

**THE EFFECTS OF MYSTERY MOTIVATORS ON DISRUPTIVE PUPIL BEHAVIOR IN
A UNIVERSAL PRE-KINDERGARTEN CLASSROOM**

By

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CERTIFICATION OF PROJECT WORK

We, the undersigned, certify that this project entitled *The Effects of Mystery Motivators on Disruptive Pupil Behavior in a Universal Pre-Kindergarten Classroom by Ashley Digirolamo*, Candidate for the Degree of Master of Science in Education, Department of Curriculum & Instruction, is acceptable in form and content and demonstrates a satisfactory knowledge of the field covered by this project.


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Abstract

Studies have shown that the teaching and learning process is being interfered with on a daily basis by disruptive pupil behaviors. In this study, a fifth year teacher, found that circle and story time in her Universal Pre-Kindergarten classroom were being greatly affected by pupil disruption. In response, she examined the effects of a classroom-based intervention called the mystery motivator game, a combination of group contingencies with randomized criteria and unknown rewards, on three specific disruptive behaviors (i.e., talk outs, inappropriate touching, and out of area). Results suggested that the intervention was successful in reducing all three disruptive behaviors to an acceptable level. In fact, the mystery motivator game reduced pupil disruption by 62% overall. Inappropriate touching was impacted the most with an average decrease of 70%. Implications for future research and practices 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 schools 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. This instructional challenge is made even more daunting when some of those children also engage in disruptive behavior at high frequencies. Disruptive behavior requires teachers to allocate more time and effort to maintaining discipline which results in less 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 (Begeny & Martens, 2006; 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 group of interventions that was designed to reduce disruptive classroom behavior was group contingencies (Gresham & Gresham, 1982). In fact, Stage and Quiroz (1998) conducted a large-scale meta-analysis and identified group contingencies as *the* most effective

intervention for decreasing disruptive classroom behavior. The purpose of this project was to examine the effects of a classroom-based, group contingency program with randomized components and mystery motivators on the disruptive behavior of a small group of four year olds attending a Universal Pre-Kindergarten class in a rural setting in Western New York. The mystery motivator game combined elements of evidence-based practices that were used successfully to improve pupils' academic and behavioral performance (see for example, Skinner, Skinner, & Burton, 2009; Skinner, Williams, & Neddenriep, 2004). It was predicted that the mystery motivator game would be effective in reducing the disruptive behavior of the group of pre-school children.

Adverse Effects of Disruptive Behavior on Teaching and Learning

There is a long and consistent empirical history on the negative effects of classroom disruption on the teaching and learning process in education (see for example, Patterson, DeBaryse, & Ramsey, 2006; Walker, Shinn, O'Neill, & Ramsey, 1987). Disruptive classroom behaviors, for example, "reduce instruction time, and make it more difficult for students to succeed academically in the classroom" (Murphy, Theodore, Aloiso, Edwards & Hughes, 2007, p. 53). Talk outs, out-of-seat, inappropriate touching and numerous other pupil behaviors interfere not only with the offending pupil's learning but others around them as well. Quite often teachers spend more time and energy trying to control disruptive behavior instead of actually teaching. Moreover, classroom disruptions increase teacher frustration and stress levels. In fact, disruptive behavior is the primary reason that most teachers leave the profession (Ingersoll & Smith, 2003). Given the relative prevalence and importance of disruptive behavior and its adverse effects on pupil learning and development, researchers and practitioners alike have developed an array of interventions, strategies, and comprehensive behavior change systems to

reduce or eliminate disruptive behaviors. Two interesting and effective classroom-based interventions are (a) group contingencies; and (b) mystery motivators.

Group 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 call, “child psychology”, “developmental psychology”, “educational psychology” and/or some related terms. While the titles highlight “psychology”, the content focus in many of these courses is often on the psychology of “individuals” and how it is 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 not individual students, and there are distinct differences between working with one and many students simultaneously. One particular 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 big idea is that an entire group can earn rewards based upon the performance of one or more of the class’ performance. Three types of group-oriented contingencies were identified (a) independent; (b) dependent; and (c) interdependent (Litow & Pumroy, 1975).

In *independent* group contingences, 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 consequences 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.

Dependent group contingencies, in contrast, are in effect when *all or none* of a group (i.e., one table 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 when one or some members of the group meet pre-established criteria (Cashwell, 1998; Gresham & Gresham, 1982; Skinner et al., 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 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.

The third instructional option for teachers to use is *interdependent* group contingencies. Here, all group members (e.g., entire class) receive access to consequences on the basis of *some aspect* of their behavior meeting group criteria (Litow & Pumroy, 1974; Skinner et al., 2004). For instance, 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 students' access to consequences depends on their own and others' behavior.

Relative Effectiveness of Independent, Dependent, and Interdependent Contingencies

All three types of group contingencies were shown to be more effective than existing instruction in (a) improving academic achievement (Litow & Pumroy, 1975; Skinner et al., 2004); (b) reducing disruptive classroom behavior (Stage & Quiroz, 1997); (c) increasing compliance with requests (Reitman, Murphy, Hupp & O'Callaghan, 2004); (d) enhancing social skills (Skinner, Cashwell & Skinner, 2000); (e) increasing homework completion and accuracy (Olympia, Sheriden, Jenson & Andrews, 1994); and (f) reducing room-to-room transition times (Campbell & Skinner, 2004). Comparative studies involving the three contingency types found them to be equally effective, for the most part, in improving pupil outcomes (Gresham & Gresham, 1982; Lynch, Theodore, Bray, & Kehle, 2009; Shapiro & Goldberg, 1986; Theodore, Bray, & Kehle, 2004). Collectively, these studies, among others, suggested that classroom teachers have at least three effective options when using group contingencies to deal with disruptive classroom behavior. Each contingency type comes with its own advantages and disadvantages and each may be used to improve pupil behavior. In the following section, the important role that rewards can play in group contingencies is discussed and a case is made for using unknown rewards in the form of mystery motivators (Rhode, Jenson, & Reavis, 1993).

