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The Effects of the Caterpillar Game on Classroom Behavior and Teacher Stress

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The Effects of the Caterpillar Game on Classroom Behavior and Teacher Stress

BY

Amber Jacoby

THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

Specialist in School Psychology

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I HEREBY RECOMMEND THIS THESIS BE ACCEPTED AS FULFILLING THIS PART OF THE GRADUATE DEGREE CITED ABOVE
# THE CATERPILLAR GAME AND TEACHER STRESS

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Abstract

A single-case, multiple baseline design was utilized to evaluate the effects of the Caterpillar Game, a classroom management system, on disruptive student behavior, teacher praise, and teacher stress. Three classrooms were included in the study (preschool, kindergarten, and second grade). When the Caterpillar Game was implemented across the three classrooms, student disruptive behavior decreased and teacher behavior-specific praise increased. Disruptive behavior and teacher praise results remained similar to intervention two to four weeks later and teachers reported being highly satisfied with the Caterpillar Game. One of the three teachers reported a decrease in stress. This study adds further support to the use of the Caterpillar Game as a class-wide intervention.
The Effects of the Caterpillar Game on Classroom Behavior and Teacher Stress

Student misbehavior is commonly observed in the classroom setting and is of particular interest because student disruptive behavior is associated with negative student and teacher outcomes (Alexander, Entwisle, & Horsey, 1997, Evers, Tomic, & Brouwers, 2004, Powers, Bierman, & The Conduct Problems Prevention Research Group, 2013, & Vitaro et al., 2007). Finding effective class-wide behavioral interventions is an important area of study because these interventions have the potential to reduce student misbehavior in the classroom. Preliminary research suggested that the Caterpillar Game has the potential to be an efficient and effective classroom-wide intervention (Floress, Boyle, & HaileMariam, in press). The current study extends previous research titled “The caterpillar game: A classroom-wide behavior intervention”, in which the authors developed a classroom-wide behavior intervention named, the Caterpillar Game (Floress, et al., in press). The purpose of this study is to provide further support for the use of the Caterpillar Game as an effective classroom-wide intervention that decreases disruptive classroom behavior.

The Caterpillar Game includes a large caterpillar with seven body segments and a head, along with a butterfly token that is moved up and down the caterpillar’s body. During class time, the teacher moves the butterfly token upwards, toward the head, when an individual or multiple students engage in appropriate behaviors. Likewise, the teacher moves the butterfly token down, towards the tail, when a student breaks an established classroom rule. When the butterfly token reaches the head of the caterpillar the classroom, as a whole, earns a quick reward (i.e., game of Simon Says) to reinforce appropriate classroom behavior. The picture of the caterpillar serves as a visual reminder
for the class that they are working together to display appropriate behaviors and partake in a quick activity reward. It also serves as a visual reminder to the teacher to praise the students for appropriate classroom behaviors. Floress et al. (in press) reported that the implementation of the Caterpillar Game significantly decreased disruptive behavior and significantly increased teacher praise.

**Disruptive Behaviors**

Disruptive behaviors are frequently witnessed and attended to by teachers and other professionals in the classroom because they impede instruction and learning. Amada and Smith (1999) defined disruptive behaviors as behaviors that interfere with the instructor’s ability to teach or interfere with students’ learning or ability to benefit from the classroom environment. Teachers are typically quick to address and manage disruptive behavior(s) when they occur, which keeps them from teaching. Some students who engage in classroom disruptive behaviors may meet criteria for a childhood and/or adolescent externalizing disorder, such as attention-deficit/hyperactivity disorder (ADHD), conduct disorder (CD), and/or oppositional defiant disorder (ODD; American Psychiatric Association, 2013). Children diagnosed with these disorders are likely to contribute to disruptive classroom behavior. For instance, children with disruptive behavior disorders are more likely to engage in conflict with authority figures such as teachers and parents (American Psychological Association, APA, 2013). Ongoing disruptive behavior increases the likelihood of negative student outcomes, such as poor teacher-student relationships and academic success.
Negative Student Outcomes

**Academic underachievement.** The relation between student disruptive behavior and underachievement is well documented. Alloyn and Roberts (1974) studied whether reinforcing academic performance would have an impact on children's disruptive behavior in the classroom. To strengthen the children's academic performance a token system was used, in which a grade of 80% or higher earned either 2 or 5 points, dependent on the accuracy of the assignment. The tokens were intended to serve as positive reinforcers and motivate the children to improve their academic performance (i.e., accuracy and completion of reading assignments). Alloyn and Roberts found that when academic performance was reinforced, disruptive behaviors decreased and academic performance improved. Other studies have examined differences in achievement based on specific disruptive behavior diagnoses.

Frick et al. (1991) examined children with a comorbid diagnosis of ADHD and CD to determine if one diagnosis was more responsible for student underachievement. Results suggested that ADHD negatively impacted academic achievement more than CD. Likewise, Hinshaw (1992) reviewed the literature on externalizing behavior problems and academic achievement and the findings suggested that inattention and hyperactivity are the most common correlates of academic failure in the early elementary years. In general, children who display disruptive and off-task behaviors, especially those with ADHD, are likely to be at-risk for academic underachievement. Considering this, it is not surprising that children who display disruptive behaviors are also less likely to graduate high school (Vitaro et al., 2001).
Dropout/Delinquency. Numerous studies have found that disruptive behavior in elementary school is a significant predictor of school failure and/or dropping out of school. Children who exhibited aggressive behaviors, earned poor grades in first grade (Ensminger & Slusarcick, 1992), displayed more disruptive behaviors than their peers (Vitaro et al., 2001), and had a greater chance of dropping out of school. Once individuals have dropped out of school their futures are often dismal. Rumberger (1987) found that students whom drop out of school are more likely to be involved in illegal activities, dependent on welfare, and experience health issues (e.g., participating in risky behaviors such as smoking, being overweight, or having a low level of physical activity). Early peer rejection has also been related to negative outcomes. Vitaro et al. (2007) found that early rejection and associating with deviant friends late in adolescence predicted delinquent (i.e., violent) behaviors. Vitaro et al. also found that children displaying disruptive behaviors at age 6 predicted having disruptive friends at age 7 to 9, and being rejected by peers at age 10 to 13. The authors asserted that early rejection of deviant children by normal children deprived the deviant children of normal socialization experiences and encouraged friendships with other rejected, disruptive children (Vitaro et al., 2007). Peer rejection and deviant friendships predicted violent delinquency. Powers et al. (2013) found that rejected peers are likely to become friends with other rejected peers and that young children commonly displaying aggressive-disruptive behaviors were more likely to be disliked by normative peers. In their study, aggressive-disruptive first graders were more likely to make friends with other aggressive-disruptive children and in turn this predicted an increase in aggressive-disruptive behavior in third grade (Powers et al., 2013). It would appear that children who display disruptive behaviors early on are
less likely to have positive interactions with normative peers, more likely to be rejected and ultimately lose out on instances of socialization that promote prosocial behaviors.

**Negative Teacher Outcomes**

**Teacher training.** Disruptive classroom behavior is a frequent concern among classroom teachers. Reinke et al. (2011) found that over the course of a year, 97% of teachers reported disruptive/acting out concerns. In addition, only 30% of teachers reported that they had the skills required to meet the mental health needs of their students. This is in line with other findings that suggest teachers may not be receiving adequate training in behavioral interventions and strategies to sufficiently manage challenging behaviors (Begeny & Martens, 2006; Westling, 2010).

Begeny and Martens (2006) investigated the amount of behavioral training graduate students from elementary, secondary, or special education master’s degree programs received. Students reported that they received little training in behavioral instruction, strategies, and related behavioral programs. Similarly, Westling (2010) found that only half of special education teachers (55%) and general education teachers (57%) reported they had adequate or extensive professional preservice training in classroom management. In terms of individual behavioral interventions, even fewer teachers reported that they felt sufficiently trained (Special Education Teachers = 45%; General Education Teachers = 36%). These findings suggest that teachers who are not confident in their training, may not feel they have adequate training in classroom management or to implement behavioral interventions effectively due to inadequate training. These teachers are more likely to require additional training and coaching when addressing student
disruptive behavior and dealing with issues for which teachers feel insufficiently trained is likely to be stressful.

**Teacher stress.** Stress negatively affects teacher career satisfaction (Collie et al., 2012) and working with children, especially in classrooms with higher levels of disruptive behavior. Teachers report that classroom discipline problems are a main cause of stress (Supaporn, Dodds, & Griffin, 2003, Collie, Shapka & Perry, 2012) and teaching has been identified as a very stressful career in general (Collie et al., 2012). Teachers are facing more demands, especially since the passage of the Individuals with Disabilities Education Improvement Act (IDEIA) in 2004, where many teachers are involved in the response-to-intervention (RtI) process. Increased levels of teacher stress may impact various areas of their professional practice, such as teaching and self-efficacy.

Teachers who reported high levels of stress (reportedly due to student misconduct) also reported low levels of classroom management self-efficacy (Klassen & Chiu, 2010; Zhai, Raver, & Li-Grining, 2011). When teachers are stressed, they may seek out resources to help decrease the stressors within the classroom (e.g., consultation). Consultation interventions, such as the Chicago School Readiness Program (CSRP; Zhai et al, 2011) and the Classroom Check Up (CCU; Reinke et al., 2008), provide teachers with training and additional support to implement evidence-based interventions and supplemental coaching to ensure interventions are implemented with fidelity. In addition, the CSRP offers stress-reduction services to teachers which include activities that help teachers change their perception of job control and social support (Zhai et al., 2011). Unfortunately, Zhai et al. (2011) found that after weekly consultation support was removed, teachers returned to feeling less confident in their abilities to implement
behavioral interventions. This suggests teachers feel more confident implementing interventions when support (e.g., consultation) is present and may return to baseline levels of confidence once support is removed (Zhai et al., 2011). It may also suggest that while teachers feel supported during consultation, they may not feel that they are gaining new skills in dealing with classroom management difficulties independently. Offering teachers additional training, that improves their knowledge-base for addressing challenging behaviors, not just support, may have a larger impact on their perceived self-efficacy. Since special education teachers (76%) and regular education teachers (81%) reported that they agreed or strongly agreed that challenging behavior increased their level of stress (Westling, 2010), lack of training and increased stress may greatly impact teacher performance and lead to professional burnout.

**Burnout.** Professional burnout refers to individuals ending their careers in a particular field due to the stressors that they associate with the career. Simply, they are unable to manage the stressors and lack the passion they once had to continue in the field. Maslach, Schaufeli, and Leiter (2001) identified three crucial dimensions of professional "burnout." Exhaustion is identified as a major contributor to stress which may lead to professional burnout. Exhaustion is not something that is simply experienced, but prompts the individual to remove or distance themselves emotionally and cognitively from work (assumably in order to deal with feeling overwhelmed). The second dimension of burnout is depersonalization. Depersonalization occurs when an individual distances themselves from one’s work by considering themselves detached objects of one’s work. They also tend to express feelings of cynicism, irritability, and negativity towards others (Maslach et al., 2001). The third dimension of burnout is lack of self-
efficacy. Self-efficacy refers to feeling accomplished or competent to effectively complete tasks or work related behaviors. Maslach et al. identified that lack of efficacy is related to the perception of limited resources to complete tasks or work related behaviors. According to Sakharov and Faber (1983), lack of self-efficacy due to burnout is most common in the helping professions, especially among teachers. Teaching is a profession known for high turnover due to teacher burnout and one of the contributors to burnout is managing disruptive student behavior (Ingersoll, 2002).

Evers et al. (2004) found that student's disruptive behavior is the largest contributor to teacher burnout and Ingersoll (2002) found that 25% of teachers left the field due to student discipline problems. Tsoupoupas et al. (2010) found that teachers who reported an increase in student discipline problems and a high level of emotional intensity stemming from student misbehavior were more likely to report high levels of emotional exhaustion. This supports the notion that teaching can be exhausting when needing to deal with increased levels of student misbehaviors. Klassen (2010) examined whether student discipline mediated job stress from student behavior and job satisfaction. He found that teachers who felt they were not effective at teaching and managing their classrooms reported higher stress levels and were less satisfied with their job. Teachers who reported they were dissatisfied with their job displayed lower job commitment and were more at risk to leave the teaching profession (Ingersoll, 2001). Ingersoll (2002) indicated that teacher turnover is costly, suggesting that it would be better to teach teachers strategies to decrease student problem behaviors rather than have teachers leave the field. Teaching teachers strategies to successfully manage student disruptive behavior is likely to improve teachers' overall classroom management skills, increase their
knowledge of behavior intervention, increase their confidence in dealing with student misbehavior, and combat teacher stress related to inadequately dealing with student disruptive behavior.

**Positive Behavior Intervention Supports**

School-wide Positive Behavior Interventions and Supports (SW-PBIS) is a proactive framework that enables schools to effectively and efficiently support students and professionals in the school by adopting evidence-based practices that influence positive teacher and student behavior (Farmer et al., 2006; Reinke et al., 2013; Sugai & Horner, 2002). The creation of SW-PBIS stemmed from that need to manage and control student problem behavior school wide. SW-PBIS has been associated with a decrease in office discipline referrals, an increase in instructional time within the classroom, and an increase in perceived school safety (Sugai and Horner, 2006).

SW-PBIS is a multi-systems framework that targets four areas for prevention and intervention: school wide, in the classroom, in non-classroom environments, and within individual students (Sugai et al., 2000). These four areas are targeted in SW-PBIS so that the entire school environment is supported and all teachers and staff emphasize prosocial and adaptive behavior universally across the school. This way prosocial student behavior is promoted whether students are riding the bus, eating breakfast in the cafeteria, receiving instruction in the classroom, or walking in the halls.

