The Effects of a Group Contingency Intervention on Academic Engagement and Problem Behavior of At-Risk Students

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ABSTRACT

A successful learning environment can be characterized by actively engaged students displaying appropriate student behavior. We implemented a group contingency intervention as a novel component to a school-wide behavior management system to decrease the frequency of inappropriate behaviors and, conversely, increase the academic engagement of students in four elementary school classrooms. Twelve students with behavioral risks served as target students to monitor effects. A reversal design was implemented to evaluate behaviors across experimental conditions. Results indicated that the frequency of inappropriate behaviors decreased and academic engaged time increased for all 12 participants. These results suggested that the group contingency was an effective class-wide intervention. Implications for research and practice are discussed.

Descriptors: Independent group contingency, interdependent group contingency, lottery-based reward, school-wide behavior management

Group contingency procedures have become increasingly popular in educational settings to manage the classroom behavior of large groups of students (Hansen & Lignugaris/Kraft, 2005). Two types of contingencies commonly used in school settings are independent and interdependent group contingencies. With independent group contingencies, all children in the class or school receive the same consequence (e.g., privileges, rewards, punishment) for exhibiting pre-determined behaviors (e.g., Brigham, Bakken, Scruggs, & Mastropieri, 1992). With interdependent group contingencies, no individual student receives the reward unless all students in a group or across the school contribute to meeting the specific reinforcement criterion (e.g., Theodore, Bray, Kehle, & Jenson, 2001).

Group contingency interventions may be particularly beneficial for use in classrooms because they (a) increase the probability of teacher attention to appropriate behavior, (b) are more efficient to implement than individualized treatments, and (c) increase the likelihood that any single student's behavior will be exposed to the reinforcement contingency (Cashwell, Skinner, & Smith, 2001; Embry, 2002; Skinner, Skinner, & Cashwell, 1999; Sugai & Horner, 2002).

Studies have shown group contingencies to decrease inappropriate behavior and increase prosocial behavior in general and special education classrooms (Stage & Quiroz, 1997) and, in some instances, to improve school-wide indicators of success (Scott, 2001; Sugai & Horner, 2002). Procedures that have been shown to be effective within the context of group contingencies include visual cuing systems, public posting, social praise, team points, self- and group-evaluation, and group and individual reinforcement systems (Babyak, Luze, & Kamps, 2000; Salend, Whittaker, & Reeder, 1992).

Despite the efficacy of reward-based group contingency interventions for teaching appropriate behavior (Scott, 2001), class-wide and school-wide behavior management programs more commonly focus on reducing inappropriate behavior through the application of punishment procedures, such as warning systems and zero tolerance policies (Cashwell, et al., 2001; Colvin, Kameenui, Sugai, 1993; Sugai & Horner, 2002). In fact, some authors have reported that school staff may be less likely to implement a reinforcement component because of the expense, time, or objection to using tangible rewards (Kelshaw-Levering, Sterling-Turner, Henry, & Skinner, 2000).

Based on these findings, we were interested in evaluating a low-cost, reward-based group contingency program that targeted appropriate behavior. Ideally, the program would be effective for large numbers of students to minimize the need for individualized programs, which are time consuming, costly, and difficult to implement in large classrooms. To increase the acceptability of the program, we embedded the intervention into an existing school-wide behavior management system. To reduce the cost and time required to implement the reward component, we instituted a lottery system in conjunction with independent and interdependent group contingencies and taught students to self-manage. As such, this study was designed to build upon the empirical literature on group contingency procedures by (a) incorporating the group contingency within a previously established school-wide management system (a warning system), (b) instituting a lottery system in conjunction with an independent group contingency, and (c) including a self-management component to further

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decrease the time and costs associated with the intervention.

Method

Participants and Settings

Three children in each of four classrooms were enrolled in the study, for a total of 12 participants. The children (9 males and 3 females) were between the ages of 7 years and 9 years. They were chosen based on requests from their teachers for assistance due to problem behaviors. All of the children were concurrently participating in an assessment project through a university research facility and were considered at risk for developing severe behavior disorders based on teacher ratings on the *Systematic Screening for Behavior Disorders Checklist* (*SSBD*) (Walker & Severson, 1992). Four of the students were diagnosed with Attention Deficit Hyperactivity Disorder, one student was diagnosed with Asperger's Syndrome, and one was diagnosed with a learning disability.