Combining Mystery Motivators with Group Contingencies. One of the biggest challenges in using group contingencies is that not everyone is equally motivated by the same consequence. For some pupils, lunch with the teacher may be a consequence to “die for” while for others it may be a downright depressing idea. 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 it (Rhode et al., 1993). It was recommended, therefore, that *unknown* rewards be used instead when one employs group

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 et al.(1993) suggested further that it is very important to “hype” mystery motivators. 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.

In one of the earliest studies, Moore, Waguespack, Wickstrom, Witt, and Gaydos (1994) used mystery motivators to improve 3rd and 5th grade students' homework completion and accuracy rates. A Mystery Motivator Weekly Chart was displayed and students were told that if they turned in *all* of their homework each day, they would earn the opportunity to color in squares under relevant chart dates. 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. If symbols did not appear, students did not choose rewards, but they were encouraged to try harder the next day. Moore et al. (1994) found that five targeted 3rd grade and four 5th grade boys with low homework completion and accuracy rates increased their completion rates from 65% to 89% and 70% to 81% respectively, while their accuracy levels improved from 57% to 81% and 52% to 65%.

Madaus, Kehle, Madaus, and Bray (2003) also used mystery motivators to increase math homework completion and accuracy in two 5th grade classrooms. 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. Squares were 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. Three of five students also improved their math accuracy. A bit earlier, De Martini-Scully et al. (2000) implemented mystery motivators as part of an intervention package designed to reduce disruptive

classroom behaviors. Participants were two, 8-year old females identified by the teacher as having disruptive classroom behavior. Target behaviors included non-compliance with teacher requests, making inappropriate noises, talk outs, out of seat, and orienting in a direction other than the teacher or work. The teacher moved through the classroom while teaching (i.e., proximity control), posted and reviewed classroom rules, used precision requests and a token economy, and mystery motivators. Students earned tokens by following classroom rules during lessons. When they earned three tokens, they were given a mystery motivator. Disruptive classroom behaviors were cut in half while the intervention package was in effect.

Musser, Bray, Kehle, and Jenson (2001) replicated the DeMartini-Scully et al. (2000) study in a special education setting. Participants were three students (2M, 1F) ranging in age from 8 to 10 who were classified seriously emotionally disturbed (SED), oppositional defiance disorder (ODD), and attention-deficit hyperactivity disorder (ADHD) respectively. 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; and 12 for each subsequent mystery motivator. All three target students showed immediate and noticeable improvements when the intervention package was in effect.

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 contingencies are quite time-consuming and inefficient for

practitioners who are responsible for large classes. Since different consequences are delivered for different pupils, it can take quite a bit of time to enforce contingencies consistently. Independent group contingencies may also be unfair because they treat some students differently from their peers. Therefore, there may be some procedural advantages to using interdependent group contingencies instead; they are easier to implement because either all or none earn rewards, there is less likelihood of negative side-effects (e.g., jealousy and peer rejection), and they promote pro-social interactions among students (Murphy et al., 2007; Popkin & Skinner, 2003). There are some limitations, however, to the use of interdependent group contingencies as well (Popkin & Skinner, 2003). First, consequences are the same across all pupils. Therefore, they may be reinforcing for some, neutral to others, and aversive to others. A second challenge involves setting appropriate criteria for all. Criteria may be too high for some pupils, yet too low for others. As such, some may fail early on to meet the criterion and may react by not performing or behaving inappropriately, while others may simply not put forth the effort because it is not necessary to do so (Kelshaw-Levering et al., 2000). 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 rewards for doing well in math, they may spend less time working on their literacy assignments (Kelshaw-Levering et al., 2000).

Some researchers suggested, however, that many limitations associated with interdependent group contingencies can be reduced by *randomizing* contingency components (e.g., target behaviors, criteria, students, and consequences) and keeping them *unknown* to pupils. In a series of studies (e.g., Kelshaw-Levering et al., 2000; Theodore, Bray, Kehle, and Jenson, 2001; Murphy et al., 2007) researchers showed that the beneficial effects of interdependent group contingencies can be maximized and limitations minimized through a

combination of randomization and mystery. Perhaps the most relevant of these investigations for the present study was conducted by Murphy and her colleagues (2007). Here, the researchers examined the effects of interdependent group contingency and randomized rewards on the disruptive behavior of 8 preschoolers in a Head Start school. 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 to earn rewards. The intervention was implemented during 15-minute large group activities and pupils were told whether or not they met criteria. When criteria were met, rewards were drawn from a mystery motivator box which was covered in wrapping paper with a question mark in the center of the box. In the box were 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 rewards substantially reduced disruptive behavior. All students showed reductions in disruptive behaviors with effect sizes ranging from .99 to 7.71. These would all be considered educationally significant reductions in disruptive pupil behavior. In addition, the teacher ranked the intervention 4.5 out of 5 on a Likert-type scale in terms of acceptability and ease of implementation.

