The Impact of a Teacher-Preferred Group Contingency with Data-Based Decision Making on Class-wide Behavior

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The Impact of a Teacher-Preferred Group Contingency with Data-Based Decision Making on Class-wide Behavior

by

Fernando Herrera

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Arts Applied Behavior Analysis Department of Child and Family Studies College of Behavioral and Community Sciences University of South Florida

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Dedication

I dedicate this manuscript to my parents, who have always supported me in all my endeavors, both academic and otherwise. I would like to specifically dedicate this manuscript to my fiancée, Jessica Moore, who showed me that if you work hard enough, and put enough energy into meaningful change, anything is possible.
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Abstract

The purpose of this study was to further examine the impact of a teacher-preferred group contingency on class-wide behavior in three general elementary education classrooms when it is used with data-based decision making by classroom teachers. A multiple baseline design across classrooms was used to examine the changes in class-wide disruptive behavior, academic engagement, and academic performance in targeted academic time periods. Data indicated that implementation of the group contingency preferred by the teachers in conjunction with data-based decision making resulted in decreases in disruptive behavior and increases in academic engagement and academic performance across classrooms. In addition, improvement in class-wide behavior was maintained at 1-week follow-up.
Introduction

Classrooms are intricate environments with a multitude of competing contingencies in which students can choose to engage in many behaviors, both desired and undesired. One concern that is consistent for educators across the country is school discipline (Dunlap, Iovannone, Wilson, Kincaid, & Strain, 2010). Eighty-five percent of new teachers feel they are unprepared to manage discipline problems, and 4 out of 10 teachers spend more time managing disruptive behavior than teaching (Good, 2004). Problem behavior is also a source of stress and is highly correlated with teacher burnout (Hastings & Bham, 2003; Talmor, Reiter, & Feigin, 2005).

In addition, dealing with problem behavior takes up a teacher’s time and disrupts classroom activities, leading to lower levels of academic engagement and academic success. These issues are seen most frequently in urban schools which are often characterized by high rates of poverty and students at risk for academic failure (Harris & Herrington, 2006; Jacob, 2007; Musti-Rao & Cartledge, 2007). Urban students need teachers who can appropriately guide them to reach academic and behavioral goals (Evers, Tonic, & Broewers, 2004). Therefore, schools are in need of effective systems to decrease problem behavior and increase academic engagement.

An evidence-based practice commonly used in schools to teach appropriate behaviors and decrease problem behaviors is Positive Behavior Interventions & Support (PBIS) (Anderson & Kincaid, 2005). This practice incorporates a three-tiered system of supports to help students reach academic and behavioral goals. Tier 1 consists of universal, school-wide supports including: stating clear expectations and rules, developing a reinforcement system, and creating a
consistent disciplinary process (George, Kincaid, & Pollard-Sage, 2009). Tier 1 is intended to address the needs of 80-90% of the student body (Anderson & Kincaid, 2005; Sugai & Horner, 2009). Tier 2 supports are meant to address the needs of 10-15% of the student body and are designated for students whose academic and behavioral goals are not met using Tier 1 interventions and are at risk for developing severe problem behavior (Hawken, Adolphson, MacLeod, & Schumann, 2009). For some students, Tier 2 supplemental supports are needed at the classroom level until appropriate behavior can be maintained by Tier 1 interventions (Gresham, 2004). Tier 3 interventions are intended to support about 5% of the student population and include individualized, intensive behavioral supports for students whose goals are not met using Tier 2 interventions (Scott, Anderson, Mancil, & Alter, 2009).

Although some students may need the intensive behavioral supports used in Tier 3, utilizing group contingencies effectively at Tier 2 or the class-wide level may reduce the need for teachers to implement individualized interventions. Group contingencies are useful in classroom settings because they are cost effective, time efficient and easily implemented across a large number of students (Heering & Wilder, 2006; Moore, Waguespack, Wickstrom, Witt, & Gaydos, 1994; Skinner, Skinner, & Burton, 2009). Therefore, group contingencies may have better contextual fit for classroom teachers because data is taken and consequences are provided to the group of students as a whole rather than individually (Benazzi, Horner, & Good, 2006; McIntosh, Filter, Bennett, Ryan, & Sugai, 2010). Group contingencies can be categorized into four groups: dependent, independent, interdependent, and randomized or unknown dependent group reinforcement. (Ennis, Blair, & George, 2015; Skinner, Skinner, & Sterling-Turner, 2002).

In dependent group contingencies, the whole class has the same expectations, but all or none of the student’s behavior is reinforced based on the performance of one student or a small
group of students (McKissick, Hawkins, Lentz, Hailley, & McGuire, 2010). Independent group contingencies target the same behavior and apply the same consequences to all students’ behavior in the classroom although the consequences are provided on an individual basis (Litow & Pumroy, 1975; Skinner, Williams, & Neddenriep, 2004). Interdependent group contingencies reinforce the class’s behavior as a whole based on the class’s meeting of a specified behavior criterion (Kelshaw-Levering, Sterling-Turner, Henry, & Skinner, 2000; McKissick, Hawkins, Lentz, Hailley, & McGuire, 2010). Randomized group contingencies reinforce the student’s behavior based on whether the class meets the behavioral criterion of a group contingency type that is unknown to the class (Gresham & Gresham, 1982; Kelshaw-Levering et al., 2000).

Research has demonstrated the four group contingencies types are equally effective in changing group academic engagement (Ennis et al., 2015; Hulac & Benson, 2010; Heering & Wilder, 2006; Ling, Hawkins, & Weber, 2011; Kamps et al., 2011; Theodore, Bray, Kehle, & DioGuardi, 2004; Williamson, Williamson, Watkins, & Hughes, 1992) and decreasing problem behavior (Ennis et al., 2015; Hulac & Benson, 2010; Kamps et al., 2011). However, several limitations with group contingencies have been discussed in the literature. For example, students may not improve their behavior in areas other than where the group contingency is being implemented or become unmotivated if they consistently fail to meet the pre-determined criteria. Another limitation may be the difficulty of promoting students’ engagement in activities when less-preferred items are selected as reinforcers for the contingency (Skinner et al., 2002). Researchers have suggested that these limitations can be minimized when one or more components (e.g., criteria, type, reinforcement) are randomized and selected at the end of the instructional time period or by including student choice in reinforcer selection (Alric, Bray,
Given the PBIS approach stresses the incorporation of key stakeholders in the process of intervention selection and design to increase the contextual fit and external validity of the interventions, classroom teachers should play an active role in selecting and implementing a group contingency intervention to enhance and sustain intervention outcomes (Cihak, Kirk, & Boon, 2009; Heering & Wilder, 2006; Wright & McCurdy, 2012). Despite overwhelming evidence supporting the importance of contextual fit, (Elliot, Turco, & Gresham, 1987; Tingstrom, 1994) few studies have evaluated teacher’s choice as an indicator of group contingency preference (Ennis et al., 2015).

Ennis et al. (2015) evaluated teacher preference using teacher choice as an indicator of group contingency preference and found all four contingency types resulted in reduced disruption and increased academic engagement across three classrooms. When teachers selected and implemented their preferred contingency type (two selected dependent and two selected independent), further improvements were made in both class-wide behaviors. Ennis et al. is the first study which examined the impact of a teacher preferred group contingency on class-wide behavior; therefore, more research is needed to further evaluate the effects of teacher preference in selecting and implementing group contingencies.

With the increasing demand of implementing Multi-Tiered Systems of Support (MTSS) and school-wide PBIS, policies at the national level emphasize regularly collecting and analyzing monitoring data and making decisions based on that data at the individual and class-wide level (Hoover & Patton, 2004; McIntosh et al., 2010). However, teachers often do not have access to the data or cannot accurately analyze the data to make data-based decisions (U. S.
Department of Education, 2009). To make data-based decisions, teachers need to evaluate performance and analyze whether an individual student’s performance (or class-wide performance) is increasing, decreasing, or remaining stable (Munger, Snell, & Loyd, 1989). When teachers collect, but do not graph and visually inspect data, decisions about whether to change programs may not be accurate (Munger et al., 1989; Snell & Loyd, 1991). Therefore, facilitating teachers to make data-based decision making based on a visual analysis of graphed data is critical in improving student performance.

Although the use of data-driven decision making would likely result in improved selection, implementation, and maintenance of effective interventions, currently, none of the studies on group contingencies have incorporated data-based decision making. This would allow teachers to monitor and evaluate the effects of interventions on class-wide student behavior and/or to adjust interventions based on the data. Given that data-driven decision making by teachers may contribute to improved outcomes of group contingency interventions, the proposed study attempted to extend the group contingency literature by examining the impact of the teacher-preferred group contingency augmented with data-driven decision making on class-wide behavior. Specifically, the study addressed the following research questions: a) to what extent can teachers implement a teacher-selected group contingency with data-based decision making independently; b) to what extent can the teacher-preferred group contingency with data-based decision making reduce class-wide problem behavior and increase academic engagement and performance; c) will changes in class-wide behavior be maintained at weekly follow-ups; and d) to what extent will teachers find teacher-selected group contingency with data-based decision making acceptably effective.
Method

Setting

This study occurred in three classrooms of an urban elementary school (Pre-K through 5th grade). The school had approximately 790 students and was a Title I school with 95% of students receiving free or reduced price lunch. The school had been implementing school-wide PBIS for six years, and data from the previous academic year (2014-2015) showed their Benchmarks of Quality (BoQ) score was 93, indicating a high degree of implementation fidelity of school-wide PBIS (Kincaid, Childs, & George, 2005). To be considered an effective Multi-Tiered Systems of Support (MTSS) school, about 80% of students would have zero to one office discipline referrals (ODRs) with 15% of students having two to five ODRs, and the remaining 5% students having six or more ODRs. Reported data from the participating school showed 65% of students having zero to one ODRs, 34% of students having two to five ODRs, and 1% of students having six or more ODRs per academic year for the previous school year. These data sources indicated a need for effective school-wide PBIS along with Tier 2 or class-wide group contingencies. The study targeted the most problematic academic time period for intervention (e.g., reading, reading centers, math) in which students engaged in high rates of disruptive behavior. The activities were selected based on teacher report and data collected during initial classroom observations.