SW-PBIS also utilizes a three-tier approach that provides increasing support to promote prosocial behavior and academic success (Sugai et al., 2000). The primary, first tier provides universal support to all students and professionals across all settings within the school (e.g., establishing positively stated school rules, social skills teaching, and
developing a school-wide reinforcement system). The secondary tier is designed to support a targeted group of students who have not responded to the universal strategies. This is usually provided by intensifying supports available in the primary tier (e.g., promoting structured settings, increasing social skills instruction, and using positive reinforcement more frequently). The third tier focuses on students with significant problems and/or who have not responded to the first and second tiers of support. Compared to the first and second tiers, the third tier specifically offers individualized intervention plans for students that need immediate, intensive support and frequent progress monitoring (e.g., individualized social skills training, small group instruction, and high-quality feedback with one-on-one instruction). As mentioned previously, SW-PBIS emphasizes support universally, in the classroom, and individually. The next section will take a closer look at how SW-PBIS in the classroom is related to effective classroom management strategies.

**PBIS in the classroom.** Classroom management and Positive Behavioral Interventions and Supports (PBIS) go hand in hand. Effective classroom management is essential for supporting learning and teaching. Martella et al. (2012) indicated that effective classroom management includes the following: a) established rules and routines that are used to ensure students understand expected classroom behavior, b) a hierarchy of consequences for responding to appropriate and inappropriate behaviors, c) a classroom setting that facilitates student attention, learning, and reduces opportunities for students to engage in inappropriate behavior, and d) prevention strategies that prompt and teach students to behave appropriately in settings or situations where inappropriate behaviors are anticipated. Similarly, PBIS emphasizes that effective classroom
management and preventive school discipline needs to be integrated into academic instruction to endorse a positive and safe school environment to increase the rate of success for all students (Farmer et al., 2006). PBIS specifically emphasizes the following standards: 1) teacher expected student behavior is defined and taught (e.g., establishing classroom rules), 2) prosocial student behavior is acknowledged and 3) teachers respond to discipline problems in a consistent, fair manner (Anderson & Spaulding, 2007).

PBIS and effective classroom management strategies complement and are similar to each other because they emphasize similar standards. Newcomer (2009) indicated that effective behavior management should include: strategies to teach, review, monitor, and reinforce classroom expectations, a continuum of strategies to respond to appropriate behaviors, and a continuum of strategies to respond to inappropriate behaviors. These characteristics are also consistent with PBIS. For example, both PBIS and effective classroom management strategies are implemented with pre-established rules. PBIS teaches and promotes school-wide rules and integrates these rules into the classroom, while effective classroom management strategies emphasize rules specific to the classroom. Both PBIS and effective classroom management systems promote posting rules where students can easily see them. Also, within both systems, professionals provide students with the knowledge and training to prevent future inappropriate behaviors. Reinforcement of prosocial behavior is utilized within a school-wide system and within effectively managed classrooms to endorse appropriate behaviors. Both systems promote explicitly teaching students proactive skills and techniques so students are more likely to behave appropriately.
There are some differences between PBIS and effective classroom management. PBIS is different because PBIS emphasizes supports and techniques within all school settings, not just the classroom. Another difference between PBIS and effective classroom management is that PBIS emphasizes safety. Safety is not explicitly emphasized or endorsed with effective classroom management. Another difference between PBIS and effective classroom management is in the way PBIS encourages home-school and community collaboration. Particularly, PBIS promotes teachers and other educators to think about how they can support and facilitate parenting, learning at home, communicating, volunteering, and parent participation in decision making (Council for Exceptional Children, 2010; Epstein, 2002). Overall, PBIS (particularly when applied to the classroom) is very similar to effective classroom management. However, PBIS is broader in that it emphasizes universal/preventative school practices (along with effective classroom management) to promote a prosocial and safe school climate to ultimately maximize success for all students (Sugai et al., 2010).

The ideas behind PBIS in the classroom and effective classroom management are not new. As early as 1968, Hall, Lund, and Jackson (1968) argued that managing classrooms as a whole was a more practical strategy for teachers, rather than trying to manage students’ behaviors individually. Implementing multiple classroom individual interventions can be tiring and unattainable for teachers. Because of this, classroom-wide management systems (that target all students in the classroom) are a good choice for teachers and other professionals because they are cost effective and efficient. However, to stay current, classroom management systems should promote the three PBIS standards: 1) teacher expected student behavior should be defined and taught (e.g., establishing
classroom rules), 2) prosocial student behavior should be acknowledged and 3) teachers should respond to discipline problems in a consistent, fair manner (Anderson & Spaulding, 2007). The next section will review empirically-based classroom management strategies and how they coincide with the three PBIS standards.

The Good Behavior Game. The Good Behavior Game (GBG), an intervention utilized since 1969, is classified as an interdependent group contingency. Over the years the GBG has been modified and replicated across many educational settings (see Tingstrom, Sterling-Turner, & Wilczynski, 2006, for review). In their original study, Barrish, Saunders, and Wolf (1969) implemented the GBG in a fourth-grade class to determine if the GBG decreased disruptive behavior. The classroom was divided into two teams. Each group received a “mark” on the blackboard when a team member displayed disruptive behaviors or broke one of the specified classroom rules. The team with fewer marks or less than 5 marks on the board won the game and earned a privilege (e.g., received a 30 minute free period at the end of the day). The GBG is considered a response-cost procedure because if a team received more than 5 marks, privileges were taken away (e.g., needed to continue working while the team that won received a privilege). Since the teacher provided a mark on the board each time a team member broke a rule, the focus of the GBG was to identify problem behaviors. Results suggested that the GBG reduced disruptive behaviors such as talking and out of seat behavior (Barrish et al., 1969).

Research on PBIS emphasizes teachers reinforcing positive, adaptive, and appropriate behaviors (Farmer et al., 2006; Newcomer, 2009). When minimal punitive consequences are used, PBIS emphasizes that they must be used within a system based
on proactive practices of reinforcement, positive teacher student interactions, and active
supervision of the effects on student behavior (Newcomer, 2009). Specifically, punitive
consequences should only be used when evidence-based research (e.g., response/cost)
establishes its effectiveness and proactive strategies are intertwined. GBG differs from
PBIS standards because the GBG does not explicitly teach students how to act
appropriately. Instead, the teacher reacts to the students' inappropriate behavior. One
similarity between PBIS standards and the GBG is how teachers respond to inappropriate
behavior. PBIS standards emphasize that teachers should respond to discipline problems
in a consistent, fair manner. Although when using the GBG teachers do not identify
appropriate behaviors, they do respond consistently to disruptive or inappropriate
behaviors. Overall, the GBG is consistent with 1 of the 3 PBIS standards.

Positive behavioral interventions have become the golden standard when
approaching environments where negative behaviors need to be reduced (Sugai &
Horner, 2002). However, studies comparing whether it is more effective to identify
student disruptive behavior (e.g., correction) or student appropriate behavior (e.g.,
reinforcement) need further exploration. Wright and McCurdy (2013) compared the use
of the GBG and a positive variation called the Caught Being Good Game (CBGG).
CBGG is a classroom-wide intervention where a timer, goes off every 20 minutes, to
remind the teacher to award points to individuals on task. The CBGG awards points to
an entire group or team dependent on whether the students were on task or displaying
appropriate behavior when the timer went off (Swiezy et al., 1992). The GBGG is
different from the GBG because the CBGG awards points (i.e., to increase appropriate
behavior), instead of using points punitively (i.e., to decrease misbehavior). Wright and
McCurdy compared the GBG and CBGG to examine which was more effective in decreasing disruptive behaviors and increasing on-task behaviors (response cost/negative reinforcement v. positive reinforcement).

Results suggested that both the GBG and CBGG reduced disruptive behavior and somewhat increased on-task behaviors. In other words, both interventions were similarly effective. A major limitation with the Wright and McCurdy (2013) study is that the GBG and CBGG are interventions with different schedules of reinforcement. Teachers implementing the GBG identified inappropriate behaviors every time they were observed and, punishment was delivered (i.e., fixed interval). The CBGG used a timer (i.e., variable interval schedule) that signaled the teacher to scan the room and identify appropriate behaviors. It is unclear whether the decrease in disruptive behavior was due to the different schedules of reinforcement or the identification of appropriate behavior versus inappropriate behavior. This limitation makes it difficult to draw conclusions regarding whether a positive behavioral approach or a punitive (identifying inappropriate behaviors) approach is superior in decreasing student disruptive behavior.

The CBGG is more closely aligned with the PBIS standards. Unlike the GBG, when the CBGG is implemented teachers acknowledge prosocial or appropriate student behavior by awarding points to the team with students displaying appropriate behavior. This is consistent with PBIS standards because teachers are acknowledging prosocial student behaviors. Students who exhibited more inappropriate behavior and therefore do not reach the criterion, do not receive the reward. This is also consistent with PBIS standards because the program is implemented in a fair, consistent manner; the third PBIS standard. However, with both the GBG and CBGG, teacher expected behavior is
not clearly defined and taught. Teachers should not assume that students know how to act appropriately; the appropriate behaviors should be taught. The CBGG utilizes 2 of the 3 PBIS standards.

**The level system.** The Level System (Filcheck, n.d.; Filcheck, McNeil, Greco, & Bernard, 2004) is another classroom-wide approach intended to decrease student disruptive behavior. The Level System includes a token economy, response cost, rewards, and teacher attention to decrease disruptive classroom behavior (Filcheck, n.d.; Filcheck et al., 2004). Preliminary research suggests the Level System is a promising classroom-wide system for decreasing disruptive behaviors.

The Level System consists of a chart that is hung up in the classroom and has seven levels, layered on top of each other, with three zones. The three zones are “sunny,” “cloudy,” and neutral. Within the three sunny levels, the levels become progressively “happier” (i.e., smile faces) and within the three cloudy levels, the levels become progressively “sadder” (i.e., frown faces). The single neutral level is plain without any face. Each student in the class is assigned a specific shape with their name on it, such as a dinosaur or heart. The children’s shape is placed on the chart in the neutral area before the timed session begins. When a child displays appropriate behavior (i.e., follows pre-established rules) the teacher moves the student’s shape up from the neutral area into the sunny zone. On the other hand, if a student displays inappropriate behavior (i.e., breaks a classroom rule) the teacher moves their shape down a level. The child’s shape can be moved up and down multiple times within the session. At the end of the session (i.e., 1 hour) the teacher rewards children who are in the “sunny level.” Rewards are designed to take less than three minutes, be inexpensive, and most are activity-based (e.g., act like
your favorite animal, Simon Says). Three or four sessions can occur during the course of the day (Filcheck, n.d.; Filcheck et al., 2004).

When teachers were taught to use the Level System (Filcheck, n.d.; Filcheck et al., 2004), they were taught to attend to student appropriate behavior by using labeled or behavior-specific praise (BSP). For instance, when a child displayed appropriate behavior the teacher moved the student’s shape up a level and used BSP so that the child knew exactly what they did to have their shape move up to a higher level. BSP is when the teacher specifies the appropriate behavior in the praise statement (e.g., “I like how you were working quietly”). Brophy (1981) argued that BSP is more effective than general praise because the child makes a connection between their behavior and teacher approval.

Students displaying inappropriate behaviors were given a visual cue (e.g., V-Shaped hand signal) and a verbal warning (e.g., “If you do not stop getting out of your seat, I will move your shape down a level”). To decrease the potentially reinforcing value of teacher attention, the teachers used monotonous speech while giving students warnings. If the student continued to display inappropriate behavior, then their shape was moved down a level. For students displaying severe misbehaved (e.g., kicking another student), the student’s shape was moved down a level immediately (without a verbal or visual warning).

The original Level System study (Filcheck, n.d.) utilized a single-case withdrawal design, ABAB, to evaluate the Level System’s effectiveness on increasing appropriate classroom behaviors. Condition B was the implementation of the Level System. The Revised Edition of School Observation Coding System (REDSOCS; Jacobs et al., 2000) was used by observers to measure disruptive classroom behavior. Four target students
(two who were considered disruptive and two who were considered typically behaving) were observed for approximately 15 min during morning structured activities. Overall, students' appropriate behavior increased when the Level System was implemented, decreased slightly during the withdrawal phase (but remained more similar to intervention rates compared to baseline), and increased to previous intervention rates or higher during the second implementation of the Level System.

Teachers completed satisfaction ratings at the end of each condition and at the follow-up assessment. Teacher satisfaction ratings of the Level System increased slightly throughout implementation of the intervention, however individual ratings varied. In addition, teachers chose to not use the Level System at follow up as their classroom management strategy. This may have been due to the fact that the children behaved more appropriately during the withdrawal phase than baseline, and the teachers may have considered the reimplementation of the Level System unnecessary (Filcheck, n.d.).

Several limitations were identified in this study. First, during baseline the level of inappropriate behaviors did not reach stability for all of the target students. It is important for baseline levels of behavior to be stable; otherwise it is unclear whether the implementation of the intervention caused the changes to the dependent variable. A major limitation of this study was that when the withdrawal phase was implemented, disruptive behavior did not return to baseline levels. Instead, disruptive behavior remained more similar to intervention rates. Because disruptive behavior did not return to baseline levels, it is difficult to conclude that the intervention is controlling or influencing student behavior. On the other hand, it could be argued that once the teacher learned to use BSP with students (despite no longer using the Level System) she may have continued to use
praise during the withdrawal condition. This was supported in that the teacher's use of praise did not return to baseline levels during the withdrawal phase. In fact, teacher praise increased, thus the increase in teacher praise may have reinforced students' appropriate behavior and decreased inappropriate behavior.

Filcheck et al. (2004) studied the efficacy of the Level System by comparing the Level System to Parent-Child Interaction Therapy (PCIT) and the impact of these interventions on decreasing student disruptive behavior. According to Filcheck et al. an ABACC′ design was utilized. Condition B was the Level System, C was the Child-Directed Intervention (CDI), and C′ was the Parent-Directed Interaction (PDI) phase. CDI and PDI make up the two components of PCIT. One teacher participated in the study and was trained on the Level System and PCIT. A frequency count of inappropriate behavior exhibited by any child in the class was recorded via videotape using the School Observation Coding System (SOCS; McNeil, Eyberg, Eisenstadt, Newcomb, & Funderback, 1991). Filcheck et al. found that inappropriate behavior decreased throughout the study. Inappropriate behavior decreased when the Level System was implemented and then further decreased when PCIT was implemented. Teacher satisfaction ratings indicated that the teacher reported she was the most satisfied using the PCIT skills, rather than the Level System even though she chose to utilize the Level System at the end of the study.

