GROUP CONTINGENCIES AND MYSTERY MOTIVATORS FOR IMPROVING CLASSROOM BEHAVIOR: AN ILLUSTRATIVE REVIEW

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A Master's Project
Submitted in Fulfillment
Of the Requirements for the Degree of
Master of Science
Department of Curriculum and Instruction
At the State University of New York University at Fredonia
Fredonia, New York

January 2012
State University of New York at Fredonia
Department of Curriculum and Instruction

CERTIFICATION OF PROJECT WORK

We, the undersigned, certify that this project entitled “Group Contingencies and Mystery Motivators for Improving Classroom Behavior: An Illustrative Review” by Jaime N. Gard, Candidate for the Degree of Master of Science in Education, Curriculum and Instruction, is acceptable in form and content and demonstrates a satisfactory knowledge of the field covered by this project.

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Abstract

Much of the psychological foundations coursework for future and practicing teachers focuses on the psychology of individuals. Yet most teachers instruct groups of students and there are important differences between individual and group psychology. One particularly relevant topic for teachers involves the use of group-oriented contingencies. A group-oriented contingency was defined as, “A contingency in which reinforcement for all members of a group is dependent on the behavior of: (a) a person within the group, (b) a select group of members within the larger group, or (c) each member of the group meeting a performance criterion (Cooper, Heron, & Heward, 2007; p.696). There are three types of group-oriented contingencies, independent, dependent, and interdependent, and each has differential effects on pupils’ academic and behavioral performance. This illustrative literature review examines the relative strengths and limitations of each group-oriented contingency and describes research findings associated with their use with elementary-aged school children. Implications and guidelines for the use of group-oriented contingencies to reduce disruptive classroom behavior are provided.
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Introduction

Contemporary classroom teachers face significant challenges meeting the academic and behavioral needs of students, many of whom come increasingly from culturally and linguistically diverse backgrounds and/or from poverty, neglect, or abuse environments. In addition, more children with special needs are entering our general education classrooms as part of the inclusion movement every year (Maheady, 1997). In many respects, the difficulty of teaching diverse learning groups in common educational settings has been under-estimated at best and unappreciated at worst. It is not easy to teach heterogeneous groups of students who may differ by as much as four or more grade levels in achievement in elementary classrooms (Heward, 2009). This instructional challenge is made even more daunting when some of those children also engage in high frequency disruptive behavior. Disruptive behavior requires teachers to allocate more time and effort to maintaining discipline which results in less time instructional time for all.

Over the years, researchers and practitioners have developed a variety of classroom-based interventions to reduce disruptive behavior and, in turn, improve academic outcomes. Implementing effective interventions to reduce disruptive classroom behaviors, however, is also difficult, particularly when one is trying to teach at the same time. Many classroom teachers, for example, have reported feeling inadequately prepared to implement behavioral interventions, while others have failed to use them at all (Mottram, Bray, Kehle, Broudy, & Jensen, 2002). There is a dire need, therefore, for interventions that can be implemented efficiently, effectively, and consistently by classroom teachers (DeMartini-Scully, Bray, & Kehle 2000).

One particular class of intervention that was designed to reduce disruptive classroom behavior was group-oriented contingencies (Gresham & Gresham, 1982; Litow & Pomroy,
1975). In fact, Stage and Quiroz (1998) conducted a large-scale meta-analysis and identified group-oriented contingencies as the most effective intervention for decreasing disruptive classroom behavior. The primary purpose of this project, therefore, was to provide an illustrative literature review of group-oriented contingencies and their potential utility for reducing disruptive behavior, particularly in inclusive educational settings. In addition, the review examines the potential benefits that may accrue from the use of unknown rewards in conjunction with group-oriented contingencies. The research base on one type of unknown reward, mystery motivators, is examined in detail. Finally, a set of practitioner guidelines are provided for using group contingencies in elementary-level, inclusive classrooms. The intent is to provide practitioners with a useful set of procedural guidelines for using group-oriented contingencies to improve pupil behavior in their inclusive classrooms.

**Group-Oriented Contingencies and Pupil Behavior**

Interestingly, most, if not all, future teachers complete “psychology-related” coursework as part of their initial and/or ongoing teacher preparation programs. These courses are typically entitled, “child psychology”, “developmental psychology”, “educational psychology” and/or some related terms. While the titles highlight “psychology”, the content focus within these courses is often on the psychology of “individuals” and how they are impacted by a variety of innate and environmental factors. While it is certainly important for all teachers to be well-versed in individual psychology, they must be equally competent in understanding how groups function. After all, most teachers will spend most of their careers teaching groups of students not individuals, and there are distinct differences between working with one and many students simultaneously. One facet of “group psychology” that is particularly important for classroom teachers is the use of group-oriented contingencies (Gresham & Gresham, 1982).
A group contingency was defined as, "A contingency in which reinforcement for all members of a group is dependent on the behavior of: (a) a person within the group, (b) a select group of members within the larger group, or (c) each member of the group meeting a performance criterion (Cooper, Heron, & Heward, 2007; p.696). The basic idea is that an entire group can earn rewards based upon the performance of one or more of the class’ performance. There are three types of group-oriented contingencies: (a) independent, (b) dependent, and (c) interdependent (Cashwell, 1998; Litow & Pumroy, 1975).