Collectively, the literature suggested that a variety of group contingency interventions can be used to improve a wide range of academic and behavioral problems. These effects appeared to be enhanced further when contingency components were randomized and remained unknown to students. This combination of group contingencies with mystery motivators, in

particular, should make an appealing instructional package for classroom teachers. The purpose of the present investigation, therefore, was to examine the effects of the mystery motivator game, an instructional package consisting of group contingencies, randomized components and mystery motivators, on the disruptive behavior of a small group of four year olds enrolled in a Universal Pre-Kindergarten classroom. Pupils displayed high rates of talk outs, out of seat, and inappropriate touching during initial baseline sessions. It was predicted that the mystery motivator game would immediately and noticeably decrease all three disruptive behaviors and that the teacher and pupils would enjoy using the intervention.

Method

Participants and Settings

Participants were 11 (6M, 5F) youngsters attending a Universal Pre-Kindergarten classroom in a small (312 students) rural elementary school in Western New York. Children were 4 years old, predominantly Caucasian, and from lower- to middle- socioeconomic backgrounds. Nine pupils were described as normally developing and two had IEPs for speech and language difficulties. This particular class was selected for participation based upon high rates of disruptive behavior, particularly during whole group activities such as circle and story time. The primary disruptive behaviors included being out of area, talking out without permission, and inappropriate touching. The primary investigator was a Caucasian female with four years of teaching experience. In addition to teaching, the investigator was also responsible for making all study-related materials, training students to use the intervention, as well as data collection and analysis. A second adult, classroom teaching assistant, also helped with study implementation by serving as a data collector and conducting fidelity of implementation assessments. The study was conducted during two, 15-minute regularly scheduled whole group

activities and the classroom teacher served as the primary investigator. A poster board defining target behaviors was displayed prominently in class and reviewed before daily whole group sessions.

Dependent Variables

The dependent variables were three disruptive behaviors (a) out of area, (b) talk outs, and (c) inappropriate touching that were interfering with whole group instruction during circle and story time. Out of area was defined as pupils leaving their assigned seating spaces without teacher permission. Talk outs were defined as students blurting or speaking out without receiving adult permission to do so while inappropriate touching was defined as putting hands, feet, or other body parts on another person's body without permission. During initial baseline sessions, these three behaviors occurred about 10 times each during lessons. This was the equivalent of three disruptive behaviors per pupil and a total of 30 disruptions for the entire class. This was considered too high for effective instruction and criteria were established to reduce these frequency levels by at least 50%. Therefore, a criterion of five or less disruptions (i.e., Total = 15 per class) was established.

All data were recorded on behavioral monitoring sheets (see Appendix A). This form was completed independently by both the investigator and the classroom teaching assistant. The only difference was that the investigator only monitored selected target behaviors while the observer recorded the frequency of all three target behaviors. Independent observations were then compared at the end of class session to determine: (a) if they were in agreement, and (b) if the class met the daily criteria. On days when both agreement and criteria was met, the class earned a chance to win a mystery motivator.

Independent Variable

The mystery motivator game included three primary components that served as independent variables: (a) randomized target behaviors, (b) interdependent group contingencies, and (c) mystery motivators.

Randomized Target Behaviors and Criteria. After examining class performance during baseline sessions, three disruptive behaviors were targeted for intervention (out of seat, talk outs, and inappropriate touching). Criteria were then set as follows: (a) talk outs = 5, (b) inappropriate touching = 5 and (c) out of area = 5. The target behaviors and criteria were written on two index cards each and then the words “all behaviors = 15” was written on one index card. All 7 cards were then placed in a covered box in the classroom. Each day, the teacher *privately* selected one index card from the box. The card determined which target behavior(s) was monitored each day. For example, if a talk outs = 5 card was selected, then the entire class must have 5 or fewer talk outs to earn a chance at the mystery motivator.

Interdependent group contingencies. Interdependent group contingencies were established by making the entire class’ access to rewards dependent on the *collective* performance of the group. For example, if the total number of talk outs during the lesson was 5 or less, then the entire class would earn a chance to win a mystery motivator. If more than 5 talk outs occurred, then the class was told that they didn’t meet the criteria and encouraged them to try harder the next day. This was an interdependent contingencies because pupils access to rewards depended on their own and others’ behavior (Litow & Pomroy, 1975; Skinner, Skinner, & Burton, 2009). Target behaviors selection was done privately to: (a) keep pupils unaware of which target behavior(s) was being monitored each day and (b) minimize time associated with monitoring pupil behavior. Prior research has also shown that one can get generalized behavior

changes (e.g., multiple behaviors improve simultaneously) by randomizing target behaviors and keeping them unknown (e.g., Hiller, 2010; Kelshaw-Levering et al., 2000; Theodore et al., 2001).

To ensure that the mystery motivator game was implemented accurately a 10-item, fidelity checklist was developed (See Appendix B). This form contained the procedural steps to use the intervention as intended and spaces to note the presence and absence of each component. The fidelity checklist was used initially to teach children how to play the game correctly and then to monitor the accuracy with which the intervention was implemented over time. The classroom teaching assistant observed the mystery motivator game during 25% of randomly selected intervention sessions and noted the frequency with which the game was used. Fidelity was calculated as the number of steps present divided by the number present and absent times 100%. Fidelity components averaged .94 over the course of the investigation with a range of .9 to 1.0. These data suggest that the mystery motivator game was implemented with a high degree of accuracy during the study.

