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Examining the differential effects of the Mystery Motivator intervention using chosen versus unknown reinforcers

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EXAMINING THE DIFFERENTIAL EFFECTS
OF THE MYSTERY MOTIVATOR INTERVENTION
USING CHOSEN VERSUS UNKNOWN REINFORCERS

A Thesis

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Master of Arts

in

The Department of Psychology

by
Natalie Robichaux
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ABSTRACT

Disruptive classroom behaviors are among the most prevalent of childhood problems and are associated with reduced instruction time, poor academic achievement, and persistent behavior problems throughout childhood. Class-wide interventions, such as the Mystery Motivator, are an easy and time efficient way to increase the level of classroom management and remediate disruptive behavior patterns. Although the effectiveness of class-wide interventions is well documented, the literature is still inconsistent as to which *type* of reinforcement is more effective when using behavioral interventions. Some research suggests individuals prefer a choice in reinforcement, while other research suggests choice is just as preferred as reinforcement without a choice. A multiple baseline design across three elementary school classrooms was used to demonstrate the effects of the Mystery Motivator intervention on disruptive behaviors. Additionally, this study compared the differential effects of using an unknown reinforcer (no choice, or mystery, reinforcement) and a chosen reinforcer. Results showed that the Mystery Motivator intervention was effective in decreasing disruptive behaviors, and this effect was equally effective when using an unknown or a chosen reinforcer.

INTRODUCTION

Response to Intervention

Tiered systems are the standard approach for service delivery within a school system (Walker & Shinn, 2010). Tiered systems can be used to address a variety of behavioral and academic issues by implementing interventions matched to student needs. Response to Intervention (RTI) is a multi-tiered approach to service delivery, which assesses the level of support required by students and delivers interventions accordingly (Walker & Shinn, 2010).

Major components of RTI include school-wide screening measures, scientifically-based interventions, progress monitoring, data-based decision making, and treatment integrity (Walker & Shinn, 2010). The RTI approach promotes the screening of students using school-wide measures three times per year. Students identified as needing additional support are then referred for additional services. Within an RTI framework, only empirically supported interventions that have demonstrated effects in the research are used to treat student issues. School personnel continuously monitor the progress of students while implementing these interventions and make treatment decisions based solely on student outcomes. School personnel also measure treatment integrity, or the degree to which the interventions are implemented as planned, to ensure all programs are carried out with highest degree of integrity (Walker & Shinn, 2010).

The RTI framework consists of three tiers of increasing intensity. Students progress to a higher tier when the current tier has not been effective at remediating the academic or behavioral concern. Tier 1 contains universal interventions that are applied to all students in all settings. These interventions are intended to prevent adverse outcomes and are usually effective for about 80% of students (Walker & Shinn, 2010). Tier 1 interventions include school-wide screening, quality core instruction, and class-wide behavior programs. Students who do not respond to Tier

1 advance to Tier 2 interventions, also known as secondary interventions. Tier 2 interventions target students at risk for developing adverse outcomes. They include programs such as small group tutoring and social skills groups. High efficiency and rapid responding are important qualities of secondary interventions. Typically, about 15% of students require Tier 2 interventions (Walker & Shinn, 2010). Students who require more support than is provided by Tier 1 or Tier 2 are targeted by Tier 3, or tertiary, interventions. Tertiary interventions are highly individualized for the student and are based on thorough and comprehensive assessments. A Tier 3 intervention might include a highly individualized, function based behavior plan to decrease a student's self-injurious behavior in the classroom. Approximately 5% of students require these intensive interventions (Walker & Shinn, 2010).

Universal Interventions

Within the context of RTI, several advantages are associated with universal interventions. Morrison and Jones (2007) noted that these interventions are more cost effective, display more equality, and are more preventative than interventions at higher tiers. Since universal interventions target the entire school population, there is an increased likelihood that academic and behavioral issues will be addressed early using minimal time and resources. Furthermore, all students are exposed to Tier 1 programs so no students are singled out or deprived of immediate services. Also, these interventions are preventative because they attempt to identify those students in need of services (i.e. screening) early and remediate problems that may worsen if left untreated. Universal interventions are easy to implement and often require little training; this quality is particularly important since school administration and teachers are usually responsible for implementing Tier 1 interventions. Additionally, universal interventions require little time and materials, which may lead to higher treatment integrity. Gresham (1989) found that as the

complexity of an intervention increases, the probability that the intervention will be implemented with integrity decreases, making intervention complexity a critical factor to consider.

Several universal interventions show extensive empirical support, including the Good Behavior Game (Barrish, Saunders & Wolf, 1969; Embry 2002; Tingstrom, Sterling-Turner & Wilczynski, 2006; Darveaux, 1984), Positive Peer Reporting (Morrison & Jones, 2007; Grieger, Kauffman & Grieger, 1976; Bowers, 1999; Moroz & Jones, 2002; Bowers, Jensen, Cook, McEachern & Tara Snyder, 2008) and Positive Behavior Intervention Support (Horner & Sugai, 2000; Sugai & Horner, 2009; Lewis, Jones, Horner & Sugai, 2010; McIntosh, Filter, Bennett, Ryan & Sugai, 2010). Effective Tier 1 interventions are paramount to school success because effective interventions at lower tiers reduce the need for interventions at subsequent tiers (Walker & Shinn, 2010).

Disruptive Classroom Behavior

A common target of universal interventions is disruptive classroom behavior. Disruptive behaviors are among the most prevalent behavior problems exhibited by children and contribute to 1/2 to 1/3 of all referrals to child mental health settings (Murphy, Theodore, Aloiso, Alric-Edwards & Hughes, 2007). Thomas, Becker and Armstrong (1968) broadly defined disruptive behavior as any behavior that is incompatible with good classroom learning conditions. They identified five general classes of disruptive behavior: gross motor, noise making, orienting, verbalizations, and aggression. Gross motor includes physical behavior that is not required by the task, including standing without permission, walking around, skipping, jumping, being out of one's seat, and rocking or kneeling on one's chair. Noise making includes behaviors such as tapping one's feet, clapping, tearing papers, tapping on desk, and kicking a desk or chair. Orienting occurs when students are turned towards another peer, showing objects to a peer, or

looking at a peer without making any noise or verbalizations. Opposite of orienting behaviors are verbalizations, which include talking with peers, shouting at teacher, screaming, singing, laughing, and whistling. Aggression includes any aggressive act displayed in the classroom, such as pushing, hitting, pinching, or slapping a peer, destroying a peer's property, taking objects belonging to a peer, and throwing objects.

These types of disruptive behavior are of high concern in a classroom setting because they adversely affect student learning by interrupting the learning process and reducing instruction time, making it more difficult for students to succeed academically (Luiselli, Putnam & Sunderland, 2002). Not surprisingly, disruptive behaviors are associated with low academic achievement, as well as additional poor outcomes, including low school attendance, substance abuse, and depression (Dishion, Stormshak & Siler, 2010). It is especially problematic for children when they display these behavior patterns early. Campbell (1995) found that preschool children with persistent disruptive behavior patterns are more at risk for maladjustment throughout childhood and adolescence. Further, children who display these behaviors in preschool are more likely to continue engaging in disruptive behavior throughout their academic career (Campbell & Ewing, 1990).