Participants

Participants in this study were students and teachers of three classrooms (one each from 1st, 2nd, and 4th grade) at the school. Classrooms were selected for inclusion based on the following criteria: (a) the teacher consented to participate in training and implementation; (b) the teacher had no prior experience with group contingency; (c) the teacher had no experience with
data-based decision making; (d) the classroom contained at least three students who engaged in disruptive behavior; (e) the disruptive behavior occurred daily during at least one instructional activity; (f) the teacher implemented at least one academic assessment per week for the target academic time period, and (g) 70% of students’ parents signed informed consent forms.

Classroom students were excluded from the study based on the following criteria: (a) if the students’ disruptive behavior was dangerous to the student or peers, and (b) the students were eligible for Special Education services. The parents of all students in participating classrooms were given detailed information regarding this study and all students in the class were asked to verbally assent to participate. Information about the study was disclosed to the students’ parents via informed consent forms which they signed and returned to the researcher if they wanted their child to participate. All children who participated in this research were 6-11 years of age.

Target classrooms were recruited through a brief teacher interview followed by a direct observation session, which identified the teacher’s interest and a need for implementation of group contingency as a class-wide or Tier 2 interventions in their classroom. Teacher interview consisted of questions to identify possible disruptive behavior, such as “does disruptive behavior in your classroom concern you?” and “how many students engage in disruptive behavior during instructional activities.” (See Appendix A). One classroom observation was conducted to confirm the number of students with disruptive behavior (at least three students) and the overall class-wide levels of disruption. Classroom observations occurred during the 20-60 min instructional academic time period where interview data suggested a high frequency of disruptive behavior. During the classroom observation, data on student disruptive behavior was collected using a 15 s partial interval recording system and on the number of students engaging in the disruptive behavior.
**Classroom 1.** Classroom 1 was a first grade classroom with 18 students with three to four students who constantly engaged in disruptive behavior during daily reading work stations. They engage in such disruptive behavior as playing with objects unrelated to task, arguing with others/teacher, out of seat/out of area without permission, shouting out, talking out of turn, crawling on floor, dancing and singing, falling to ground, throwing objects, rocking back and forth on chair. When the initial classroom observation was conducted, the classroom students engaged in disruptive behavior 60% of intervals during the reading work station time. The instructional activity during the reading work stations included small group instruction on reading skills and independent work in different stations around the classroom. One of the students was receiving additional Tier 3 behavioral supports (e.g., Check & Connect) during this time by the school PBIS team and the teacher. This student was included in measurement of target behaviors until he engaged in severe aggressive behavior after not receiving the reward. A Caucasian female teacher, 30 years old with eight years of teaching experience was teaching the classroom. She had a Bachelor’s of Science in Elementary Education.

**Classroom 2.** Classroom 2 was a second grade classroom with 18 students with three to four students engaging in disruptive behavior. During the targeted whole group reading instruction, they engaged in such disruptive behavior as head down on desk, playing with materials unrelated to task, arguing with others, laughing at others inappropriately, yelling at teachers/others, tattling, calling out when only one student is supposed to answer the teacher, talking to other students while teacher is talking, walking around classroom/out of seat without permission, talking with others during lecture, running around classroom, hitting others with materials, and throwing objects. During the initial observation, the classroom students engaged in disruptive behavior in 50% of the intervals. Instruction during reading usually started with
teacher presenting to the class in a large group format and then going into independent seat work or independent reading on the carpet. On occasion, after large groups, the students had a group-wide hands-on activity (e.g. making posters) related to the reading materials. Eight students in the classroom received additional supports during this instructional activity from an English Language Learners (ELL) support staff that would pull the students for testing and additional support. These students remained in all measures of disruptive behavior and academic engagement when they remained in the classroom. A Caucasian female, 31 years of age with two years of teaching experience and had a Bachelor’s of Science in Sociology was teaching this classroom.

**Classroom 3.** Classroom 3 was a fourth grade classroom with 18 students with three to four students who constantly engaged in disruptive behavior, throughout the day, in particular, during whole group math instruction, such as throwing objects, out of seat/area. The classroom disruptive behavior occurred in 60% of the intervals during the initial classroom observation. This classroom had one of the highest numbers of ODRs (19) at the elementary school compared to other classrooms. All students received additional supports during this instructional activity from a math coach, who provided a few minutes assistance individually to the students. Instruction during math usually started with the teacher presenting to the class in a large group format, and then going into independent seat work or small group work on occasion. Also, prior to large group instruction, the teacher gave out math test or academic assessment once per week. A Caucasian female, 38 years old, with 10 years of teaching experience was teaching this classroom. This teacher had a Bachelor’s of Art in Theatre with a Minor in English, and a Master’s Degree as a Reading Specialist. Table 1 provides details on the demographic information of each classroom.
Measures and Data Collection

The dependent variables were class-wide academic engagement, disruptive behavior, and academic performance. Academic engagement was measured using the planned activity check (PLACHECK), a type of momentary time sampling for measuring group-wide behavior (Cooper, Heron, & Heward, 2007) which measured the average percentage of students engaged in the specified behavior within 3-min intervals during direct observation in the target instructional activity. The PLACHECK was measured by counting the number of students engaged in the target behavior and dividing by the total number of students. This number was multiplied by 100 to calculate the percentage of academic engagement. Changes in the number of students in the classroom were noted throughout observations to make sure the percentages were precise. The average percentage of academic engagement for each observation was calculated by summing the percentage of students academically engaged at each check and dividing by the total number of checks. Disruptive behavior was measured as the percentage of intervals where disruptive behavior occurred in 15-s intervals within 20-30 min observations. Academic performance was measured as the mean percentage of correct responses on a weekly assessment. Additionally, implementation fidelity and social validity were measured to assess the integrity of treatment and acceptability of the intervention by teachers.

Two research assistants were trained on the partial interval, PLACHECK, and treatment fidelity data collection procedures. Research assistant training included taking data on video clips with simulated classroom activities, using similar operational definitions of behaviors developed for each class. A score of 80% or better on the training session for target behaviors was required prior to becoming a research assistant during study observations.
Data were collected 3-4 times per week during targeted instructional activities where the teacher could implement group contingencies for 20 to 60 min; however, data were collected from the beginning of activities for a maximum of 30 min, or when the activity finished, whichever occurred first. Data were collected with paper (see Appendix B) and pencil, and an electronic timer on iPhone was used to indicate different time intervals for interval recording. The timer was set to a vibration mode to avoid interruption of the classroom activities. To supplement data on class-wide behavior, the teachers collected data on both academic engagement and disruptive behavior using a Behavior Rating Scale (BRS) (See Appendix C).

**Academic engagement.** Academic engagement was defined, in collaboration with teachers, as eyes on work, task, or teacher while remaining in the assigned area with his/her head oriented towards the designated materials or teacher, or working with group members during small group instruction (e.g., staying engaged in materials and talking with others when called to). Students were counted as being academically engaged if they were walking between areas to acquire something (e.g., getting a drink of water, going to the library) with teacher permission.

**Disruptive behavior.** Disruptive behavior was defined in collaboration with the teachers and determined to correspond with classroom rules and expectations. Disruptive behavior included off-task, disrespect, interfering with students’ learning, disregarding instructions, and being unsafe. Off-task was defined as head down on desk, playing with objects unrelated to task, playing with task materials in a non-instructional way, putting things in other peers’ desks, looking away from text or teacher during instruction, or putting self in personal space of others.

Disrespect was defined as laughing at others inappropriately, yelling at others, tattling (e.g., when another students placed things in other’s desk, going to the teacher and whining that the other student was being bad), touching others (e.g. poking others in the arm, running hand on
back), being at teacher’s desk without permission, cursing, bossing others (e.g., telling other students how they should sit or talk), or taking others’ property.

Interfering with student’s learning was defined as dancing or singing (e.g., moving body back and forth, engaging in vocalizations unrelated to activity), out of seat/area (e.g., going up to other parts of the room without a clear objective to sharpen pencil, drink water, or use bathroom), talking to others during lecture engaging in vocalizations with other nearby students, making noises (e.g., tapping pencil on desk with enough force to create an audible sound, making non-speech vocalizations), loud talking (e.g., vocalizing words in a high enough volume that it is heard from one end of room to the other end of the room), crawling on floor, crying and sobbing, calling out when only one student is supposed to answer the teacher, laying down on floor, or running around room.

Disregarding instructions was defined as ignoring directions after first instruction is given, looking away from teacher/materials during directions, refusing task, or laying head down on desk. Being unsafe was defined as throwing objects (e.g., picking up an object and releasing from hand with enough force to create an audible bang when the object landed), hitting others with objects or hands, deliberately falling to ground from standing position, unsafely sitting in chair (e.g., rocking back and forth on chair with both feet are off ground, sitting on feet, leaning chair backwards with legs off the ground), running around classroom, jumping up and down, jumping on desk/table, kicking objects, threatening others (e.g., telling other student’s that they “would get it”, or to “shut up or else”), or playing with unsafe objects (e.g., manipulating scissors and placing sharpened pencil into skin). Each 15-s interval was scored as occurrence if any of the topographies occurred within an interval.
**Academic performance.** Class-wide student academic performance was measured as the percentage of correct responses on weekly academic assessment questions using the permanent product (e.g., recorded responses to answers on paper sheets or oral responses to questions tallied and written down on a piece of paper). The weekly academic assessments were given to each student in baseline, intervention, and follow-up. Questions were varied in number (between one to up to 30 questions depending on the activity/classroom) and based on the material that was covered for the week during the target academic time period. The assessments consisted of short answer questions for reading in a paper format, oral answers written down on a piece of paper for reading centers, and multiplication or division problems on paper for math (see Appendix I for an example). Based on the individual student’s scores, the average percentage of correct responses was calculated to determine the academic performance at the class-wide level.

**Behavior rating scale (BRS) on academic engagement and disruption.** To supplement direct observational data on academic engagement and disruption, the teachers were asked to collect daily data on the class-wide academic engagement and disruptive behavior using a BRS (Appendix C), which was based on the estimated number of students in the classroom engaging in the target behaviors. The BRS for disruption used a 6-point Likert-type scale with the number of students engaging in disruption as the measure (e.g., 0-2 set as an anchor point 1, 2-4 at 2, 4-6 at 3, 6-8 at 4, 8-10 at 5, and 10+ at 6). The BRS for academic engagement also used a 6-point Likert-type scale with a poor day being set at anchor point 1, an average day being set at anchor point 3, and the best day being set at anchor point 6. The specific anchors depended on the goal for class-wide academic engagement and disruptive behavior selected by the teacher. Each instructional activity had one data point each for academic engagement and disruptive behavior per day. At the end of an instructional activity, the teachers marked the number of students they
believed to be disruptive for the majority of the instructional activity according to the operational definitions above. The teachers also marked the performance of the class as a whole with academic engagement according to the operational definitions and the rating system. The teacher marked the score by circling the rating score of each session that indicated the score the class achieved during that instructional activity for academic engagement and disruptive behavior. After a few sessions, the teachers connected the circled scores on the behavior rating scale to create a line graph that can be used for interpreting students’ performance.