**Independent Group-Oriented Contingencies.** In independent group-oriented contingencies, all pupils are given the same materials, instructions, tasks and criteria and then earn consequences (i.e., positive and/or negative) based on their own performance. In other words, each pupil’s access to rewards or punishers is determined independent from others in the class. A perfect example of this is the traditional grading system used in our public schools. Each pupil’s access to consequences (i.e., rewards = high grades and punishers = failing grades) is determined solely on each individual’s performance. One pupil gains access to an A grade for getting a 100% on a quiz while another receives an F for only getting 50% correct. Isn’t this the way our public schools have operated for a long time? Independent group-oriented contingencies are also used when deciding whom to promote from one grade to another or graduate after their senior years. Pupils gain entry to the honor society based on their own academic performance, receive smiley faces and/or frowns on the basis of their own behavior, and gain admission to prestigious universities based solely on their own academic credentials. In fact, independent group-oriented contingencies pervade our pupil school systems (Skinner, Skinner, & Burton, 2009); and why not? They are fairly easy to implement and are viewed as fair by most teachers, administrators, parents, and students (Skinner et al., 2009). Independent
group-oriented contingencies are clearly the most frequently used contingencies in school, but they may not come without their own limitations.

To begin, some may argue that there is nothing fair about treating different individuals in the same way (Heward, 2009). Students with special needs, for example, may need to be treated differently in order to treat them fairly. Is it unfair, for example, to provide assistive technologies (e.g., amplification devices, magnifiers, and/or speech and language processors) to pupils with physical and/or sensory impairments to improve their performance on academic tasks? Where is the fairness in assigning higher and/or lower grades to pupils on the same tasks when many of those students were already performing at very different levels when they entered that class? Won’t lower performing students have to do “more” work to earn the same grade as their initially higher performing peers? Can high performing students get by simply by outperforming their lower performing peers? Unfortunately, the answers to these questions appear to be yes. Just because we provide the same instruction for all pupils does not mean that we are, in fact, treating everyone fairly. The “differentiated instruction” movement was founded on the basic belief that some students must be treated differently in order to deal with them fairly.

There is also evidence to suggest that independent group-oriented contingencies may not be equally motivating for all students and/or across all behaviors or subject areas (Popkin & Skinner, 2003; Skinner et al., 2009). For example, the teacher might announce that the “reward” for completing independent work assignments on time and neatly will be lunch with the teacher. Some pupils might find this consequence “highly motivating”, others less so, and some might even view this as a mild form of punishment. The point is that the same consequence for all pupils will have differential effects on individual pupil performance. Similarly, some pupils are more likely to earn positive consequences in one subject area over another. Jimmy may earn
more positive consequences (e.g., praise and stickers) for his reading performance, for example than his math work. Predictably, Jimmy would appear more motivated to read and spend more time in reading where his reward possibilities are maximized and less effort is required. He would also appear to be less motivated by math and spend less time doing so.

A third limitation to independent group-oriented contingencies is that they may also produce adverse social side effects. For example, when contingencies are held constant (everything is the same for everyone) and consequences are public, students learn something about their peers. They recognize for example, who got the As, Bs, Cs and Fs on a quiz; they see who got the stickers or smiley faces and who didn’t; and they hear whose name is used when praise and reprimands are used publicly. Independent group-oriented contingencies, by their very nature, produce winners and losers. As such, there is an exclusionary nature to rewarding some students but not others (Skinner et al., 2009). Finally, independent group-oriented contingencies also lose their effectiveness when rewards are not personally desirable (Cashwell, 1998). Pupils who are not motivated by potential group rewards, in turn, often work against classroom goals and rules by “sabotaging” group outcomes (Rhode, Jenson, & Reavis, 1993). One alternative to independent group-oriented contingencies is the use of dependent group contingencies.

**Dependent Group-Oriented Contingencies.** Dependent group-oriented contingencies, are applied when *all or none* of a group (i.e., one table and/or entire class) receives access to consequences (positive and negative) based on the behavior of one or just a few students (Skinner et al., 2009). For example, rewards are given to the entire group (i.e., table or class) when *one or some* members of the group meet pre-established criteria (Cashwell, 1998; Gresham & Gresham, 1982; Skinner, Williams, & Neddenriep, 2004). The entire class might earn 10 minutes of free time if Nicole gets at least a B on the math quiz. An entire table might receive no
homework coupons, if Jimmy’s paper met the teacher’s pre-established criteria (85% correct). In
dependent group-oriented contingencies, everyone’s (e.g., entire class) access to consequences
(positive and negative) is dependent on others’ behavior; unless, of course, their performance
was being evaluated at the time. Skinner et al. (2009) suggested that there are a number of
procedural advantages to dependent group-oriented contingencies. First, they are relatively easy
to use because teachers deliver the same consequences to all or none of the students at one time.
Because everyone either wins or loses together, there is less likelihood for disparaging comments
being directed toward winners and/or losers. A second potential benefit is that teachers only have
to evaluate one or some pupils’ performance(s) to determine if the entire group gains access to
the consequence (Gresham & Gresham, 1982; Heering & Wilder, 2006). Finally, dependent
group-oriented contingencies allow teachers to use activity-based consequences that may
normally be difficult to give to some students but not others (e.g., listening to preferred music
and free time). There is also some evidence that dependent group-oriented contingencies may
also increase the probability of peer assistance and support because everyone gets rewarded
when certain target students perform well. Students are more inclined to help others when it also
results in them receiving positive consequences as well.