Mystery Motivators. Mystery motivators are incentive systems designed to deliver random rewards for appropriate behavior to individuals, small groups, or an entire class (Rhode et al., 1993). Typically, there are two parts to the MM system. The first consists of a series of boxes that represent the days of the week (i.e., Monday – Friday) as well as an optional 6th “bonus” box. (A class calendar can be used as well). An invisible ink pen is used to put an “M” on randomly selected days when rewards are available (e.g., two or three out of five days). A criterion is set for pupil performance (e.g., everyone must turn in homework assignment and the class average must be at least 80% correct) and if students meet the criteria, they are given a developer pen to color in the square to see if an “M” appears. If it does then a reward is given; if

there is no “M”, students are encouraged to try harder the next day. (It is recommended that students be given frequent opportunities to “win” and earn rewards early on in game use). The second MM component is a series of highly decorated envelopes that are displayed prominently in class. Each envelope contains a paper slip with the name of a “mystery” reward written on it. On those days when students meet pre-established criteria and find an invisible “M”, they are allowed to pick one of the mystery envelopes to see what they won. Murphy, Theodore, Aloiso, Alric-Edwards, and Hughes (2007) used interdependent group contingencies with mystery motivators to improve the behavior of nine, pre-school students enrolled in a Head Start program. The teacher posted rules and told students that if everyone received five or fewer checks (i.e., for rule breaks) then the entire class could pick one of 12 picture cards from the mystery box. The researchers found that the intervention produced immediate decreases in all students’ disruptive behavior.

Experimental Design and Procedures

The investigator used an A-B data-based case study design to examine the effects of the mystery motivator game on the children’s rate of disruptive behavior. This particular design is *not* capable of establishing a cause and effect relationship but it is useful for monitoring the effects of any classroom-based intervention (Kennedy, 2005). The study began with a brief, five-day baseline phase during which the investigator used her normal classroom management approach. This plan consisted of three lights (i.e., green, yellow, and red). Each day, all students started on the “green light” and remained there unless they were reprimanded. The yellow light was used when students received at least two warnings about their behavior. Students on “yellow light” forfeited 5 minutes of play time. Finally, if pupils needed more than two formal reminders then they were on “red light” and missed all of their play time. If disruptive behavior continued,

students were sent to the principal. Although the three light system did not seem to be overly effective, it was used throughout the course of the investigation. A typical baseline session proceeded as follows.

First, students were reminded of classroom rules before class sessions began. Most lessons started with a brief review of previously learning information, followed by the introduction of new material and then a small group instructional activity. Once the small group activity was completed pupils came back together and repeated the instructional sequence. Students were praised for raising their hands before speaking, their ability to sit still and take turns, and keeping their hands and feet to themselves. If students broke these rules, they were typically given two warnings before their light was moved from green to yellow and then a few more before the light was moved from yellow to red. The teaching assistant monitored all three target behaviors during each 15-min session and tallied frequency data on the behavior monitoring form. When pupils' baseline performance stabilized after five days, the mystery motivator game was introduced to the class.

Prior to formal data collection, the investigator conducted a brief (20-minute) training session with the students. She explained that the purpose of the game was to decrease three disruptive behaviors; operational defined the targets using words and colorful picture icons; and displayed the information on a poster board in the classroom. The investigator explained that the target behaviors would be monitored twice a day during circle and story time.

Next, she introduced the mystery motivator chart (displayed on a large blue calendar pocket chart with blank white paper squares in each pocket). The investigator showed students a sample white paper square and how it was possible to see an invisible star when a flashlight was shone on the paper. The investigator told pupils that if they met criteria during circle and/or story

time then they would earn an opportunity to reveal invisible stars on the mystery motivator chart. She also explained and showed pupils that on some days that met the criteria, there were no stars. She explained that if stars appear, then the whole class gets a reward; if not, then they would be encouraged to try harder the next day. The “mystery” rewards were displayed in colorful sealed envelopes around the classroom. Each envelope contained the name of a different reward and included: (a) stickers, (b) picking from the treasure box, (c) connecting dots on the class’ ice cream party chart moves, (d) stamps and/or (e) small treats.

A typical mystery motivator session worked as follows. First, the teacher did a quick review of the class rules and the target behaviors that might be monitored during class. She then privately picked an index card out of a sealed box to determine which target behavior was monitored for that 15-minute session and placed the card back in the sealed box (see Appendix B). The investigator then taught her scheduled 15-minute lesson while praising appropriate pupil behaviors and redirecting or reprimanding inappropriate outbursts. Once lessons were completed and students transitioned to the next activity, then the investigator and teaching assistant discussed their observations. If their frequency counts matched and students met the criteria, then the investigator announced that students had a chance to reveal a star on the mystery motivator chart. One student was selected to shine the flashlight on the first white square. If a star appeared then students picked a mystery motivator envelope to see what the class won. If no star was revealed, the students were praised for their hard work and encouraged to try again later the next day.

Results

Four separate graphs were created to examine the effects of the mystery motivator game on pre-school children’s disruptive behavior. Figure 1 shows the intervention’s effect on the first

target behavior, out of seat. As shown, out of seat behavior was quite prevalent during initial baseline sessions. On average, students displayed one out of seat behavior every 2.14 minutes during circle time (blue) and one disruption every 5 minutes during story time (pink). There appeared to be a slight decrease in pupil disruption immediately after the mystery motivator game was introduced. These effects were more notable during circle than story time. It should be noted, however, that there was also a slow but steady increase in out of seat behavior over the next week or so. On days 17 and 18, for example, there was an average of one disruption every 1.66 minutes during both circle and story time. It should also be noted that these two days also straddled the school's spring break. Out of seat behavior decreased noticeably thereafter. During circle time, for instance, there was a 60% decrease in this target behavior to the end of the intervention. There was also a 65% decrease in out of seat behavior during story time after this point.

Figure 2 shows the effects of the mystery motivator game on the class' talk out behavior. The data suggest that the game had the least impact on this target behavior, although it did decrease by almost 55% over initial baseline conditions. At the start of the study, for example, talk outs occurred on average once every 1.9 minutes during circle time (blue). This improved to an average of one talk out every 5 minutes by the end of the intervention. Furthermore, it was noted that talk outs during story time (pink) decreased from an average of once every 2.5 minutes to one every 15 minutes by the end of the study. Once again the days bordering the spring break appeared to be particularly troublesome for students. Similar to the effects on out of seat behavior, talk outs began to decrease gradually over the course of the investigation.