**Teacher implementation fidelity.** Research assistants completed a teacher implementation fidelity checklist during intervention. Teachers’ implementation of the group contingency procedures was assessed for adherence to each treatment component using a 20-item fidelity checklist with a yes/no format, twice a week (See Appendix D). The number of the components completed correctly was divided by the total number of components and then multiplied by 100 to determine the percentage fidelity of intervention implementation. Teacher implementation fidelity was assessed during all sessions in all classrooms’ intervention phases. Teachers scored 75%-100% for adherence to treatment during intervention. During the teacher preferred group contingency condition, Classroom 1 teacher’s average adherence was 92% (range = 75%-100% ). Both Classroom 2 and Classroom 3 teachers showed high levels of implementation adherence; they were at 100% treatment adherence throughout the teacher the intervention phase.

**Social validity.** Teachers completed a modified Intervention Rating Profile-15 rating scale (IRP-15, Martens, Witt, Elliot, & Darveaux, 1985) at the end of intervention (See Appendix H) to evaluate the social validity of their chosen group contingency intervention. The questionnaire included 15 items and was designed for school environments. The items was
assessed using a 6-point Likert-type scale to indicate whether the intervention was acceptable, effective, and efficient. Reliability of the IRP-15 was shown to be .98 (Martens et al., 1985). The IRP-15 was slightly modified by changing the definitions from individual children to the whole class and describing the group contingency intervention. Teachers also completed short teacher preference assessment questionnaire (Appendix G) at end of training, prior to intervention. This assessment included 4 questions asking the teachers to respond using a rating scale from 1 (strongly disagree) to 4 (strongly agree). Responses to this assessment were used to examine what the teachers found significant in making her selection.

**Inter-observer agreement (IOA).** To assess IOA, a research assistant simultaneously and independently collected data on disruptive behavior, academic engagement, academic performance, and teacher implementation fidelity for at least 33% of sessions for each condition. The researcher trained the research assistants on how to collect these data using Behavior Skills Training (BST; Miltenberger, 2001) with YouTube videos of classroom students that are similar to the behaviors they would be observing in the classroom. These training mediums were as close to the training environment as possible in terms of occurrence and topography of behavior. Research assistants were required to score 90% or better on practice data training forms to collect data. Research assistants were two undergraduate students in the Applied Behavior Analysis minor program. For the PLACHECK observations, IOA was calculated by dividing the smaller number of students observed by the larger number of students observed for each check, summing these ratios together, and dividing by the total number of checks. For the partial interval recording observations of disruptive behavior, IOA was calculated by dividing the number of intervals in which both observers agreed on occurrence and non-occurrence of disruptive behavior by the total intervals observed and multiplying by 100%. For teacher
implementation fidelity, IOA was calculated by taking the number of components agreed upon by each observer divided by the total number of components and then multiplied by 100%. For academic performance, IOA was calculated using a point-by-point (item-by-item) method by dividing the number of questions agreed by the total number of questions and then multiplied by 100%.

In baseline, average IOA was 84.5% for disruption, 88.4% for academic engagement, 100% for academic performance, and 100% for implementation fidelity across classrooms. In intervention, average IOA was 88.4% for disruption, 95.62% for academic engagement, 100% for academic performance, and 100% for implementation fidelity across classrooms. During follow-up, average IOA was 93.33% for disruption, 100% for academic engagement, 100% for academic performance, and 100% for implementation fidelity across classrooms.

**Experimental Design and Procedure**

The study used a concurrent multiple baseline design across classrooms. Experimental phases consisted of baseline, intervention, and follow-up. Between three and nine baseline data points and between seven and eight intervention data points were collected for each classroom until a stable pattern or trend was established. Two weekly follow-up data points were collected one week after termination of intervention.

**Teacher training on completing BRS.** Before baseline data collection began, the researcher provided 10 min training to the teachers on how to complete the BRS after goals for academic engagement and disruptive behavior had been selected. The researcher provided the teachers with an instruction sheet with information detailing how to complete the BRS, which they could refer to at any time. The researcher and teachers collaboratively determined the definitions of disruptive behavior and academic engagement during this training. Teachers were
given brief training on changes in level, trend, and variability, and how stimuli in the environment can affect their students’ behavior. General goals were made prior to baseline, and teachers were asked to collect BRS data during each experimental phase.

**Baseline.** During this phase, teachers conducted class as usual with students receiving universal supports. The teachers posted classroom expectations and rules on the walls of the classrooms and these rules corresponded to the school-wide expectations. Classroom baseline data were used for each classroom to assist in determining goals for the level of problem and appropriate behavior during the intervention phase. During class, all of the teachers used a level system where students moved clips up and down on a chart with either various colors (e.g., green, red, yellow) or phrases (e.g., flying high, on level, grounded), based on each student’s appropriate or problem behavior during class. These colors or phrases were associated with either positive or negative consequences at the end of the day. All teachers provided behavior-specific praise and school-wide tokens to students that were based on student’s positive behaviors. All teachers referred to school-wide expectations and rules when there were instances of problem behaviors.

**Selection of mystery motivators.** A menu of Mystery Motivators was provided to each class at the end of the baseline phase (see Appendix E). During a brief preference assessment with the classroom teachers, which was conducted using a 4 question, Likert-type survey method, the teachers differentiated between items they felt were appropriate for classroom as a whole compared to individual students and created a list of Mystery Motivators. This list was shown to students who were then given an opportunity to select three items and activities that were the most preferred. The items and activities selected by at least 25% of students were chosen as Mystery Motivators. The preferred items or activities were relatively inexpensive or
free items and activities that were available in the school, except some highly preferred edibles that were provided by the researcher. The Mystery Motivator included candies, cookies, chips, notebooks, mechanical pencils, playing in playground, free play, time with animals, playing a game, and time with stuffed animals. The amount of edibles or tangibles given to students was determined daily by the teacher, if applicable.

**Teacher training and selection of preferred group contingency.** Teacher training on implementing group contingencies was provided individually upon completion of baseline data collection at a time and place convenient for the teacher. Training lasted between 45 and 80 min and consisted of general training on how to implement the different group contingencies (randomized, independent, and interdependent) with some background information on the different types of contingencies using a PowerPoint (PPT) presentation as a guideline. Teachers were given a short summary of the benefits and issues of dependent contingencies. The dependent contingency type was introduced; however, due to the shortcomings of the dependent contingency, the teachers chose not to implement the dependent contingency. Although the literature base supports the use of dependent group contingency, the teachers were concerned with the implementation of the contingency due to the possibility of stigmatizing individual students. Teacher training also included written materials and brief YouTube videos of group contingencies, which were provided via e-mail to better utilize their time and the researcher’s modeling of procedures. At the end of the training, teachers filled out the short preference assessment survey on group contingencies (Appendix H). The survey included a description of the group contingencies and questions regarding which group contingency may be more effective with the teacher’s students. The teachers were told they could not change the group contingency once they choose their preferred contingency type.
Based on their opinions, the independent group contingency was chosen for Classroom 1 and Classroom 2, and the randomized group contingency was chosen for Classroom 3. The researcher provided two boxes labeled “Criteria” or “Mystery Motivator” to Classroom 1 and Classroom 2 teachers and three boxes that were labeled “Group Reward Type”, # of X’s or √’s for Today (Criteria), or Mystery Reward (Mystery Motivator) to Classroom 3 teacher. Strips of paper that identified all choices for each box were placed in the box so that each choice was drawn randomly (e.g., two types of group contingencies, four criteria for rewards, and five mystery motivators). The teachers were provided with a simplified Group Contingencies Information Chart that fit on a single page (See Appendix F). The chart described how to implement procedures including a brief script to read to the students before implementing each contingency type, which boxes to draw out of for each contingency type, how to provide the Mystery Motivator, and limiting access to mystery motivators. Training was considered complete when the teacher felt they were comfortable enough with procedures to implement their preferred group contingency. Teachers were told that they could refer to their individualized Group Contingency Information Chart at any time during intervention. Teachers were also told that they could ask questions at any time prior to intervention.

Immediately after training on group contingencies, the teachers and researchers reviewed data collected during baseline and were in agreement on the final goals for disruptive behavior reduction levels and academic engagement increase levels. Range of the criteria for reinforcement was also defined for their preferred group contingency type. Classroom 1 selected criteria that alternated between 4 and 8 rule violations. Classroom 2 selected criteria that alternated between 2 and 8 rule violations. Classroom 3 selected criteria that alternated between 5 and 7 rule violation for independent group contingency, and 7-9 for interdependent group
contingency. The criterion for the independent contingency looked like “No more than 5 Xs”. The criterion for interdependent contingency looked like, “Class total Xs” or “Check marks less than 7”.

**Student training.** Prior to the first intervention session, the researcher and teacher introduced the group contingency interventions to students using a PPT presentation (see Appendix J for an outline of the presentation). This presentation lasted approximately 10 min and included a review of the class’s expectations and rules and examples of rule-following and rule-breaking behaviors. The teacher-chosen group contingency was reviewed in child-appropriate language, and the Mystery Motivator list was presented. The presentation stressed the importance of boosting peers and following class rules to have the Mystery Motivator for the day. Students asked and were given answers to questions at any time throughout the presentation by either the teacher or researcher.

**Intervention.** During intervention, teachers implemented their chosen, preferred group contingency with data-based decision making procedures. The researcher provided the teachers with two selection boxes at the beginning of the phase. These boxes had the following labels (depending on the group contingency chosen): Reinforcement Criteria, and Mystery Motivator or Mystery Reward, and Group Reward Type (Group Contingency Type) described above. Inside these boxes were cards that corresponded to the label on the outside of the box. For example, the Mystery Motivator box had cards labeled with the items and activities the class had selected as highly preferred. Teachers were also given a written sheet of the procedures for their chosen contingency type that were simplified and specific for their class to assist them with implementation of procedures throughout intervention phases. The teachers were instructed to select one card from the boxes depending on the contingency the teacher was implementing. If
an independent or interdependent contingency was being implemented, the teacher selected one card from the Reinforcement Criteria box and one from the Mystery Motivator box. If the teacher was implementing a randomized group contingency, the teacher selected one card each from the Group Contingency, Reinforcement Criteria, and Mystery Motivator boxes.