On the other hand, there are some inherent difficulties to using dependent group-oriented
contingencies. First, they place a tremendous amount of pressure on target students. After all,
everyone’s consequences depend on their performance. If they perform well, then peers may
praise their behavior; but if they fail, they may be punished by their peers (e.g., threats and/or
derogatory comments). Second, these contingencies may cause peers to monitor and evaluate one
another’s behavior more intently (Skinner et al., 2009). As such, these contingencies might draw
undue attention to pupils’ different or undesirable performance. Finally, dependent group-
oriented contingencies may be less attractive to practitioners and pupils because they are perceived as unfair (e.g., Heering & Wilder, 2006; Popkin & Skinner, 2003). Children who perform well academically and/or behaviorally do not understand why they can’t earn rewards just because others didn’t perform well.

**Interdependent Group-Oriented Consequences.** The third instructional option for teachers to use is interdependent group-oriented contingencies. With interdependent group-oriented contingencies, all members of a group (entire class) receive access to consequences on the basis of some aspect of the group’s behavior meeting a group-oriented criterion (Litow & Pumroy, 1974; Skinner et al., 2004). For example, if the class average on a math quiz is 85% or higher, then the entire class earns a pizza party. Similarly, if the whole class sells at least 200 raffle tickets, then everyone receives no homework coupons. These contingencies are said to be interdependent because each student’s access to consequences is interdependent on their own and others’ behavior. The class is more likely to earn no homework coupons, for example, if everyone in class sells a minimum amount.

Because all-or-none of the pupils receive access to consequences, interdependent group-oriented contingencies are relatively easy to manage (easier to deliver rewards to all than some). Similarly, when all-or-none of the students receive access, teachers don’t have to worry about students who did not earn them gaining access or stealing them from peers. Finally, using these contingencies allows teachers to use inexpensive, activity-based rewards that are often difficult to give to some pupils but not others (e.g., listening to music, extra credit, and/or extra recess time). Like the dependent group-oriented contingency, this option may also lead to positive or negative consequences depending on the entire group’s performance (Cashwell, 1998). For example, target students may feel undue pressure, they might be threatened, and/or others may
complain that the contingencies are not fair. Given that dependent and interdependent group-oriented contingencies may produce positive and/or negative peer responses, it is important to include systematic procedures to promote the former rather than the latter outcomes. Specific recommendations are provided later in the paper for maximizing benefits and minimizing potential negative side-effects of both dependent and interdependent group-oriented contingencies.

**Relative Effectiveness of Independent, Dependent, and Interdependent Contingencies**

Over the past 35 years or more, researchers have evaluated the relative effectiveness of the three group-oriented contingencies in terms of their impact on pupil behavior. Here, the focus will be primarily on their impact on reducing disruptive classroom behaviors. Gresham and Gresham (1982) initially compared the effectiveness of independent, dependent, and interdependent group contingencies in controlling the disruptive classroom behavior of a group of students with mild mental challenges enrolled in a self-contained special education class. The participants were 12 students ranging in age from 6 to 10 years old. Researchers defined disruptive behavior as: (a) talking out without permission, (b) being out of seat, (c) laughing inappropriately, (d) verbal or physical aggression, and/or (e) throwing objects in the classroom. Observations were collected during non-instructional times in the morning and afternoon. Under the **independent** group-oriented contingency, each child competed against every other child for reinforcement. To earn rewards, students had to have five or less instances of disruptive behavior. The child with the **lowest** number of disruptive behaviors received reinforcement. This particular condition closely approximated **typical** classroom management procedures. During the **interdependent** group-oriented contingency, however, the class was divided into two teams and the one with the fewest marks for disruptive behavior earned reinforcement for the day. If either
team had more than five disruptive behaviors, however, then neither team earned rewards. During dependent contingency conditions, team captains were assigned to each team. Team reinforcement was then dependent on the team captains’ frequencies of disruptive behavior. The captain with the fewest disruptive behaviors earned his/her teammates reinforcement for the day. Marks were recorded on the chalkboard, so students were able to monitor their own behavior. Results indicated that both dependent and interdependent group-oriented contingencies produced lower rates of disruptive behavior than independent group contingencies. In fact, disruptive behavior occurred over two and a half times less often under interdependent contingencies and almost half as frequently when dependent group contingencies were in effect. Gresham and Gresham (1982) concluded that interdependent and dependent group contingencies were more effective because they promoted group cooperation. They observed, for example, that children on both teams often praised one another for good behavior and they verbally reprimanded their peers for being disruptive. In contrast, no cooperation was observed during the independent group-oriented contingency (Gresham & Gresham, 1982).

In a more recent investigation, Theodore, Bray, and Kehle (2004) compared the effects of independent, dependent, and interdependent group-oriented contingencies with randomized reinforcers on pupils’ disruptive classroom behavior. Participants included three, 17 year old males who were identified as seriously emotionally disturbed (SED) and oppositional defiant disordered (ODD). These adolescents exhibited a range of disruptive behaviors including opposition towards authority figures, difficulty resisting impulses, physical intimidation, and difficulty cultivating relationships with peers and adults in their self-contained special education classroom. Using an alternating treatments design, Theodore et al., presented one intervention condition per day in random fashion. Classroom rules were posted across conditions and students
were given when students failed to follow rules. Under *independent* group-oriented contingencies, students were given checks for not following classroom rules. If they earned five or fewer checks, then they were allowed to choose reinforcers from the reward jar. During *interdependent* group conditions, *all* students in class needed five or fewer checks for *any* student to receive reinforcement. Finally, under the *dependent* group contingency, students were given checkmarks and then one student’s name was drawn from a “names” jar. If the selected student(s) met the criterion (five or fewer checks), then the entire class received rewards. A reward jar containing student-generated suggestions was also present across all contingencies.