Disruptive Behaviors and Classroom Management

One factor contributing to increased disruptive classroom behavior is poor classroom management. Poor classroom management has been repeatedly linked with increased disruptive behavior problems and a decreased focus on academics (Bradshaw, Mitchell & Leaf, 2010). However, when the teacher's behavior management techniques improve, disruptive behavior decreases. Several studies have found a positive effect of teacher behavior management techniques on children's immediate observed on-task behavior in the classroom (Ferguson &

Houghton, 1992; Sutherland, Conroy, Abrams & Vo, 2010; Conroy, Sutherland, Haydon, Stormont & Harmon, 2009).

Group Contingencies

Interventions designed to decrease disruptive behaviors often employ group contingencies. Group contingencies are ideal components to classroom interventions because they reduce aggressive, noncompliant, and inappropriate behaviors, and increase on task behaviors (Murphy et al., 2007). A meta-analysis conducted by Stage and Quiroz (1997) found that interventions using group contingencies were the most effective at reducing disruptive classroom behaviors when compared to alternative reinforcement methods.

Different types of group contingencies are often used in these behavioral interventions. Litow and Pumroy (1975) identified three group contingencies: dependent, independent, and interdependent. Dependent group contingencies deliver reinforcement to the group contingent upon the performance of selected individuals. In contrast, independent group contingencies provide reinforcement contingent upon each individual's performance; however, all group members are required to meet the same criteria in order to earn reinforcement. Finally, interdependent group contingencies reinforce the entire group based on the performance of the group as a whole. In a study by Gresham and Gresham (1982) comparing the three different group contingencies, interdependent and dependent group contingencies were more effective in decreasing disruptive behaviors than independent contingencies.

Of the three types of group contingencies, interdependent group contingencies have notable advantages. Interdependent contingencies are easier to manage and more cost effective (Skinner, Cashwell & Dunn, 1996). Interdependent contingencies are also a more efficient use of teacher time (Gresham & Gresham, 1982) since the teacher is only responsible for monitoring

and rewarding the group's performance instead of each individual student. Further, interdependent group contingencies avoid peer conflicts since the entire group is either rewarded or not rewarded (Popkin & Skinner, 2003). Finally, students may enhance social interactions and cooperation with peers by working toward a common goal (Skinner et al., 1996; Gresham & Gresham, 1982).

Reinforcer Choice

Different types of rewards may serve as reinforcement when using interdependent group contingencies. The reinforcement may be a desirable object or activity the student selects upon meeting a pre specified criteria (a chosen reward), or an unknown object or activity the student is rewarded with upon meeting the same standard (mystery motivator). While the preference for choice has been widely researched, the results are somewhat mixed and do not indicate an indisputable preference for choice. Much empirical evidence suggests that individuals prefer choice (Dunlap, dePerczel, Clarke, Wilson, Wright, White, et al., 1994; Brigham & Sherman, 1973). This preference persists even when the reinforcement in the choice and no choice conditions are exactly the same, suggesting that the choice itself is reinforcing (Fisher, Thompson, Piazza, Crosland, & Gotjen, 1997; Tiger, Hanley, & Hernandez, 2006). However, there is also empirical support that the preference for choice of reinforcement varies across participants (Tiger, Hanley, & Hernandez, 2006; Sran & Borrero, 2010). Some participants prefer the option to choose over no choice, while some do not. Lerman, Iwata, Rainville, Adelinis, Crosland, and Kogan (1997) found no differences in behavior when comparing choice and no choice conditions. With regards to these studies, it is not yet clear whether a preference for choice is always present. Since the research on choice preference is largely inconsistent, it is difficult to generalize these findings. The current study sought to resolve the inconsistency in the

choice literature by evaluating the efficacy of choice compared to a no choice, “mystery” reinforcement condition.

Mystery Motivators

Mystery motivators are positive reinforcers valued by the participant that remain unknown to the participant in order to increase anticipation for the prize (Musser, Bray, Kehle & Jenson, 2001). In studies of interventions that use mystery motivators, student interest is maintained in the prize because they are unaware of what the reward will be (Murphy et al., 2007). Relatively any intervention can use a mystery motivator as its form of reinforcement. One such intervention, the Mystery Motivator, has much empirical support documenting its effectiveness in decreasing undesirable behaviors and increasing desirable behaviors.

Mystery Motivator Intervention

Rhode, Jenson and Reavis (1992) developed the Mystery Motivator as a universal intervention for the classroom setting, requiring minimal teacher time, training, and materials. The Mystery Motivator is a highly flexible intervention; it can be used to target selected students or an entire class and can be implemented throughout a single activity or the entire school day. The intervention contains several core components: an interdependent group contingency, a variable schedule of reinforcement, reinforcement uncertainty, and immediate performance feedback. The Mystery Motivator uses an interdependent group contingency in which students work towards a common goal and reinforcement is contingent upon the performance of the class (Litow & Pumroy, 1975). The schedule of reinforcement varies by day so students are unaware which day behavior will be reinforced. Additionally, students are unaware of what the reward will be (i.e. reinforcement uncertainty). Throughout the intervention, the teacher provides constant, immediate performance feedback to students about their behavior in order to increase

desirable behaviors and decrease undesirable behaviors. Previous studies on the Mystery Motivator intervention document its effectiveness for both behavioral and academic concerns.

Several studies have addressed the issue of homework completion and accuracy using the Mystery Motivator. Madaus, Kehle, Madaus and Bray (2003) increased both homework completion and accuracy in a sample of 5th grade students exhibiting low homework completion. Similarly, Moore, Waguespack, Wickstrom and Witt, (1994) used the Mystery Motivator to increase homework completion in 3rd and 5th grade target students. Interestingly, this study did not employ true mystery motivators; rather, upon successful homework completion, students *chose* a prize from a reward menu.

Various studies show the intervention is effective for reducing disruptive classroom behaviors. De Martini-Scully, Bray and Kehle (2000) employed the Mystery Motivator intervention to decrease disruptive classroom behaviors in a sample of 8-year-old female students. Similarly, Murphy et al. (2007) used the intervention to decrease disruptive behaviors with nine target students in a preschool classroom. Another study showed that the intervention improved behavior in a class of 9th grade students exhibiting increased levels of disruptive behaviors (Schanding & Sterling-Turner, 2010). Additionally, the Mystery Motivator has been shown to successfully reduce the disruptive behavior of clinical samples. Musser et al. (2001) found the intervention effectively decreased disruptive behaviors exhibited by children diagnosed with Emotional Disturbance. The Mystery Motivator intervention was also used to decrease disruptive behavior in a sample of 2nd grade students with Oppositional Defiant Disorder (Mottram, Bray, Kehle, Broudy & Jenson, 2002). The current study will use the Mystery Motivator to address behavioral concerns in a classroom setting similar to the previously mentioned studies.

The Mystery Motivator requires few materials: invisible markers, a Mystery Motivator chart, and a reward menu. Prior to the intervention, the teacher creates a weekly Mystery Motivator chart containing a box for each day of the week. She then displays this chart in the classroom. An example of a Mystery Motivator weekly chart is located in Appendix A. The teacher randomly chooses several days in which students will be rewarded and writes an “M” under these days with the invisible marker. The teacher selects the target behaviors to decrease and the appropriate replacement behaviors (i.e. no talking out; raise hand instead). The teacher posts a lists of these behaviors and reviews the list with the students using a “tell, show, do” approach. First, the teacher explains to the students what constitutes inappropriate behaviors and what constitutes desirable replacement behaviors. Second, the teacher models the appropriate behavior for the students. Lastly, the teacher allows the students the opportunity to practice the appropriate behaviors to ensure generalization. After reviewing the behaviors, the teacher sets a daily behavior goal (i.e. less than 10 instances of talking out per day).