The four participating classrooms included two third-grade classes (Class 1 and Class 2) and two second-grade classes (Class 3 and Class 4), all located in a school in a suburban community of a Midwestern city. Each class had approximately 18 to 20 students. The percentage of minority students was 48%, with 60% of students eligible for free or reduced lunches. The teachers had15 years to 30 years of classroom experience. At the time of the study, each classroom was implementing a school-wide behavioral management program consisting of a warning system that targeted inappropriate behavior. Consequences included loss of recess time and home notes.

Materials

Materials included a wall chart with pockets containing each student's name and colored cards, desktop self-management charts, lottery tickets and rewards, warning cards, and consequence cards. The materials in use for the school-wide behavioral management system at the time of the study included the wall chart and color cards (called "flip cards"), which were provided by the school at no cost to the teacher. To implement the intervention, teachers used small lottery cards (5.1 cm x 5.1 cm) for distribution to students for appropriate behavior. The lottery cards included a space for the student to write his or her name. Each student was given a 10.2 cm x 15.2 cm self-management chart to tape on the top of his or her desk. The 27 spaces on the chart were used to record the number of lottery tickets they had received. Rewards such as pencils, erasers, small notebooks, stickers, and shoelaces were provided by a researcher for the lottery drawing. In addition to lottery incentives, occasional pizza and donut parties were also provided by the researcher. Teachers also used warning cards during the intervention, which were distributed for inappropriate behavior at the same time the lottery cards were given out for appropriate behaviors. Warning cards were 7.6 cm x 7.6 cm and had spaces on the back for student name, parent signature, and to note loss of recess. Costs for the rewards were approximately $150 for the study duration. The remaining materials (i.e., lottery tickets, warning cards, self-management charts) were created using standard paper stock, with costs under $50.

Response Measurement

Academic engagement time. Data on the duration of academic engagement were collected during 15-min academic periods. A timer was started whenever the participant was engaged in the appropriate activity and stopped when the participant was not appropriately engaged. Academic engagement included attending to the teacher, reading, writing, academic responding, and other behaviors associated with assignment completion and following directions. The student was considered off task when he or she was not attending, completing assignments, or following directions. Duration data on academic engagement were converted to a percentage of time by dividing the total recorded academic engagement time by the total observation time and then multiplying the result by 100.

Inappropriate behavior. Frequency data were collected on the occurrence of inappropriate behaviors during the 15-min academic period. Inappropriate behaviors included aggression (i.e., hitting, pushing), out of seat/area, negative verbalizations to peer (i.e., arguing, name calling, teasing), negative verbalizations to adult (i.e., arguing, non-compliance), talking out or talking during quiet time (i.e., talking without teacher permission), disruptive behavior (i.e., using materials inappropriately, throwing objects), and behavioral or academic non-compliance (i.e., failure to initiate requested response within 5 s).

Teacher praise. Teacher praise was defined as (a) verbal praise statements giving approval or acknowledgement of appropriate academic or behavioral performance, (b) physical gestures of affection or tangibles, and (c) giving rewards such as tokens, points. Frequency data were collected on the occurrence of praise during the 15-min period. Praise data were categorized as group (to the entire class, including the target child) or individual (directed to the target child). Teachers were aware across all conditions that praise statements and gestures were recorded.

Social validity surveys. Satisfaction surveys were distributed to teachers and all students. On the teacher satisfaction survey, the responses were presented in Likert-type scales with values from 1 (strongly disagree) to 5 (strongly agree), as related to implementation (e.g., "The lottery game fits into the daily routine;" "The lottery game was easy for me to learn how to use.") and effectiveness (e.g., "The lottery game helped my students to have appropriate behavior;" "The lottery game helped my students stay on task."). On the student satisfaction survey, the responses were presented in a written Likert-type scale (i.e., "Not at all", "A little", "Quite a bit", and "Very much").