The teacher was also provided with a chart that listed all of the student’s names with empty boxes next to each of the names. This was the chart on which the teacher recorded the frequency with which each student engaged in disruptive behavior by placing a checkmark or X, or tally for each occurrence of disruptive behavior in the boxes. This chart was referred to at the end of each group contingency condition to determine which students or the entire class (if any) would receive the Mystery Motivator based on the contingency the teacher selected. Each of the group contingencies was to be implemented as follows.

Independent. The teacher began the instructional activity by reading the script from the Group Contingencies Information Chart explaining how students would have the opportunity to earn a Mystery Motivator based on their own behavior. The teacher then told the students the expectations and the range of criteria for disruptive behaviors, but not what the Mystery Motivator was. After the script was told to the students, the teacher continued teaching her planned lessons. If a student engaged in a disruptive behavior during the instructional activity, then the student received a check mark by his or her name on the chart for each occurrence. The teacher could say something like “Johnny has earned a check because he talked out.” The checks were visible to all students. At the end of the instructional time, the teacher announced the end of implementation, selected the criterion and Mystery Motivator from the respective boxes, and then compared the criterion to the number of check marks next to each student’s name. If the student met the criterion or less than the criterion number of checks, he or she
received praise that is in line with school expectations and classroom rules and the Mystery Motivator. If a student exceeded the criterion then he or she was not able to receive the reinforcer and the teacher said a statement such as “Well you weren’t able to earn it this time, but you can have another chance to earn it later.”

**Interdependent.** The teacher began the instructional activity by reading the script from the Group Contingencies Information Chart which explained how the class would be working together as a whole to gain Mystery Motivators for everybody (See Appendix F). The teacher told the students the expectations and the criteria for the range of disruptive behaviors, but not what the Mystery Motivator was. If any student engaged in a disruptive behavior during the instructional activity, then he or she received a check mark by his or her name on the chart for each occurrence. The teacher said something like “Johnny has earned a check because he talked out.” The teacher recorded check marks for all students, and these checks were visible to students. After the instructional activity, the teacher announced the end of implementation, selected the criterion from the box, and compared the criterion with the number of check marks in the class as a whole. The teacher then selected the Mystery Motivator from the box if the class met the criterion for reinforcement. If the class earned the Mystery Motivator, the students were praised in alignment with school expectations and classroom rules along with the Mystery Motivator. If they did not make the criterion, the teacher said something like “Well you weren’t able to earn it this time, but you can have another chance to earn it later.”

**Randomized.** The teacher began the instructional activity by reading the script from the Group Contingencies Information Chart which explained this instructional activity. Students could earn the Mystery Motivator, but this was based on the behavior of each child individually (independent contingency) or the class as a whole (interdependent contingency). Afterwards, the
instructor told the class the expectations and the range of criteria for disruptive behavior, but did not reveal the group contingency type; the students did not know how access to reinforcement would be determined. The teacher then began the targeted instructional activity. If a student engaged in a disruptive behavior during the instructional activity, he or she received a check mark by his or her name on the chart for each occurrence. The teacher said something like “Johnny has earned a check because he talked out.” The teacher recorded check marks for all students, and these checks were visible to students. After the instructional activity was over, the teacher selected the group contingency type from the Group Contingency Type box and completed the appropriate procedures for determining access to the reinforcement based on which contingency type was being implemented in the manner described above.

Prior to the beginning of intervention phase, teachers were shown the researcher’s graphs and asked to make goals based on the percentage of intervals/PLACHECK graph that the researcher had shown them. During the intervention phase, teachers collected BRS data per session and self-monitored their implementation using the implementation fidelity checklist. They continued to implement their preferred contingency without any modification to their procedures when their BRS demonstrated continued improvement towards class goals. When the BRS data did not demonstrate continued improvement or running counter to preferred change after a few sessions, the teachers implemented the data-based decision making procedures. The teachers reviewed the last week’s data points they had charted on the BRS and their completed fidelity checklists, and identified problems that might have caused the undesirable changes in the class-wide target behaviors. When their BRS data showed increases in disruption and decreases in academic engagement, they changed criteria to gain rewards(Classroom 1 and classroom 3), increased the length of implementation session (Classroom 2), or increased student buy-in by
having them pick out of the Mystery Motivator box and/or Criteria for Reward box (Classroom 2 and 3). The teachers informed the researcher they were going to start changing components, and on occasion collaborated with the researcher during the data-based decision making process to identify the components that require modifications. However, the teachers made modifications to their group contingency procedures on their own based on their data-based decision making rather than requesting additional training or participating in the problem solving process with the researcher.

**Follow-up.** One week following the intervention, two weekly probe data points were collected. Teachers were no longer being asked to implement the group contingency intervention following termination of intervention phases. However, all three classroom teachers reported to the researcher that they chose to continue implementing their preferred group contingency intervention during follow-up.
Results

**Teacher Implementation Fidelity**

Classroom 1 teacher implemented the intervention procedures with 75% fidelity in the first intervention session. However, in the sixth intervention session she implemented the procedures with 100% fidelity. Her fidelity averaged 92% with a range of 75%-100%. Classroom 2 teacher implemented the procedures with 100% fidelity throughout the intervention sessions. Teacher 3 also implemented the procedures with 100% fidelity in every intervention session. Implementation fidelity in follow-up was 90%, 100%, and 100% for Classroom 1, 2, and 3 teachers, respectively. Figure 1 presents the teacher implementation fidelity across teachers.

**Direct Observation of Disruptive Behavior and Academic Engagement**

**Disruptive behavior.** Figure 1 shows class-wide disruptive behavior during the target instructional activity in the three participating classrooms. These data indicated that the two types of teacher preferred group contingencies, independent and randomized, combined with data-based decision making were effective in decreasing disruptive behavior. Classroom 1 and 2 teachers chose the independent group contingency type whereas Classroom 3 teacher chose the randomized group contingency type. The intervention resulted in a large and immediate decrease in disruptive behavior from baseline to intervention for all classrooms. Data suggest the randomized group contingency (Classroom 3) resulted in faster decreases in disruptive behavior than the dependent group contingency. Average rates of disruptive behavior and standard deviations per class by phase and the implemented group contingency are shown in Table 5.

The top panel of Figure 1 shows data on disruptive behavior for Classroom 1. In baseline, disruptive behavior occurred during a mean of 51.3% of intervals (range, 40-59%) in baseline and showed an increasing trend. Classroom 1 teacher set her ultimate goal for decreasing
disruptive behavior at 30% of intervals. When the teacher preferred group contingency (independent) was implemented, this resulted in a decrease in disruptive behavior to a mean of 21.6% (range, 18-26%) during which the disruptive behavior remained low and slightly decreasing in trend.

The middle panel of Figure 1 shows data on disruptive behavior for Classroom 2. In baseline, disruptive behavior occurred during a mean of 48% of intervals (range, 36-63%) with an increasing trend. The classroom teacher set her ultimate goal for decreasing disruptive behavior at 30% of intervals. When the teacher preferred group contingency (independent) was implemented, this resulted in an immediate decrease in disruptive behavior to a mean of 17.9% (range, 9-24%) and data showed a stable pattern.

The bottommost panel of Figure 1 shows data on disruptive behavior for Classroom 3. In baseline, disruptive behavior occurred a mean of 60.3% of intervals. Baseline data were somewhat variable during initial sessions, but became stable and showed an increasing trend toward the end of baseline. When the teacher preferred group contingency (randomized) was implemented, this resulted in a decrease in disruptive behavior to a mean of 8.2%.

**Academic engagement.** Figure 1 also shows class-wide academic engagement in the three participating classrooms. Table 5 shows the average percentage of students engaged in academic activities and standard deviations per class by phase and type of group contingency. As shown in the figure and table, the teacher preferred group contingencies implemented with data-based decision making was effective in increasing academic engagement in all three classrooms. Academic engagement increased immediately upon implementation of intervention and remained stable over the course of intervention.
The topmost panel in Figure 1 shows academic engagement for Classroom 1. In baseline, the mean percentage of students engaged was 80.7% (range, 72%-95%). Teacher 1 set her ultimate goal for increasing academic engagement at 85% of intervals. Academic engagement in baseline showed a decreasing trend. When the teacher preferred group contingency (independent) was implemented, this resulted in an increase in academic engagement to a mean of 92.9% (range, 89-95%). Academic engagement remained high during intervention.

Academic engagement data are displayed in the middle Panel in Figure 1 for Classroom 2. In baseline, the mean percentage of students engaged was 76.2% (range, 61-86%). The classroom teacher set her ultimate goal for increasing academic engagement at 90%. Implementation of the teacher-preferred group contingency (independent) resulted in an increase in academic engagement to a mean of 95.1%. Data were stable with the last three data points showing an increasing trend during intervention.

Data for academic engagement in Classroom 3 are displayed in the bottom panel of Figure 1. In baseline, the mean percentage of students academically engaged was 79.7% with a stable pattern followed by a decreasing trend toward the end of baseline. During intervention, the academic engagement increased to a mean of 97.4% with a stable pattern.

Behavior Rating Scales of Disruptive Behavior and Academic Engagement

Figure 2 shows the teacher collected BRS data on academic engagement and disruptive behavior. As shown in the figure, all three classroom teachers completed the BRS in every session across baseline and intervention phases. The BRS data indicated that the teachers’ perceived levels of disruptive behavior decreased and academic engagement increased in all classrooms as a result of implementing the group contingency selected by the teachers in conjunction with data-based decision making. The teachers’ ratings for disruptive behavior
averaged 5.7, 3.8, and 4.0 in baseline while their ratings averaged 4.1, 3.0, and 2.8 in intervention for Classroom 1, Classroom 2, and Classroom 3, respectively. For academic engagement, the ratings averaged 3.7, 2.6, and 3.7 in baseline and 4.3, 4.4, and 4.5 in intervention for Classroom 1, Classroom 2, and Classroom 3, respectively. Although the direct observational data on both behaviors consistently showed lower rates or higher rates in intervention compared to those in baseline, the ratings for both behaviors by Classroom 1 teacher were variable in intervention. For Classroom 2, the teacher’s ratings for disruptive behavior in intervention were initially higher than those in baseline although the direct observational data indicated an immediate decrease as the intervention was implemented. However, the ratings for disruptive behavior in later intervention sessions were consistently much lower than the ratings in baseline. The Classroom 2 teacher’s ratings for academic engagement showed an increasing trend in intervention. For Classroom 3, the teacher’s ratings for disruptive behaviors were consistently low (2 or 3 out of 6) in intervention. The rating for academic engagement was high (6 out of 6) in session 1 of intervention, but decreased to 3 in session 2 of intervention. However, the ratings for academic engagement showed an increasing trend in later sessions.