At the start of the day or activity, the teacher places the daily prize in an envelope and displays it in the classroom near the Mystery Motivator chart. Once she begins the intervention, she monitors student behavior throughout the day or activity and provides continuous performance feedback. Students receive a check each time a target rule is broken. At the end of the day or activity, the teacher tallies the number of rule violations and determines if the students meet the daily goal. If the number of tallies is less than the daily goal number, they are allowed to color in that day on the Mystery Motivator chart; if an “M” appears, students are rewarded with the prize in the envelope. If an “M” does not appear, the teacher verbally praises student behavior and reminds the students they can work for a prize the next day. The Mystery Motivator chart may also include a “weekly goal” in which students earn a bonus prize at the end of the

week (i.e. weekly goal = meet daily goal 3 times). The weekly goal was not included as a component in this study in order to eliminate any possible confounding effects that might influence student behavior.

The Mystery Motivator intervention is highly acceptable and easy to implement in a classroom setting. Kehle, Bray, Theodore, Jenson & Clark (2000) noted that the intervention can easily be incorporated into ongoing class activities. Further, numerous teacher and student ratings suggest the Mystery Motivator intervention is an acceptable intervention that can be delivered with high integrity (Moore et al., 1994; Kehle et al., 2000; Musser et al., 2001; Murphy et al., 2007). The purpose of the current study was to examine the effects of the Mystery Motivator intervention on disruptive classroom behaviors in an elementary setting. Additionally, since Moore et al. (1994) demonstrated behavior change using *chosen* reinforcers as opposed to true mystery motivators (which most Mystery Motivator studies have used), this study compared the effectiveness of the intervention using an unknown reinforcer and a chosen reinforcer.

METHOD

Participants

Three elementary classrooms from public schools in southeast Louisiana participated in this study. Classes were referred by school administration. Each class was required to meet pre-requisite criteria before inclusion in the study. Each class was assessed using a class-wide screener and direct observations by an observer. The first three classes to meet these criteria were included in the study. Participants included a 1st grade, 2nd grade, and 3rd grade class.

Experimental Design and Data Analysis

A multiple baseline design was used across the three classes selected to participate in this study (Kazdin, 1985) to analyze the effects of the intervention on class behavior. To determine the degree of behavior change, the frequency of rule violations was used as the primary outcome measure. The data for each class was treated as a single case and was therefore analyzed using visual analysis. With visual analysis, the data is presented in a graph in order to determine if the introduction of the independent variable affected the dependent variable (Whitley, 2002). For this study, the independent variable was the Mystery Motivator intervention and the dependent variable was disruptive behavior measured in frequency of rule violations. If there is a large, fast change in the dependent variable following the introduction of the independent variable, it is likely that the independent variable caused this change (Whitley, 2002). Stability and trend were considered before transitioning to a different phase (Whitley, 2002). A positive trend is displayed if the values increase over sessions; a negative trend is displayed if the values decrease. Stability exists if the data lack a trend and display little variability between sessions (Kazdin, 1982). Classes transitioned from the baseline phase to the intervention phase once a stable pattern

(Kazdin, 1982) of behavior was exhibited, or if the behavior was displaying an upward trend (Whitley, 2002).

To compare the effects of each reinforcement condition, the frequency of rule violations in the unknown reinforcement condition was compared to the frequency of rule violations in the chosen reinforcement condition to determine which condition was more effective. This comparison was also made by visual analysis.

Measures

BASC-2 Behavioral and Emotional Screening System. The *BASC-2 Behavioral and Emotional Screening System* (BASC-2 BESS; Kamphaus & Reynolds, 2007) is a universal screening tool used to assess behavioral and emotional functioning for students aged pre-school through 12th grade. The BESS contains teacher, parent, and student forms and takes approximately 3 minutes to complete per student. On the 27-item teacher form, teachers rank students using a 4-point Likert scale, ranging from *Never*, meaning the student never displays that behavior, to *Always*, meaning the student always displays that behavior. The BESS has test-retest reliability estimates between .80–.91 and inter-rater reliability estimates between .71–.83 (Dowdy, Ritchey, & Kamphaus, 2010). Concurrent validity estimates with other behavioral rating scales, such as the *Achenbach System of Empirically Based Assessment* (ASEBA) and the *Conners' Rating Scales* (CRS), are between .71–.77 and .51-.79 (Dowdy, Ritchey, & Kamphaus, 2010), respectively. This measure is part of a comprehensive screening package used by AIMSweb® Behavior (NCS Pearson, 2012) to identify students who are at risk for developing behavioral and academic concerns and allow for progress monitoring of these students after interventions have begun. This measure, along with two other measures from the AIMSweb® Behavior package, was used to determine if students were “at risk” for problematic behavior.

Social Skills Improvement System-Performance Screening Guide. The *Social Skills Improvement System-Performance Screening Guide* (SSIS-PSG; Gresham & Elliott, 2007) is a class-wide screener used to identify skill deficits in four areas: pro-social behavior, motivation to learn, reading skills, and math skills. The teacher rates students using a 5-point Likert scale, ranging from 1 (students demonstrate little or very poor skills in this area) to 5 (students demonstrate excellent and highly developed skills in this area). Thus, each student has one score in each of the skill areas. Two scales from this screener were administered for each class. The *Pro-Social Behavior* scale was used to identify students with deficits in social behavior and the *Motivation to Learn* scale was used to assess student's motivation to learn and participate in academic tasks. The *Pro-Social Behavior* scale has a test-retest reliability of .69 and an inter-observer reliability of .55 for elementary aged students. The *Motivation to Learn* scale has a test-retest reliability of .74 and an inter-observer reliability of .62 for elementary aged students (Gresham & Elliott, 2007). These two scales, along with the BASC 2-BESS, were used to determine the percentage of students in each class at risk for behavioral or academic issues.

Rule Violation Tracking Sheet. The teachers and an observer used a rule violation tracking sheet to monitor student behavior. The target behaviors chosen by the teacher for intervention were listed on this sheet in separate columns. Each time a student in the class broke one of the rules, the teacher placed a check or tally mark under that rule on the rule violation tracking sheet. Also, an observer recorded behavior for 40% of sessions (i.e. 2 times per week) using this sheet as a measure of inter-observer agreement (IOA) with the teacher. A sample rule violation tracking sheet is located in Appendix B.

Student Preference Assessment. The teachers administered a preference assessment to the class in order to build the reward menu. Each student received a sheet of paper with several

tangible items and activities listed on it. The teacher instructed the students to circle the prize they would most like to receive and the class activity they would most like to do. Any item circled was added to the reward menu.

Treatment Integrity Forms. Treatment Integrity Forms were created for an observer to fill out during the Mystery Motivator intervention. These forms contained certain steps required by the intervention in a checklist format. An observer rated the teacher's completion of these items using the checklist for 40% of sessions (i.e. 2 times per week). The treatment integrity checklist is located in Appendix C.