Similar to the results in the Filcheck (n.d.) study, disruptive behaviors did not return to baseline levels during the withdrawal phase. As mentioned previously when reviewing the Filcheck (n.d.) study, disruptive behaviors may have not returned to baseline levels because the teacher learned to praise students effectively. Therefore, even
though the intervention was “withdrawn” the teacher may have continued to praise and this may have influenced student behavior. Similarly to the Filcheck (n.d.) study, Filcheck et al. (2004) reported that teacher praise increased when both interventions were implemented and remained higher than baseline levels, even during the withdrawal phase. Praise findings from both of these studies suggest that once teachers are taught to increase their use of praise with students, it may be hard for them to stop using praise.

Based on the studies reviewed (i.e., Filcheck, n.d.; Filcheck et al., 2004), the Level System incorporates two PBIS standards: 1) prosocial student behavior is acknowledged and 2) teachers respond to discipline problems in a consistent, fair manner. Prosocial student behavior is acknowledged by using BSP and moving the child’s shape up a level. Secondly, each child’s behavior is monitored individually in a fair, consistent manner and the same set of rules for earning or not earning activity rewards apply to all students. The Level System did not include defining and teaching students appropriate classroom behavior explicitly, the third PBIS standard. The Level System allows for students in the classroom to observe other children receiving praise and moving their tokens, which models appropriate behavior and positive consequences, however, appropriate behavior is not directly taught. Similarly teachers are taught to use BSP which is thought to help children make learning connections between appropriate behavior and positive consequences. However, teachers are not explicitly teaching the appropriate behaviors students should demonstrate or how to demonstrate those behaviors. Therefore, the Level System meets 2 of the 3 PBIS standards.

**The Caterpillar Game.** The Caterpillar Game is a classroom-wide intervention that was inspired by the Level System (Filcheck, n.d.). Preliminary research suggests that
the Caterpillar Game may effectively reduce disruptive behaviors in the classroom (Floress et al., in press). A multiple baseline across settings design was used to examine the effectiveness of the Caterpillar Game on disruptive student behavior in a first-grade classroom. Before implementation of the Caterpillar Game, the 1st grade teacher was taught how to provide differential reinforcement of alternative behavior (DRA; Athens & Vollmer, 2010). Specifically, the teacher was taught how to distinguish between inappropriate and appropriate behaviors, in which an emphasis on reinforcing appropriate behaviors was identified and minor inappropriate behaviors were ignored.

The Caterpillar Game consisted of a 12 x 36 inches long visual chart. This chart consisted of a picture of a caterpillar with seven body segments and a head, and a Velcro butterfly token. The chart was hung up during three settings within the classroom where the students could easily view it; Carpet Time, Seat Work Activity 1, and Seat Work Activity 2. When the Caterpillar Game was implemented, the teacher moved the butterfly token upwards, toward the head, when a student or multiple students engaged in appropriate behaviors. Similarly, the teacher moved the butterfly token down, towards the tail, when a student broke an established classroom rule. When the butterfly token reached the head of the caterpillar the classroom, as a whole, earned a quick reward (e.g., Eye Spy) to reinforce appropriate classroom behavior. After participating in the activity, the butterfly token returned to the bottom of the caterpillar so students could earn their way up to the top of the caterpillar again during the next session. Another requirement of the Caterpillar Game was that the teacher was trained to praise students using BSPs at a rate of three praises per 10 minutes. This particular rate was selected after Floress et al. (in press) observed a variety of classrooms and found very low levels of teacher praise.
Three praises per 10 minutes was selected because it was likely to increase teachers' natural rate of praise without disrupting teaching.

Floress et al. (in press) measured changes in student disruptive behavior through a modified version of the REDSOCS (Jacobs et al., 2000). The impact of the Caterpillar Game on teacher praise was also assessed by measuring changes in teacher praise. The frequencies of the teachers' use of behavior-specific and general praise were recorded during each observation period. Floress et al. (in press) reported that disruptive behaviors decreased after the Caterpillar Game was implemented in each setting and remained low throughout the remainder of the study. Floress et al. also reported large effect sizes across each setting, suggesting that the intervention effectively decreased disruptive behavior. Teacher praise also increased when the Caterpillar Game was implemented. During the maintenance phase (i.e., eight weeks after teacher support or aid in the implementation of the Caterpillar Game was removed) low levels of disruptive behavior and high levels of teacher praise remained. Teacher satisfaction results indicated that the teacher was highly satisfied with the Caterpillar Game and indicated that she would continue to use the Caterpillar Game in her classroom.

One of the important aspects of the Floress et al. (in press) study was that experimental control was demonstrated through the use of a multiple baseline design. Considering the difficulty with experimental control with previous Level System studies (Filcheck, n.d.; Filcheck et al., 2004), it appears that using a multiple baseline design when teaching teachers to increase their use of praise may be advantageous. Specifically, in previous studies (Filcheck, n.d.; Filcheck et al., 2004) after teaching teachers to use praise, their use of praise did not return to baseline levels during the withdrawal
conditions. One reason for this could be that teaching teachers to praise is something that cannot be “unlearned,” similar to learning to read or riding a bike. In addition, many teachers may not be willing to stop praising students if they have observed a direct benefit of praise on improving student behavior. Therefore, when teaching teachers how to increase their use and type of praise a multiple baseline design should be used over an ABAB withdrawal design.

Limitations of the Floress et al. (in press) study include potential experimenter bias, the lack of interobserver agreement (IOA), and the sampling of student disruptive behavior. It is possible that the researcher may have unintentionally influenced data collection because disruptive behavior, teacher praise, and treatment integrity data were all collected by the second author. The second author was also not blind to the conditions of the study (i.e., knew when the teacher was trained, knew when each setting was introduced to the intervention) and she could have been unintentionally bias in her data collection.

Another limitation of the Floress et al. (in press) study is the lack of IOA data. IOA of students’ disruptive behavior, teacher praise, and treatment integrity were assessed only during the maintenance phase of the experiment. During the maintenance phase, IOA was above 71% across all settings for disruptive behavior (range 87% - 98%) and teacher praise (range 71% - 83%). Future replication of the Caterpillar Game should include IOA across all settings for all measures.

Another limitation is in how students were randomly selected for disruptive behavior observations. During each observation three students were randomly selected from a hat and those students were observed for the entire 10 minute observation period.
For the next observation, the previously observed three student names were placed back into the hat and three names were drawn. Because only three students were observed during each 10 minute observation, it is possible that there was not an accurate measure of classroom-wide disruptive behavior. For instance, by chance, the students selected may have been students who exhibited few disruptive behaviors. Future studies might sample a wider range of students during each observation. For instance, 10 students might be observed during each observation for one minute.

The Caterpillar Game utilizes two standards of an effective PBIS system: 1) prosocial student behavior is acknowledged and 2) teachers respond to discipline problems in a consistent, fair manner. The use of BSP was utilized to identify appropriate student behaviors within the classroom, which promotes prosocial behaviors. Also, within the time allotted, the teacher responds consistently and fairly to appropriate and inappropriate behavior by moving the token up or down dependent on the children's behavior. Arguably, the Caterpillar Game touches on the third PBIS standard, defining and teaching students appropriate behavior (e.g., teacher holds up her hand when an inappropriate behavior is observed and briefly states which rule was broken). However, it is performed in a reactive manner and more could be done to teach students what appropriate behaviors are expected of them proactively. Overall, this study provided preliminary support for the Caterpillar Game decreasing classroom disruptive behavior and increasing teacher use of praise.

**Purpose of Study and Hypotheses**

Student disruptive behavior takes time away from teacher instruction, and in highly disruptive classrooms it may be difficult for teachers to manage student
misbehavior with separate plans for individual students. Therefore, effective class-wide management systems have the potential to efficiently and effectively manage all students' behavior. The effectiveness of three class-wide management systems (the Good Behavior Game, the Level System, and the Caterpillar Game) were reviewed along with how they align with the three PBIS standards (see Appendix A for a summary of the interventions reviewed). Particular study limitations call for further research, especially with the Caterpillar Game, which has only been examined experimentally once. Based on past methodological difficulties with experimental control (Filcheck, n.d.; Filcheck et al., 2004) future studies evaluating the effectiveness of the Caterpillar Game should not use an ABAB withdrawal design. In the original Caterpillar study (Floress et al., in press) experimental control was demonstrated using a multiple-baseline design across settings. This design is advantageous because it does not withdraw treatment; rather the multiple-baseline design demonstrates experimental control by showing that behavior change occurs repeatedly once the intervention is introduced in each setting, behavior, or individual (Kazdin, 1982). Because the Caterpillar Game teaches teachers how to praise, a multiple-baseline design is recommended because it is likely that teachers cannot "unlearn" how to praise or may be unwilling to stop praising after finding it effectively reduces student disruptive behavior. Therefore, using a multiple baseline design may eliminate some methodological concerns other studies have reported using ABAB withdrawal designs.

The ease of intervention implementation likely influences whether or not teachers choose to implement an intervention. Teacher satisfaction with the Level System has varied. Filcheck (n.d.) found that teacher satisfaction of the Level System increased
throughout the implementation of the intervention, and Filcheck et al. (2004) found that
the teacher was more satisfied with her typical classroom management strategies than the
Level System. Tiano, Fortson, McNeil, and Humphreys (2005) indicated that compared
to previously implemented classroom management strategies and a response cost version
of the Level System, the Level System was more time consuming. This was due to each
student having their own icon and each icon needing to be moved up and down
frequently. The Caterpillar Game (Floress et al., in press) sought to improve these
concerns by modifying the Level System into a streamlined intervention with one icon.
Initial teacher satisfaction appeared positive, as the teacher from the Floress et al. study
reported that she was very satisfied with the Caterpillar Game, continued to use the
Caterpillar Game after the study was complete, and that her students enjoyed the
Caterpillar Game. Having one icon or token for the entire class may be more appealing to
teachers because they do not need to spend time moving tokens up and down for each
student. This information provides support to further study the Caterpillar Game, since
teachers are more likely to implement interventions they are satisfied with (Dart, Cook,

Since the Floress et al. (in press) study was the first and only study to have
examined the effects of the Caterpillar Game, more research is needed. Replication of the
previous findings is important to verify the efficacy of the Caterpillar Game. To do this,
the current researcher implemented the Caterpillar Game across different classrooms and
examined the effects on decreasing student disruptive and off-task behavior.

Additional changes were made to the current study to improve upon the Floress et
al. (in press) study. In the original study the second author collected all of the data
independently. Furthermore, she only collected IOA for students’ disruptive behavior, teacher praise, and treatment integrity during the maintenance phase. The current study sought to improve upon the Floress et al. (in press) study by training observers (who are blind to the conditions of the study) to collect data. In addition, IOA was collected with at least 30% of all observations in each condition. These changes improved upon potential experimenter bias and helped ensure the data collected was valid and reliable.

The current study also sought to obtain a wider sample of class-wide disruptive behavior. In the original study (Floress et al., in press) randomly selected three students from a hat and observed all three students for 10 minutes. The current study intended to randomly select 10 different students, each observation period, and observe each student for one minute. This process will hopefully provide a better measure of class-wide disruptive behavior because more students were observed each observation session, thereby capturing a more representative sample of student behavior class-wide.

As touched upon previously, the Caterpillar Game (Floress et al., in press) utilizes 2 of the 3 PBIS components: 1) prosocial student behavior is acknowledged and 2) teachers respond to discipline problems in a consistent, fair manner. However, the Caterpillar Game does not explicitly define and teach students appropriate behavior. In order to ensure that the Caterpillar Game is consistent with all three PBIS components the following changes were made to the Caterpillar Game. In the current study, the teacher was trained to teach (e.g., define and model) appropriate student behavior (e.g., listening quietly, raising one’s hand quietly, etc.) and reviewed the classroom rules each day before the Caterpillar Game was implemented. Adding this to the Caterpillar Game ensured
students were taught to exhibit appropriate behaviors in the classroom and that the Caterpillar Game is consistent with PBIS standards and therefore best practice.

The final change to the previous study (Floress et al., in press) included examining changes in teacher stress. As mentioned previously, working with disruptive children is a source of stress for teachers (Westling, 2010) and is related to poor career satisfaction (Collie et al., 2012). Teachers who report high levels of stress, due to student misbehavior, also report low levels of classroom management self-efficacy (Klassen & Chiu, 2010; Zhai, Raver, & Li-Grining, 2011). Therefore, it is possible that teaching teachers how to implement an intervention (e.g., the Caterpillar Game) that decreases student disruptive behavior may in turn reduce teacher stress. If this is supported, future studies could look at other long term outcomes, such as the effects on teacher burn out.

The purpose of the current study is to examine the effects of the Caterpillar Game on elementary-aged students' disruptive behavior. Specifically, this study intended to replicate previous research (Floress et al., in press) suggested the Caterpillar Game is an effective class-wide intervention for decreasing disruptive behavior and increasing teacher BSP. It is hypothesized, based on previous findings, the Caterpillar Game will decrease disruptive classroom behavior in elementary-aged students and increase teacher BSP. In addition, this study examined whether the Caterpillar Game influences teacher stress. It is hypothesized that the Caterpillar Game will reduce teacher stress.

Methods

Participants

Early childhood through second grade teachers were recruited for the current study. Participants included three classroom teachers from three different schools located
in Central Illinois. Each teacher was interested in learning a classroom management system to decrease student disruptive and off-task behavior. The teacher from classroom 1 taught 2nd grade, general education students. She had 31 years of teaching experience and was 50 years old. The teacher from classroom 2 taught a class that included both preschool and kindergarten special education students. She was 28 years old and had 3 years of teaching experience. The teacher from classroom 3 taught kindergarten general education students and was 39 year old. She had 13 years of teaching experience. Student participants (across all three classrooms) included approximately 60-65 students ranging from 4 to 8 years of age.