Theodore, et al (2004) reported that all three group contingencies substantially reduced disruptive behavior across the 9-week intervention period. Two students improved most under dependent contingencies, while the other performed best when independent contingencies were in effect. The researchers speculated that the dependent group contingency was more effective because it randomized reward criteria. If students were concerned about peer approval and/or disapproval, then randomization of being chosen as the determining factor for their peers earning rewards may have motivated them. While finding no clearly superior group-oriented contingency, researchers suggested that the randomization was one possible explanation for the stronger effect of the dependent group contingency (Theodore, et al., 2004). More recently, Lynch, Theodore, Bray, and Kehle (2009) compared the effects of independent, dependent, and interdependent contingencies on the math homework completion and accuracy of six students with special needs in a self-contained classroom. Using an alternating treatments design, the researchers found that all three types of group contingencies produced noticeable improvements in students’ work completion and accuracy in mathematics. With regard to homework accuracy, the interdependent group contingencies produced slightly better results that the other two
options. The classroom teacher rated the group contingency interventions as effective, appropriate, and acceptable and said she would recommend the intervention to others. Once again, students rated all three group contingencies in a favorable manner.

Collectively, these studies, among others, suggested that classroom teachers have at least three options when using group-oriented contingencies to deal with disruptive classroom behavior (e.g., McKissick, Hawkins, Lentz, Hailly, & McQuire, 2010; Reinhardt, Theodore, Bray, & Kehle, 2009). Each contingency type comes with its own advantages and disadvantages and each may be used effectively to improve pupil behavior. In the following section, the important role that rewards can play in group-oriented contingencies is discussed and a case is made for the use of unknown rewards, particularly in the form of mystery motivators (Rhode et al., 1993).

**Combining Unknown Rewards with Group-Oriented Contingencies.** As noted, one of the inherent concerns in using group-oriented contingencies is that not everyone will be equally motivated by the same consequence. For some pupils, lunch with the teacher may be to “die for” while for others it may be perceived as a downright discouraging experience. Praise may be very reinforcing to some pupils, but disturbing for others. As such, when one uses specific rewards that are known to pupils, they may have differential effects on pupils based on their particular desire for them (Rhode et al., 1993). It was recommended, therefore, that unknown rewards be used instead when one employs group-oriented contingencies. In that way, students will not know what rewards they may or may not receive. One type of unknown reward that has been used quite frequently is a mystery motivator (Rhode et al., 1993).

Mystery motivators are unknown rewards that are delivered contingent on the successful completion of pre-specified criteria (e.g., 100% assignment completion with 85% accuracy).
Typically, the mystery motivator system uses an invisible ink pen to draw stars or an “M” on the class calendar under randomly selected dates. On days when pupils’ meet pre-established criteria they are allowed to shine an ultra-violet light underneath the date or use a secret “decoding” pen to determine if there is a star or letter under the date. If an invisible mark shows through, then students are allowed to select a mystery motivator envelope from those hanging from the ceiling. Mystery motivator envelopes are usually decorated with colorful question marks and sealed. Envelopes contain slips of paper with the names of potential rewards on them. Ideas for possible rewards are usually elicited from students and often include activity-based consequences such as free time, no homework coupons, drop work dots, preferred seating arrangements, and puzzle pieces to build toward a larger reward (e.g., slices of pizza toward a pizza party).

Rhode, Jenson, and Reavis (1993) suggested further that it is very important to “hype” the mystery motivators among students. Teachers can speak excitedly about what might be won that day and provide reminders to build excitement around the “mysterious” rewards. Much of the early research on mystery motivators was conducted with individual target students, particularly those with significant learning and behavior problems (Rhode et al., 1993). A series of more recent empirical investigations, however, has combined group contingencies and mystery motivators into intervention packages that were then used to improve pupils’ academic and behavioral performance. A sampling of this research is summarized in subsequent sections of this document.

**Independent Group-Oriented Contingencies and Mystery Motivators**

In a typical study, target students are required to engage in appropriate academic and/or social behavior to a pre-determined criterion. For example, they might be required to raise their hands and wait to be called on at least twice in class to earn a mystery motivator. When students
meet the criterion, they are allowed to use the “magic decoding pen” or AV light to see if they earned a reward for that particular session. Each pupil’s behavior determines whether or not they gain access to rewards on those days. Given the consistent success of mystery motivators with individual pupils (Rhode et al., 1993), some researchers began to use them with larger groups (e.g., an entire general or special education classroom). In one of the earliest studies, Moore, Waguespack, Wickstrom, Witt, and Gaydos (1994) found that mystery motivators were effective in improving elementary students’ homework completion and accuracy rates. Case studies were performed with target students in 3rd and 5th grade classrooms. A Mystery Motivator Weekly Chart was presented to students who were told, in turn, that if they turned in all of their homework each day, they would earn the opportunity to color in squares that corresponded to chart dates. Initially, researchers placed mystery motivator symbols under four of five dates using “invisible” ink pens. If students turned in 100% of their homework, then they colored in the chart using a “decoding” marker. If symbols appeared, then students chose rewards from mystery motivator reward menus that included tangible and non-tangible items such as being the “teacher’s helper”. If symbols did not appear, they were not allowed to choose rewards, but were encouraged to try harder the next day.