Intervention Rating Profile-15. The *Intervention Rating Profile-15* (IRP-15; Witt & Elliott, 1985) is a 15-item questionnaire to assess teacher acceptability of an intervention. Items are scored according to a 6-point Likert scale, ranging from *Strongly Disagree* to *Strongly Agree*. Averaging these scores across the 15 items computes an acceptability score. Scores between 5-6 represent strong acceptability and scores between 1-2 represent low acceptability. The IRP-15 was administered to each teacher before and after the intervention to gain a measure of treatment acceptability.

Procedure

Class Screening and Selection. Classes were referred by the administration at two different elementary schools in southeast Louisiana. Verbal consent was obtained for all teachers. Ms. Swan's second grade class consisted of 25 students. She reported that, being her first year teaching, she felt unprepared in basic classroom management techniques. Ms. Black's third grade class consisted of 17 students. She was in her fourth year of teaching and expressed her confidence in teaching academic material but not with managing behavior. Ms. Cullen's first

grade class consisted of 25 students. She had been teaching for five years and expressed difficulty managing her class's behavior since returning from a recent maternity leave.

Each class was screened prior to inclusion in the study. First, the teachers completed the AIMSweb® Behavior class-wide screener, composed of the BASC-2 BESS and the SSIS-PSG Pro-Social Behavior and Motivation to Learn scales, for each student. A numeric coding system was used to protect the identity of each student. Teachers were instructed to concentrate on the student's behavior *only for the time period targeted by the intervention* when filling out the screeners, instead of focusing on the students overall behavior. Scores on these measures were entered into AIMSweb® Behavior. This program evaluates student functioning by considering the ratings from all three scales. Students who are “at risk” for developing behavioral, emotional or academic concerns are flagged as needing intervention services. At least 30% of the class had to be identified as “at-risk” for behavior, emotional, or academic difficulties to participate in the study. All three classes met this criterion. Twelve students were identified in Ms. Swan's class, nine students were identified in Ms. Black's class, and 11 students were identified in Ms. Cullen's class. Next, an interview with the teacher was conducted to identify specific target behaviors in need of remediation and their operational definitions. Teachers were encouraged to choose 1-3 behaviors to target. Appropriate replacement behaviors were also identified. The teacher then indicated the most problematic time of day (i.e. morning routine) or class activity (i.e. reading groups) that she wanted to receive intervention services. For Ms. Swan, the most problematic time was the afternoon math class from 1:20-2:20 and the behavior targeted was “talking without permission”. For Ms. Black, the intervention was implemented between 8:30-9:00 during morning work, and the behaviors targeted were “talking without permission” and “leaving assigned seat without permission”. For Ms. Cullen, the most problematic time was the

whole group reading lesson from 9:00-9:40 and the target behavior was “talking without permission”. During these time periods, a researcher conducted an observation and any instances of rule breaking were recorded using the rule violation tracking sheet with the target behaviors and their definitions. There had to be at least 10 total rule violations during this time to qualify for intervention services. All these classes far exceeded this criterion and were thus included in this study. Details for each participating class can be found in.

Table 1

Details for Each Participating Class

Teacher	Grade	# Students	Period/Length	Target Behavior(s)	Years Teaching
Swan	2 nd	25	Math Class/60 min.	Talking Out	1
Black	3 rd	17	Morning Work/30 min.	Talking Out, Leaving Seat	4
Cullen	1 st	25	Group Reading/40 min.	Talking Out	5

Baseline. Each class participated in a baseline phase before beginning the intervention. Baseline details for each class are included in Table 2. Using the rule violation tracking sheet, teachers recorded the frequency of rule violations that occurred each day. The teacher only recorded these behaviors during the most problematic time period indicated in the teacher interview. Teachers were instructed to use their normal classroom management techniques during this phase in order to obtain an accurate measure of behavior before the intervention. The data for each class was evaluated independently, and each class only moved to the next phase once a stable pattern (the absence of a trend and little variability between sessions) (Kazdin, 1982) of behavior was exhibited, or if the behavior was displaying an upward trend (Whitley, 2002). The time spent in baseline for each class varied to allow for a multiple baseline design (Kazdin, 1982). Ms. Swan’s class spent four days in baseline, Ms. Black’s class spent nine days in baseline, and Ms. Cullen’s class spent ten days in baseline.

Table 2

Baseline Details Across Classes

Teacher	Average Rule Violations	Days in Baseline
Swan	70	4
Black	29	9
Cullen	33	10

Mystery Motivator Intervention. After baseline, each class transitioned immediately into the intervention phase. The first day of the intervention consisted of the teacher explaining the intervention and conducting the preference assessment. The teacher informed the students that they were starting a new class game to improve behavior. The teacher explained the Mystery Motivator intervention to the students and the rules of the intervention. Students were informed that they would be working to improve certain behaviors and would be working towards a behavior “goal” each day. The teacher identified the target behaviors and explained the replacement behaviors using the “tell, show, do” approach. This consisted of the teacher explaining and modeling the right and wrong way to behave, then allowing the students the opportunity to practice the appropriate behavior. Upon meeting the goal, they would be allowed to color in that day on the Mystery Motivator weekly behavior chart. If an invisible “M” appeared, they would be rewarded. The teacher then described the different reinforcement conditions. Students were informed that some days they would choose a prize and other days they would receive a “mystery” prize from an envelope. A list of the operationally defined behaviors with pictures was posted in each classroom near the Mystery Motivator chart.

A preference assessment was conducted with the students to establish prizes for the reward menu. The teacher assisted in developing this questionnaire. The teacher administered a list of several tangible items (i.e. stickers, erasers, tattoos, small toys) and class activities (i.e. extra computer time, extra recess) and instructed the students to circle their favorite prize and

activity. One teacher, Ms. Cullen, was concerned that activities would take too much time away from instruction, so only tangible rewards were listed on this preference assessment. Any item circled by a student was added to the reward menu. Those items that no student circled were not added. During the preference assessment for Ms. Black's class, many students indicated that they liked all prizes listed and did not want to choose a single one. Some students even circled two prizes in each category even though the directions were to select one. The class expressed to Ms. Black that they were excited to work for *all* the prizes and given the opportunity would choose any of the prizes. Since it was impossible to determine which items would have been the first choice, all items remained on the reward menu.

On the second day, the teacher began the Mystery Motivator intervention. To ensure students did not associate a reinforcement condition with a reinforcement schedule, the next four intervention sessions all included an "M" and there were two opportunities to choose a prize and two opportunities to receive the unknown prize. This also increased the probability that students were able to make initial contact with the reinforcement. Students were informed at the start of each day whether they were going to be rewarded by the teacher (mystery prize) or be allowed to choose their prize (prize box). The reinforcement condition was posted near the Mystery Motivator chart each day so the students were constantly aware of the condition. When the class was to be rewarded with an unknown prize, the envelope containing the prize was placed near the Mystery Motivator chart, or in a nearby visible area. If the class was to be rewarded with a chosen prize, the teacher posted a sheet of paper reading "prize box", which informed students they would choose a prize that day.