Data collection and observations. All data were collected by trained research staff. Observer training consisted of mastery of the behavioral definitions and

collection of the data in the classrooms until 80% reliability was reached across two sessions. Data collection occurred in the morning and afternoon because the intervention was implemented across the day. The schedules were shifted weekly for the consultant to be able to observe morning and afternoon sessions in both group and independent activities.

Reliability. Interobserver agreement was assessed in each of the classrooms where the intervention took place. Reliability was measured on 20% to 28% of the sessions by having a second observer independently collect data. Interobserver agreement was calculated by dividing the lowest percentage of academic engagement time or frequency of behavior by the highest percentage or frequency and multiplying by 100%. Mean agreement across the four classrooms for student behavior ranged from 85% to 92% in baseline and 93% to 100% in treatment. Mean interobserver agreement for teacher praise ranged from 67% to 100% in baseline and 80% to 100% in treatment.

Research Design

A reversal design (Baer, Wolf, & Risley, 1968) was used to study the effects of the group contingency intervention. Experimental conditions were ABABC, where A = baseline, B = treatment, and C = fading of treatment (maintenance).

Baseline

The teachers implemented the pre-existing behavior management procedures (e.g., school-wide warning system, loss of recess, home notes) during baseline. The school-wide warning system consisted of colored cards used as a visual representation of each individual student's behavior throughout the day. The consequences for inappropriate behaviors incorporated in the "color card system" were as follows: green = good student behavior; yellow = student has had a warning due to inappropriate behavior; red = student has had a 2nd warning and 5 min off of his/her recess time; blue = student has had repeated warnings, lost all recess time and a note is sent to parent(s) noting the behavioral problems. Office referrals were frequently used for disruptions. The students were asked to "flip his/her card" when given a reprimand for inappropriate behavior.

Intervention

The components of the intervention included a classroom lottery game, interdependent group contingency, self-management, and individual warning cards. A reward-based lottery game was combined with the existing school-wide warning system described previously. All students (the participants and the other students in the class) received lottery tickets for maintaining appropriate behavior (i.e., having a green card or yellow card showing on the school-wide colored card system) and recorded the number of lottery tickets earned on a self-management chart by placing an "X" in a box for each ticket received. The group contingency lottery game (i.e., teacher distributing and drawing of winning lottery tickets simultaneously) was designed to occur twice a day, once in the morning and once in the afternoon. Teachers were instructed to randomize the times that they awarded the lottery tickets to avoid any behavioral patterns (e.g., tickets always being awarded before recess) and to increase required appropriate student behaviors for longer durations of time. Teachers were instructed to include a verbal praise statement to the student(s) as they were awarding the lottery tickets. The teacher drew four or five winning lottery tickets right after distribution twice a day; students with the winning tickets could choose a small reward (e.g., pencils, stickers). An interdependent group contingency also was included in the intervention. The entire class received a pizza party as soon as each student had received enough lottery tickets to fill his or her self-management chart (27). The parties occurred approximately once per month.

Finally, individual warning cards were used in conjunction with the color cards and verbal warnings for inappropriate behavior. Any student on the color yellow, red or blue in the flip card system was given a warning card, and he or she was required to follow the steps on the warning card for each color change on the flip card system due to inappropriate behavior. The sequence was green = good behavior and student participates in lottery; yellow = inappropriate behavior, student given a warning card and required to sign the back but still able to participate in the lottery; red = warning, 5 min off recess, and parent signature required on the warning card; blue = warning, parent signature required on the card, and loss of all recess time. The warning cards were distributed at the same time as the lottery tickets.

Just as the parents were informed of the inappropriate behaviors via the warning card, it was suggested to the teachers that they incorporate a short note home telling the parents that their children had good behavior that week. Teachers were also required to submit their colored card records for each student at the end of each semester to the school.