In classroom 1, there were 18, 2nd grade students who ranged from 7-9 years of age. According to Illinois Report Card (illinoisreportcard.com), 70% of students attending this school were considered low income. Approximately 85.7% of the students were White, 3.6% Black, 5.6% Hispanic, 0.3% Asian, 0% American Indian, 4.8% two or more races, and 0% Pacific Islander. In classroom 2, there were 9 preschool or kindergarten students who ranged from 4-6 years of age. All of the students in this classroom were receiving special education services. Approximately 49.1% of students attending this school were considered low income. Student demographics included 97.6% White, 0% Black, 0.3% Hispanic, 0.3% Asian, 0% American Indian, 1.6% two or more races, and 0.3% Pacific Islander. In classroom 3, there were 22 kindergarten students who ranged from 5-6 years of age. Approximately 59.3% of students attending this school were considered low income. Student demographics included 85% White, 9.7% Black, Hispanic 0.9%, Asian 0.4%, American Indian 0.4%, Two or More Races 3.5%, Pacific Islander 0%. 
For a classroom to be included in this study, class-wide disruptive behavior needed to be observed during 25% of the observation intervals (on average) during the first three observations. Classrooms were also included if the baseline data were variable, but did not meet the 25% disruptive and off-task criteria (see classroom 3).

Settings

Teacher training took place in the classroom when the teacher was free from other classroom responsibilities (e.g., before or after school). The implementation of the Caterpillar Game, as well as observations of student disruptive and off-task behavior and teacher praise, took place in the classroom during regular school hours.

Materials for the Teacher

Caterpillar Game. The Caterpillar Game consisted of chart (24 x 36 inches) that contained a caterpillar with seven body segments and a head and a Velcro butterfly token (Appendix B). The chart was hung up in the front of each classroom where all children could easily view the chart. The teacher was instructed to move the butterfly token up or down one of the seven body segments when appropriate or disruptive behaviors were displayed by students in the classroom. If the token reached the caterpillar’s head, the whole class participated in a reward activity, with the intention of reinforcing students’ appropriate classroom behavior.

Reward cards. Reward cards consisted of short, fun activities which were used to determine the reward activity students earned for moving the butterfly token to the head of the caterpillar. The teachers were given a menu of reward activities and asked to choose 5-10. The reward cards were different for each classroom, because teachers chose activities that fit their classroom specifically (i.e., activities they wanted to make
available to students, and activities their students would enjoy). See Appendix C for an abbreviated menu of reward cards that teachers selected from. The teachers selected a random student that was following classroom rules and expectations to draw a card to determine the reward activity.

**Teacher satisfaction.** The teacher satisfaction measure was developed and used in the Floress et al. (in press) study was used to assess the teachers’ acceptability of the Caterpillar Game (Appendix D). It also assessed the teachers’ satisfaction with the researcher (i.e., person teaching the intervention). The measure included 15 items that were answered based upon a 6-point Likert scale (e.g., 1 indicates “I do not agree” and 6 indicates “I do agree”). Some of the items were reversed scored. The responses to the items were totaled. A larger raw score indicated greater satisfaction and a smaller raw score indicated less satisfaction. The author of this study added two questions to the original teachers’ acceptability form used by Floress et al. (in press) to gauge whether the Caterpillar Game was easy for the teachers to learn and if the students liked the Caterpillar Game (see * in Appendix D for added questions).

**Teacher stress.** The Teacher Stress Inventory (TSI) is a 49 item scale (Fimian, 1984; see Appendix E). Each of the items are evaluated on a 5 point Likert-scale from 1 (no strength or noticeable), to 5 (major strength or extremely noticeable). The TSI consists of 10 scales that identify the sources of stress related to teaching and how stress is displayed. Five of the scales purport to measure source of stress: Time Management, Work-Related Stressors, Professional Distress, Discipline and Motivation, and Professional Investment. Five of the scales purport to measure manifestation of stress: Emotional Manifestations, Fatigues Manifestations, Cardiovascular Manifestations,
Gastronomical Manifestations, and Behavioral Manifestations. Each scale includes 3 to 8 questions. To score the TSI, each subscale is summed and divided by the number of items in the subscale to obtain the mean. To calculate the overall score, the subscale means are added and divided by 10. The overall score provides a collective measure of teacher stress. To interpret the meaning of the overall score, cut-off scores are utilized. A score of 3.28 or above = *Significantly Strong*, indicating significant stress. A score of 1.94 to 3.27 = *Moderate*, indicating a moderate amount of stress and a score of 1.93 or below = *Significantly Weak*, indicating little or no stress.

There is research to support the validity and reliability of the TSI (Fimian & Fastenau, 1990). Fimian and Fastenau (1990) had 3,401 teachers complete the TSI. Factor analysis using varimax and oblique rotations found that the total stress (i.e., 10 subscales) accounted for 58% of the total variance. In other words, all 10 factors were verified as individual factors that contributed to the total stress score. All items exceeded the .35 loading criterion and all but two items exceeded .40. This gives support for the validity of this measure. In addition, the TSI is a reliable measure. Cronbach’s alpha for the entire scale was .93. This research supports the use of the TSI to measure overall teacher stress.

**Materials for the Observer**

**Student behavior observation form.** The student behavior observation form (Appendix F) measured students’ disruptive behavior and was adapted from the Revised Edition of the School Observation Coding System (REDSOCS; Jacobs et al., 2000). The student observation form measured 13 categories of disruptive behavior including: whining, crying, yelling, destructive behavior, aggressive behavior, negativism, self-stimulation, demanding attention, inappropriate behavior, talking out of order, being out
of area, cheating, and off-task (Refer to Appendix F for definitions). The student observation form was divided into 10 second partial intervals making up a 10 minute observation. After six, 10 second intervals (i.e., each minute of coding), there was a 10 second break, where no coding occurred.

Disruptive behavior was collected in all three classrooms. Before each observation, the observer picked a random number (e.g., 1-5), then “counted off” the students using the number selected starting with the student closest to the classroom door. For example, if the number 3 was chosen, the observer counted down the student rows to the third desk and observed that child, then the next child that was seated in the third desk after that. Prior to the observation, the observer wrote down a physical characteristic (e.g., red shirt, glasses, orange bow) above the observation intervals to keep track of which child was to be observed. Each child selected was observed for 1 min (six, 10-second partial intervals) and a total of 10 students were observed during each observation. If the observed student engaged in disruptive behavior at any point during the observation interval, the corresponding interval was marked. There were 13 disruptive behavior categories (see Appendix F). Disruptive behavior was only counted once for each interval, even if multiple disruptive behaviors were observed. An overall percentage of intervals where disruptive behavior occurred was calculated.

**Teacher behavior observation form.** The teacher observation form (Appendix F) was embedded within the student behavior observation form, so that the observation of both students and teacher was efficient. The teacher observation form measured the teachers’ use of praise. The frequency of behavior-specific and general praise was recorded during the same 10 minute observation session in which disruptive behavior was
observed. General praise was identified when the teacher gave a nonspecific statement admiring the student (e.g. “Good work!” “You are doing great!”). BSP was identified when the teacher specified the appropriate behavior in the praise statement (e.g., “I like when you raise your hand!” “I was happy that you sat at your desk quietly!”). A final frequency of behavior-specific, general, and total praise was recorded for each observation throughout the study.

**Treatment integrity form.** The observer assessed treatment integrity by answering seven questions related to the teacher’s fidelity in the implementation of the Caterpillar Game (Appendix G). The seven questions included: 1) Did the teacher hang the Caterpillar chart in an area where all children can see it? 2) Did the teacher define and teach at least one appropriate behavior prior to the start of the Caterpillar Game starting? 3) Did the teacher make it clear to all children that the Caterpillar Game is starting? 4) Did the teacher deliver BSP each time she moved the token up a segment (closer to the caterpillar head)? 5) Did the teacher use a minimum of 3 BSPs during the 10 min observation? 6) If a student broke a classroom rule, did the teacher give a visual signal, briefly state the rule that was broke, and move the butterfly token down a segment (further from the caterpillar head)? 7) At the end of the activity, if the butterfly token was at the caterpillar head, did the teacher reward the children using a reward activity (i.e., draw a reward card)? The observer indicated whether the seven treatment integrity questions were observed during the observation sessions. If all seven items are observed, then 100% treatment integrity was achieved.
Dependent Variables

**Disruptive behavior.** Disruptive behavior was measured by adding the total number of intervals where disruptive behavior was identified, dividing by the total number of intervals observed and multiplying by 100 (Appendix F). Operational definitions for 12 of the 13 types of disruptive behavior were adapted from the Revised Edition of the School Observation Coding System (REDSOCS; Jacobs et al., 2000) and located in Appendix F. Off-task was one of the 13 types of disruptive behavior and was identified when the child was looking away from his/her desk work or looking away from the teacher at the front of the class, or looking away from teacher instruction (e.g., smart board). Examples include, staring at the ceiling or looking at a visitor in the class, or staring off where the student’s eye gaze is not directed toward their work, the teacher, or instruction.

Overall disruptive behavior was calculated by counting the number of intervals that disruptive behavior occurred during the observation, dividing that number by the total number of intervals (i.e., 60), and then multiplying by 100. This produced the percentage of intervals where disruptive behavior occurred.

**Teacher behavior-specific praise.** Although general praise and BSP were collected during the classroom observations the focus was placed on reporting BSP because the BSP is commonly cited as superior in influencing student behavior compared to general praise (Brophy, 1981). Changes in teacher BSP was measured using the teacher observation form (which is embedded within the student observation form; Appendix F). BSP occurred when the teacher specified the appropriate behavior in the praise statement (e.g., “I like how you raised your hand!” “You did a great job showing me that you all..."
can be quiet!"). The frequency of the behavior-specific praise was recorded during each 10 minute observation period. This produced the rate of behavior-specific praise used by each teacher during a 10 min observation period.

**Teacher stress.** Changes in teacher stress were measured using the Teacher Stress Inventory (TSI; Appendix E). To score the TSI, each subscale was summed and divided by the number of items in that subscale to obtain a mean. To obtain the overall score, the subscale means were added and divided by 10. The overall score provided a collective measure of teacher stress. The overall score was used to measure change in teacher stress before and after the implementation of the Caterpillar Game.

**Independent Variables**

**Caterpillar Game.** The only independent variable in this study was the Caterpillar Game. The Caterpillar Game is used in the classroom throughout the day. Specifically, the Caterpillar Game was visible (e.g., in the front of the classroom) to the students at all times during implementation. Specific implementation of the Caterpillar Game is explained in the Procedures section (see Training).

**Procedures**

Elementary schools in the Midwest were contacted and permission to implement the Caterpillar Game was sought from school administrators and Institutional Review Board (IRB) approval was obtained before teachers were recruited. Recruitment of teachers took place by e-mailing elementary teachers in the Midwest to see if they were interested in implementing a new class-wide intervention. Before the study began, informed consent was obtained from teachers (Appendix H) and passive consent was obtained from parents of students (Appendix I) in the teacher’s class. If a parent indicated
they did not want their child to be involved in the study, their child was not observed. In other words, no disruptive or off-task behavior was collected on those students. A total of 2 students were not included in the data collection out of the 3 classrooms observed. However, all students received the Caterpillar intervention because the teacher had decided to incorporate the Caterpillar Game into her classroom to manage class-wide behavior. To ensure confidentiality, each teacher was assigned a number which was used to identify all data collected for that classroom. No identifying student information was collected. At the end of the study, the teachers kept the Caterpillar Game materials. No other incentives were given for participation in this study.

The study consisted of a primary researcher, who implemented the intervention with the teachers, assisted with observational data collection, and assisted with IOA data collection. Four research assistants (three undergraduate and one graduate) were also trained to collect direct observations and assist with IOA data collection. Along with the primary researcher, the four research assistants were trained to collect systematic behavioral observations in classrooms. Each observer was trained to collect observation data by reviewing operational definitions for coding teacher praise and student disruptive behavior, discussing examples and non-examples of student and teacher codes, and watching teacher and student videos to practice and discuss correct coding. Prior to collecting direct observation data the observers needed to obtain at least 80% inter-observer agreement (IOA) with an observer who had previously been trained by the research supervisor for at least two observations for each variable (i.e., two student observations and two teacher observations).

**Design.** A nonconcurrent baseline design across settings (e.g., Classroom 1,
Classroom 2, and Classroom 3) was used to measure the effectiveness of the Caterpillar Game on student’s disruptive behavior. Teachers’ use of praise (e.g., behavior-specific and general) was recorded during classroom observation sessions in each classroom. To be included in the study each classroom needed to meet inclusionary criteria. If inclusionary criteria were met the data was used as part of that classroom’s baseline data. At this time the primary researcher assessed and determined that the disruptive behavior definitions (see Appendix F) covered all the disruptive behaviors observed by students in each of the classrooms and therefore no changes to the definitions were made.

**Baseline.** During baseline data collection, the teacher was instructed to conduct classroom instruction without training on the Caterpillar Game. Baseline disruptive student behavior was established by randomly observing 10 students during the observation period with the student observation form and definitions (Appendix F). Before each observation period, the primary researcher randomly selected a number (e.g., 1-5) to determine which students would be observed that day (see section on Student Observation Form for more information). A total of 10 students were observed during each 10 min observation to obtain the percentage of disruptive behavior intervals observed. Baseline data was collected across each classroom until disruptive behavior stabilized or an increasing trend was observed. Baseline data for Classroom 3 was the least stable, which was why intervention was introduced to this classroom last. During baseline the observers also recorded the frequency of teacher praise (e.g., behavior-specific and general) using the teacher observation form.

**Training.** Each teacher was trained in a one-on-one session in her classroom with the primary researcher using the following 5 training steps: 1) goals for intervention 2)
how to praise 3) how to teach appropriate behavior 4) how to implement Caterpillar Game 5) how to implement reward activity (Appendix J).

**Step 1: goals.** First the researcher explained the goals for the intervention to the teacher. The Caterpillar Game had three goals: 1) reduce inappropriate classroom behavior, 2) increase appropriate classroom behavior, and 3) increase positive interactions between the teacher and students. These goals were explained to the teacher to further clarify the intent and goals of the Caterpillar Game.