The behavior goal for each week was calculated by the researcher. Throughout the entire intervention, the primary researcher provided the teacher with a Mystery Motivator chart and a

list of rewards at the beginning of each week. Teachers were not responsible for deciding the goal, which days contained M's, or which prize (mystery or chosen) the students received each day. Thus, the teachers were also blind as to which days behavior would be reinforced.

Everything was pre-determined by the researcher to ensure a pattern did not evolve from the days containing an M and to ensure equal pairings between days that contained/did not contain an M and each reinforcement type.

To establish behavioral goals for the first week of the intervention, the frequency of rule violations were averaged from baseline. The behavioral goal was equal to the mean of rule violations exhibited during baseline. Students had to earn less rule violations than the goal number in order to color in that day on the Mystery Motivator chart. For each week thereafter, the behavior goal for each week decreased based on the class's performance the previous week. Rule violations were averaged from the previous week and the new daily behavior goal was set at 10% less than that average in an effort to shape student behavior. The goal for the first week was 70 for Ms. Swan's class, 29 for Ms. Black's class, and 33 for Ms. Cullen's class.

The teacher verbally acknowledged and physically tracked rule violations using the rule violation tracking sheet. Each time a rule was broken, she informed the student which rule they broke and placed a mark under that rule. She then provided immediate feedback to the student and reminded the student of the appropriate replacement behavior. At the end of the activity, the teacher totaled the rule violations and determined if the class met their daily goal. If so, the teacher colored in that day on the chart. If an "M" appeared, she rewarded the class with either the prize in the envelope or allowed each student to choose a prize, depending on the condition.

Each week, an "M" was placed under four random days of the week. Previous student behavior was used to determine how many days of the week contained an "M." If the average

frequency of rule violations during any week was 40% below the average of baseline, the days containing an “M” decreased to three days, and remained at three for the duration of the study. Ms. Black’s class did not participate in the intervention on Thursday due to the ancillary schedule. Thus, this class started with three days of the week containing an “M”, and decreased to only two days of the week containing an “M” once the average rule violations were 40% below the baseline average.

In addition to the reinforcement schedule, the reinforcement condition varied systematically by day. Throughout the intervention, there was an equal number of pairings between (1) “M” + unknown reward and “M” + chosen reward, and (2) no “M” + unknown reward and no “M” + chosen reward. The type of reinforcement used for the unknown reward also varied by day. The envelope did not contain the same prize two days in a row, and each prize was used for the unknown reward.

RESULTS

Dependent Measure

The teacher recorded the number of rule violations by the class each day, which was the main outcome variable. These numbers were used to determine if the behavior of the class was improving. Since this study attempted to decrease the frequency of disruptive behaviors, high rates of disruptive behavior during baseline and low rates during the intervention were desirable. Figure 1 shows the data from each class during baseline and intervention phases. Since each class participated in the intervention for a different length of time each day, the data are displayed by rate of disruptive behavior per minute instead of frequency to allow for better comparison across classes. The behavioral goal for each session is depicted in brackets. The session in which the class switched from four M's per week to only three M's per week is indicated with an arrow. Again, Ms. Black's class only participated in the intervention for four days each week, so the class began with three M's and decreased to two.

All classes demonstrated behavioral improvement after the implementation of the intervention. Ms. Swan's class had a high frequency of disruptive behavior in baseline. On average, the class displayed 70 rule violations per day. Once the intervention was introduced, there was a quick decline in disruptive behavior. After four sessions of the intervention, the behavior became stable at a very low frequency and remained low for the duration of the intervention. During the last week of the intervention, the class averaged only 6 rule violations per day. This represents a 91% decrease in rule violations from baseline levels.

Ms. Black's class had a somewhat variable baseline. On average, the class displayed 29 rule violations per day. An observer conducted IOA with Ms. Black during the first two sessions in baseline. During these sessions, Ms. Black adhered to her typical classroom management

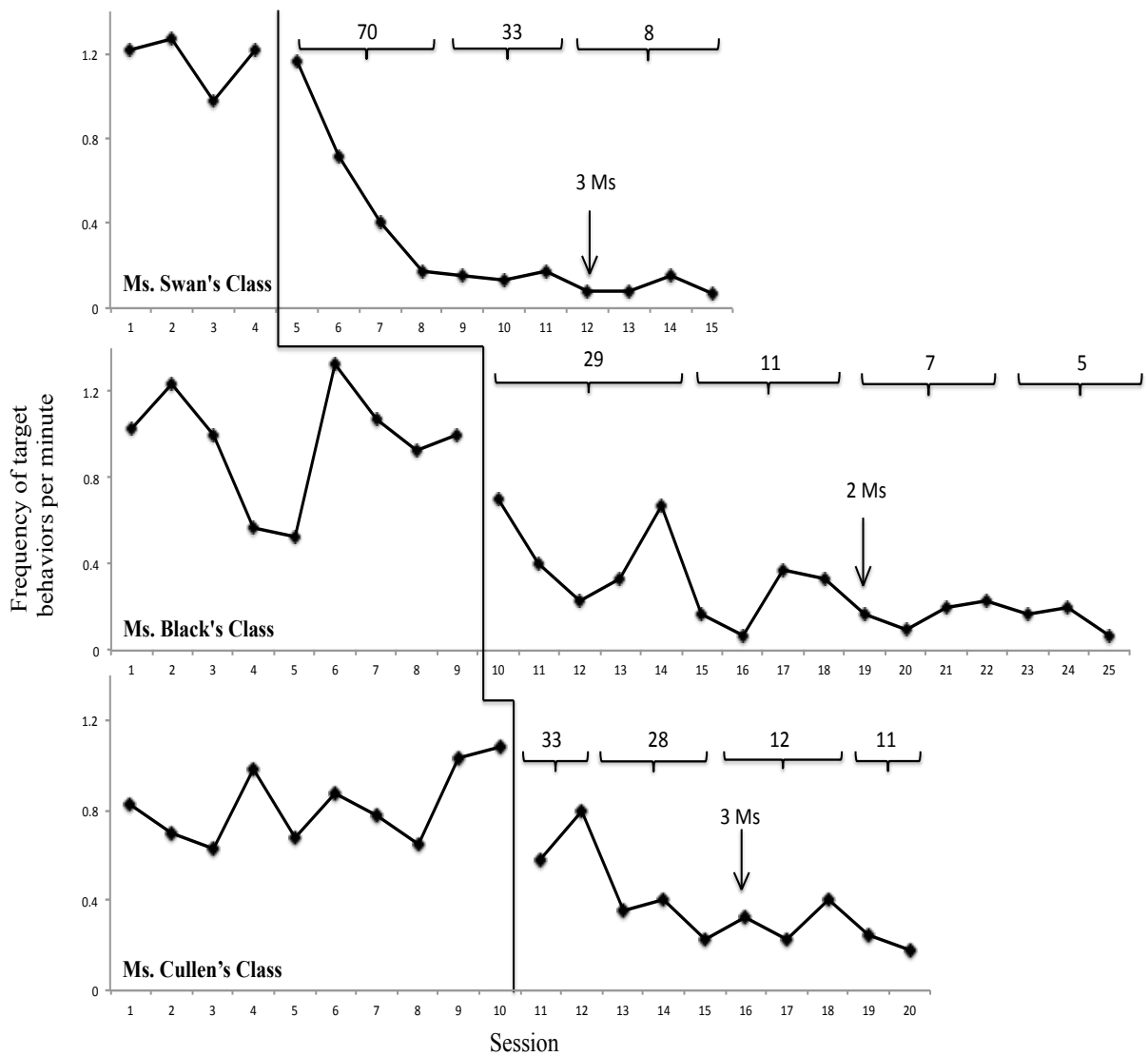


Figure 1. Rate of Disruptive Behavior Per Minute for Each Class

(as instructed) and baseline data was somewhat stable, with 31 and 37 instance of talking out with acceptable levels of IOA (94%, 84% respectively). During the fifth session, the observer noticed Ms. Black was providing feedback to the student's after each rule violation. This consisted of statements such as, "Don't talk out of turn. If you need me, raise your hand." This type of feedback was not initially part of Ms. Black's classroom management procedures. After the session, Ms. Black stated that the students had been unusually well behaved during the last