Training and Implementation of the Intervention

The intervention was implemented in several steps. First, an initial meeting was held between the teacher and researcher to discuss the implementation of the intervention (approximately 60 min). This was followed by an initial meeting with the entire class to discuss the new intervention (approximately 30 min). During the explanation of the lottery game to the class, the researcher explained that they were chosen to do a game that would require them to show others what it is to be a good student. It was explained that their teacher would be passing out lottery tickets, which were contingent upon their colored card status. The student self-management charts and warning cards were also described. It was also explained that when each student in the class turned at least one chart in to the teacher, there would be a class party; that each new day began a new day of the lottery (i.e., prior tickets discarded);

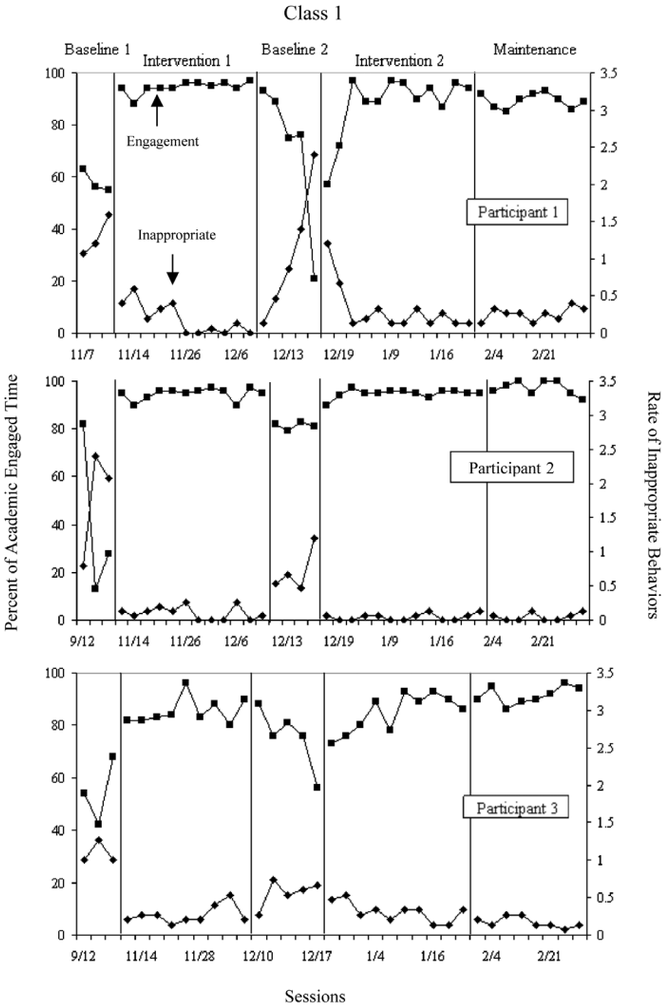

Figure 1. Percentage of time engaged and rate of disruptive behavior for the students in Class 1.