**Academic Performance**

Figure 1 also shows data on class-wide academic performance which was measured as an average percentage of correct responses. One or three tests or assessments were given in baseline and two or three were given in intervention across classrooms. Additionally, one test was given in follow-up. The data indicated that, compared to baseline, the mean levels of class-wide academic performance increased during intervention and further increased during follow-up. In baseline, the average class-wide academic performance (average percentage of correct responses) was 28% (only 1 assessment was given) for Classroom 1, 73% (range, 66-80%) for
Classroom 2, and 80% (range, 58-92%) for Classroom 3. In intervention, the academic performance was 64% (50-78%) for Classroom 1, 78% (range, 68-87%) for Classroom 2, and 95% (range, 58-99%) for Classroom 3. During follow-up, the academic performance further increased to 94% for Classroom 1 and 95% for Classroom 2.

Social Validity

_Teachers_. The IRP-15 completed by three teachers showed that the teacher preferred group contingency with data-based decision making was rated as highly acceptable. Mean ratings by classroom for each item are presented in Table 2. The ratings by each teacher averaged 5.1 out of 6, with a range of 4-6 across items indicating a high level of acceptability and satisfaction with the intervention.
Table 1

Demographic Features of Classrooms in the Study

<table>
<thead>
<tr>
<th>Class</th>
<th>Grade</th>
<th>N</th>
<th>Gender</th>
<th>Race</th>
<th>ELL</th>
<th>Free Lunch</th>
<th>Students w/ODRs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Male</td>
<td>Female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1st</td>
<td>18</td>
<td>66.7%</td>
<td>33.3%</td>
<td>5.6%</td>
<td>38.9%</td>
<td>44.4% 5.6% 11.1%</td>
</tr>
<tr>
<td>2</td>
<td>2nd</td>
<td>18</td>
<td>55.6%</td>
<td>44.4%</td>
<td>11.1%</td>
<td>44.4%</td>
<td>33.3% 11.1% 0%</td>
</tr>
<tr>
<td>3</td>
<td>4th</td>
<td>18</td>
<td>55.6%</td>
<td>44.4%</td>
<td>5.6%</td>
<td>44.4%</td>
<td>27.8% 5.6% 16.7%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>54</td>
<td>32</td>
<td>22</td>
<td>3</td>
<td>23</td>
<td>19    4    5</td>
</tr>
</tbody>
</table>

Notes: Demographic features are reflective of self-report that was given to the school by parents during enrollment. ELL = English Language Learners.
Table 2.
Mean, range, and standard deviation of disruptive behavior and academic engagement across phases by classroom.

<table>
<thead>
<tr>
<th>Phases</th>
<th>Classroom 1</th>
<th></th>
<th>Classroom 2</th>
<th></th>
<th>Classroom 3</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Disrup</td>
<td>AE</td>
<td>Disrup</td>
<td>AE</td>
<td>Disrup</td>
<td>AE</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Baseline</td>
<td>51.3%</td>
<td>10.0</td>
<td>80.7%</td>
<td>12.5</td>
<td>48.0%</td>
<td>10.8</td>
</tr>
<tr>
<td></td>
<td>(40-59%)</td>
<td>(72-95%)</td>
<td>(55-63%)</td>
<td>(61-70%)</td>
<td>(55-70%)</td>
<td>(55-63%)</td>
</tr>
<tr>
<td>Intervention</td>
<td>Indep.</td>
<td>21.6%</td>
<td>2.5</td>
<td>92.9%</td>
<td>2.3</td>
<td>17.9%</td>
</tr>
<tr>
<td></td>
<td>(18-26%)</td>
<td>(89-95%)</td>
<td>(8-24%)</td>
<td>(89-95%)</td>
<td>(8-24%)</td>
<td>(8-24%)</td>
</tr>
<tr>
<td></td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Follow-up</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: Disrup. = disruptive behavior; AE = academic engagement; N/A = not applicable; Indep. = interdependent; Rand. = randomized.
Table 3

*Teachers’ IRP-15 ratings*

<table>
<thead>
<tr>
<th>IRP Question</th>
<th>Class 1</th>
<th>Class 2</th>
<th>Class 3</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>This was an agreeable intervention for disruptive behavior in my class</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Many teachers would find this treatment acceptable for other problem behaviors</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>This intervention proved effective in reducing overall disruptive behavior in the classroom</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>I would recommend this treatment to other teachers</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>5.5</td>
</tr>
<tr>
<td>Disruptive behavior in the class was frequent enough to permit use of this treatment</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Many teachers would find this treatment effective for use in their class</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>5.5</td>
</tr>
<tr>
<td>I was disposed to use this treatment in my classroom</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>5.5</td>
</tr>
<tr>
<td><em>This intervention resulted in detrimental side effects to my students</em></td>
<td>2 (4)</td>
<td>1 (5)</td>
<td>1 (5)</td>
<td>1.5 (4.5)</td>
</tr>
<tr>
<td>This intervention could be acceptable for a range of students and classrooms</td>
<td>6</td>
<td>6</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>This intervention was similar to other treatments I have used in my classroom</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>This intervention was an equitable way to handle disruptive behavior in the classroom.</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>5.5</td>
</tr>
<tr>
<td>This intervention was reasonable to be used for disruptive behavior in my class</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>5.5</td>
</tr>
<tr>
<td>I found the procedures in the intervention useful.</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>5.5</td>
</tr>
<tr>
<td>This intervention was a good way to handle disruptive behavior in the classroom.</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>5.5</td>
</tr>
<tr>
<td>As a whole, this intervention was reasonable to be used in the classroom.</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>5.5</td>
</tr>
</tbody>
</table>

**Mean score:**

|                  | 5.1 | 5.7 | 4.9 | 5.4 |

Notes: Scores were based on a 1 to 6 Likert-type scale with 1 meaning “strongly disagree” and 6 indicating “strongly agree”. Indpt. = Independent; R = Randomized Interdependent. *Reverse scored item.
Figure 1. Disruptive behavior, academic engagement, implementation fidelity, and academic performance across Classrooms. The dark dashed lines in the bottom of the panels represent disruptive behavior goal levels. The lighter dashed lines near the top of the panel represent academic engagement goal levels.
Figure 2. Behavior rating scores by teachers for academic engagement and disruptive behavior across classrooms.
Discussion

This study examined the impact of the teacher preferred group contingency with data-based decision making on classroom disruptive behavior and academic engagement with three classrooms with three classrooms in an urban elementary school setting. Teachers implemented the group contingency intervention with data-based decision making with high levels of fidelity throughout intervention, and the beginning of follow-up phases. The results of direct observations showed that all three classroom’s disruptive behavior decreased dramatically and academic engagement increased immediately when the intervention was implemented. In addition, classroom academic performance increased as a result of the intervention implementation across classrooms. The changes in all target behaviors were maintained during weekly follow-ups. The classroom teachers conducted data-based decision making based on BRS data and made adjustments to the criteria of the contingencies, session length, or student involvement in selecting criteria or Mystery Motivators without guidance from the researcher. No additional training sessions were needed across teachers during intervention. In addition, teachers found this intervention highly acceptable and liked implementing group contingencies.

The results of this study support previous results in that group contingencies are effective in increasing academic engagement and decreasing disruptive behavior in classrooms (Alric et al., 2007; Shapiro & Goldberg, 1986; Speltz, Shimamura & McReynolds, 1982) and that a teacher preferred group contingency can further enhance class-wide student behavioral outcomes in elementary schools (Ennis et al., 2015. The teachers in Ennis et al.’s study implemented four
different group contingencies (independent, dependent, interdependent, and randomized) in an alternating format in the first phase of intervention and then implemented their most preferred group contingency type in the second phase of intervention. Ennis et al. (2015) suggested that although all of the group contingencies were equally effective in increasing academic engagement and decreasing disruptive behavior in the classrooms, teachers’ preference on the types of group contingencies could vary depending on their instructional practices and their classroom’s ecology. These researchers found that in order to enhance student behavioral outcomes, a preference assessment on the group contingency types could be conducted by teachers before choosing a group contingency intervention. This process may promote buy-in from teachers which is critical to implement the intervention with fidelity and to improve student behavior and classroom ecology (Ennis et al., 2015).

As indicated by the high social validity of the intervention, the three classroom teachers in the current study valued the group contingency that they selected and were able to implement their chosen, preferred contingency with fidelity. Furthermore, with minimal training on the BRS and data-based decision making, the teachers efficiently and effectively modified their group contingency implementation procedures based on their collected BRS data. The results demonstrated large intervention effects; no intervention data points for disruptive behavior overlapped with the baseline data points in any of the three classrooms, and no intervention data points for academic engagement overlapped with the baseline data points in two classrooms.

Although, data from direct observation showed stability, demonstrating higher rates of academic engagement and lower rates of disruptive behavior across intervention sessions compared to baseline, teachers’ perceptions on the rates of disruptive behavior and academic engagement were less desirable than their expectations or goals, and they chose to make
modifications to their procedures. One reason that there were differences in level and variability of data between the two data sources might be that although the direct observation data were collected during the first 30 minutes of their activity period in the case of classes that lasted 30 minutes or longer, the teachers’ ratings were based on their entire activity time period and that disruptive behavior might have occurred at higher rates during some days.

The teachers in this study chose independent or randomized group contingency as their preferred group contingency type after having consensus on the removal of the dependent contingency as an option due to issues with implementing the dependent contingency in the classroom. No teachers chose interdependent group contingency as their preferred type. This is in line with Elliot, Turco, & Gresham (1987) which had found that teachers did not find the dependent contingency suitable after reading procedures.