two sessions. The researcher explained that feedback was a key component in the Mystery Motivator intervention and discussed the importance of refraining from using new behavioral techniques during baseline. Ms. Black stated that she noticed herself providing more feedback over the last two sessions, something which she had not done the first three sessions of baseline. The researcher explained that even though Ms. Black may become more *aware* of the disruptive behavior through tracking it, she was not to respond to it any differently than she normally did. She was instructed to discontinue the newly introduced feedback until the intervention phase. An observer collected IOA again during the sixth session, and the frequency of disruptive behavior once again increased, exceeding previous levels. The intervention was put into place after the data became stable. At the start of the intervention, Ms. Black's class demonstrated variable levels of disruptive behavior, which eventually decreased dramatically. The behavior became stable around the tenth intervention session, and remained at a frequency much lower than baseline levels for the remainder of the intervention. By the last week of the intervention, the average frequency of rule violations had decreased to 4 rule violations. This represents a decrease of 86% from baseline levels.

Ms. Cullen's class demonstrated a somewhat variable baseline. On average, the class displayed 33 rule violations per day. After a positive trend emerged indicating that the class was performing worse, the intervention was introduced. The disruptive behavior decreases steadily below baseline levels. By the last week of the intervention, the average frequency of rule violations had decreased to only 9 rule violations. This represents a 73% decrease in rule violations from baseline levels.

Figure 2 displays each class's data for the unknown and chosen reinforcement conditions. This comparison was analyzed using visual analysis. For all classes, there were no differences

between the unknown and chosen reinforcement condition. Both types of reinforcement produced decreases in disruptive behavior. The two types of reinforcement were equally effective for all classes.

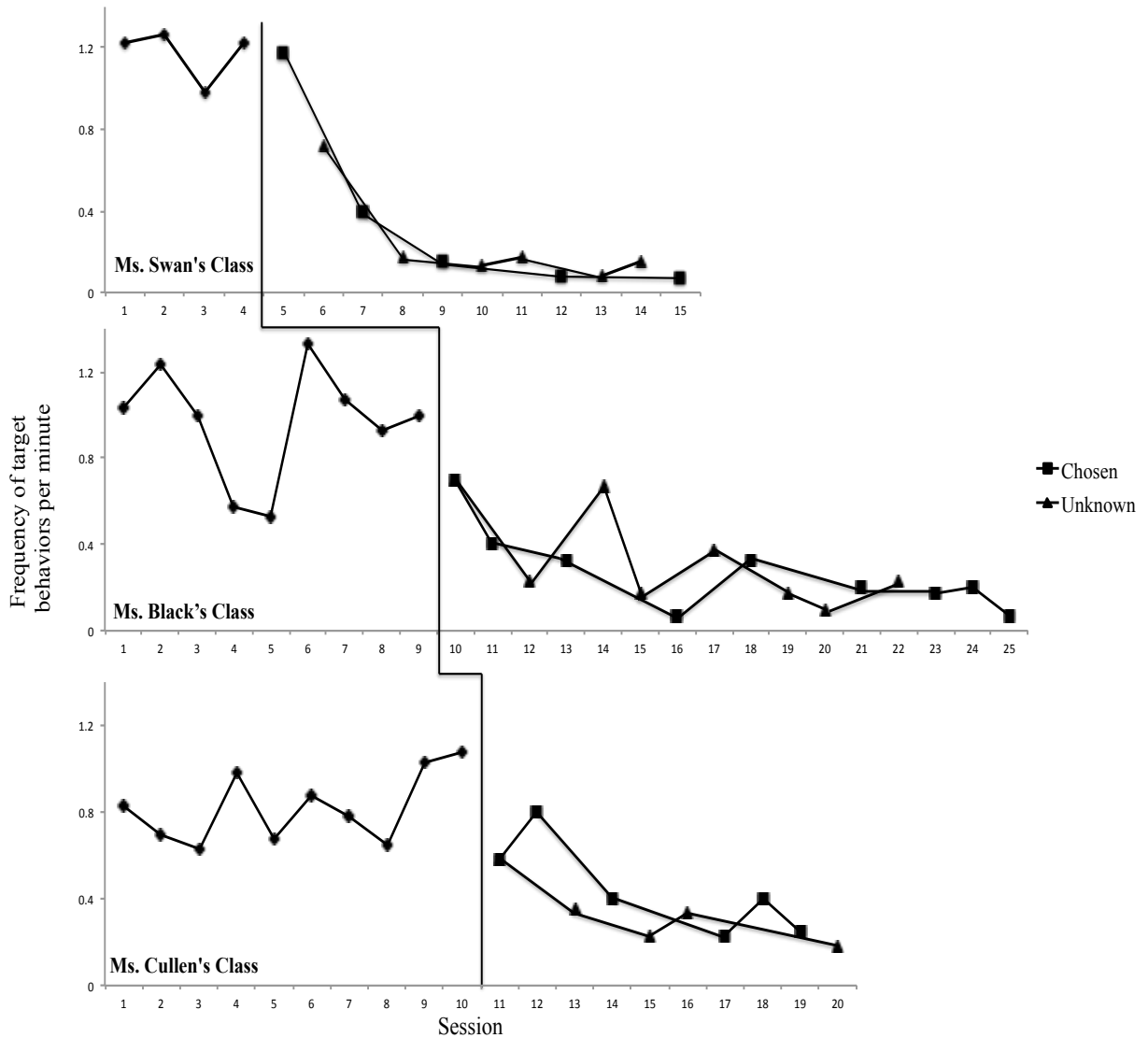


Figure 2. Rate of Disruptive Behavior Per Minute with Unknown and Chosen Reinforcement

Inter-observer Agreement

Inter-observer agreement (IOA) was calculated with the teacher using the rule violation tracking sheet for 40% of sessions (i.e. twice per week). Details regarding IOA are listed in

Table 3. IOA was calculated by dividing the teachers report of rule violations with the observers

report (or vice versa). If IOA fell below 80% at any time, the researcher met with the teacher and discussed ways to improve IOA (i.e. more accurate tracking, consistency, etc.). During the first IOA session, Ms. Swan and Ms. Cullen both had agreement levels below 80%. The researcher met with each teacher and delivered feedback, and IOA increased to acceptable levels the following session and remained at acceptable levels for the duration of the intervention.