**Step 2: praise.** Next, the primary researcher taught the teachers how to use praise by teaching how to differentially attend to appropriate behaviors, teaching the definitions for behavior-specific and general praise, modeling each type of praise, and lastly modeling the use of praise while demonstrating how to move the token up and down on the Caterpillar Game. To teach teachers how to differentially attend to student appropriate behaviors, teachers were trained to provide differential reinforcement of alternate behavior (DRA). Specifically, the teachers identified and attended to students’ appropriate behavior (e.g., raising hand before speaking, or sitting quietly at their desk). Next teachers were taught to use behavior-specific and general praise using DRA. The teacher was taught that general praise vocalizes approval in an unspecific manner (e.g., “Great work!” “You did awesome!”) and BSP provides the student specific approval (e.g., “I like how you sat quietly at your desk!,” “I am proud of you for raising your hand!”). The use of both behavior-specific and general praise were modeled for the teacher and the teacher was asked to demonstrate using each type of praise. The teachers were then taught how to use DRA for appropriate behavior in conjunction with the Caterpillar Game. Praise criterion developed by Floress et al. (in press) was used (for an
explanation of how this criterion was determined see Floress et al.'s Caterpillar Game previously reviewed). Teachers were taught to deliver three BSPs per 10 minutes.

**Step 3: appropriate behavior.** Teachers were taught how to teach students to use appropriate behaviors in the classroom. The primary researcher shared some common appropriate behaviors that the teacher may want to teach, but also offered to add to the list if there were specific appropriate behaviors that the teacher indicated would be helpful for the students in her class to learn. After discussing and deciding on a list of appropriate behaviors (see Appendix K for an example) the researcher showed the teacher the steps involved in teaching the class how to demonstrate the appropriate behaviors. The researcher explained to the teacher that at least one appropriate classroom behavior would be taught each time the Caterpillar Game was played. Therefore, if the Caterpillar Game was played twice in one day, two appropriate behaviors were taught over the course of that day. The primary researcher taught the teacher how to define and teach appropriate behaviors by explaining the procedure in detail and modeled how to correctly teach the appropriate behaviors. Teachers were taught to follow 5 steps when teaching students how to use the appropriate behaviors: 1) the teacher were taught to announce that he/she was going to teach an appropriate behavior, 2) the teacher would tell the class why the appropriate behavior was important, 3) the appropriate behavior steps were provided as a guide for the teacher to define the steps of the appropriate behavior (see Appendix K), 4) the teacher provided a model of the appropriate behavior, and 5) the teacher used BSP to praise a student(s) for demonstrating the behavior taught.

**Step 4: Caterpillar Game.** Teachers were instructed by the primary researcher how to implement the Caterpillar Game. The teachers were provided with the Caterpillar
Game poster, the primary researcher gave an overview on how to implement the Caterpillar Game, and the primary researcher physically showed the teacher how to move the token up or down the segments. First, the teachers were taught that they needed to announce to the class that the Caterpillar Game was beginning. The teachers understood that they needed to make the announcement twice a day during whole-class instruction time (i.e., once in the morning and once after lunch time). The Caterpillar poster was hung up in an area where all the students could easily view it from any setting within the classroom. Teachers were encouraged to move the poster if the class moved to an area where the poster was difficult to view. So that this was possible, Velcro was affixed to the back of the Caterpillar posters, making it portable from one classroom setting to another (if needed). The primary researcher explained and modeled how and when to move the token on the Caterpillar poster. The teachers were instructed how to move the token up one segment when she observed students demonstrating appropriate behavior(s). Also, the teacher used BSP to identify the specific appropriate behavior demonstrated. The teachers were taught to move the token down when she observed a child break a classroom rule (i.e., demonstrate inappropriate behavior). This was done by having the teacher give a visual signal (e.g., hand-up in a stop position) and a verbal warning. While stating the warning, the teacher used an uninterested tone to reduce the possibility of providing the child with the value of teacher attention. If the student continued to display inappropriate behavior, the butterfly token was moved down a level without warning and the teacher stated the rule that was broken. Teachers were told that for students who displayed severe misbehavior (e.g., kicking), the shape was moved down a segment immediately, without verbal or visual warning, however severe behavior was never
observed. It was emphasized that the focus of the Caterpillar Game was to reinforce appropriate behaviors, not disruptive classroom behaviors. Therefore, the teacher was instructed to move the token down only when needed.

**Step 5: reward activity.** The teacher was taught how the reward activity should be implemented. Moreover, when the butterfly token reached the top or head of the caterpillar the entire class participated in a reward activity once the classroom activity or independent classroom work was completed. The teacher drew a reward activity card randomly from the pile of cards and instructed the class to participate in the short, fun activity. After the activity was completed, the token was moved back to the bottom of the caterpillar, and the Caterpillar Game restarted and the class had another opportunity to earn a reward. See Appendix C for examples of activity rewards. The primary researcher shared various examples of activity rewards and the teacher selected a variety (5-10 cards) that she found appropriate for her class and that her students would enjoy.

**Intervention phase.** The intervention phase was first implemented in the classroom whose baseline disruptive behavior data was stable or showed an increasing trend. The Caterpillar Game was implemented across the three classrooms in a staggered fashion. The teacher implemented the Caterpillar Game as she learned in the training session. The primary researcher observed the teacher’s first implementation of the Caterpillar Game and coached the teacher in the classroom (if necessary), and provided feedback on the teacher’s adherence to the implementation of the Caterpillar Game correctly. The Caterpillar Game was implemented twice during the school day in each classroom. Before each implementation the teacher would 1) teach the students one appropriate behavior, and 2) announce that the Caterpillar Game was starting and review
the general rules. When the teacher observed a student performing an appropriate classroom behavior she praised the student and moved the token up one segment. If the teacher observed a student breaking a rule, then the teacher gave a visual signal (e.g., hand in a stop position), briefly stated the classroom rule that was broken, and moved the token down one segment away from the caterpillar head (e.g., further away from the reinforcer (reward activity)). If the butterfly token reached the top of the caterpillar head, then the class was reinforced with the short activity card that was pulled from the reward activity cards.

**Maintenance phase.** A maintenance phase was conducted about two to four weeks (depending on the classroom) after the last intervention observation was conducted to evaluate whether or not the effects of the interventions were maintained over time. Disruptive behavior and teacher praise data were collected in each classroom using the same measures that were used during the baseline and intervention phases. Treatment integrity data was collected to determine whether or not the teachers continued to implement the Caterpillar Game as intended.

**Treatment Integrity**

A treatment integrity checklist (see Appendix G) adapted from Floress et al. (in press) was used to evaluate whether the teachers accurately implemented the intervention. In classroom 1, the teacher met 98.3% (range 86% - 100%) treatment integrity throughout the intervention and maintenance phase. Treatment integrity was assessed during the intervention and maintenance phases. During the first observation after training, Teacher 1 did not reach 100% treatment integrity because she failed to teach and define an appropriate behavior before she implemented the Caterpillar Game. Her
treatment integrity was 86% for this observation. The primary investigator re-taught her how to teach and define appropriate behaviors before she implemented the Caterpillar Game again by meeting with her after school the day she failed to meet 100% integrity. During the next Caterpillar implementation, the primary investigator gave the teacher encouragement from the back of the classroom (e.g., head nodding, thumbs up, and smiles) while she implemented the Caterpillar Game. During this observation and all subsequent observations she met 100% treatment integrity. In classroom 2, the teacher met 100% treatment integrity throughout intervention and maintenance. In classroom 3, the teacher met 100% treatment integrity throughout intervention and maintenance.

**Reliability**

Research assistants blind to the purpose of the study collected student and teacher observation data. During 32% of the observations, two observers collected observation data so that interobserver agreement (IOA) could be calculated. Some of these observations were completed by the primary investigator and a research assistant and some were completed by two research assistants. IOA was calculated for baseline, intervention, and maintenance phases to determine the level of agreement between observers measuring student disruptive behavior, teacher BSP, and treatment integrity. IOA for disruptive behavior was calculated using Cohen's kappa rather than percent agreement because disruptive behavior was collected using partial interval recording, where agreement is based on both the occurrence and nonoccurrence of behavior. Cohen's kappa is thought to be a more robust measure compared to percent agreement because it takes into account the agreement occurring by chance (Tang, Hu, Zhang, Wu, & He, 2015). Landis and Koch (1977) proposed that a kappa in the range of
.21 to .40 to be considered ‘fair’ agreement, a kappa in the .41 to .60 range to be considered ‘moderate’ agreement, .61 to .80 to be considered ‘substantial’ agreement, and larger than .81 to be considered ‘almost perfect’ agreement. Overall kappa for disruptive behavior across all settings was .96 (range, .66 - 1.00), therefore the agreement among disruptive behaviors was ‘almost perfect’ agreement.

IOA for teacher praise was calculated by dividing the smaller number of BSP praise by the larger number of BSP to obtain a percentage of discrepancy between observers (Cooper, Heron, & Heward, 2006). Overall IOA for teacher BSP across all settings was 99% (range 90% - 100%).

IOA for treatment integrity was calculated by dividing the smaller number of treatment integrity components observed by the larger number of treatment integrity components observed to obtain a percentage of discrepancy between observers (Cooper, Heron, & Heward, 2006). Across all three classrooms, treatment integrity IOA was 100%.

**Design and Data Analysis**

As mentioned above (See Procedures section) a nonconcurrent multiple baseline design across settings was utilized in this study. In a multiple baseline design the intervention is introduced to one setting at a time in a staggered, step-wise fashion, to demonstrate experimental control. For instance, experimental control is demonstrated when a change in the dependent variable(s) occurs across each setting when the intervention is introduced. In the current study, it was expected that disruptive behavior would change in the first setting exposed to intervention; however it was expected that the other settings would remain steady at baseline levels. When this occurs it
demonstrates that the change in the dependent variable (i.e., disruptive behavior) is under the control of the intervention. In this study, the changes in disruptive behavior and teacher praise were determined by visual analysis and by calculating effect sizes.

According to Olive and Smith (2005), calculating the Standard Mean Difference (SMD) is a way to evaluate the effect of an intervention. SMD was calculated for this study. SMD was calculated using the intervention mean subtracted by the baseline mean divided by the standard deviation of the baseline data (Olive & Smith, 2005). The use of SMD is advantageous in single-subject designs since it utilizes the baseline and intervention means, is easily understood because it produces a Cohen’s $d$ value, and overall is easily calculated. Effect sizes of .2 are considered small, .5 to be medium, and .8 is considered large (Cohen, 1988).

Horner et al. (2005) expressed that Nonoverlap of All Pairs (NAP) is an up and coming standard for evaluating single-case research. NAP is an index that compares the overlap of datum between phases (e.g., baseline compared to the intervention phase). Specifically, NAP is calculated by counting all overlapping pairs between the baseline and intervention phases, and subtracting that calculation from the total possible pairs to obtain a nonoverlap count. NAP values from 0-.65 are considered weak effects, .66-.92 are considered medium effects, and .93-1.0 are large or strong effects (Parker & Vannest, 2009).

**Results**

The effect of the Caterpillar Game on student behavior was measured during baseline, intervention, and maintenance phases across three classrooms. Pre and post measures of teacher stress were also collected. It was hypothesized that the Caterpillar
Game would decrease disruptive student behavior among students ranging from 4-8 years of age and increase teacher BSP across all three classrooms. It was also hypothesized that teacher stress would improve once the Caterpillar Game was implemented.

**Disruptive Behavior**

The percentage of intervals where disruptive student behavior occurred across three classrooms is presented in Figure 1 (mean percentages were rounded to the nearest tenths place). In addition, the standard deviation and means for disruptive behavior during baseline and intervention phases are presented in Table 1. During baseline, disruptive behavior was variable across all three settings with mean percentages of 11.3%, 27.2%, and 16.3%, respectively. However, when the Caterpillar Game was introduced the percentage of disruptive student behavior immediately decreased and stabilized across all three classroom settings. Disruptive behavior decreased to 2.4% (Classroom 1), 11.7% (Classroom 2), and 8.9% (Classroom 3). SMD and NAP effect size scores for changes in disruptive behavior are presented in Table 2. SMD and NAP effect size comparisons for disruptive behavior reflect strong effects for Classroom 1 and Classroom 2. SMD and NAP effect size comparisons for disruptive behavior in Classroom 3 reflect medium effects.

Two to four weeks after intervention ended, all three teachers continued to utilize the Caterpillar Game within their classrooms and maintenance data was collected. Disruptive behavior remained low and considerably lower than baseline across all three classrooms. Disruptive behavior in Classroom 1 and Classroom 3 decreased from intervention levels, occurring during 0% and 7.5% of observation intervals, respectively. Disruptive behavior in Classroom 2 was slightly higher than intervention, but remained
low compared to baseline (12.3% of the observation intervals).

**Teacher Praise**

The frequency of teacher’s use of BSP, toward any student in the classroom, during 10 min observations are displayed in Figure 2 (mean frequencies were rounded to the nearest tenths place). In addition, the standard deviation and means for BSP during baseline and intervention phases are presented in Table 1. During baseline, BSP was stable in Classroom 2 and Classroom 3, but somewhat variable in Classroom 1. Across all three baselines, the mean frequency of total teacher praise was low (range 0.2 – 1.0 per 10 min).

When the Caterpillar Game was introduced, the frequency of teacher BSP increased notably across all three classrooms. In Classroom 1, the mean frequency of BSP increased to 7.6 per 10 min and during Classroom 2, the mean frequency of praise increased to 6.0 per 10 min. While the Caterpillar Game was implemented in Classroom 3, the frequency of teacher praise increased to 8.0 per 10 min. The mean frequency of teachers’ use of praise across all three classrooms ranged from 6.0-8.0 during intervention. SMD and NAP Effect size comparisons for BSP reflected strong effects (see Table 2).