One factor that might have impacted the large intervention effects in this study is the development of criteria for contingencies (accessing reinforcement) linking school-wide expectations and classroom rules. It was observed that the participating teachers reviewed the expectations and rules every time when they were implementing their preferred contingency. In Ennis et al. (2016), teachers tended to pass reviewing the classroom rules and expectations when they were implementing their preferred contingency every day.

Another important aspect of the current study is the development of operational definitions for disruptive behavior. Disruptive behavior was defined for each classroom using descriptors that were in line with school-wide expectations, and then were further defined through sub-descriptors with several meetings with teachers before baseline. These behavioral definitions were defined through the researcher’s initial observations, the initial interview, and discussion with the teachers over several meetings. Teachers also agreed that the definitions for
behavior were mutually exclusive, either the student was disruptive or the student was academically engaged.

This study extends research by showing that following a brief training using only instructions, a simplified individualized instruction sheet, and modeling, teachers could implement the group contingency procedures with high levels of fidelity. Ennis et al. (2016) had a training procedure using BST, which emphasized instruction, modeling, rehearsal, and feedback to train teachers. However, no teacher in the current study chose to rehearse the procedures, and only one teacher stated that she watched the group contingency training videos at home. One factor that helped the teachers in the current study to implement the group contingencies with data-based decision-making without extensive training or consultation support from outside experts might have been their success with implementing school-wide PBIS with high fidelity and their exposure to data-based decision-making through the Multi-Tiered Systems of Supports.

In addition according to the PBIS Team, overall, the ODRs were reduced from 7 ODRs in baseline to 1 ODR in intervention in Classroom 1 and from 21 ODRs to 1 ODR in Classroom 3. Compared to baseline during which several students had ODRs, only one student had ODR in intervention in both classrooms. In Classroom 2, the ODRs did not decrease during intervention. The PBIS team indicated that several students in Classroom 2 might have needed more intensive Tier 2 supports.

Limitations and Future Directions

The findings from this study can be limited by small sample size; there were only three teachers, from three grades. These teachers’ survey responses and their selection of contingencies may not accurately represent the population of elementary school general
education teachers. This small size was due to the time commitment for implementation of group contingency conditions, and the length of time it took to get parents to sign consent forms. Future research may want to look into having a larger sample of teachers to see if the preferences for group contingencies would be similar.

Another limitation could have arisen from the data collection methods. There were different measurement systems for disruptive behavior and academic engagement. Partial interval recording was chosen for disruptive behavior since disruptions were brief, discrete behavior whereas academic engagement was an action that did not have a clear beginning or endpoint, so PLACHECK was chosen as that recording method. Overall, IOA was high, but there were some sessions with low IOAs, particularly for disruptive behavior, which may be not only because of collecting data using different measurement systems, but also because of difficulty observing the behavior of 18 individual students at one time. In addition, disruptions such as talking to others and putting objects in other’s desk were more difficult to see and were dependent on the observer’s position to the child. Academic engagement was also difficult to measure when students were transitioning between places and when the teachers did not give instructions on what was acceptable or not acceptable during transitions. For example, during baseline, students often placed their head down and wrote down their answers. Teachers were inconsistent with their feedback with regards to heads being down on desks while working, and this may have resulted in differences of recording with disruptive behaviors (head down), and academic engagement (eyes on work).

An additional limitation is with follow-up data. The study collected only 2 weekly follow-up data points during which the teacher implemented the intervention; thus, it is difficult to determine whether the group contingency intervention with data-based decision making can
promote maintenance of behaviors after the intervention has been terminated. Further research using a larger sample of participants and long-term follow-up assessment would increase confidence in the findings.

Slight implementation modifications were made by the teachers, which may have increased the contextual fit of the group contingency interventions. For example, the Classroom 1 teacher chose to have a student ring a bell each day to indicate that implementation was over. The teacher also chose to implement intervention for 45 min throughout reading centers. Classroom 2 chose to implement intervention throughout reading, which was 60 min in duration. Classroom 3 chose to implement intervention throughout math, which was 50 min. The teachers also established the goals and criteria for rewards used during intervention. The difference between baseline levels and the goals that were selected were somewhat variable. The teachers of Classrooms 1 and 2 selected disruptive behavior goals that were a little below the lowest level of disruptive behavior whereas Classroom 3 teacher selected a disruptive behavior goal that was further below the lowest level of disruptive behavior.

Teachers engaged in varied methods to check rule violations. Classroom 1 teacher kept a chart on the board that was visible to all students, and kept a chart on her clipboard with a jingle bell on the clipboard. Classroom 2 and Classroom 3 teachers put a chart on a clipboard so that they could mark down violations quickly in the classroom, and so students couldn’t try and erase marks. These clipboards were not visible to the students. Classroom 1 teacher marked violations and provided a quick statement “some friends need to learn to read quietly”. Classroom 2 marked infractions and provided a quick statement such as “some of our friends need to remember to stop talking when the teacher is talking.” However, Classroom 3 marked rule violations and gave explicit reminder and re-teaching expectations in situ. “You are getting a tally because you had
your feet on your desk. We should be sitting like mathematicians, like this (teacher models appropriate sitting behavior)” or “You are getting a tally because you had your head down when the rest of the class was writing their assignment down.” The teacher also involved the students in the problem solving process (e.g., Teacher-“What should you have been doing instead? Student-”I should have been sitting up with my pencil in hand writing down my assignment.” Teacher-“That’s completely correct, good job letting me know the math rules.”). These different methods, along with different grade levels, may have made it more difficult to compare findings across classrooms; however, these methods most likely helped with contextual fit and acceptability of interventions. Researchers who are interested in enhancing the outcomes of group contingency interventions should consider developing implementation procedures that incorporate teacher preference to increase the contextual fit.

Group contingencies, like other class-wide interventions, can be in the undefined area between Tier 1 and 2 PBIS treatments. In the three participating classrooms, most of the students were successful with Tier 1 supports, but some students in the classroom remained disruptive, indicating they needed more support. The group rewards procedures also provided a guide for teachers to address classroom factors in implementing school wide PBIS and this extra support helped students contact their rewards for meeting school expectations and classroom rules. It may be beneficial for students in elementary school setting to have these procedures in the classroom. Additional training on using group contingencies with data-based decision making across the school may help through benefiting classroom behavior management, and could help define group contingencies in the Tier 1 level of supports.
References


APPENDICES
Appendix A: Teacher Interview Form

The purpose of this study is to find whether teacher preferred group contingency interventions can result in improved outcomes in a classroom setting. We will also be looking to see types of academic engagement and disruptive behavior and conduct teacher surveys to see how satisfactory the group contingency intervention is. We would also be looking at how teachers could use data to base their decisions when conducting group contingencies.

Does disruptive behavior concern you?

What are the behaviors?

When do these behaviors occur? Do they occur in two or more instructional activities?

How frequent do those behaviors occur? (Do they occur every day?)

Is there more than one student engaging in disruptive behaviors?

Can you provide more information about these students who engage in disruptive behavior?

<table>
<thead>
<tr>
<th>Student</th>
<th>Instructional Activity</th>
<th>How Often Disruptive Behavior Occur</th>
<th>Academic Engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Daily Weekly Less than once a week</td>
<td>High Medium Low</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Daily Weekly Less than once a week</td>
<td>High Medium Low</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Daily Weekly Less than once a week</td>
<td>High Medium Low</td>
</tr>
</tbody>
</table>

Based on the answers you have given me, your classroom would be a good candidate for my study. What my study looks at is using group contingencies to improve behavior of students in a classroom as a whole. All group contingencies are based on using rewards to manage the behavior of a group of students. Students learn to encourage each other, and how to monitor their behavior.

To start the procedures, you’d make a brief statement to the classroom before conducting typical lessons. As the instructional activity goes on, a check mark will be placed by a student’s name every time a rule violation occurred. I will briefly describe the group contingencies below.

In the independent group contingency, students gain access to rewards based on their individual performance. An example of this is students who gain two or less checks earn access to the reward.

In the interdependent group contingency, the classrooms students’ gain access to rewards based on the performance of the class as a whole. An example of this is if the class gains five or less checkmark in total to earn access to their reward.
In the randomized contingency, one of the previous three contingencies can be in place. During this contingency, the statement will be said, and the rule violations will still be tracked. No one knows how the reward will be chosen until the end of the intervention. At the end of the activity you will be able to select the contingency type from a box, and then follow procedures for the other group contingencies.

Both criteria and rewards will vary each day to ensure that students are more likely to be motivated. If you choose to participate, you will receive training on each of these procedures and will have a written guide to refer to throughout participation.

*Do you have questions?*

*Have you used group contingencies in the classroom?*

*Have you used data based decision making using graphs before?*

Now we will go over the informed consent in order to participate in the study. Thank you for choosing to participate.
Appendix B: Data Sheet

Date: __/__/___  Observer: ____________________________  Researcher/Research Assistant
Start time: _______  End time: __________
Class: ___________________  Attendance: ____________

Clearly mark (circle, /, or x) each behavior that occurs within each 15s interval. You may mark more than one or no behaviors within each interval.
D (disruption): ____________________________  A (# of students academically engaged):_____

