined using momentary time sampling. At the beginning of each interval the observer looks at the child and in that moment determines whether or not the child is passively engaged. Some examples of passively engaged behaviors are:

- listening to the lesson
- eye contact on teacher
- looking at an assignment
- reading assignment silently
- looking at board during instruction
- listening to peers respond to the lesson

This behavior will also be coded when students have finished their assigned seatwork, and are sitting at their desk not displaying disruptive behaviors.

**Off-Task Passive (OFT-P):** Whether or not the child is passively not attending to the assigned task is determined using momentary time sampling. At the beginning of each interval the observer looks at the child and in that moment determines whether or not the child is passively off-task. Examples of off-task passive behaviors are:

- looking around the room
- staring out the window
- listening other students talk about unassigned topics
- staring at their desk

This behavior will also be coded when students are in time out.

**Off-Task Motor (Off-M):** Whether or not the child is engaging in motor activity that is not directly related to the assigned task is determined using momentary time sampling. At the beginning of each interval the observer looks at the child and in that moment determines whether or not the child is engaging in behavior that is off-task motor. Some examples of off-task motor are:

- manipulating objects not related to task
- touching oneself or another student
- bending or reaching for an object
- out of seat or turning around in seat
- repetitive motor movements that last for at least 3 seconds
**Off-Task Verbal (Off-V):** Whether or not the child is engaging in verbal behavior that occurs without teacher permission, or does not occur during choral or group responding is determined using momentary time sampling. At the beginning of each interval the observer looks at the child and in that moment determines whether or not the child is engaging in behavior that is off-task verbal. Some examples of off-task verbal are:

- talking to other students about topics not related to the assignment
- talking, singing, or rapping to themselves
- shouting out to get the teacher’s attention rather than raising their hand

**Partial Variables:**

**Disruptive Behavior:** Any instance when a student is out of their seat without permission, engages in any type vocalization without teacher permission, or makes noises with their bodies or classroom materials that are distracting to those around them. These behaviors will always be coded simultaneously with off-task motor and off-task verbal.

**Positive Teacher Statements:** Positive teacher statements were defined as any statement of praise made by the teacher addressed toward a single student, a group of students, or the entire class regarding rule following behaviors.

**Negative Teacher Statements:** Negative teacher statements were defined as any reprimand given by the teacher addressed toward a single student, a group of students, or the entire class.
Appendix B: Interdependent Group Contingency Script

Date:

Materials: Classroom rules poster, frequency counter, bag containing possible criteria, bag containing possible rewards, and group rewards

Steps:

☐ Review rules poster with the class:
   1. Stay in seat.
   2. Use respectful language.
   3. Pay attention.
   4. Listen when others are talking.

☐ Tell the class that you will be watching to be sure that they are following the rules during the class period, and that you will keep track of the number of times that they are talking during class without raising their hand, talking with their neighbors during seatwork time, using disrespectful language, or getting out of their seat without permission with a “clicker”.

☐ Tell the class that you will draw a random number from a paper bag at the end of the class period, and that if the number displayed on the clicker is less than the number drawn from the bag, then they will all receive a reward. List a few possible rewards.

☐ For the duration of the class period, record disruptive behaviors by clicking the frequency counter each time that students are talking during class without raising their hand, talking with their neighbors during seatwork time, using disrespectful language, or getting out of their seat without permission.

☐ At the end of the class period, check the number displayed on the frequency counter.

☐ Draw a number from the brown paper bag.

☐ Announce whether or not the class earned the reward.

☐ If the class earned the reward, draw a reward from the reward bag and deliver it to the students.

☐ If the class did not earn the reward, remind them that they will have the opportunity to do so the following day.

Appendix C: Interdependent Group Contingency + Self-Monitoring Script

Date:

Materials: Classroom Rules Poster, frequency counter, Student self-monitoring sheet, points bag, rewards bag, and group rewards

Steps:

☐ Review rules poster with the class:
   5. Stay in seat.
   6. Use respectful language.
   7. Pay attention.
   8. Listen when others are talking.

☐ Tell the class that you will be watching to be sure that they are following the rules during the class period, and that you will keep track of the number of times that they are talking during class without raising their hand, talking with their neighbors during seatwork time, using disrespectful language, or getting out of their seat without permission with a “clicker”.

☐ Tell the class that they will have the opportunity to check to see if they are following the rules during the class period as well.

☐ Pass out the self-monitoring sheet, and explain to the class that they should mark an X in one of the boxes on the sheet each time that they catch themselves talking during class without raising their hand, talking with their neighbors during seatwork time, using disrespectful language, or getting out of their seat without permission.

☐ Tell the class to remember that each time they have to mark an X on their paper, then it will make it harder for the class to earn the reward. Remind them to do their best to stay on task.

☐ Tell the class that you will draw a random number from a paper bag at the end of the class period, and that if the number displayed on the clicker is less than the number drawn from the bag, then they will all receive a reward. List a few possible rewards.

☐ For the duration of the class period, and that if the number displayed on the clicker is less than the number drawn from the bag, then they will all receive a reward. List a few possible rewards.

☐ At the end of the class period, check the number displayed on the frequency counter.

☐ Draw a number from the brown paper bag.

☐ Announce whether or not the class earned a reward.

☐ If the class earned the reward, draw a reward from the reward bag and deliver it to the students.

☐ If the class did not earn the reward, remind them that they will have the opportunity to do so the following day.

**Appendix D: Student Self-Monitoring Data Sheet**

If you catch yourself talking during class without raising your hand, talking with your friends when you should be doing your work, using disrespectful language, or getting out of your seat without permission, please place an X in one of the boxes
Appendix E: Teacher Social Validity Questionnaire

Teacher Social Validity Questionnaire

(adapted from Erhardt et al., 1996 and Martens, Witt, Elliot, & Darveaux, 1985)
The purpose of this questionnaire is to get feedback concerning your overall satisfaction with the intervention(s) implemented in your classroom. Please read the following statements and circle the number (1-5) that best describes your agreement or disagreement with each statement. The purpose of this questionnaire is to get feedback concerning your overall satisfaction with the intervention(s) implemented in your classroom. Please read the following statements and circle the number (1-5) that best describes your agreement or disagreement with each statement.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Not sure</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I had adequate input in developing the intervention scripts</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I liked the procedures used in this intervention</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The intervention was easy to include in my daily routine</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The intervention helped my students follow classroom rules</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I think that the self-monitoring sheets used by the students made the intervention more successful.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I would use just the group contingency component of this intervention in the future.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I would use the group contingency component of this intervention, along with the self-monitoring component, in the future.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Additional comments/concerns/suggestions:

Appendix F: Student Social Validity Questionnaire

Student Social Validity Questionnaire
Please fill out this worksheet to let the UC students know how you feel about the UC game that you played in your class this year. Please read the sentences and circle the number (1-5) that best describes how you feel.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Not sure</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I liked it when my teacher used a clicker to monitor my class’ disruptions</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>When my teacher used a clicker to monitor my class’ disruptions, it helped me remember to follow the classroom rules and not be disruptive</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The rules for when my teacher used the clicker and when my class earned prizes were easy for me to understand</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The rules for when I was supposed to monitor my own behavior by placing an “X” on the worksheets were easy for me to understand</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I liked using the worksheets to monitor my own behavior</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I think that using the worksheets to monitor my own behavior helped me do better in class</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I liked the prizes that my class earned when we had less disruptions than the number that was pulled from the bag</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Do you have any other thoughts or feelings about the UC game that you would like to share?