2022

Investigating the Effectiveness of the Positive Reinforcement Components of Tootling

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Recommended Citation

Alstead, K. J. (2022). Investigating the effectiveness of the positive reinforcement components of tootling [Doctoral dissertation, Minnesota State University, Mankato]. Cornerstone: A Collection of Scholarly and Creative Works for Minnesota State University, Mankato. https://cornerstone.lib.mnsu.edu/etds/1193/

Investigating the Effectiveness of the Positive Reinforcement Components of

Tootling

By

Kennedi J. Alstead, M.S.

A Dissertation Submitted in Partial Fulfillment of the

Requirements for the Degree of

Doctor of Psychology

In

School Psychology

Minnesota State University, Mankato

Mankato, Minnesota

April 2022

Date: April 2022

Title: Investigating the Effectiveness of the Positive Reinforcement Components of

Tootling

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Dedication

To my family, thank you for your continuous support and encouragement throughout my entire college career. It never went unnoticed.

Abstract of the Dissertation

Investigating the Effectiveness of the Positive Reinforcement Components of Tootling

By

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Doctor of Psychology in School Psychology
College of Graduate Studies and Research
Minnesota State University, Mankato, 2022

Disruptive behavior in the classroom can have a negative impact on students' academic and social outcomes. Additionally, teachers have expressed difficulty with implementing class-wide behavioral interventions that address this problem. Tootling is a class-wide, positive behavioral intervention that has been shown to increase prosocial behavior and academic engagement, as well as decreasing disruptive behavior in the classroom. Tootling is derived from another form of positive peer reporting and is considered the opposite of tattling. In tootling, students report on their peers' prosocial behaviors. This intervention has multiple components that assist in its effectiveness. Specifically, there are three components with aspects of positive reinforcement: interdependent group-oriented contingency, public posting of progress feedback, and specific verbal feedback and praise. No research to date has analyzed the effectiveness of the multiple components of tootling.

The current study examined how effective each of the positive reinforcement components of tootling are in increasing on-task behavior and decreasing disruptive behavior in a 5th grade general education classroom through the implementation of a multiple treatment reversal design. Results of this study demonstrated that the interdependent group-oriented contingency was the most effective component in increasing on-task behavior and decreasing disruptive behavior. The specific verbal feedback and praise component also had moderately positive effects; however, the public posting of progress feedback component had inconclusive effects. The classroom teacher rated tootling and its components as a highly acceptable intervention according to a modified version of the IRP-15. Additional research investigating the individual components of tootling in a variety of settings and with a variety of individuals is needed to determine the effectiveness of each component on behavior.

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Chapter 1

Introduction

Disruptive behavior in the classroom can have a negative impact on students'

academic and social outcomes by interfering with classroom instruction (Hofstadter et al.,

2009; Lambert et al., 2015; Lum et al., 2017). Unfortunately, many teachers continue to

struggle with managing student behavior and promoting appropriate behavior in their

classroom (Cihak et al., 2009). It is also more common for teachers to observe the

negative behaviors that occur in the classroom as opposed to prosocial behaviors, which

are seen as expected (Akin-Little et al., 2004). Additionally, it is often difficult for

teachers to observe both prosocial and negative behaviors due to the other demands on

their time and attention, such as class-wide instruction or other student needs (Lambert et

al., 2015). This situation can then lead to teachers relying on student reports on their

classmates' behaviors (which are often negative) and can also lead to a lack of

opportunity for teachers to reinforce student prosocial behaviors (Cihak et al., 2009). This

creates a demand for effective and efficient class-wide behavioral interventions to

remediate these concerns in the classroom.

Tootling

Tootling is a peer-mediated, class-wide, positive behavioral intervention that has

demonstrated effectiveness in decreasing disruptive behaviors, as well as increasing

prosocial behaviors and academic engagement in the classroom (Cashwell et al., 2001;

Cihak et al., 2009; Lambert et al., 2015). The term "tootling" comes from the word

"tattling" and the phrase "tooting your own horn" (Skinner et al., 2000). Instead of

students reporting on peers' negative behaviors, tootling encourages students to report on their peers' prosocial behaviors (i.e., sharing with another student). Recent research on positive behavioral interventions has included peer-mediated interventions, such as tootling, which may be a more preventative and proactive approach to managing student behavior (Shelton-Quinn, 2009). It is often seen as unrealistic for general education teachers to implement many individualized interventions for students while managing the rest of their responsibilities throughout a given school day (Collins et al., 2018). Peer-mediated interventions can be a more effective way of implementing interventions in the classroom. In peer-mediated interventions, peers are the change agent leading to positive behavioral change, instead of having teachers or other support staff manage all of the behavioral interventions in the classroom. Students can be trained in these peer-mediated interventions to teach, reinforce, model, and encourage prosocial behaviors among their peers. Using students as the change agents is more cost-effective, more generalizable, and less obtrusive in the classroom setting than interventions mediated by teachers (Shelton-Quinn, 2009). It also allows for immediate feedback and more opportunities to respond (Collins et al., 2018). These interventions have been shown to improve students' academic, behavioral, social, and communicative behaviors. Specifically, they have been effective in improving academic achievement, decreasing disruptive behaviors, increasing on-task behaviors, and increasing students' social skills and self-esteem (Kaya et al., 2015) for elementary students all the way up to high school students (Dunn et al., 2017).