<table>
<thead>
<tr>
<th></th>
<th>0:00</th>
<th>0:15</th>
<th>0:30</th>
<th>0:45</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 min.</td>
<td>1</td>
<td>D</td>
<td>2</td>
<td>D</td>
</tr>
<tr>
<td>2 min.</td>
<td>5</td>
<td>D</td>
<td>6</td>
<td>D</td>
</tr>
<tr>
<td>3 min.</td>
<td>9</td>
<td>D</td>
<td>10</td>
<td>D</td>
</tr>
<tr>
<td>4 min.</td>
<td>13</td>
<td>D</td>
<td>14</td>
<td>D</td>
</tr>
<tr>
<td>5 min.</td>
<td>17</td>
<td>D</td>
<td>18</td>
<td>D</td>
</tr>
<tr>
<td>6 min.</td>
<td>21</td>
<td>D</td>
<td>22</td>
<td>D</td>
</tr>
<tr>
<td>7 min.</td>
<td>25</td>
<td>D</td>
<td>26</td>
<td>D</td>
</tr>
<tr>
<td>8 min.</td>
<td>29</td>
<td>D</td>
<td>30</td>
<td>D</td>
</tr>
<tr>
<td>9 min.</td>
<td>33</td>
<td>D</td>
<td>34</td>
<td>D</td>
</tr>
<tr>
<td>10 min.</td>
<td>37</td>
<td>D</td>
<td>38</td>
<td>D</td>
</tr>
<tr>
<td>11 min.</td>
<td>41</td>
<td>D</td>
<td>42</td>
<td>D</td>
</tr>
<tr>
<td>12 min.</td>
<td>45</td>
<td>D</td>
<td>46</td>
<td>D</td>
</tr>
<tr>
<td>13 min.</td>
<td>49</td>
<td>D</td>
<td>50</td>
<td>D</td>
</tr>
<tr>
<td>14 min.</td>
<td>53</td>
<td>D</td>
<td>54</td>
<td>D</td>
</tr>
<tr>
<td>15 min.</td>
<td>57</td>
<td>D</td>
<td>58</td>
<td>D</td>
</tr>
<tr>
<td>16 min.</td>
<td>61</td>
<td>D</td>
<td>62</td>
<td>D</td>
</tr>
<tr>
<td>17 min.</td>
<td>65</td>
<td>D</td>
<td>66</td>
<td>D</td>
</tr>
<tr>
<td>18 min.</td>
<td>69</td>
<td>D</td>
<td>70</td>
<td>D</td>
</tr>
<tr>
<td>19 min.</td>
<td>73</td>
<td>D</td>
<td>74</td>
<td>D</td>
</tr>
<tr>
<td>20 min.</td>
<td>77</td>
<td>D</td>
<td>78</td>
<td>D</td>
</tr>
<tr>
<td>21 min.</td>
<td>81</td>
<td>D</td>
<td>82</td>
<td>D</td>
</tr>
<tr>
<td>22 min.</td>
<td>85</td>
<td>D</td>
<td>86</td>
<td>D</td>
</tr>
<tr>
<td>23 min.</td>
<td>89</td>
<td>D</td>
<td>90</td>
<td>D</td>
</tr>
<tr>
<td>24 min.</td>
<td>93</td>
<td>D</td>
<td>94</td>
<td>D</td>
</tr>
<tr>
<td>25 min.</td>
<td>97</td>
<td>D</td>
<td>98</td>
<td>D</td>
</tr>
<tr>
<td>26 min.</td>
<td>101</td>
<td>D</td>
<td>102</td>
<td>D</td>
</tr>
<tr>
<td>27 min.</td>
<td>105</td>
<td>D</td>
<td>106</td>
<td>D</td>
</tr>
<tr>
<td>28 min.</td>
<td>109</td>
<td>D</td>
<td>110</td>
<td>D</td>
</tr>
<tr>
<td>29 min.</td>
<td>113</td>
<td>D</td>
<td>114</td>
<td>D</td>
</tr>
<tr>
<td>30 min.</td>
<td>117</td>
<td>D</td>
<td>118</td>
<td>D</td>
</tr>
</tbody>
</table>

Contingency: Independent / Interdependent / Random: ______________
Criteria: ____________________________Met? Yes / No
Teacher Counted rule violations: ____________________________
### Appendix C: Behavior Rating Scale

Classroom: __________________

<table>
<thead>
<tr>
<th>Target Behavior</th>
<th>Date</th>
<th>10+</th>
<th>8-10</th>
<th>6-8</th>
<th>4-6</th>
<th>2-4</th>
<th>0-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disruption</td>
<td>Date</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>10+</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>8-10</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6-8</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>4-6</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2-4</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>0-2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Target Behavior</th>
<th>Date</th>
<th>10+</th>
<th>8-10</th>
<th>6-8</th>
<th>4-6</th>
<th>2-4</th>
<th>0-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engagement</td>
<td>Date</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Best day</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Poor day</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Key:

Disruptive Behavior: Academic Engagement:
### Appendix D. Teacher Implementation Fidelity Checklist (Group Contingency)

Classroom/Teacher: ______ Date: ______________ Recorder: ______

<table>
<thead>
<tr>
<th>Interventions</th>
<th>Was the intervention implemented?</th>
<th>Fidelity Score Y=1; N=0 N/A=N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Continue Using Selected Intervention Type and Read Script</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Goes over expectations and rules</td>
<td>Y / N / NA</td>
<td></td>
</tr>
<tr>
<td>2) Goes over correct contingency type and criteria</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Keeps track of rule violation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Marking by names of students throughout intervention period</td>
<td>Y / N / NA</td>
<td></td>
</tr>
<tr>
<td><strong>Marks rule violations that occur</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Marks most rule violations (may miss one or a few)</td>
<td>Y / N / NA</td>
<td></td>
</tr>
<tr>
<td>2) Marks for disruptive behavior consistent with definitions</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Teacher indicates end of implementation period</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Duration (20-60 min)</td>
<td>Y / N / NA</td>
<td></td>
</tr>
<tr>
<td><strong>Select random components</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Contingency type (random)</td>
<td>Y / N / NA</td>
<td></td>
</tr>
<tr>
<td>2) Criteria (all types)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Determine if criteria for reward is met</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Accurately count rule violations for the classroom as a whole and reward</td>
<td>Y / N / NA</td>
<td></td>
</tr>
<tr>
<td>based on whether the group criteria was met (interdependent)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Accurately compare number of individual violations to the individual</td>
<td>Y / N / NA</td>
<td></td>
</tr>
<tr>
<td>student (independent)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Chose the Reward (Teacher)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Chooses the Mystery Motivator based on whether one or more students</td>
<td>Y / N / NA</td>
<td></td>
</tr>
<tr>
<td>have received reward (depending on group contingency type)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Give Access to Reward</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) To all students if goals were met (interdependent)</td>
<td>Y / N / NA</td>
<td></td>
</tr>
<tr>
<td>2) To students who met goals (independent)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) Praise aligned with school-wide expectations given.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hold Access to Reward</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) To all students if goals weren’t met (interdependent)</td>
<td>Y / N / NA</td>
<td></td>
</tr>
<tr>
<td>2) To students who did not meet goals (independent)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) Encourage students to try again</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Recording Data</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Marks rule violations on Behavior Rating Scale</td>
<td>Y / N / NA</td>
<td></td>
</tr>
<tr>
<td>2) Completes implementation fidelity data sheet (twice a week)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fidelity Score</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Total Yes's/Total Yes's + No's) X100%=</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix E: Mystery Motivator Set

Please look at the suggestions below and cross out any items that you don’t feel are suitable for group reinforcement in the class. (May be used for interdependent, or randomized group contingencies). Please write down in any items that aren’t in this list that you may like to include. Mystery Motivators could be provided to the class a whole or no one depending on whether criteria were met.

- Bull Bucks
- Peel stickers
- Homework pass
- A few minutes of interaction time with peers
- Extra time for
  - Recess
  - Computer
  - Other: ____________________________
- Eat lunch in different location
- Reading in different locations
- Music/Dance time
- Hear music during independent seat work
- Movie in class
- Classroom game
  - Educational games: ____________________________
  - Duck-Duck Goose
  - Board games
  - Other: ____________________________
- Show (perform a favorite activity for other students)
- School supplies
  - Mini staplers, pencils, markers, etc.
  - Other: ____________________________
- Toys
  - Stuffed animal, ball, music toy, etc.
  - Other: ____________________________
- Edibles
  - Candy (various)
  - Potato Chips
  - Other: ____________________________
- Other
  - ____________________________
  - ____________________________
Please look at the suggestions below and cross out any items that you don’t feel are suitable for individual reinforcement. (May be used for independent group contingencies). Please write down in any items that aren’t in this list that you may like to include. Mystery Motivators could be provided to some students while others will not.

- Bull Bucks
- Peel stickers
- Homework pass
- A few minutes of interaction time with peers
- Extra time for
  - Recess
  - Computer
  - Other: ___________________________________________________
- Eat lunch in different location
- Reading in different locations
- Music/Dance time
- Hear music during independent seat work
- Movie in class
- Classroom game
  - Educational games: ____________________________________________
  - Duck-Duck Goose
  - Board games
  - Other: _________________________________________________________
- Show (perform a favorite activity for other students)
- School supplies
  - Mini staplers, pencils, markers, etc.
  - Other: _________________________________________________________
- Toys
  - Stuffed animal, ball, music toy, etc.
  - Other: _________________________________________________________
- Edibles
  - Candy (various)
  - Potato Chips
  - Other: _________________________________________________________
- Other
  - _____________________________________________________________
  - _____________________________________________________________
## Appendix F. Group Contingencies Information Chart

<table>
<thead>
<tr>
<th>When to Do Stuff</th>
<th>Steps</th>
<th>Randomized Rewards Script</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Do this at the Beginning of Math</strong></td>
<td><strong>Read Script (can say different ways)</strong></td>
<td>Today we can work for a reward but we don’t know if your own individual behavior will decide the reward or if your class’s behavior as a whole will decide the reward. Some examples of classroom rules you need to follow are: ___________________ (eyes on me, following along with me…….) Some example of not following rules are: __________________________________________________________________________ (throwing things, interrupting me……...) Alright, so we are going to begin math and decide who gets the reward at the end of math.</td>
</tr>
<tr>
<td><strong>Do this throughout Math</strong></td>
<td><strong>Mark X’s or √’s</strong></td>
<td>Put a mark ( X’s or √’s) on your clipboard by each student’s name when a student breaks a rule/disrupts</td>
</tr>
<tr>
<td><strong>Do this at the end of Math</strong></td>
<td><strong>Teacher selects criteria/ Choose Randomized Elements</strong></td>
<td>Teacher chooses contingency type- <strong>Individual</strong> or <strong>Classroom as a Whole</strong> Choose random components out of the boxes- # of X’s or √’ s and Random Reward <strong>Individual</strong>-Compare individual student’s checks to the number of X’s or √’ s picked for that day <strong>Classroom as a Whole</strong>-Compared all of the students’ total number of checks to the number of X’s or √’ s picked for that day.</td>
</tr>
<tr>
<td></td>
<td><strong>Compare number of X’s or √’ s to criteria</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Give or Don’t Give the Mystery Rewards</strong></td>
<td><strong>Individual</strong>- Individual students earn the reward. Give to students who have ___X’s or less. <strong>Classroom as a Whole</strong> -Everyone or nobody get the reward. Give to class as a whole who have _____X’s or less <strong>Also</strong>-Give praise and mention expectations and rules if they earned it. Tell them to try again next time if they didn’t earn it</td>
</tr>
</tbody>
</table>
Appendix G: Group Contingency Preference Assessment Questionnaire

The following page contains a brief questionnaire related to the different types of group contingencies. This questionnaire will be used to help obtain information that will help you to determine what group contingencies may be best for your classroom.