Figure 3 depicts the effects of the mystery motivator game on inappropriate touching. As shown, this behavior was reduced dramatically by an average of 69% during the study.

Behavioral decreases were slightly more evident during story 70% than circle time (67%). Initially, inappropriate touching occurred once every 2.5 and 3 minutes during story and circle times respectively. At the end of the study there was an average of only one instance per 15-minute lesson across both observation times. Like other disruptive behaviors, inappropriate touching spiked on the two days straddling the spring break. Similarly, there was a clear decelerating trend in this behavior the longer that the intervention was in effect.

The effects of the mystery motivator game on the class' overall disruptive behaviors can be seen in Figure 4. As noted, all three disruptive behaviors occurred at relatively high frequencies overall during initial baseline session. When the mystery motivator was implemented, however, there was a gradual yet noticeable decrease in the total number of disruptive behaviors. With the exception of the few spike days noted earlier, there was a gradual decrease in the amount of disruption occurring during both observation times. Overall, the mystery motivator game appeared to reduce behavioral variability and total class disruptions.

Discussion

The present study showed that the mystery motivator game was moderately effective in reducing disruptive behavior among a group of preschool children during 15-minute, circle and story time sessions. During initial baseline, the class engaged in three disruptive behaviors at relatively high frequencies. The frequent movement, talk outs, and inappropriate touching interfered greatly with instructional delivery and pupil learning. When the mystery motivator game was implemented, there was a gradual decrease in the overall frequency of all target behaviors. These outcomes while not as large in magnitude are quite consistent with previous research on the effects of both interdependent group contingencies (e.g., Hulac & Benson, 2010; Kelshaw-Levering, 2000; Lynch et al., 2009; Reinhardt et al., 2009; Skinner et al., 2004;

Theodore et al., 2009) and mystery motivators (e.g., Bennett, 2009; Madaus et al., 2003; Moore et al., 1994; Murphy et al., 2007; Robinson & Sheridan, 2000). The present findings extend the research base to a new student population, geographic location, and target behaviors. Over an extended time period, the mystery motivator game had a more noticeable impact, albeit for the exception of days surrounding the school break. By the time the study ended, disruptive behaviors had decreased substantially and it was much easier to teach and for the students to learn. The slower rate of pupil progress may stem from a number of factors, the most obvious of which is the students' age and developmental status. Group contingencies with randomized components have been used most often with older children who may have caught on to the game's purpose more readily. It is also quite possible that preschool children may just need a bit more time to develop self-control over behaviors that they are just learning to use in school. In any event, most teachers would be quite satisfied with the positive yet gradual changes in pupil behavior. There is a dire need for effective academic interventions that can improve the performance of all students in inclusive settings (e.g., Heward, 2009).

While the mystery motivator game had a noticeable, positive effect on reducing pupils' disruptive behavior, the contributors to these improvements are less obvious. Certainly, randomized criteria for rewards as well as the rewards themselves played a big role in improving pupil performance. By randomizing target behavior, students were motivated to improve their behavior but they didn't know exactly which disruptive behavior was being monitored by the teacher each day. Regarding randomized rewards, the suspense or mystery surrounding the identity and availability of the mystery motivator certainly contributed to pupil excitement. Rewards didn't lose their appeal because students weren't aware of what they were going to win. They also never appeared to be disappointed that they did not receive a particular reward.

Positive peer interactions may have also contributed to improved pupil performance. A classroom community was created as students worked toward common goals (i.e., to reduce their classroom disruptions). On a few occasions, students were observed prompting and encouraging one another to follow the game rules.

The mystery motivator game was also feasible to implement and socially acceptable to students and teachers. This finding is also consistent with previous research that shows positive consumer satisfaction evaluations for mystery motivators (e.g., Madaus et al., 2003; Moore et al., 1994; Murphy et al., 2007). Students seemed to enjoy playing the game especially when the invisible letter appeared and they got to open the mystery envelope. Students cheered and gave high fives when they won. Identifying class-wide interventions that are effective for all pupils, feasible to implement, and acceptable to teachers and pupils is very important in the evidence-based era (e.g., Cook, Landrum, Tankersley, & Kauffman, 2003; Cook, Tankersley, & Landrum, 2009; Detrich, Keyworth, & States, 2008; Spencer, Detrich, & Slocum, 2012). This research-to-practice study used an evidence-based practice in an applied setting that would parallel many Universal Pre-Kindergartens across the country. Therefore, the mystery motivator game may be well-suited for decreasing disruptive behavior in inclusive educational settings.

Although current findings are promising, there are a few study limitations that may reduce the usefulness of these findings to some extent. First, the study was conducted with only one group of students (N=11), in one geographical location, and in one narrow facet of interpersonal behavior (i.e., classroom disruptions). Generalizations to other grade levels, geographic settings, and subject areas are not warranted at this time. Future research should replicate the present study across various subject areas, age ranges, settings (special education and inclusive classrooms), and populations. Second, the investigator used an A-B data based case

study design. This particular design is incapable of establishing a functional relationship between the use of the mystery motivator game and reductions in pupils' disruptive behavior. While the data certainly suggest that there is a relationship between these two variables, other extraneous factors (e.g., history, maturation, and reactivity effects) may have also played a role (Kennedy, 2005). As such, future replications should use more rigorous research designs (e.g., A-B-A-B, multiple baseline, and alternating treatments) in their evaluations.