Moore et al. (1994) found that five targeted boys with low homework completion and accuracy rates in the 3rd grade class improved their homework completion rates from 65% to 89% and their accuracy levels from 57% to 81% when mystery motivators were in effect. Four other pupils were targeted from a 5th grade class in a university laboratory school. Once again, mystery motivators improved pupils’ homework completion rates from 70% to 81% (i.e., 11% increase in completion) while producing comparable increases in homework accuracy from 52% to 65%. One of the four target students, however, did show a decrease in completion and
accuracy rates, an outcome that the researchers attributed to excessive student engagement in extra-curricular activities which limited their opportunities to play the mystery motivator game.

Madaus, Kehle, Madaus, and Bray (2003) also used mystery motivators in an attempt to increase math homework completion and accuracy in two 5th grade classrooms. Using an A-B-A-B reversal design, researchers targeted five pupils who were having difficulty completing homework with any degree of accuracy. The intervention consisted of each student having individual charts with their names and 22 assignments written on them. Eighteen of the 22 squares were marked with a mystery motivator symbol. The squares were then covered with construction paper to conceal them. To uncover squares, students had to have 100% of the homework assignment completed with 80% accuracy. Researchers found that four of the five students showed immediate and noticeable improvements in homework completion. The fifth student hadn’t experienced completion problems initially. Three students also improved their math accuracy, while two others performed more poorly for unknown reasons. While the results were not overly conclusive, they did suggest that mystery motivators can enhance homework completion and accuracy rates among struggling learners.

A bit earlier, De Martini-Scully et al. (2000) implemented mystery motivators as part of an intervention package designed to reduce disruptive classroom behaviors. The intervention was delivered using an independent group contingency contract. Participants were two, 8-year old females identified by the teacher as having inappropriate classroom behavior. Dependent variables included non-compliance with teacher requests, making inappropriate noises, talking out of turn, out of seat, and orienting in a direction other than the teacher or work. The intervention package consisted of teacher movement through the classroom while teaching (i.e., proximity control), precision requests, posted classroom rules, a token economy, and mystery
motivators. Students earned tokens by following posted classroom rules throughout all class lessons. When they earned three tickets, they were given a mystery motivator. During baseline, disruptive behavior occurred on average about 41% of observed intervals. These disruptive behavior rates were cut in half (i.e., 20%) when the intervention package was put into effect. When the intervention was withdrawn, disruptive behavior increased again to an average of 25% of the observed intervals and then decreased once more when the intervention was put back into effect.

In another independent contingency contract study, Musser, Bray, Kehle, and Jenson (2001) replicated the De-Martini-Scully et al. (2000) study in a special education setting. Participants were three students (2M, 1F) ranging in age from 8-10 who were classified seriously emotionally disturbed (SED), oppositional defiance disordered (ODD), and attention-deficit hyperactivity disorder (ADHD). Disruptive behavior was defined as non-compliance, talking out or making noises without permission, out of seat, playing with non-work related objects, verbal and physical aggression, and orienting or staring at something other than the teacher or work. The intervention package was identical to that of the DeMartini-Scully (2000) study except that students earned stickers instead of tokens. In addition, students earned stickers every 30 minutes that they showed appropriate behavior. They were required to earn eight stickers to earn the first mystery motivator; 10 stickers for the second mystery motivator; and 12 for each subsequent mystery motivator. All three target students showed immediate and noticeable improvements when the intervention package was in effect. Student 1 decreased his disruptive behavior from 39%, to 9% of observed intervals. Student 2's disruptions decreased from 36%, to 9%, while Student 3 showed decreased from 36% to 12% of observed intervals. Like the DeMartini-Scully et al. (2000) study, Musser et al. (2001) showed that the intervention package that included
mystery motivators was quite effective in reducing disruptive classroom behavior among challenging learners.

In a subsequent study, Mottram et al. (2002) used mystery motivators as part of a multi-component intervention which also included a token economy with response cost and posted classroom rules. Participants included three, 7-year old male general education students enrolled in a parochial elementary school. Pupils were identified by their teacher as non-compliant, inattentive, and aggressive. Using a multiple baseline across students, researchers implemented an intervention consisting of: (a) posted classroom rules, (b) token economy with response cost, and (c) mystery motivators. Classroom rules were posted to the inside of students’ desks. The token economy consisted of each student receiving a token for obeying all the rules every 10 minutes. If students displayed inappropriate behavior then they lost a token. If the student had five tokens by the end of the day, a mystery motivator in the form of an envelope with the child’s name and a question mark on the front was presented to the child (Mottram et al., 2002).

The researchers found that all three students responded well to the intervention. Student 1 showed a baseline average of 54% disruptive behaviors across the time interval, which improved to 12% during the intervention period and continued to decrease during follow-up, with a mean of 9%. Student 2 showed a baseline average of 59%, which reduced during the intervention period to 16%, and remained stable with an average of 16% during follow-up. Finally, Student 3 showed a baseline average of 54%, which reduced to 14% during the intervention period, and further decreased to 11% during follow-up. The teacher reported that the intervention was very easy to implement and would be incorporated into her daily instruction package, indicating not only a high success rate, but also ease and efficiency of implementation (Mottram et al., 2002).
Interdependent Group Contingencies and Mystery Motivators