Similarly to disruptive behavior, teacher BSP was also collected across each classroom during maintenance (approximately 2-4 weeks after intervention ended). Across all three classrooms, teacher BSP remained high, but varied across classrooms (range 4 – 10.5 BSP per 10 min). The mean frequency of BSP in Classroom 2 and Classroom 3 were similar or higher than during intervention. The mean frequency of BSP in Classroom 1 was slightly lower than intervention.
Teacher Stress

Teacher stress was measured using the Teacher Stress Inventory (TSI; Appendix E) before and after implementing the Caterpillar Game. Total scores at pre and post assessment were rounded to the nearest tenths place. All three teachers’ TSI scores decreased after implementing the Caterpillar Game. The teacher from Classroom 1 scored 2.3 (Moderate) at pre and 2.0 (Moderate) at post. The teacher from Classroom 2 scored 2.7 (Moderate) at pre and 2.2 (Moderate) at post and the teacher from Classroom 3 scored 2.3 (Moderate) at pre and 1.9 (Significantly Weak) at post. Therefore, 1 out of the 3 teachers reported reduced stress after implementing the Caterpillar Game in their classroom.

Teacher Satisfaction

After maintenance data were collected within each classroom teachers completed the teacher satisfaction survey (see Appendix D), which assessed how satisfied they were with the interaction. The total satisfaction score could range from 17-102 points, with higher scores indicating more satisfaction and lower scores indicating less satisfaction. Across all three classrooms, all teachers were highly satisfied (Classroom 1, 93; Classroom 2, 95; and Classroom 3, 102).

Discussion

The purpose of this study was to examine the effects of the Caterpillar Game on young children’s disruptive behavior, teacher BSP, and teacher stress. This study also aimed to replicate previous findings from Floress et al. (in press) that suggested that the Caterpillar Game is an effective class-wide intervention for decreasing disruptive behavior and increasing teacher BSP.
First, results of the current study demonstrated that the Caterpillar Game had an immediate and sustained effect on student disruptive behavior across all three classrooms. When the Caterpillar Game was introduced, disruptive behavior systematically decreased and teacher BSP increased. These results are promising because they demonstrate experimental control, replicate prior research (Floress et al., in press), and are in line with PBIS standards. PBIS standards include 1) defining and teaching students appropriate behaviors, 2) acknowledging when students display prosocial behaviors, and 3) responding to student misbehavior in a consistent and fair manner (Anderson & Spaulding, 2007). The Caterpillar Game is consistent with these standards because the teacher 1) taught an appropriate behavior every time the Caterpillar Game was played 2) acknowledged student appropriate behavior (e.g., praise), and 3) responded to both student appropriate and inappropriate behavior in a consistent and fair manner. In addition, the current findings are consistent with prior research that has demonstrated the functional relationship between teacher praise and student disruptive behavior (Madsen, Becker, & Thomas, 1968; Ward & Baker, 1968) because in the current study, when teachers increased their use of BSP student disruptive behavior decreased.

Secondly, the SMD and NAP effect sizes reflected strong effect size in Classroom 1 and Classroom 2, while reflecting medium effect sizes in Classroom 3 for the Caterpillar Game in the current study. Compared to previous studies examined previously in the literature review (e.g., The Good Behavior Game, Barrish et al., 1969; Caught Being Good Game, Wright & McCurdy, 2013; The Level System, Filcheck et al., 2004) the current study explicitly calculated the effect the intervention had on disruptive behavior and behavior specific praise. Previous studies, even though they have declared
to be effective by using visual analysis and comparisons of mean frequency changes throughout the phases of intervention, have not explicitly calculated effect sizes. Therefore, future studies may examine the effects of the intervention by using effect calculations, such as SMD or NAP, to evaluate the effect of the study and not rely on visual analysis alone.

Thirdly, the results of the current study show that the Caterpillar Game has been found effective in preschool, kindergarten, and second grade classrooms. Moreover, the Caterpillar Game is geared toward students in preschool through 3rd grade in general and special education classrooms. Even though the Caterpillar Game is geared toward preschool and early elementary students, the components of the Caterpillar Game (e.g., behavior specific praise and physical activity rewards) could also be utilized for older students (grades 4-8). One component of the Caterpillar Game that could be changed for the intervention to appeal to older students would be the caterpillar visual. For example, the response/cost utility of the Caterpillar Game and all other components could still be utilized, but the visual could be changed to a phone battery, with the different segments, to appeal to older students. Therefore, future research might change the visual of the Caterpillar Game and examine the effects of the modified intervention with older students.

Another component of the Caterpillar Game is the emphasis on teachers verbally recognizing appropriate behavior by utilizing behavior-specific praise. Even though the teachers in the current study reported high satisfaction with the Caterpillar Game, future studies might consider utilizing non-verbal cues to response to appropriate behavior (e.g., just moving the token up the Caterpillar). This may appeal to teachers who find it
difficult to utilize behavior-specific praise consistently. It is also possible that only moving the token (without pairing with verbal praise) for appropriate student behaviors may be more efficient and increase time for student learning. Therefore, future research might examine whether the traditional Caterpillar Game (BSP and moving the token) is superior to a non-verbal version (moving the token only).

Fourthly, one of the three teachers reported reduced stress after implementing the Caterpillar Game. At pre-test, all three teachers’ ratings indicated that they fell within the moderate stress range. At post-test, only one teacher’s score fell within the weak stress range and the other two teachers’ ratings remained within the moderate stress range. These results were not consistent with the prediction that teacher stress would decrease after implementing the Caterpillar Game. Although special education and regular education teachers have reported increased stress due to dealing with challenging student behavior (Westling, 2010), it is likely that other daily interactions also contribute to teachers’ stress. In other words, the Caterpillar Game alone may not have as strong of an impact on teacher stress because teaching is a stressful career in general (Collie et al., 2012) and other factors may also influence teacher stress aside from dealing with student misbehavior.

Disruptive behavior across all three classrooms at baseline was not excessively high, which may also explain why teacher stress was not reduced after implementing the Caterpillar Game. For example, the highest percentage of disruptive behavior intervals observed during a 10 minute observation during baseline was 37% and at this time, teachers reported moderate stress. Had teachers been managing higher rates of disruptive behavior at baseline, they may have reported higher stress and therefore been able to
make larger gains in reducing stress. Future studies might examine the effects of implementing the Caterpillar Game in classrooms with higher rates of disruptive behavior to determine whether the Caterpillar Game has an impact on teacher stress when teachers are experiencing more stress (possibly due to higher rates of disruptive behavior). Future research might also examine factors that contribute to teacher stress, beyond student disruptive behavior, to determine what areas might be targeted to further reduce teacher stress.

Despite the lack of improvement in teacher stress, all the teachers reported being highly satisfied with the Caterpillar Game. The three teachers reported that the Caterpillar Game was easy to implement, valuable, and effective within their classroom. During recruitment, the teachers were told that they could discontinue the use of the Caterpillar Game after intervention and before maintenance data were collected. All three teachers chose to continue to use the Caterpillar Game in their classroom in between intervention and maintenance. Furthermore, all three teachers continued to use the Caterpillar Game after the maintenance data were collected.

**Limitations**

Although these results suggest that the Caterpillar Game is an effective classroom management system, there are a few limitations to note. First, during observations of student disruptive behavior, only 10 students were observed per observation. Even though students observed during observations were selected randomly, student disruptive behavior measured in this study is a sample of overall classroom disruptive behavior and may not be as accurate as observing every student during every observation. It is also possible that students and teachers may have been reactive to observers in the classroom.
Future researchers might consider video recording classroom observations so that a measure of disruptive behavior for every student in the classroom could be obtained and to reduce the possibility of student and teacher reactivity.

Another potential limitation is the slight change made to the Caterpillar Game in the current study compared to the original study (Floress, et al., in press). The current study had teachers explicitly teach an appropriate behavior to the class before starting the Caterpillar Game. Despite finding similar results to the original study, it is unclear if teaching appropriate behaviors to the class is necessary or whether it can be eliminated. Teaching appropriate behaviors was added to the current study so that the Caterpillar Game was aligned with PBIS standards and could therefore be easily offered as a classroom management system for schools subscribing to a PBIS framework. However it is likely that the added component takes up classroom time (something that is rarely in excess) and if similarly positive results are found, as in the original study, it may make sense to eliminate this component. Future research might compare the effects of implementing the Caterpillar Game in accordance with the original training and the current study to determine if the teaching component is necessary for reducing student disruptive behavior.

Finally, this study was conducted within three classrooms located within rural Central Illinois. Specifically, the majority of the students within the study were White and were considered low-income. Therefore, the results of this study may not generalize to other classrooms in urban areas. However, it is important to note that decreases in disruptive behavior and increases in teacher praise were found across three different classrooms, which included preschool, kindergarten, and second grade students and also
special education only classrooms and general education classrooms. The diversity of the three classrooms included in this study provides evidence to the robust nature of the Caterpillar Game.

**Future Research**

As mentioned above, future research should attempt to understand the impact each factor of the Caterpillar Game has on students’ classroom behavior. Specifically, future studies should consider which factors of the Caterpillar Game have the most positive impact on student behavior. For example, this study added the teaching component of appropriate behavior before the start of the Caterpillar Game, in which the original study did not have this component. However, since the Caterpillar Game is a bundled intervention it is unclear if the teaching component adds to the overall effectiveness of the intervention on student behavior. It is clear that having the teaching component ensures that the Caterpillar Game is aligned with the three PBIS standards, which may increase its appeal to staff who select interventions based on their PBIS compatibility.

Future studies should examine how teachers are trained to use BSP. In the current study, teachers needed to give at least 3 BSP statements per 10 minutes. Recently, Floress and Jenkins (2015) recommended that for BSP to be effective as a Tier 3 intervention it likely needs to be administered at a rate of 3-5 times per 10 minutes. This recommendation was based on reviewing intervention studies and examining the rate at which praise was delivered in order to observe decreases in student disruptive behavior. Even though there is substantial research demonstrating the functional relationship between increased teacher BSP and decreased student disruptive behavior, no study has experimentally manipulated teachers’ rate of BSP with individual students or students
classroom-wide. Future studies should experimentally evaluate the rate at which BSP is delivered and how BSP is delivered to determine an ideal rate of teacher BSP.

In addition, future studies should examine the impact classroom management strategies and packaged interventions have on teachers with high stress. As mentioned previously, this study only examined teachers with moderate stress before they implemented the Caterpillar Game. It is unclear if the Caterpillar Game would have impacted teacher stress if teachers were experiencing high levels of stress. Therefore, future studies might consider implementing the Caterpillar Game with teachers experiencing high stress to determine if teacher stress is reduced and ultimately if teachers are less likely to leave the field of education (Evers et al., 2004).

Implications

The Caterpillar Game is a bundled intervention that includes the teacher teaching appropriate behaviors, using DRA, delivering 3-5 BSP per 10 min, and rewarding the entire class when the token reaches the top of the Caterpillar. In combination these components led to a decrease in classroom disruptive behavior and increased teacher BSP. It is unclear what specific components alone have an effect on student and teacher behavior, therefore all the components of the Caterpillar Game should be implemented as described in this study.

One of the strengths of this study is its potential utility in general education and special education classrooms, its use with a wide-range of young students (i.e., preschool, kindergarten, and second grade), and its use with teachers with various years of teaching experience (i.e., 3 years, 13 years, and 31 years). All three teachers reported satisfaction with the Caterpillar Game suggesting that teachers who teach young children in both
special education and general education are likely to find the Caterpillar Game effective and easy to implement. Teacher satisfaction is important to consider, as research suggests that teachers who are not satisfied with an intervention are not likely to implement it correctly or at all (Dart et al., 2012). In addition, previous researchers (Begeny & Martens, 2006; Westling, 2010) found that teachers report receiving inadequate training in behavioral interventions to manage problem behaviors. Based on results from this study, the Caterpillar Game has the potential to offer a simple and cost effective way to train teachers seeking additional behavioral training.

In terms of teacher training, one of the key features of the Caterpillar Game is the focus on increasing adaptive and appropriate behavior by training teachers to use BSP at an effective rate. Because the Caterpillar Game and PBIS standards are closely aligned, teachers at schools implementing PBIS school-wide may be more likely to use the Caterpillar Game in their classrooms. Many teachers report that disruptive behavior is a large contributor to teacher burnout (Evers et al., 2004). Therefore, it is important to find easy to implement, management systems for teachers to implement to decrease student disruptive behavior.