Third, the study was conducted for a relatively short duration (30 days) and no generalizations and maintenance data were collected. Therefore, it is not appropriate to conclude that the same effects would be obtained over a longer time period and/or that benefits would generalize to other areas of pupil behavior (e.g., pro-social interactions, work completion, and/or unstructured teaching arrangements), and/or be sustained in the absence of the intervention. Future research should include longer intervention times and more explicit generalization measures. Finally, the current findings are limited because the investigator also served as the primary data collector and evaluator. Although procedures were used to monitor fidelity of implementation, one cannot rule out potential experimenter bias effects at this time. Future research should utilize independently-trained data collectors.

In summary, the present study examined the effects of the mystery motivator game, a combination of interdependent group contingencies with randomized components and mystery motivators, on the disruptive behaviors of eleven preschoolers in a Universal Pre-Kindergarten setting. With a minimum of teacher time and effort, the mystery motivator game produced gradual and noticeable reductions in all pupils' disruptive behaviors. The classroom teacher was able to implement the game with a high degree of accuracy and rated the intervention favorably. Overall, present findings indicated that the mystery motivator game was a moderately effective

and efficient intervention for decreasing talk outs, out of area and inappropriate touching among a group of 4 year old children during circle and story time. Obviously, more research is needed on the potential utility of the mystery motivator game as a means of improving pupils' academic competence.

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Figure 1 show the effects of the mystery motivator game on out of seat behavior across story and circle time.

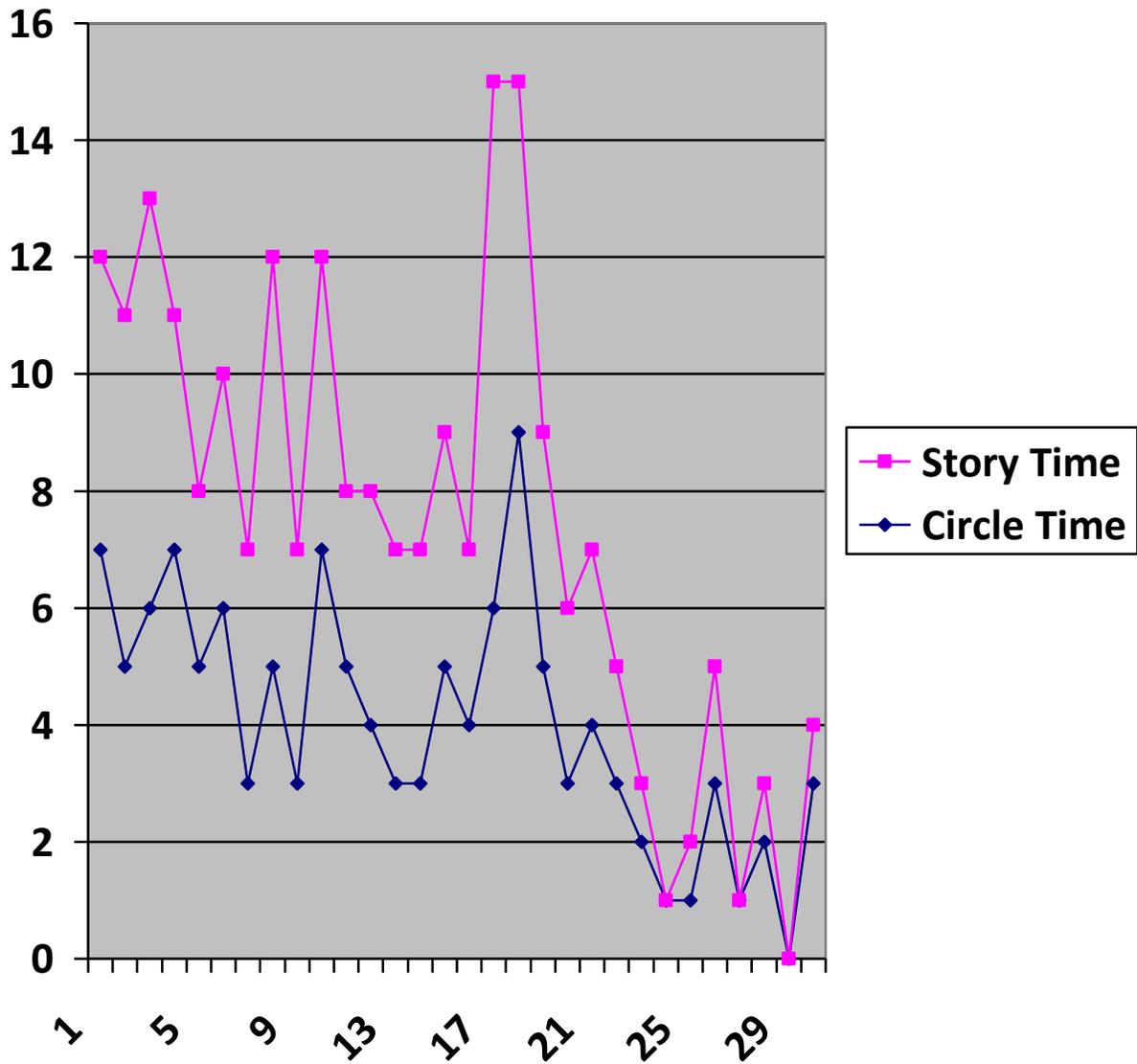


Figure 2 show the effects of the mystery motivator game on talk outs across story and circle time.