While independent group contingencies have shown that they can reduce a variety of disruptive classroom behaviors across diverse educational settings, they come with their own limitations. First, independent group contingency interventions allow only target students to receive access to reinforcement based on their own behavior. This may prove too time-consuming and inefficient for practitioners who are responsible for entire classes of students. Second, some would argue that independent contingencies are unfair in that they treat some students differently from their peers. In such cases, interdependent or dependent group contingency may be appropriate options. Advantages to using interdependent group contingencies include procedural efficiency, reduced likelihood of negative side-effects (e.g., jealousy and peer rejection), and increased levels of pro-social interactions and group cooperation (Murphy, Theodore, Aloiso, Alric-Edwards, & Hughes, 2007; Popkin & Skinner, 2003). Interdependent group contingencies avoid negative side-effects by selecting target students randomly; therefore, the group cannot know whose performance is linked to the contingency (Kelshaw et al., 2000). These contingencies also allow teachers to use activity-based (i.e. non-tangible) rewards, which can be given easily and/or withheld from the entire group. There are some limitations, however, to the use of interdependent group contingencies (Popkin & Skinner, 2003). First, consequences are the same across all pupils in the class. This means that the consequences may be reinforcing for some, neutral to others, and aversive to others. When selected rewards are not reinforcing, then pupils may perform poorly or influence others to perform poorly to avoid the consequence (Kelshaw et al., 2000). A second limitation involves the criterion within the contingency. It may be too high for some pupils, yet too low for others. As such, some may fail early to meet the criterion and may react by not performing or
behaving inappropriately (Kelshaw et al., 2000). Similarly, higher performing and well-behaved pupils may not be challenged and may even be offended by lower standards or expectations. Finally, when some target behaviors are rewarded, others may begin to decline because they are not being recognized as readily. For example, if students can earn group contingent rewards for doing well in math, they may spend less time working on their literacy assignments (Kelshaw et al., 2000).

Kelshaw et al., (2000) suggested that many limitations of interdependent group contingencies could be alleviated by randomizing contingency components (e.g., target behaviors, criteria, students, and consequences). In an initial study, they compared the effects of randomizing all contingency components versus only the reinforcers; much like mystery motivators. Twelve, 2nd grade students with high rates of disruptive behavior participated. Four disruptive behaviors were identified: (a) off-task behavior, (b) inappropriate vocalizations, (c) out of area, and (d) non-compliance. Using an A-B-A-C-B-C experimental design, the researchers conducted a very interesting study. During the B phase, classroom rules were introduced and criteria for earning mystery motivators were explained. The teacher listed possible rewards and explained that if the criterion was met, a reinforcer would be drawn randomly from an opaque jar (Kelshaw et al., 2000). A data collection check-sheet was created with students’ names and target behaviors listed. The teacher placed checkmarks next to student names and the target behaviors each time they occurred. If the class as a whole had 36 or fewer checks throughout the day, they earned a reinforcer.

Following a second baseline period, all contingency components (i.e., target behaviors, students, criteria, and rewards) were randomized. The teacher explained that instead of having fewer than 36 checks, students would not know the criteria for earning reinforcement. She then
explained the *four jars* procedure to them. The first jar was labeled “Behaviors” and contained the names of the target behaviors and criteria (i.e., 0 -36) and/or the word “All” (which indicated that all behaviors were targeted). The second jar was labeled “Group or Individual”. Pieces of paper in this jar had either “Whole Class” or “Individual Student” printed on them. When whole class was selected, the teacher evaluated everyone’s behavior against the criterion. When “Individual Student” was selected, the teacher picked a paper slip from the third jar, which was labeled “Names”. The teacher then only evaluated the selected student’s behavior against the criterion. Student names were announced only on days when the criteria were met. If students met the selected criteria, then they drew paper slips from the fourth jar labeled “Reinforcers” and rewards were distributed to the entire class. When students did not meet criteria, they were told that they didn’t meet the criteria and would not select rewards that day. Again, pupil names were never revealed on days when criteria were not met. Instead, the entire class was encouraged to try harder the next day.