Overall, this study adds to the research on the effectiveness of the Caterpillar Game. It provides promising results in providing further evidence of this easy, streamlined, simple, and no cost intervention that elementary general and special education teachers can utilize within their classroom to reduce class-wide student disruptive behavior.
References


dropout: A longitudinal study of a first-grade cohort. Sociology of Education, 65,


Evers, W. J. G., Tomic, W., & Brouwers, A. (2004). Burnout among teachers: Student’s
and teachers compared. School Psychology International, 25(2), 131-148. doi:
10.1177/0143034304043670

Competence enhancement behavior management. Preventing School Failure, 50,
39-44. doi: 10.3200/PSFL.50.3.39-44

Filcheck, H. A. (n.d.). Evaluation of a whole-class token economy to manage disruptive
behavior in preschool classrooms (Doctoral dissertation, West Virginia
University).

token economy and coaching of teacher skills in a preschool classroom to manage
disruptive behavior. Psychology in the Schools, 41(3), 351-361. doi:
10.1002/pits.10168

classrooms: Practical and philosophical concerns. The Journal of Early and
Intensive Behavioral Intervention, 1(11), 94-104. doi:10.1037/h0100281

inventory: A re-analysis of aggregate data. Journal of Organizational Behavior,


Jacobs, J. R., Boggs, S. R., Eyberg, S. M., Edwards, D., Durning, P., Querido, J. G.,
point data for the revised edition of the school observation coding system.
*Behavior Therapy, 31*, 695-712. doi: 10.1016/S0005-7894(00)80039-8

settings (2nd ed.)*. New York, NY: Oxford University Press.


satisfaction: Teacher gender, years of experience, and job stress. *Journal of
Educational Psychology, 102*(3), 741-756. doi: 10.1037/a0019237

Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for
categorical data. *Biometrics, 33*(1), 159-174.

disruptive behavior disorders from the first decade of the developmental trends
study. *Clinical Child & Family Psychology Review, 3*, 497-523. doi:
10.1023/A:1009567419190

Loeber, R., & Keenan, K. (1994). Interaction between conduct disorder and its comorbid
doi: 10.1016/0272-7358(94)90015-9

Comprehensive behavior management: Individualized, classroom, and schoolwide


Disruptive Behavior

Figure 1. Percentage of intervals in Classroom 1, 2, and 3 where disruptive behavior was observed in the classroom during a 10 min observation session, with phase means.
Figure 1. Frequency of BSP observed within Classroom 1, 2, and 3 where BSP was observed during a 10 min observation session, with phase means.
Table 1

*Standard Deviation and Mean for Baseline and Intervention for Disruptive Behavior and BSP*

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<th>Classroom</th>
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<th>Intervention Phase</th>
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<td>SD</td>
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Table 2

Effect Sizes for Classroom Disruptive Behavior and BSP

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<tr>
<td>3</td>
<td>0.76</td>
<td>Medium</td>
<td>0.67</td>
<td>Medium</td>
</tr>
<tr>
<td>BSP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>5.26</td>
<td>Large</td>
<td>1.00</td>
<td>Large</td>
</tr>
<tr>
<td>2</td>
<td>10.00</td>
<td>Large</td>
<td>1.00</td>
<td>Large</td>
</tr>
<tr>
<td>3</td>
<td>13.03</td>
<td>Large</td>
<td>1.00</td>
<td>Large</td>
</tr>
</tbody>
</table>
### APPENDIX A

Summary of Standards of Interventions Reviewed

<table>
<thead>
<tr>
<th>Systems</th>
<th>Use/Types of Praise</th>
<th>Identify Appropriate Behavior</th>
<th>Response/Cost</th>
<th>Reinforcers</th>
<th>Student System</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Good Behavior Game (Barrish, Saunders, &amp; Wolf, 1969).</td>
<td>No, praise not taught to teachers.</td>
<td>No.</td>
<td>Yes.</td>
<td>Yes.</td>
<td>Class-wide</td>
</tr>
<tr>
<td>Caught Being Good Game (Wright &amp; McCurdy, 2013).</td>
<td>No, does not emphasize praise.</td>
<td>Yes.</td>
<td>No.</td>
<td>Yes.</td>
<td>Class-wide</td>
</tr>
<tr>
<td>The Level System (Filcheck, n.d.).</td>
<td>Yes. (BSP)</td>
<td>Yes.</td>
<td>Yes. Also, components of a token economy intertwined.</td>
<td>Yes.</td>
<td>Individual</td>
</tr>
<tr>
<td>The Caterpillar Game (Boyle, 2013).</td>
<td>Yes. (BSP)</td>
<td>Yes.</td>
<td>Yes.</td>
<td>Yes.</td>
<td>Class-wide</td>
</tr>
</tbody>
</table>
Appendix B

Caterpillar Visual
### APPENDIX C

**Reward Cards Examples**

<table>
<thead>
<tr>
<th>Charades</th>
<th>Eye Spy</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Snow Angels</td>
<td>&quot;Eye spy something with my little eye that is (color).&quot;</td>
</tr>
<tr>
<td>- Building a snowman</td>
<td></td>
</tr>
<tr>
<td>- Opening presents</td>
<td></td>
</tr>
<tr>
<td>- Making a snowball</td>
<td></td>
</tr>
<tr>
<td>- Sledding</td>
<td></td>
</tr>
<tr>
<td>- Ice skating</td>
<td></td>
</tr>
<tr>
<td>- Wrapping a present</td>
<td></td>
</tr>
<tr>
<td>- Shoveling snow</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Simon Says</th>
<th>Follow the Leader</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher chooses one student to be Simon. Play a few rounds.</td>
<td>Choose one student to be the leader. The rest of the students line up behind him/her. Ideas for the leader: crawling, hopping, patting the desks, whistling, clapping, skipping, etc.</td>
</tr>
</tbody>
</table>
APPENDIX D

Teacher Satisfaction Rating Form

Directions: Please complete this rating form, indicating the degree to which you agree or do not agree with the following statements.

1. My experiences in the Caterpillar Game was beneficial to my professional growth.  
2. I would recommend The Caterpillar Game to other early elementary teachers. 
3. The graduate student could have explained how to deliver general and BSP more clearly. 
4. The program components were unreasonable. 
5. I would recommend this graduate student to other teachers. 
6. The graduate student was helpful in answering my questions relating to student problem behaviors. 
7. This program provided me with valuable learning experiences. 
8. Expectations of my role in the intervention were clearly communicated prior to beginning. 
9. The Caterpillar Game was easy to learn. 
10. The students liked the Caterpillar Game. 
11. I will continue to utilize the Caterpillar Game. 
12. I would have liked the graduate student to have better explained the Caterpillar Game (moving the token and providing the reinforcement). 
13. I felt comfortable asking the graduate student questions to better help my understanding of the intervention. 
14. I will continue to utilize general and BSP in my classroom. 
15. Having the graduate student provide feedback during the coaching session made me uncomfortable. 
16. Having classroom activities observed was disruptive. 
17. I would rate my overall experience with the intervention as outstanding.

I Do Not Agree
I Agree
1 2 3 4 5 6

Comments:

________________________________________________________________________

________________________________________________________________________
APPENDIX E

Teacher Stress Inventory

The following are a number teacher concerns. Please identify those factors which cause you stress in your present position. Read each statement carefully and decide if you ever feel this way about your job. Then, indicate how strong the feeling is when you experience it by circling the appropriate rating on the 5-point scale. If you have not experienced this feeling, or if the item is inappropriate for your position, circle number 1 (no strength; not noticeable). The rating scale is shown at the top of each page.

Examples:

I feel insufficiently prepared for my job. 1 2 3 4 5

If you feel very strongly that you are insufficiently prepared for your job, you would circle number 5.

I feel that if I step back in either effort or commitment, I may be seen as less competent. 1 2 3 4 5

If you never feel this way, and the feeling does not have noticeable strength, you would circle number 1.

<table>
<thead>
<tr>
<th>HOW</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>STRONG</td>
<td>no</td>
<td>mild</td>
<td>medium</td>
<td>great</td>
<td>major</td>
</tr>
<tr>
<td>?</td>
<td>not</td>
<td>barely</td>
<td>moderately</td>
<td>very</td>
<td>extremely</td>
</tr>
<tr>
<td>noticeable</td>
<td>noticeable</td>
<td>noticeable</td>
<td>noticeable</td>
<td>noticeable</td>
<td>noticeable</td>
</tr>
</tbody>
</table>

TIME MANAGEMENT

1. I easily over-commit myself. 1 2 3 4 5
2. I become impatient if others do things to slowly. 1 2 3 4 5
3. I have to try doing more than one thing at a time. 1 2 3 4 5
4. I have little time to relax/enjoy the time of day. 1 2 3 4 5
5. I think about unrelated matters during conversations. 1 2 3 4 5
6. I feel uncomfortable wasting time. 1 2 3 4 5
7. There isn't enough time to get things done. 1 2 3 4 5
8. I rush in my speech. 1 2 3 4 5

Add items 1 through 8; divide by 8; place your score here:

WORK-RELATED STRESSORS

9. There is little time to prepare for my lessons/responsibilities. 1 2 3 4 5
10. There is too much work to do. 1 2 3 4 5
11. The pace of the school day is too fast. 1 2 3 4 5
12. My caseload/class is too big. 1 2 3 4 5
13. My personal priorities are being shortchanged due to time demands. 1 2 3 4 5
14. There is too much administrative paperwork in my job. 1 2 3 4 5

Add items 9 through 14; divide by 6; place your score here:

PROFESSIONAL DISTRESS

15. I lack promotion and/or advancement opportunities. 1 2 3 4 5
16. I am not progressing my job as rapidly as I would like. 1 2 3 4 5
17. I need more status and respect on my job. 1 2 3 4 5
18. I receive an inadequate salary for the work I do. 1 2 3 4 5
19. I lack recognition for the extra work and/or good teaching I do. 1 2 3 4 5

Add items 15 through 19; divide by 5; place your score here:

DISCIPLINE AND MOTIVATION

I feel frustrated...

20. ...because of discipline problems in my classroom. 1 2 3 4 5
21. ...having to monitor pupil behavior. 1 2 3 4 5
22. ...because some students would better if they tried. 1 2 3 4 5
23. ...attempting to teach students who are poorly motivated. 1 2 3 4 5
24. ...because of inadequate/poorly defined discipline problems. 1 2 3 4 5
25. ...when my authority is rejected by pupils/administration. 1 2 3 4 5

Add items 20 through 25; divide by 6; place your score here:

PROFESSIONAL INVESTMENT

26. My personal opinions are not sufficiently aired. 1 2 3 4 5
27. I lack control over decisions made about classroom/school matters. 1 2 3 4 5
28. I am not emotionally/intellectually stimulated on the job. 1 2 3 4 5
29. I lack opportunities for professional improvement. 1 2 3 4 5

Add items 26 through 29; divide by 4; place your score here:

EMOTIONAL MANIFESTATIONS

I respond to stress...

30. ...by feeling insecure. 1 2 3 4 5
31. ...by feeling vulnerable. 1 2 3 4 5
32. ...by feeling unable to cope. 1 2 3 4 5
33. ...by feeling depressed. 1 2 3 4 5
34. ...by feeling anxious. 1 2 3 4 5

Add items 30 through 34; divide by 5; place your score here:
FATIGUE MANIFESTATIONS

I respond to stress...

35. ...by sleeping more than usual. 1 2 3 4 5
36. ...by procrastinating. 1 2 3 4 5
37. ...by becoming fatigued in a very short time. 1 2 3 4 5
38. ...with physical exhaustion. 1 2 3 4 5
39. ...with physical weakness. 1 2 3 4 5

Add items 35 through 39; divide by 5; place your score here:

CARDIOVASCULAR MANIFESTATIONS

I respond to stress...

40. ...with feelings of increased blood pressure. 1 2 3 4 5
41. ...with feeling of heart pounding or racing. 1 2 3 4 5
42. ...with rapid and/or shallow breath. 1 2 3 4 5

Add items 40 through 42; divide by 3; place your score here:

GASTRONOMICAL MANIFESTATIONS

I respond to stress...

43. ...with stomach pain of extended duration. 1 2 3 4 5
44. ...with stomach cramps. 1 2 3 4 5
45. ...with stomach acid. 1 2 3 4 5

Add items 43 through 45; divide by 3; place your score here:

BEHAVIORAL MANIFESTATIONS

I respond to stress...

46. ...by using over-the-counter drugs. 1 2 3 4 5
47. ...by using prescription drugs. 1 2 3 4 5
48. ...by using alcohol. 1 2 3 4 5
49. ...by calling in sick. 1 2 3 4 5

Add items 46 through 49; divide by 4; place your score here:

TOTAL SCORE

Add all calculated scores; enter the value here ______.

Then, divide by 10; enter the Total Score here ______.
Appendix F

Student Observation Form: Disruptive Behavior

<table>
<thead>
<tr>
<th>Minute 1</th>
<th>Minute 2</th>
<th>Minute 3</th>
<th>Minute 4</th>
<th>Minute 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5 6</td>
<td>1 2 3 4 5 6</td>
<td>1 2 3 4 5 6</td>
<td>1 2 3 4 5 6</td>
<td>1 2 3 4 5 6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Minute 6</th>
<th>Minute 7</th>
<th>Minute 8</th>
<th>Minute 9</th>
<th>Minute 10</th>
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<tbody>
<tr>
<td>1 2 3 4 5 6</td>
<td>1 2 3 4 5 6</td>
<td>1 2 3 4 5 6</td>
<td>1 2 3 4 5 6</td>
<td>1 2 3 4 5 6</td>
</tr>
</tbody>
</table>

(✓) Disruptive behavior includes:
- whine
- destructive
- cheating
- demands
- self-stimulation
- yell
- negative
- tantrum
- out of area
- disruptive
- off task

Total DB: ____________ Total Time: ____________ Total Intervals: ____________

Teacher Observation Form: Praise

<table>
<thead>
<tr>
<th>General Praise</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BSP</th>
</tr>
</thead>
</table>
Definitions of Inappropriate Behavior *adapted from the REDSOCS*

**Whining:** Words and sounds uttered by the child in a slurring, nasal, high-pitched voice.

**Crying:** Inarticulate utterances of distress (e.g., audible weeping) that may or may not be accompanied by tears.

**Yelling:** Loud screeching, screaming, or shouting. The sound must be loud enough so that it is clearly above the intensity of normal indoor conversation. Yelling or loud voices are not coded as inappropriate during outdoor activities.

**Destructive behavior:** Behaviors during which the child damages or destroys an object or threatens to damage an object. Do not code destructiveness if it is appropriate within the context of the play situation (i.e., ramming cars in a car crash).

**Aggressive behavior:** Examples include fighting, kicking, slapping, hitting, grabbing an object roughly from another person, or threatening to do any of the preceding.

**Negativism:** Verbal or nonverbal behavior expressing a negative attitude. Negativism may be scored when the child makes a neutral comment that is delivered in a tone of voice that conveys an attitude of “don’t bother me.” Negativism may be expressed in a derogatory, uncomplimentary, or angry manner. Also included are exaggerated defeatist statements such as “I give up,” contradictions of another person, and teasing or mocking behaviors or verbalizations. “Pouting” facial expressions are included in this category.

**Self-stimulation:** Repetitive physical movements (involving only the child’s body and not the other objects) that might be harmful AND that interfere with the child’s ability to attend to or complete a task. Examples include tapping a pencil repeatedly, head banging, repetitive leg shaking or hair twirling, thumb sucking, and masturbation. It is important to note, however, that if the child is engaging in repetitive physical movements, but is still able to attend to his or her task, the behavior would not be coded as inappropriate. An example of non-interfering repetitive movements would include a child who is repetitively twirling his or her hair, while remaining engaged in schoolwork.

**Demanding attention:** Includes inappropriate verbal or nonverbal bids for attention from the teacher or other students (e.g., “Call on me! Call on me! Call on me!”). Other examples include tapping on the teacher’s sleeve, tapping a neighbor on the shoulder, and waving arms in the air.