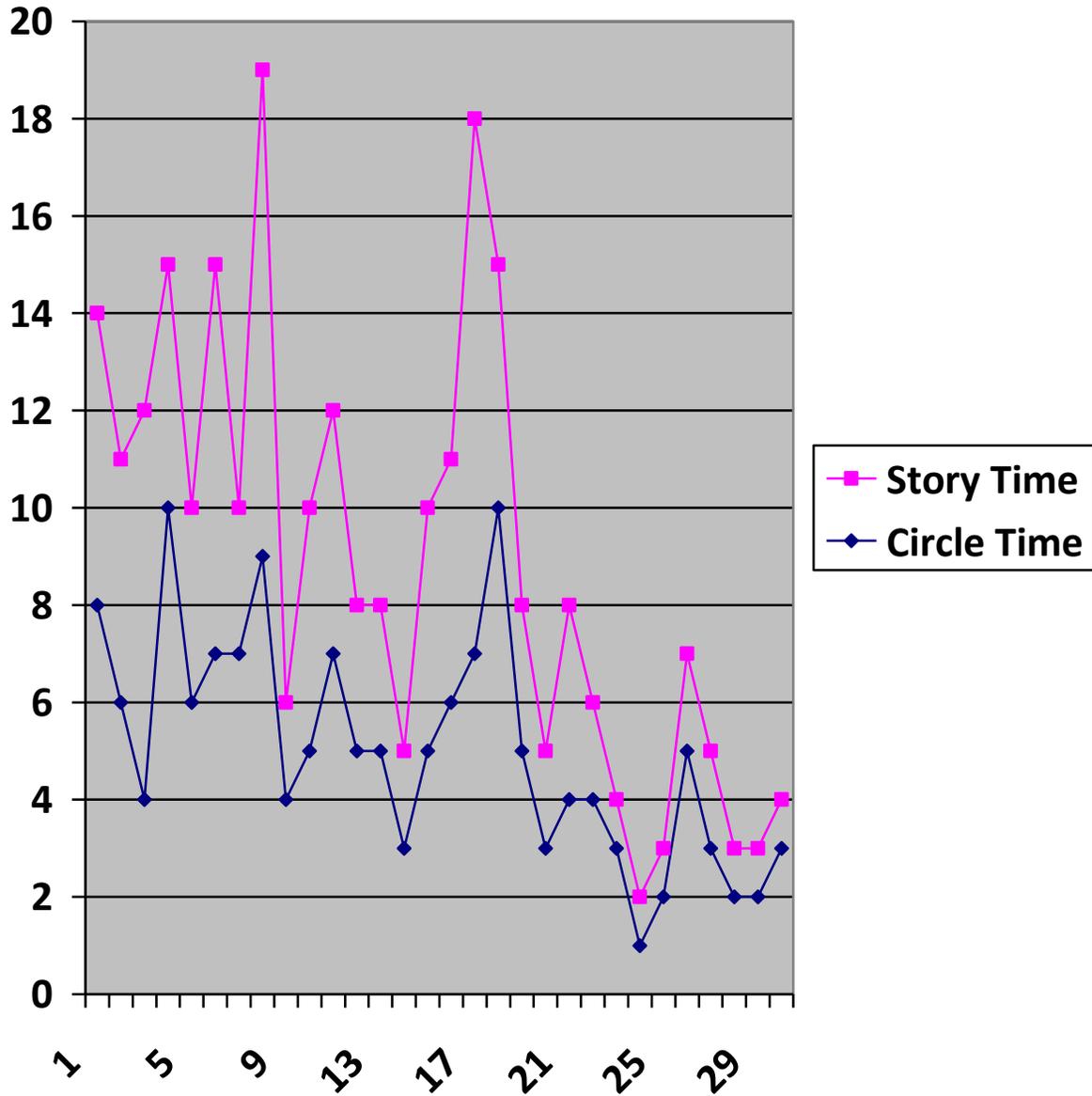


Figure 3 show the effects of the mystery motivator game on inappropriate touching across story and circle time.