During initial baseline sessions, students engaged in disruptive behavior during 37% of observed intervals. These occurrences decreased to 14% when randomized rewards only were used. When the intervention was withdrawn, disruptive behavior increased once again to a mean of 42% of observed intervals. When the second intervention was put into place (i.e., all components randomized), there was an immediate and noticeable decrease in disruption to 11% of the intervals. The subsequent withdrawal of the intervention produced a slight increase in disruptive behavior to 16%. Final implementation of the all randomized intervention produced subsequent decreases to 4% of observed intervals. These data indicated that randomizing all contingency components rather than only rewards may lead to greater behavioral changes.
In a similar study, Theodore, Bray, Kehle, and Jenson (2001) employed an interdependent group contingency with randomized criteria for reinforcement. Criteria for rewards were randomized by varying the independent (whole group, high, low, and/or average performances) and unknown dependent group contingency (randomly selected students). Five adolescent males diagnosed as SED participated in the study and similar disruptive behaviors were targeted. A checklist with each student’s name was given to the teacher and failure to follow the rules resulted in checkmarks being placed next to students’ names. At the end of each period, the teacher drew a slip of paper from an opaque jar labeled “criteria”. This jar randomized criteria and included the performance of: (a) entire group, (b) student with highest performance, (c) student with the lowest performance, (d) average of all performances, and (e) individual students’ names. If individual student(s) and/or whole group met the criteria (five check marks or less) then all students earned rewards. Reinforcers were selected by drawing paper slips from a second opaque jar labeled “reinforcers”. Basically, Theodore et al. carried out a two rather than four jar intervention. All students’ behaviors improved as a result of the two jar intervention. Student 1’s disruptive behavior decreased from 58% to 3% initially, then increased to 44% during the second baseline and ultimately declined to 6% during the final phase. The remaining four target students showed comparable decreases across each intervention phase: (a) Student 2: 43% to 5% to 31% to 4%; (b) Student 3: 38% to 2% to 23% and 1%; (c) Student 4: 33% to 6% to 44%, no data were collected during final phase because of student suspension; and (d) Student 5: 40% to 4%. Importantly, all students and the teacher rated the intervention very positively. These results in conjunction with Kelshaw et al. (2000) findings suggested that both two and four jars may be highly effective interventions for decreasing classroom disruptions.
In a later study, Murphy et al. (2007) also examined the effects of interdependent group contingency and randomized reinforcers on disruptive behavior among preschoolers. Eight preschoolers (4M, 4F) in a Head Start school participated. Three target behaviors were identified: (a) keeping hands and feet to self, (b) remaining on task, and (c) sitting or standing properly on the rug. During the intervention, classroom rules with corresponding picture cues were posted. Students were told that they would receive checks each time rules were broken, and that they needed five or fewer checkmarks to earn rewards. The intervention was implemented during 15-minutes large group activities and pupils were told whether they met criteria. When criteria were met, rewards were drawn from a mystery motivator box which was covered in wrapping paper with a large question mark in the center of the box. The mystery motivator box contained 12 picture cards of all rewards. When criteria were not met, the teacher explained why and informed students that they would have another chance to earn another mystery motivator the next day.

Results showed that once again the interdependent group contingency with randomized reinforcers substantially reduced disruptive behavior. All students showed immediate and noticeable reductions in disruptive behaviors with effect sizes ranging from .99 to 7.71. These would all be considered educationally significant reductions in disruptive behavior. In addition, the teacher ranked the intervention 4.5 out of 5 on a Likert-type scale in terms of ease of implementation (Murphy et al., 2007).

Collectively, the literature suggested that a variety of group-oriented contingency interventions can be used to improve a wide range of academic and interpersonal behaviors. These effects appeared to be enhanced further when different contingency components were randomized and remained unknown to students. This combination of group-oriented
contingencies with unknown rewards such as mystery motivators should be an appealing intervention package for many general education teachers. The fact that teachers reported that they were relatively easy to implement and that pupils liked them a lot should add to their attractiveness.

**Recommendations for Practitioners**

The research presented here offers several possibilities for successful interventions to reduce disruptive classroom behaviors. The following recommendations are provided to maximize the benefits for classroom teachers.

1. **Select group contingency intervention based upon the specific needs of your class.**

   While one research study (Gresham & Gresham, 1982) presented evidence that interdependent and dependent group contingencies are more effective than independent group contingencies for managing the disruptive behavior of a few students, Kelshaw et al., (2000) findings suggested that interdependent group contingencies might be highly effective with entire classes. If behavior problems exist for only one or a few students, then an independent group contingency may be more appropriate (De-Martini-Scully et al., 2000; Madaus et. al., 2003; Moore et al., 1994; Mottram et al., 2002; Murphy et al., 2007). However, if behavior problems existed on a whole class level then the “two or four jars” and other interdependent contingencies procedures may be more appropriate.

2. **Always use group contingencies with publicly posted classroom rules and criteria.**

   Posted rules remind students of expected behavior while the criteria inform them about how well they must behave to earn positive consequences. Identify the most important behaviors to target for intervention in group-oriented contingencies. Important educational outcomes might include increased academic productivity (i.e., increased
work completion and accuracy), active engagement in class activities (e.g., asking or answering questions), and/or engaging in pro-social interactions with adults and peers. However, the number of target behaviors should not exceed five. The more target behaviors that are included, the less likely the contingency is to be effective for any one behavior (Skinner, Cashwell, & Dunn, 1996; Skinner & Skinner, 2004). It might be wise, therefore, for teachers to prioritize target behaviors (i.e., most to least important) and then include more opportunities to monitor and evaluate those behaviors (e.g., putting more high priority target behavior slips in the jars intervention). Loading the jars in this way increases the probability of drawing those target behaviors that were deemed high priority (Skinner et al., 1996). As student behavior improves, teachers can also change the criteria to best meet class needs.

3. **Never Use Punishing Consequences.**

It is not appropriate to use interdependent and/or dependent contingencies with negative or high-stakes consequences. Because others may be punished because of one or a few students’ behavior, there are numerous aversive consequences that may accrue (Skinner et al., 2009). For example, the entire class is not allowed to go to recess because Michael was behaving inappropriately during class. The class pizza party is canceled because two pupils failed to complete their assignments. While these consequences may appear to “work”, there are simply too many aversive side-effects to encourage its use. To begin, students who are punished on the basis of their peer’s behavior are placed in a situation where they have little or no control over the consequences they receive. Repeated instances can result in learned helplessness and/or an avoidance of class settings. In
addition, peers may threaten or aggress against one another and/or those responsible for the class getting punished will be under undue pressure to avoid failure.