Table 3

Average Inter-observer Agreement Percentages

Teacher	Avg. Baseline	Range	Avg. Treatment	Range
Swan	79%	69% - 89%	82%	71% - 100%
Black	86%	80% - 94%	91%	81% - 100%
Cullen	91%	79% - 100%	96%	92% - 100%

Treatment Integrity

Each teacher was observed for 40% of sessions to measure treatment integrity. Integrity data for each teacher is located in Table 4. The rule violation tracking sheet was collected daily and the Mystery Motivator chart was collected weekly as permanent products of integrity. If integrity fell below acceptable levels, performance feedback was given to the teacher. Ms. Black had one day with integrity at 71%. The researcher provided feedback, and integrity increased 100% for the remainder of the intervention. Similarly, at the beginning of the intervention, Ms. Cullen had a low treatment integrity score of 50%. The researcher provided descriptive feedback, and integrity increased to acceptable levels.

Table 4

Average Treatment Integrity Scores

Teacher	Avg. Treatment Integrity	Range
Swan	100%	100%
Black	93%	71% - 100%
Cullen	75%	50% - 100%

Acceptability

Acceptability ratings can be found in Table 5. Prior to the training phase, teachers completed the IRP-15 to determine teacher acceptability of the intervention before its implementation. All teachers rated the intervention as acceptable. After the intervention, the teachers again completed the measure. All teachers again rated the intervention as acceptable. Ms. Black and Ms. Cullen's acceptability ratings increased from pre-test, while Ms. Swan's ratings slightly decreased. Additionally, all teachers expressed their satisfaction with the intervention and desired to add the intervention to other class activities aside from the activity chosen for this study.

Table 5

IRP-15 Scores Pre-/Post-Intervention

Teacher	Pre-Intervention Rating	Post Intervention Rating
Swan	5.87	5.73
Black	5.27	5.53
Cullen	5.20	5.53

AIMSweb® Behavior Screener

The AIMSweb® Behavior screener identified 12 students “at risk” in Ms. Swan's class prior to the intervention. After the intervention, Ms. Swan rated her class once again using this measure. Only seven students were identified as “at risk” upon the second rating; six were no longer identified. All remaining six students were once again identified. One student that did not previously qualify on the first rating was identified at the second rating, for a total of seven students identified. Ms. Black's class contained nine students identified as “at risk” before the intervention. Upon rating the class again, 11 students were identified as “at risk”. From the initial nine students identified, two students no longer qualified as “at risk”, while the remaining seven students still qualified at the second rating. Additionally, four new students were identified as “at

risk”, for a total of 11 students “at risk”. Ms. Cullen’s class consisted of 11 students identified as “at risk” prior to the start of the intervention. Ms. Cullen rated the class again after the intervention and identified 10 students as “at risk”. Two students from the pre-intervention rating no longer qualified, and one new student did. These findings are summarized in Table 6.

Table 6

AIMSweb® Behavior Screener “At Risk” Students Pre-/Post-Intervention

Teacher	# Students “At Risk” Pre-Intervention	# Students “At Risk” Post-Intervention
Swan	12	7
Black	9	11
Cullen	11	10

DISCUSSION

Overall, the Mystery Motivator intervention was effective in reducing the amount of disruptive behavior exhibited by all classes. Ms. Swan's class displayed a large decrease in the frequency of daily rule violations. The class averaged 70 rule violations during baseline and averaged only six rule violations during the last week of treatment, a 91% decrease from baseline. Ms. Black's class showed a marked reduction in rule violations from a baseline average of 29 to an average of only four during the last week of treatment, an 86% decrease from baseline. Ms. Cullen's class also showed a significant decrease in rule violations from a baseline average of 33 to an average of only 9 during the last week of treatment. This represents a 73% decrease. Again, there were no differences between the unknown and chosen reinforcement condition for any class.

The AIMSweb® Behavior screener identified 12 students "at risk" in Ms. Swan's class prior to the intervention. After the intervention, Ms. Swan rated her class once again using this measure. Only seven students were identified as "at risk" during the second rating. This is consistent with what would be expected considering an RTI framework. About 20% of students do not respond to Tier 1 interventions and require additional supports (Walker & Shinn, 2010). Ms. Black's class contained nine students identified as "at risk" before the intervention. After the intervention, Ms. Black rated the class again and 11 students were identified as "at risk". There are several factors that could have contributed to the increase in students identified as "at risk". First, Ms. Black might have become more aware of the class's disruptive behavior patterns through the process of tracking rule violations each day. This awareness could have exaggerated her ratings of the class's behavior. Second, Ms. Black's expectations of the class's behavior could have changed. By participating in the Mystery Motivator intervention, it is possible that

Ms. Black developed more rigid behavioral expectations for the students in her class. It is also possible that after the disruptive behavior decreased, Ms. Black became more aware of students struggling academically. Since students could qualify as “at risk” based on academic concerns as well as behavioral concerns, this is a possible explanation for the increased number of students identified as “at risk”. Ms. Cullen’s class consisted of 11 students identified as “at risk” prior to the start of the intervention. At the post-intervention rating, 10 students were identified. There was only a slight decrease much lower than what would be predicted by an RTI framework. Ms. Cullen’s class spent the least amount of time in the intervention phase – only ten days. Perhaps the intervention phase was too short for Ms. Cullen to observe positive behavioral changes in multiple students.

Limitations and Future Research

There are several potential limitations to this study. First, treatment integrity was not collected during baseline. There was no rating of whether or not teachers continued to use their usual classroom management techniques and if they refrained from introducing components of the intervention into baseline. As is evident by the baseline data for Ms. Black, this is an important component to include in the procedures for any baseline phase. During the fifth session, the observer noticed Ms. Black was providing feedback to the student’s after each rule violation, something which she had not initially included as part of her classroom management. Because Ms. Black was not observed on the fourth session when the drop in rule violations occurred, it is impossible to conclude what, if anything, contributed to Ms. Black introducing this new component. Although she was instructed to discontinue the newly introduced feedback until the intervention phase, it is impossible to determine the trend in baseline data if feedback has not

been prematurely introduced. This is support for the collection of treatment integrity during not only treatment phases, but baseline phases as well.

Second, because the intervention was only used with typically developing elementary students, it is difficult to generalize these findings to other grade levels and developmental levels. Since only first, second, and third grade public general education classes participated in the study, the effects on students with disabilities or students in different grade levels (i.e. pre-school, middle school, high school) cannot be determined.

Third, researchers should be aware of the difficulty in obtaining high levels of IOA. The teachers were required to collect frequency data while still teaching, whereas the observer had no other obligations aside from collecting the data. Thus, IOA sometimes fell below acceptable levels, especially at the beginning of the baseline phases when teachers first began tracking rule violations. If the IOA had begun and remained at consistently high levels throughout baseline, the data may have displayed a different pattern. However, this probably did not impact the results enormously, since only unacceptable levels of IOA were observed during the first IOA session of the phase. Researchers attempting to replicate these findings should be cautious of the difficulties in collecting IOA with such high frequency behavior, and plan for ways to counter this before the tracking begins. For this study, emphasizing the importance of accurate tracking before the tracking started and providing immediate feedback to the teachers was effective at increasing IOA.

Fourth, target behaviors in this study consisted of only 1-2 behaviors (i.e. talking without permission and leaving one's seat without permission). In reality, teachers are likely to report *multiple* disruptive behaviors that occur with a high frequency, all of which can impact student

learning. Future research should target more behaviors to determine the feasibility and effects of the intervention.