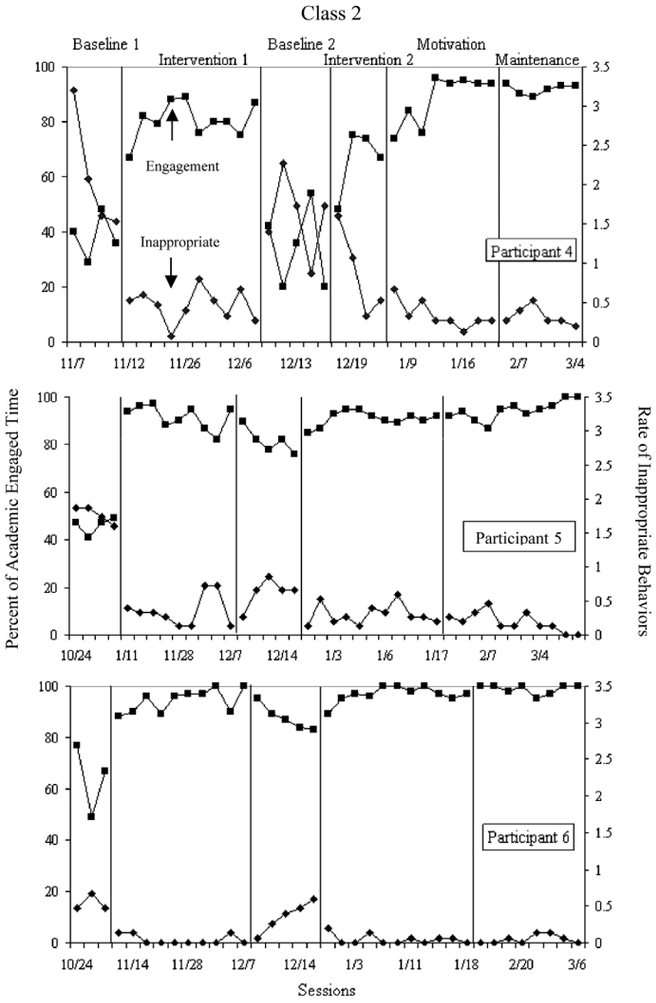

Figure 2. Percentage of time engaged and rate of disruptive behavior for the students in Class 2.

and individual student cards began on green. Training regarding appropriate behaviors occurred for approximately 15 min and consisted of modeling by the researcher and student role plays of 'incorrect' and 'correct' behavior.

After the training, the teachers took the lead role in distributing the lottery tickets and warning cards and conducting the lottery drawings. These activities required 10 min of the teacher's time, twice per day. The researcher provided feedback to the teachers on their praise rates and their students' progress. During the game, the researcher frequently provided feedback to the entire group on their progress and/or clarified expectations. Typically, the classes were given bonus lottery tickets for their efforts and occasionally rewarded with small candies or prizes (e.g., pencils). The researcher also provided assistance in writing weekly positive home notes for the students.

Fading the Intervention

Eventually, the lottery drawing was faded to once per day, but varied with respect to the time of day (e.g., not always at the end of the day). Lottery tickets were still awarded twice each day to the students for good behavior. Teachers were asked to continue the use of verbal praise for appropriate student behaviors during the entire day. Teachers incorporated the lottery ticket totals and chart completions into the individual student progress notebooks, which were shown to parents at conference times.

Individual Motivational System

During the 2nd week of the group intervention, an individual motivational system was implemented for Participant 4 consisting of (a) teacher feedback at the end of each activity, (b) individual rewards for performance, and (c) a home-school note of daily performance. This individual program was implemented because the student's academic engagement time was not increasing and disruptive behavior remained high, suggesting that the student needed more individualized behavior support. It was implemented during the entire day and included the teacher's signature or stamp on a behavior chart for each

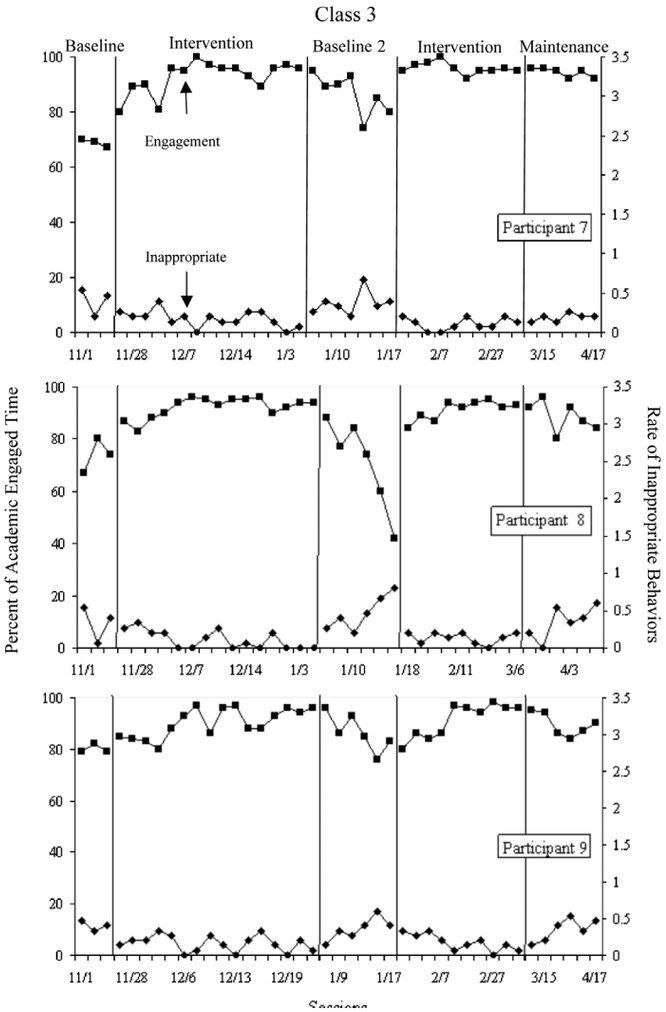

Figure 3. Percentage of time engaged and rate of disruptive behavior for the students in Class 3.