**Disruptive Behavior:** Any physically active or repetitive behavior that is or may become disruptive to others. Examples include kicking a child’s chair repeatedly, drumming on a table loudly, clowning, making funny noises, teasing, or spinning a pencil on a desk.

**Talking Out of Order:** Any talking when the class has been instructed to be silent unless called on to speak. This includes situations in which a “classroom rule” exists that silence is to be maintained (i.e., the teacher does not have to give the instruction explicitly- the expectation for silence is sufficient). Examples include whispering to a neighbor, calling out to another child, answering a question directed to someone else, answering a question by yelling out when it is clear that the children are expected to raise their hand to speak, and talking, singing, or humming to themselves.

**Being Out of Area:** Coded when the target child leaves the area to which he or she is assigned without permission. Examples include standing up when the rest of the class is seated, leaving his or her desk, approaching the teacher without permission, or playing with a toy that is not in the child’s assigned work area. The behavior must be appropriate for the context or classroom norms (e.g., in some classrooms children are allowed to walk to the teacher’s desk to obtain help with an assignment).

**Cheating:** Child borrows another child’s work when such behavior is clearly not allowed. Examples include looking at another child’s paper during a spelling quiz and copying another child’s work.

**Off Task:** Child is looking away from desk work or looking away from the teacher at the front of the class, or looking away from teacher instruction (e.g., smart board). Examples include, staring at the ceiling or looking at a visitor in the class, or staring off where the student’s eye gaze is not directed toward their work, the teacher, or instruction.

*Not adapted from the REDSOCS.*
Appendix G

Treatment Integrity Checklist

Observer: ____________________ Status: (circle one) Primary or Reliability Partner __________

Date: _______________ School: ____________________ Teacher ID: _______________

__ Caterpillar is hung in a spot where all children can see it.
__ Teacher defines and teaches appropriate behavior. (5 steps...Announces, Why, Define, Model, Praise)
__ Teacher makes it clear to all children that the Caterpillar Game is beginning.
__ BSP is delivered when moving the token up.
__ A minimum of 3 praises are given per 10 minute observation.
__ A visual signal is given, the teacher briefly states the rule that was broken, and the token is moved down for inappropriate behavior (classroom rules).
__ At the end of the activity the children are rewarded using a reward card.

Completed by: ____________________
CONSENT TO PARTICIPATE IN RESEARCH — Teacher Form

The Caterpillar Game

You are invited to participate in a research study conducted by Amber Jacoby and Margaret Floress, Ph.D., from the psychology department at Eastern Illinois University.

Your participation in this study is entirely voluntary. Please ask any questions about anything you do not understand, before deciding whether or not to participate.

• PURPOSE OF THE STUDY

You are being asked to participate in a thesis research project. The purpose of this project is to examine the effects of a classroom intervention called the Caterpillar Game, on student’ inappropriate classroom behavior. To be included in the study, classroom-wide inappropriate behavior needs to be observed during 25% of the intervals during a 10 min observation.

• PROCEDURES

If you agree to participate, the study will include the following procedures/activities:

1) Implementation of the Caterpillar Game, a simple, classroom-wide behavior management system.
2) Caterpillar Game training (approx. 1 hr session) and coaching of first intervention session.
3) Classroom-wide student observations (10 min observations; as many as 2 in one day).
4) Length of participation is estimated to last 2 months, with follow-up data collected about 6 to 8 weeks later.

• POTENTIAL RISKS AND DISCOMFORTS

There are minimal risks to you as a result of your participation. Risks may include feeling anxious about learning or performing a new classroom management system. If this occurs, the primary researcher will provide additional supports/coaching in the classroom. If necessary, appropriate referrals to address anxiety or discomfort will be made on your behalf to address these or similar issues.

• POTENTIAL BENEFITS TO SUBJECTS AND/OR SOCIETY

A potential benefit of this research is to learn an easy method for reducing inappropriate behaviors class-wide in early elementary classrooms. Anticipated results include increasing the positive interactions between you and your students and increased appropriate behavior from the entire class. Results from this study may assist in promoting the use of the Caterpillar Game with other teachers, schools, and districts. The Caterpillar Game materials will be offered to you to keep at the end of the study.

• CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law.
Confidentiality will be maintained by means of assigning you a number, which will be used to identify you and your class during data collection.

**PARTICIPATION AND WITHDRAWAL**

Your consent to participation in this research project is completely voluntary and refusal to participate will result in no penalty, repercussions, or loss of benefits to which you are otherwise entitled. Further, you may discontinue participation at any time without penalty or repercussion.

**IDENTIFICATION OF INVESTIGATORS**

If you have questions or concerns regarding the research, please contact Amber Jacoby, at 618.570.0582 or by email at aljacoby@eiu.edu. You may also contact her Faculty Sponsor Margaret Floress, Ph.D. at 217.581.2127 or by email mfloress@eiu.edu.

**RIGHTS OF RESEARCH SUBJECTS**

If you have any questions or concerns about the treatment of human participants in this study, you may call or write:

Institutional Review Board  
Eastern Illinois University  
600 Lincoln Ave.  
Charleston, IL  61920  
Telephone: (217) 581-8576  
E-mail: euiirb@www.eiu.edu

You will be given the opportunity to discuss any questions about your rights as a research subject with a member of the IRB. The IRB is an independent committee composed of members of the University community, as well as lay members of the community not connected with EIU. The IRB has reviewed and approved this study.

I voluntarily agree to participate in this study. I understand that I am free to withdraw my consent and discontinue my participation at any time. I have been given a copy of this form.

_________________________  
Printed Name of Participant

_________________________  
Signature of Participant  
Date

I, the undersigned, have defined and fully explained the investigation to the above subject.

_________________________  
Signature of Investigator  
Date
APPENDIX I
Parent Passive Consent Form

Dear Parent,

Your child’s classroom teacher is participating in a research study conducted by Amber Jacoby and Margaret Floress, Ph.D., from the psychology department at Eastern Illinois University.

The purpose of this project is to examine the effects of a class-wide management system called the Caterpillar Game on students’ classroom behavior.

Your child’s teacher has agreed to implement the Caterpillar Game in his/her classroom which includes praising children when they display appropriate behavior and simultaneously moving a token up 8 segments to earn a reward activity (e.g., playing Simon Says). If a child breaks a classroom rule, the class as a whole moves further away from receiving a reward activity.

All students in the class will be randomly observed via direct observation to obtain a measure of classroom inappropriate behavior. No more than 2 (10 min) observations will take place a day. Data collection is estimated to last 2 months with follow-up data collection approximately 6 to 8 weeks later.

No risks are anticipated for your child. During the intervention the teacher will identify appropriate and inappropriate student behavior, with an emphasis on identifying appropriate behaviors. It is possible that when the teacher moves the token further away from earning a reward activity, this may cause disappointment and mild discomfort to students. Reinforcement and response-cost has been supported through empirical research to have minimal risks, and most importantly increase desired behaviors.

Anticipated results include increasing the positive interactions between students and the classroom teacher. In addition, it is possible that the Caterpillar Game will lead to an increase in appropriate behavior classroom-wide.

No individual student information will be collected and therefore, no data will be linked or identified with any one student in the class. Classroom-wide student observation data will be given a teacher code to also keep teacher information confidential. If you have questions or concerns about this research, please contact: Amber Jacoby, at 618.570.0582 or aljacoby@eiu.edu. You may also contact her Faculty Sponsor Margaret Floress, Ph.D., at 217.581.2127 or mfloress@eiu.edu. If you have any questions or concerns about the treatment of human participants in this study, you may call or write:

Institutional Review Board
Eastern Illinois University
600 Lincoln Ave.
Charleston, IL  61920
Telephone: (217) 581-8576
E-mail: eiuirb@www.eiu.edu

If you do not want your child to be observed, as a part of this classroom-wide project, please sign below. Your child will continue to benefit from the Caterpillar Game, as your classroom teacher has decided to implement this system in his/her classroom to possibly increase student appropriate behavior.

I do not want my child, ___________________________ to be observed via direct observation. I understand that they will continue to benefit and come in contact with the Caterpillar Game, as my child’s teacher has decided to adopt this management system into his/her classroom.

Signature of Parent/ Guardian ___________________________ Date ___________________________
APPENDIX J

Training/Coaching Outline

- Didactic approach
  - First trained in a one-on-one session with the experimenter
  - Then coached in the classroom and given feedback during the first day of the intervention implementation
    - Once the teacher has demonstrated the use of the Caterpillar Game with 100% integrity (i.e., completes 7/7 items on the integrity checklist) and is able to provide 3 BSPs per 10 minutes they are considered trained and coaching is removed.

Training Session

1. GOALS: Describe the goals of The Caterpillar Game
   a. Reduce inappropriate classroom behaviors
   b. Increase appropriate behaviors
   c. Increase positive interactions between you and your students

2. PRAISE: Discuss general and BSP
   a. Provide handout with definitions and examples
      i. Identify and attend to students' everyday appropriate behavior
         1. e.g., pushing in a chair, staying seated, or raising their hand before speaking
         2. DRA – discuss ignoring inappropriate, minor behavior that can be ignored
      ii. Two types of praise, general and behavior-specific
          1. General praise expresses approval without being specific (e.g., “Good job!” “I’m proud of you!”)
          2. BSPs expresses approval for a specific action (e.g., “Great job counting the blocks!” “I like how you are sharing the ball with your friends!”)
      iii. Moving the token down
          1. This only occurs when a classroom rule is broken
          2. Give visual signal along with brief verbal explanation. Important to remain calm, neutral and move on.
          3. Emphasize idea that identifying appropriate behavior is a stronger tool than response-cost. Therefore, should be moving tokens up much more frequently than moving tokens down.

3. APPROPRIATE BEHAVIORS: Define and teach appropriate behaviors.
   a. Announce. Teacher announces to the class that she/he is going to teach “listening attentively to instruction” (teacher will name one appropriate classroom behavior that they will teach). For a complete list of appropriate classroom behavior, see Appendix L.
   b. Why. Teacher lets the students know why performing the appropriate behavior is important
   c. Define. Teacher defines “sitting quietly at desk.” Provides 2-3 steps included in carrying out sitting quietly.
   d. Model. Teacher uses one of the three following strategies to model “listening attentively to instruction.”
      i. Identifies a child who is currently demonstrating “listening attentively to instruction.”
      ii. Prompts a child to demonstrate “listening attentively to instruction.” For example, John please show us how you “listening attentively to instruction.”
      iii. Teacher models for the class “listening attentively to instruction.”
   e. Praise. Teacher uses BSP to praise students demonstrating sitting quietly. If whole class is not demonstrating skill, teacher uses BSP to an individual child or group who is demonstrating sitting quietly.

4. CATERPILLAR GAME: Discuss implementation of the Caterpillar Game poster
   a. Announce to the class that they will start playing the Caterpillar Game and hang the chart up where all students can see
   b. Briefly remind the students the rules of the Caterpillar Game
c. If the teacher observes everyday appropriate behavior
   i. Use BSP to specifically identify what the student did that was appropriate
   ii. Moves the butterfly token one segment closer to the caterpillar head

d. If the teacher observes a student breaking a classroom rule
   i. Give a visual signal (i.e., hand held up in a “stop” position)
   ii. Briefly states the rule that was broken
   iii. Move the butterfly token one segment away from the caterpillar head

5. REWARD ACTIVITY: If the butterfly token reaches the caterpillar head the entire class is able to participate in a play activity once the classroom activity is finished
   a. Draw a reinforcement card randomly from the pile and allow the class to quickly participate
   b. Game resets and the token is moved back to the bottom so that the class has another opportunity to earn a reinforcer.

Coaching Session
1. Ensure correct implementation of the Caterpillar Game
2. Model delivering general and BSP
3. Coach teacher as he/she delivers general and BSP
APPENDIX K

Appropriate Behavior Steps

STEPS TO TEACH APPROPRIATE BEHAVIORS:

1. **Announce.** Teacher announces to the class that she/he is going to teach “listening attentively to instruction” (teacher will name one appropriate classroom behavior that they will teach).
2. **Why.** Teacher lets the students know why performing the appropriate behavior is important.
3. **Define.** Teacher defines “listening attentively to instruction.” Provides 2-3 steps included in carrying out “listening attentively to instruction”.
4. **Model.** Teacher uses one of the three following strategies to model “listening attentively to instruction.”
   a. Identifies a child who is currently demonstrating “listening attentively to instruction.”
   b. Prompts a child to demonstrate “listening attentively to instruction.” For example, John please show us how you listen attentively to instruction.
   c. Teacher models for the class “listening attentively to instruction.”
5. **Praise.** Teacher uses BSP to praise students demonstrating listening attentively to instruction. If whole class is not demonstrating skill, teacher uses BSP to an individual child or group who is demonstrating listening attentively to instruction.

**APPROPRIATE BEHAVIOR STEPS**

**Raising hand to be called on:** 1) bottom in seat/on carpet 2) hand above head 3) mouth quiet.

**Sitting appropriately in chair/carpet time:** 1) face forward 2) eyes on teacher or work 3) bottom in seat/on carpet.

**Listening attentively to instruction:** 1) mouth quiet 2) eyes on teacher or work.

**Saying Thank You:** 1) the student needs to be polite with manners such as: “thank you,” “you’re welcome,” “please,” “may I please go to the bathroom,” “thank you for letting me get a drink,” etc.

**Hands to Self:** 1) hands on lap/on sides of body 2) hands kept to self.

**Helping Others:** 1) Assist those who need help.

**Use kind words:** 1) Use uplifting words to brighten others day.

**Using inside voices:** 1) Speak in normal speaking voice.

**Responsible for personal property:** 1) Be organized 2) Do not steal or vandalize other student’s belongings.

**Clean up after yourself:** 1) Clean and clear desk/table.

**Follow directions quickly:** 1) mouth quiet (if applicable) 2) Start activity after instructions are given.

**Working on your own work:** 1) Eyes on own work 2) mouth quiet 3) hands to yourself.

**Lining up appropriately:** 1) Mouth quiet 2) hands to yourself.