Research supports the use of the Mystery Motivator intervention to reduce a host of academic and behavioral concerns. Additionally, there is support that the use of mystery reinforcement (i.e. unknown reinforcement) as a reward is effective at producing behavioral change. The current study contributes to the research conducted on the preference for choice of reinforcement. This study found no significant differences between using unknown (i.e. mystery) reinforcement and chosen reinforcement for Ms. Swan's class or Ms. Black's class. Both reinforcement conditions were equally effective at producing behavior change. The effects of the two reinforcement conditions for Ms. Cullen's class have yet to be analyzed, but preliminary results suggests there is no difference between the conditions. This has important implications for educators and researchers. Using an unknown reinforcer is easier, more time efficient, and just as effective as letting students chose their reward. The teacher does not lose instructional time by allowing each student to sift through the selection of prizes and choose something. It is easier for the teacher to keep track of the rewards and how often each reward is used since she is in charge of reward selection and distribution. Additionally, the teacher does not have to program for extra supervision that may be necessary if some students select an activity as a reward while the rest of the class selects a tangible item. If the teacher selects the activity reward for the class, then all students will participate in the activity, eliminating the scenario in which all students in the class are engaged in different activities. There is a potential risk when the teacher choses the reinforcement that the item will not be reinforcing for all students. Thus, if a student is never satisfied with the mystery prize, they may not be motivated to work for it. This illustrates the

importance of conducting a preference assessment to determine what is reinforcing and changing the rewards daily to ensure that all items have a chance to be a mystery reward.

Future research that systematically compares the two conditions should be conducted to replicate these findings using the Mystery Motivator intervention *and* alternative class-wide interventions. Since there is still inconsistency in the literature regarding choice preference, more studies should be conducted evaluating the effects of different types of reinforcement in the classroom context. Future studies should also examine these effects using different rewards since the current study only included small tangible prizes and common classroom activities. If the same findings surface with interventions in which students typically *choose* reinforcement, this may be indicative of an easier, more manageable way for teachers to reward students and still obtain significant behavioral changes.

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APPENDIX A: MYSTERY MOTIVATOR CHART

MYSTERY MOTIVATOR CHART



Class/Student: _____ Week of: _____				
BEHAVIOR GOALS: 1. _____				
2. _____				
3. _____				
Monday	Tuesday	Wednesday	Thursday	Friday

APPENDIX B: RULE VIOLATION TRACKING SHEET

Rule Violation Tracking Sheet

Date _____ Teacher _____ Activity _____

Monitor class behavior throughout the activity. Place a mark or a check in the box each time a student breaks one of the rules listed below.

Did not raise hand to speak while in centers	Did not stay in seat/area during centers

APPENDIX C: MYSTERY MOTIVATOR TREATMENT INTEGRITY FORM

Mystery Motivator Treatment Integrity Form

- | | | |
|---|---|---|
| 1. The teacher informs students of reinforcement condition (verbally or by posting condition). | Y | N |
| 2. The teacher verbally acknowledges rule violations. | Y | N |
| 3. The teacher physically tracks rule violations with a check. | Y | N |
| 4. The teacher provides feedback to the student after a rule violation. | Y | N |
| 5. The teacher tallies the marks at the end of the period and informs students if they met their goal or not. | Y | N |
| 6. The teacher colors in the MM chart (if applicable). | Y | N |
| 7. The teacher awards students (if applicable). | Y | N |

Observer _____ Date _____

Teacher _____ Integrity = ____ / ____ = _____%

APPENDIX D: IRB APPROVAL FORM

Application for Exemption from Institutional Oversight

Unless qualified as meeting the specific criteria for exemption from Institutional Review Board (IRB) oversight, ALL LSU research/ projects using living humans as subjects, or samples, or data obtained from humans, directly or indirectly, with or without their consent, must be approved or exempted in advance by the LSU IRB. This Form helps the PI determine if a project may be exempted, and is used to request an exemption.



Institutional Review Board
 Dr. Robert Mathews, Chair
 131 David Boyd Hall
 Baton Rouge, LA 70803
 P: 225.578.8692
 F: 225.578.6792
 irb@lsu.edu
 lsu.edu/irb

-- Applicant, Please fill out the application in its entirety and include the completed application as well as parts A-E, listed below, when submitting to the IRB. Once the application is completed, please submit two copies of the completed application to the IRB Office or to a member of the Human Subjects Screening Committee. Members of this committee can be found at <http://www.lsu.edu/screeningmembers.shtml>

-- A Complete Application Includes All of the Following:

- (A) Two copies of this completed form and two copies of part B thru E.
- (B) A brief project description (adequate to evaluate risks to subjects and to explain your responses to Parts 1&2)
- (C) Copies of all instruments to be used.

*If this proposal is part of a grant proposal, include a copy of the proposal and all recruitment material.

- (D) The consent form that you will use in the study (see part 3 for more information.)
- (E) Certificate of Completion of Human Subjects Protection Training for all personnel involved in the project, including students who are involved with testing or handling data, unless already on file with the IRB. Training link: (<http://phrp.nihtraining.com/users/login.php>)
- (F) IRB Security of Data Agreement: (<http://www.lsu.edu/irb/IRB%20Security%20of%20Data.pdf>)

1) Principal Investigator: Rank:
 Dept: Ph: E-mail:

2) Co Investigator(s): please include department, rank, phone and e-mail for each

IRB# <u>E5804</u>	LSU Proposal # _____
<input checked="" type="radio"/>	Complete Application
<input checked="" type="radio"/>	Human Subjects Training

3) Project Title:

Study Exempted By:
 Dr. Robert C. Mathews, Chairman
 Institutional Review Board
 Louisiana State University
 203 B-1 David Boyd Hall
 225-578-8692 | www.lsu.edu/irb
 Exemption Expires: 12-11-2014

4) Proposal? (yes or no) If Yes, LSU Proposal Number

Also, if YES, either This application completely matches the scope of work in the grant
 OR More IRB Applications will be filed later

5) Subject pool (e.g. Psychology students)

*Circle any "vulnerable populations" to be used: (children <18; the mentally impaired, pregnant women, the aged, other). Projects with incarcerated persons cannot be exempted.

6) PI Signature Date (no per signatures)

** I certify my responses are accurate and complete. If the project scope or design is later changes, I will resubmit for review. I will obtain written approval from the Authorized Representative of all non-LSU institutions in which the study is conducted. I also understand that it is my responsibility to maintain copies of all consent forms at LSU for three years after completion of the study. If I leave LSU before that time the consent forms should be preserved in the Departmental Office.

Screening Committee Action: Exempted <input checked="" type="checkbox"/> Not Exempted <input type="checkbox"/>	Category/Paragraph <u>1</u>
Reviewer <u>Mathews</u>	Signature <u>[Signature]</u> Date <u>12/12/11</u>



VITA

Natalie Robichaux is a candidate for a Master of Arts degree in school psychology at Louisiana State University. She graduated with a Bachelor of Science degree in psychology from Louisiana State University in May of 2010 and is currently pursuing the Doctor of Philosophy degree in the school psychology program. Natalie conducts graduate work and research under the supervision of Dr. Frank M. Gresham, Ph.D.