4. **Allow Choice, Random Selection, and Exchangeable Rewards.**

As noted earlier, some consequences are rewarding to some pupils but not others. Because all students usually receive the same consequence when group-oriented contingencies are used, it may be difficult to develop consequences that are reinforcing for everyone. Three possible solutions to this dilemma include: (a) choice, (b) randomization, and (c) exchangeable rewards. The first option would allow students to choose their own rewards from a possible reinforcement menu (Skinner et al., 2009). On days when behavioral criteria are met, pupils would simply pick a preferred item or activity from an extensive menu of options. Another possible solution would be to allow students to randomly select rewards. This would be particularly appealing when using interdependent and dependent group contingencies. One relatively easy way to do this is through the use of paper slips in jars. Each time students meet pre-established criteria, they are allowed to pick one slip of paper from a covered jar. Although they might not always select their own “preferred” reward, the fact that they might do so proves to be quite motivating (Popkin & Skinner, 2003; Sharp & Skinner, 2004). This method also allows rewards to be given on variable schedules; this means that pupils are more likely to maintain these behaviors over time (Skinner et al., 2009). To randomly select rewards, it will be necessary for teachers to assemble a pool of rewards. The easiest way to do this is by simply asking the students. Guidelines for possible rewards might include: (a) free and/or inexpensive, (b) liked by most students, (c) legal and moral, and (d) easy to deliver (Skinner et al., 2009). Activity-based rewards such as extra free time, more recess time,
preferred seating arrangements, and/or listening to music during seatwork might be particularly easy to deliver. A third option that teachers have is to use exchangeable rewards. For example, students may need to earn a certain number of points for their academic and/or behavioral performance in order to exchange them for some type of preferred reward. When the entire class sells 200 raffle tickets, for example, they can have a pizza party. It should also be noted that recognition in the form of good behavior notes or public posting of student work or performance can also be very reinforcing. It might also be useful to include a “reward suggestion box” in the classroom. Student suggestions can then be reviewed and included in the jars as possible rewards.

5. **Select Pro-Social Target Behaviors.**

The great preponderance of research discussed in this paper focused on the reduction and/or elimination of disruptive classroom behavior. While this is certainly an important educational outcome, it is also critical that educators focus on the development of good academic and social performance. Whenever possible, teachers should select pro-social behavior (providing assistance to others, sharing materials, and/or reporting instances of positive peer behavior) as target behaviors and recognize their occurrence regularly in class. After all, if we want children to behave in a pro-social manner, then it is essential that we recognize them when they do so. In addition, there is clear evidence in the empirical literature that as one strengthens or increases pro-social behavior, the frequency of disruptive behavior decreases as well (e.g., Alberto & Troutman, 2009).

6. **Select Academic Target Behaviors.**

Although grades should not be given based on peers’ performance, educators should focus some of their target behaviors on academic productivity. Two appropriate targets
might be increased academic completion and accuracy rates for in class and homework assignments. Academic targets are important for a number of reasons. First, they are commonly expected outcomes that are monitored and reinforced in existing school reward systems. Second, increased academic productivity is the only way that students who struggle academically can “catch up” with their normally achieving peers. Finally, increased academic productivity is incompatible with disruptive behavior. There are numerous instances in the applied behavior analysis literature, for example, that demonstrated that as academic productivity increases there were concurrent decreases in classroom disruption (Skinner et al., 2009).

7. **Randomly Select Target Students.**

As noted, sometimes dependent group-oriented contingencies can put undue pressure on target students and/or call attention to their disruptive behaviors (or absence of pro-social behaviors). However, these potential problems may be alleviated by randomly selecting target students (Gresham & Gresham, 1982; Heering & Wilder, 2006). For example, Heering and Wilder (2006) rewarded an entire class contingent on the “on task” behavior of one row. The class did not know, however, which row of students was targeted and as a result they all improved their performance. In this instance, it was also appropriate for the teacher to announce which row was targeted if the criterion was reached. If the targeted row or student(s) did not meet the criterion, then they were not identified by the teacher. Teachers can also “rig” their drawings in order to publicly praise specific students who are doing well. They might, for example, place additional paper slips with the names of certain target students on them in jars to increase the likelihood that their names will be selected. Kelshaw-Levering et al., (2000) did that by choosing unpopular
or poorly performing students and purposefully raised their status by announcing that they had earned rewards for the entire class.

8. **Use Unknown Rewards and Mystery Motivators.**

One common finding from this literature review was that students became highly motivated when they were not aware of what rewards they might earn if they met criteria. One particularly powerful form of unknown reward was mystery motivators (Rhode et al., 1993). As shown in previous studies, pupils were quite motivated by the "mystery" of finding out what they may have won. By allowing students the opportunities to put possible mystery motivators into a suggestion box, all pupils will think that they may win their own reward each time an envelope is selected. Another suggestion is to keep reminders of the contingencies and rewards in plain view. Keep the jars, for example, in a location where all students can see them and post the names of possible rewards in plain sight for all students to see. Make a big production over class drawings from the jars and/or allow particularly well-performing students to pick rewards.

**Summary and Conclusions**

It is quite possible that some educators may be uncomfortable with the idea that students may work hard and do well academically, but do not earn rewards because of their peers’ behavior. Therefore, it is very important that educators continue to use independent contingencies in the classroom on an as needed basis (Skinner et al., 2009). It is also possible, however, that they may wish to *supplement* these independent contingencies with positive dependent and interdependent group-oriented contingencies. With proper planning, interdependent and dependent group contingencies can be implemented efficiently and effectively in the classroom. Research has provided a few different ways that these kinds of
contingencies can be used to improve pupils’ academic and behavioral performance. It is anticipated that inclusive classrooms will be much better places for everyone when all students can earn positive consequences routinely and often.
References