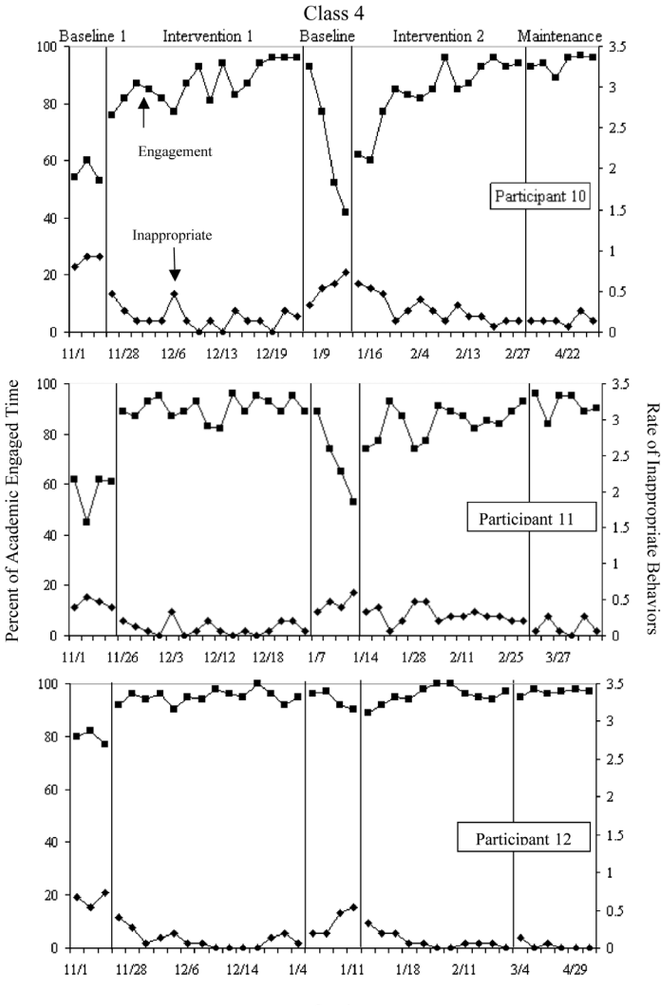

Figure 4. Percentage of time engaged and rate of disruptive behavior for the students in Class 4

activity completed (e.g., reading, math, computer time) during which the child maintained appropriate behaviors. The stamps were given at the end of the activity and put on a record sheet that was sent home and signed by the parent. The participant earned a bonus lottery ticket if he maintained good behavior during four of the five daily activities.

Results

Overall, results demonstrated that the intervention improved student behaviors in all four classrooms. As shown in Figures 1, 2, 3, and 4, all but 1 of the 12 participant showed substantial increases in academic engagement and decreases in inappropriate behavior during the intervention. Participant 4 showed improvements in both behaviors when the individual motivational system was combined with the intervention. Experimental control was clearly demonstrated for most participants through a reversal and replication of the effect. The effects maintained for all participants when the lottery drawing was faded to once per day. The students also showed improvements when the *SSBD* was re-administered in the spring. Ten of the 12 students were shown as 'not at-risk' on the *Maladaptive Behaviors Scale* of the *SSBD* (compared to seven in the fall); and nine of the participants had decreasing scores from fall to spring. Eleven students remained at normative levels on the *Adaptive Behavior Scale* of the *SSBD*.

All teachers increased group praise statements slightly during the 15-min data session from a mean of 1 response per min [rpm] during baseline to a mean of 3 rpm during the intervention. Each of the four teachers also increased praise statements directed to individuals from a mean of 0 rpm in baseline to a mean of 1 rpm during intervention. This outcome was replicated during the reversal to baseline and reintroduction of the intervention.