**Independent Group Contingencies**

In the Independent Group Contingency, each student can individually earn the Mystery Motivator based on his or her progress towards meeting criteria. At the end of the activity you will determine whether the student met the criteria, and which student earned the Mystery Motivator and which student did not earn the Mystery Motivator.

Please circle the number that best describes your agreement or disagreement with each statement using the scale below:

1=Strongly Disagree  2=Disagree  3=Agree  4=Strongly Agree

1. This could be an acceptable intervention for my class
2. This could be a good fit for my classroom
3. I think the students will respond well to this intervention
4. I think this procedure was similar to interventions I have used
The following page contains a brief questionnaire related to the different types of group contingencies. This questionnaire will be used to help obtain information that will help you to determine what group contingencies may be best for your classroom.

**Interdependent Group Contingencies**

During the Interdependent Group Contingency, the classroom as a whole will be able to earn the Mystery Motivator given their progress to meeting teacher chosen criteria. At the end of the activity you will determine whether the class met the criteria, and whether the class as a whole received the Mystery Motivator, or none of them did at all.

Please circle the number that best describes your agreement or disagreement with each statement using the scale below:

1 = Strongly Disagree  2 = Disagree  3 = Agree  4 = Strongly Agree

1. This could be an acceptable intervention for my class  
   
2. This could be a good fit for my classroom  
   
3. I think the students will respond well to this intervention  
   
4. I think this procedure was similar to interventions I have used
The following page contains a brief questionnaire related to the different types of group contingencies. This questionnaire will be used to help obtain information that will help you to determine what group contingencies may be best for your classroom.

**Randomized Group Contingencies**

During the Randomized Group Contingency, neither the students nor you will know how whose behavior will earn the Mystery Motivator. At the end of the instructional activity you chose a contingency procedure to determine who would get eligibility for the Mystery Motivator. Mystery Motivator could be given through each student’s behavior, through the class as a whole, or based on one student’s behavior.

Please circle the number that best describes your agreement or disagreement with each statement using the scale below

1=Strongly Disagree  2=Disagree  3=Agree  4=Strongly Agree

1. This could be an acceptable intervention for my class  
2. This could be an good fit for my classroom  
3. I think the students will respond well to this intervention  
4. I think this procedure was similar to interventions I have used

1 2 3 4
Appendix H. Social Validity Checklist: Modified Intervention Rating Profile-15 (IRP 15)

Adapted from the IRP-15 Copyright, 1982. Brian K. Martens & Joseph C. Witt

Group Contingency

The following page contains questions relevant to the group contingency you implemented. This questionnaire will be used to obtain information that will help to determine the validity of the group contingency intervention.

Please circle the number that best describes your agreement or disagreement with each statement using the scale below.

1 = Strongly disagree  2 = Disagree  3 = Slightly disagree  4 = Slightly agree  5 = Agree  6 = Strongly agree

1.  This was an agreeable intervention for disruptive behavior in my class
2.  Many teachers would find this treatment acceptable for other problem behaviors
3.  This intervention proved effective in reducing overall disruptive behavior in the classroom
4.  I would recommend this treatment to other teachers
5.  Disruptive behavior in the class was frequent enough to permit use of this treatment
6.  Many teachers would find this treatment effective for use in their class
7.  I was disposed to use this treatment in my classroom
8.  This intervention resulted in detrimental side effects to my students
9.  This intervention could be acceptable for a range of students and classrooms
10. This intervention was similar to other treatments I have used in my classroom.
11. This intervention was an equitable way to handle disruptive behavior in the classroom.
12. This intervention was reasonable to be used for disruptive behavior in my class.

13. I found the procedures in the intervention useful.

14. This intervention was a good way to handle disruptive behavior in the classroom.

15. As a whole, this intervention was reasonable to be used in the classroom.
Appendix I. Sample Assessment

Primary Weekly Assessments (K-2)

The follow pages contain samples of assessment questions that are based on the academic instructional activity targeted for primary grade classrooms, Kindergarten through Second Grade.

<table>
<thead>
<tr>
<th>Name:____________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math</td>
</tr>
<tr>
<td>1. Write 273 in expanded form</td>
</tr>
<tr>
<td>2. Bob has 10 apples, Jimmy eats 5 of Bob’s apples, how many apples does Bob have left?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name:__________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science</td>
</tr>
<tr>
<td>1. Properties of matter: describe the properties of paper.</td>
</tr>
<tr>
<td>2. List an example of a solid, liquid, and a gas.</td>
</tr>
</tbody>
</table>
Name:

Reading

Write down a word or two that describes how bats feel:
Stanzas 1-4

________________________________________________________________________

Stanzas 5-9

________________________________________________________________________

Stanzas 10-14

________________________________________________________________________

Stanzas 15-18

________________________________________________________________________

________________________________________________________________________

Reading

Write down what the main ideas from the chapter of Bob’s Dogs that we read

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

V+ = 2 examples, 3-4 sentences
V=1 example
V-=Gave no examples
1. How many sentences are in a paragraph?

<table>
<thead>
<tr>
<th>Correct-</th>
<th>Incorrect-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Intermediary Weekly Assessments (3-5th grade)

The follow pages contain a sample of assessment questions that are based on the academic instructional activity targeted for intermediary grade classrooms, Third through Fifth Grade.

Math Assessment

<table>
<thead>
<tr>
<th>Name:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Answer these questions as best as you can:</td>
</tr>
</tbody>
</table>

1. 1X1= 8. 1X8= 15. 1X15= 22. 1X22=
2. 1X2= 9. 1X9= 16. 1X16= 23. 1X23=
3. 1X3= 10. 1X10= 17. 1X17= 24. 1X24
4. 1X4= 11. 1X11= 18. 1X18=
5. 1X5= 12. 1X12= 19. 1X19=
6. 1X6= 13. 1X13= 20. 1X20=
7. 1X7= 14. 1X14= 21. 1X21=
Appendix J. Student Powerpoint Presentation Outline

- Group Rewards
  - Researcher and Teacher Introduction
- How do we do our best?
  - Classroom-Specific Rules & Expectations
- Independent Group Reward
  - Reward will be given if you behave
  - Participate in_____and follow the rules!
  - When you break a rule you get a check mark by your name
  - In the end, the teacher chooses a number that will be the rule for seeing who earns the reward
  - Some people can get the reward, others won’t be able to
- Modeling
  - Let’s see how INDEPENDENT group rewards work….Mark violations
    - Who gets a reward?
    - What is the reward?
- Interdependent Group Reward
  - Reward will be given if everyone behaves!
  - Participate in ____ and follow the rules
  - When you break a rule you get a check mark by your name on the board
  - In the end, the teacher chooses a number that will be the rule for seeing who earns the reward
  - Everyone will get rewarded OR no one will get rewarded
- Modeling
  - Let’s see how INTERDEPENDENT group rewards work….Mark violations
    - Who gets a reward?
    - What is the reward?
- Interdependent Group Reward
  - This type combines from all other types
  - Nobody knows how reward will be decided
  - Participate in _____ and follow the rules
  - When you break a rule you get a check mark by your name on the board
  - In the end, the teacher picks one out of the two group reward types: Independent, interdependent
  - Then the teacher will follow the same steps as before
- Modeling
  - Let’s see how INTERDEPENDENT group rewards work….Mark violations
    - Who gets a reward?
    - What is the reward?
- What should you do?
- Do your best!
- At times your classroom will be working as a whole- your behavior counts towards the classroom’s reward!
- Sometimes it’ll be your own behavior that sees if you get the reward
- Help each other
  - Everyone’s behavior can sometimes earn you the reward!
- No blaming friends
  - You can lose the chance to earn rewards if you bully your classmates
- Don’t complain or whine
  - Teacher’s check and judgement won’t be changed
  - Try harder next time if you don’t earn it!

• Questions?
Appendix K. Permission for IRP-15

Brian Martens, the author of the IRP-15 survey was asked via e-mail if the researcher could use this instrument. The adapted instrument is in Appendix H. Permission to use the instrument was given along with an attached version of the IRP-15.

---

Brian K Martens <bkmarten@syr.edu>  8/25/15

to me

I Fernando – you have my permission to adapt the IRP-15 (attached) for your project. Be sure to reference the scale using the citation below and good luck! Prof. Martens
Appendix L. USF IRB Approval

October 19, 2015

Fernando Herrera
ABA-Applied Behavior Analysis
Tampa, FL  33612

RE:  Expedited Approval for Initial Review
IRB#:  Pro00023784
Title:  The Impact of a Teacher Preferred Group Contingency on Class-Wide Behavior: The Role of Data Based Decision Making

Study Approval Period: 10/19/2015 to 10/19/2016

Dear Mr. Herrera:

On 10/19/2015, the Institutional Review Board (IRB) reviewed and APPROVED the above application and all documents contained within, including those outlined below.

Approved Item(s):
Protocol Document(s):
Protocol_V1.docx

Note, no research activities can begin without submitting the required letter of support and receiving an approval through the Amendment process.

Consent/Assent Document(s)*:
SB Parental Permission_V1_10.13.15.docx.pdf
Teacher Consent Form_V1_10.13.15.docx.pdf
Student Assent_V1 (Verbal, not a stamped form).

*Please use only the official IRB stamped informed consent/assent document(s) found under the "Attachments" tab. Please note, these consent/assent document(s) are only valid during the approval period indicated at the top of the form(s).
It was the determination of the IRB that your study qualified for expedited review which includes activities that (1) present no more than minimal risk to human subjects, and (2) involve only procedures listed in one or more of the categories outlined below. The IRB may review research through the expedited review procedure authorized by 45 CFR 46.110 and 21 CFR 56.110. The research proposed in this study is categorized under the following expedited review category:

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

[This study involving data pertaining to children falls under 45 CFR 46.404 – Research not involving greater than minimal risk.]

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB for review and approval via an amendment. Additionally, all unanticipated problems must be reported to the USF IRB within five (5) calendar days.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

Kristen Salomon, Ph.D., Vice Chairperson
USF Institutional Review Board