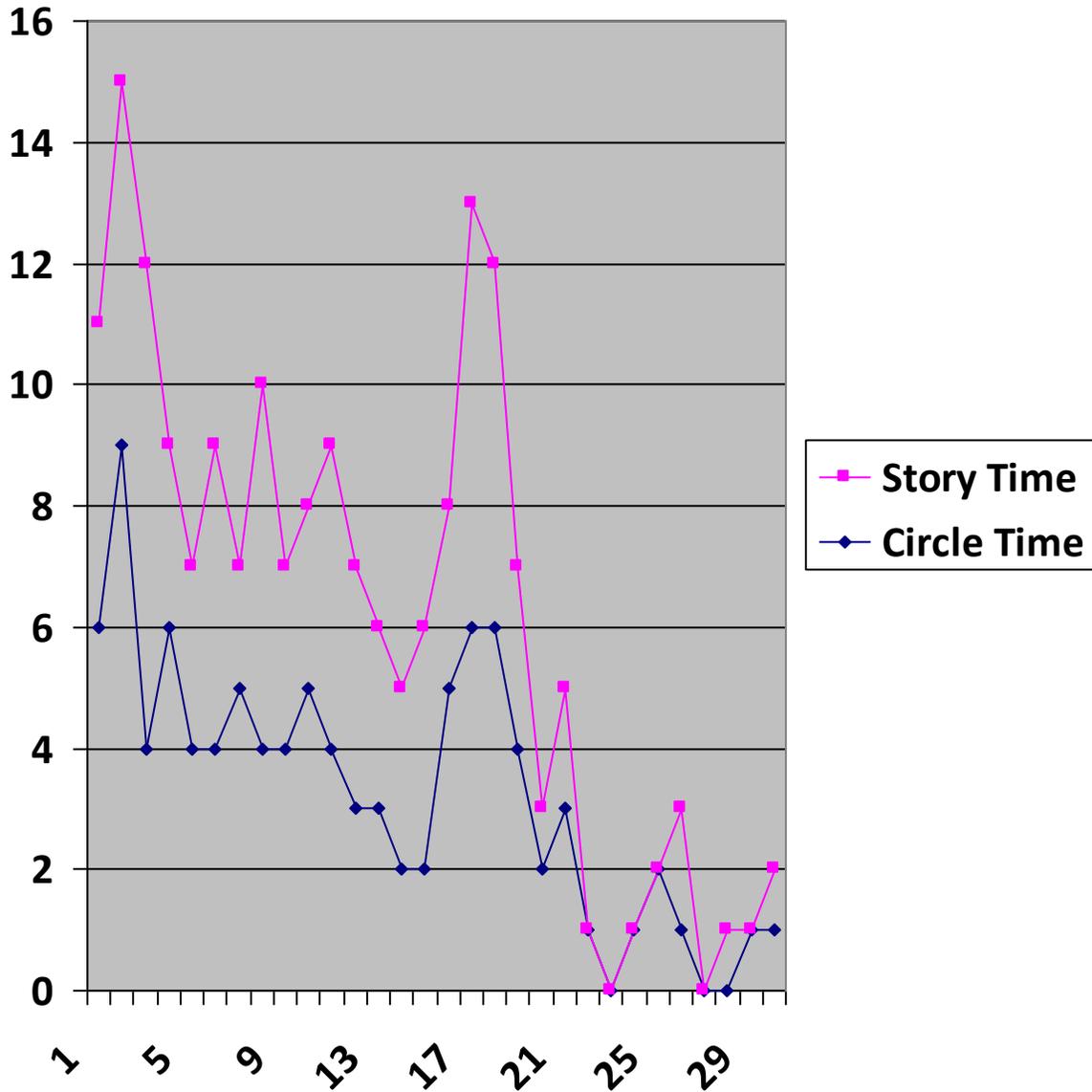
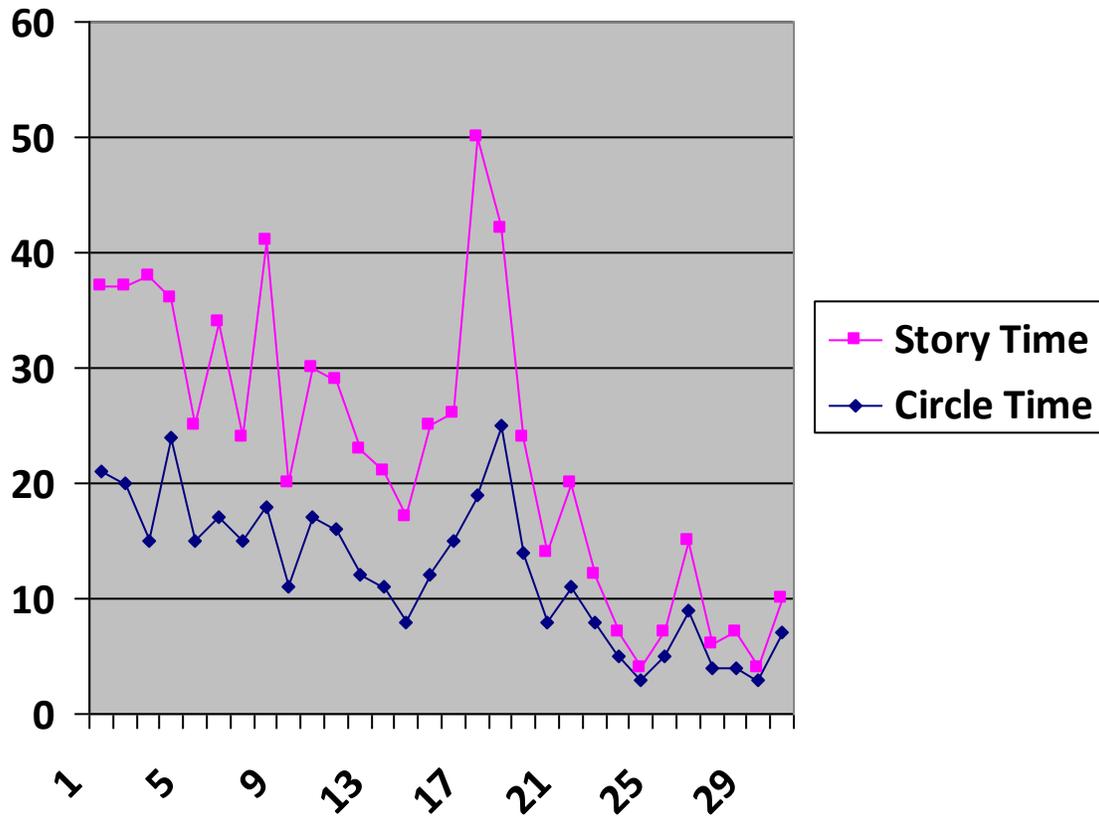


Figure 4 show the effects of the mystery motivator game on all disruptive behaviors across story and circle time.



_____ 7. At the end of the designated time period, the investigator and independent observer’s observations will be compared to determine: (a) if they are in agreement and (b) if the class met the daily criteria.

_____ 8. On days when both agreement and criteria are met, the class will earn a chance to win a mystery motivator. If group fails to reach criteria, then investigator announces that they did not meet the criteria and encourages them to work harder the following day.

_____ 9. Teacher does not mention name of individuals when criteria is not reached.

_____ 10. Following session, investigator makes a smooth transition to the next instructional activity.

Total _____/10 (Please record the number of behaviors observed plus the number of NA)

_____ % **Procedural fidelity**

Anecdotal Comments: _____