Finally, a majority of students, a total of 85, responded to the student satisfaction questionnaire at the end of the study. Overall, students rated the group contingency lottery game positively. When asked, "How much did you like to play the group contingency lottery game?", the majority of students (86%) responded "Very much." Eighty-six percent of students responded that

the lottery game helped them have good student behavior "Quite a bit" or "Very much," 85% of students responded that the game helped them stay on task "Quite a bit" or "Very much," and 85% reported they wanted to play the lottery game in the future. Satisfaction data collected from the teachers at the end of the study indicated that the teachers "Agreed" or "Strongly Agreed" that the group contingency lottery game fit into their daily routine, was easy for them to learn how to use, and was easy for them to teach their students how to play. The teachers "Agreed" or "Strongly Agreed" that the group contingency lottery game helped their students to have appropriate behavior, be more productive, and stay on task. All teachers agreed or strongly agreed that "their students seemed to enjoy the playing the group contingency lottery game" and "they would recommend that other teachers use the group contingency lottery game in their classrooms." Three teachers responded that they planned on using the lottery game "Frequently" or "Occasionally" in the future.

Conclusions

This study provided an example of a group contingency intervention in four classrooms. The results showed that an intervention consisting of a reward-based independent group contingency and lottery, interdependent group contingency (class parties), and self-management was effective for 2nd and 3rd grade children and target students who were at risk for severe behavior disorders. These components, embedded within the existing school-wide punitive-only behavior management program, were intended to increase the feasibility and acceptability of using rewards in the classroom. Results of the satisfaction surveys indicated that the teachers and students were pleased with the intervention. In fact, the teachers requested the intervention data be used in addition to progress reports during parent conferences.

These findings are consistent with other research showing the effectiveness of group contingency interventions to increase engagement (Babyak et al., 2000) and decrease problem behaviors (Hansen & Lignugaris/Kraft, 2005). For all 12 at-risk children, the frequency of inappropriate behaviors decreased and no longer interfered with their classroom performance. Further support was also demonstrated for combining self-management with group contingencies (Kern, Dunlap, Childs, & Cook, 1994).

In spite of overall student and class improvement, one student (Participant 4) required an individualized intervention. He continued to be disruptive during the class-wide intervention, and removal from the classroom was occurring several times per week. However, the individual motivational system rapidly improved the effectiveness of the group contingency program. Several other limitations of this study must be considered. First, no data were collected on the integrity with which the teachers implemented the intervention. Second, the component(s) of the intervention that were responsible for the outcome is unclear because multiple components were introduced simultaneously (lottery drawings, self-management). Finally, interobserver agreement was assessed using a relatively imprecise calculation method (whole session).

Recommendations for Practitioners

We highly recommend a class-level group contingency to support school-wide behavior management systems. The contingency should focus the teacher's attention on appropriate behavior and use tangible rewards that could potentially reinforce student task engagement. The practicality of the intervention in this study allowed the teacher to focus on instruction and provided the students with a learning environment that was engaging and positive.

We recommend including both independent (i.e., individual consequences) and interdependence (e.g., consequences based on the entire group) components. The interdependent criteria for earning the class party appeared to increase cooperation and encouragement of students to their peers to do well.

We also highly recommend the use of lottery tickets as an added component to delivery of rewards. Giving small prizes to four or five students rather than the whole class saved money and time. Use of the lottery drawing twice per day during natural breaks was easy to do and resulted in improvements for 11 of 12 students. This was easily faded to once per day, making the procedure even more efficient. The desk charts used for self-management appeared to assist with student motivation and were a simple way to track lottery tickets so the teachers knew when students had earned a class party.

Finally, we encourage the use of positive notes home as a feature of the class-wide group contingency. Teacher praise didn't change very much during intervention. As such, we would suggest using additional strategies to increase verbal attention to appropriate behavior (e.g., having teachers self-manage, teaching students to recruit praise, prompting teachers via a timer to deliver praise intermittently).

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