Typically, when implementing the tootling intervention in a research context, researchers first train the cooperating teacher in the intervention. Explicit instruction, including opportunities to respond, and behavioral skills training are the key components within the tootling training procedures. Training the teacher in the intervention usually consists of one short session describing the intervention and providing a script for training the students. Once this is completed, the researchers and the teacher will train the students in the tootling process, using the script as a guide (Lambert et al., 2015). Training the students includes instruction on what prosocial behaviors are, how and when to write a tootle, and how to earn their group reinforcement. Training the students consists of either one to two sessions depending on how well the students understand the intervention (Cashwell et al., 2001; Cihak et al., 2009). Once the students have been trained in the intervention, the researchers, teacher, and students agree on a set number of tootles needed to reach their goal. They also agree on a group reinforcement, to be awarded once the class reaches its goal.

After the training sessions, tootling is implemented in the classroom. Typically, students will write their tootles during designated transition or break times to not disrupt instruction. The teacher will read out loud the correct tootles that were written that day and provide specific verbal feedback and praise to the students who wrote the tootles and the students who were the recipients of the tootles. Corrective feedback is provided for incorrect tootles. This can be done at the end of the school day or the morning of the next school day depending on what is more feasible to the teacher. These tootles are then added to the cumulative total of tootles, which can be displayed in the front of the

classroom by a dry-erase class thermometer. This process is continued until the students reach the number of tootles specified in their goal. Once they have reached their goal, the class will receive an interdependent group-oriented contingency (class-wide reward), the number of tootles starts back at zero, a new goal number of tootles is set, and a new class-wide reward is selected.

Past Tootling Research

Researchers have demonstrated tootling's effectiveness in increasing prosocial behaviors, increasing on-task behaviors, and decreasing disruptive behaviors in the general education classroom setting (Cashwell et al., 2001; Cihak et al., 2009; Lambert et al., 2015; Skinner et al., 2000). The majority of research on tootling has occurred in middle to upper elementary general education classroom settings, with more recent research extending tootling to other settings such as middle school classrooms, high school classrooms, a post-secondary special education setting, and an after-school program (Kirkpatrick et al., 2019; Lipscomb et al., 2018; Lum et al., 2017). The following sections will describe past tootling research conducted with a variety of student populations and in a variety of settings. Past research was described in chronological order to best illustrate the evolution of tootling research. For example, dependent variables used in tootling research have become more effective over time, and tootling has been applied increasingly in a variety of settings. Limitations and suggestions for future research were also identified and are described in this section.

Populations and Settings

While most research on tootling has been conducted within elementary general education classroom settings, additional research has looked into the effectiveness of tootling within middle school classrooms, high school classrooms, after-school programs, and even with postsecondary students with disabilities. Although the research outside of elementary general education settings is not as extensive, initial results indicate promising potential for generalizing tootling to these settings.

Elementary School. Skinner et al. (2000) were the first to publish research on tootling, which they positioned as a modification of positive peer reporting (PPR). They implemented tootling with interdependent group contingencies and publicly posted feedback of their progress in a general education classroom consisting of 28 4th-grade students, none of which were receiving special education services. Using an ABAB withdrawal design, the students in the classroom exhibited increased reports of prosocial behaviors during the tootling intervention; however, the authors did not investigate the impact of tootling on observable student behaviors. The researchers published another study in which tootling was implemented in a 2nd-grade general education classroom using an ABAB withdrawal design (again, none of the students received special education services; Cashwell et al., 2001). Their goal was to extend tootling to a younger group of students to investigate whether they could successfully participate in tootling. Thus, the dependent variable in this study was again reports of prosocial behavior (tootles) rather than the observable behavior itself. In this study, the baseline phase was the tootling intervention without the interdependent group contingency component and publicly posted progress feedback and the intervention phase consisted of all three

components. During the intervention phase, reports of peer prosocial behavior increased, suggesting that 2nd-grade students may be able to participate in tootling and that tootling with the additional components was more effective in increasing reports of peer prosocial behavior than tootling alone. In both of these early studies, the dependent variable is a limitation. Tootling may have only increased the reports of peer prosocial behavior rather than increasing the actual frequency of prosocial behavior.

Cihak et al. (2009) were the first to publish research on the effectiveness of tootling in decreasing disruptive behaviors in the classroom and were also the first in the published research to include students with disabilities. Within the Cihak et al. (2009) study, tootling was implemented in one 3rd-grade inclusive classroom that included four students with disabilities (SLD and/or ADHD) using an ABAB withdrawal design. Tootling was associated with a decrease in disruptive behaviors. The authors hypothesized that this was a result of increased positive reinforcement for prosocial behavior and possibly a decrease in reinforcement available for disruptive behavior. These researchers were also the first in the published literature to investigate the social validity of tootling. The classroom teacher reported favorable opinions about the tootling intervention and the improvements in students' behaviors; student perceptions of social validity were not measured.

Other studies have also investigated teacher acceptability of tootling. Lambert et al. (2015) implemented tootling in two elementary general education classrooms, and both teachers rated it highly acceptable. In this study, researchers implemented tootling in two general education classrooms, one 4th-grade classroom and one 5th-grade classroom.

The 5th-grade classroom did not include students with disabilities; however, the 4th-grade classroom included two students with a specific learning disability. These researchers used an ABAB withdrawal design with a multiple baseline element across classrooms and were the first to determine if tootling would also be effective in both decreasing disruptive behaviors and increasing rates of appropriate behaviors. The results of this study indicated that tootling was effective in decreasing class-wide disruptive behaviors and increasing appropriate behaviors across both classrooms. However, no data were collected regarding the effectiveness of the intervention specifically for the students with disabilities.

McHugh et al. (2016) furthered the tootling research for lower elementary general education classrooms. This study included three classrooms containing 2nd-and 3rd-grade students. One classroom contained no students receiving special education services, the second classroom contained three students identified as English learners and were identified as having a disability under Other Health Impaired, and the third classroom had one student who received services under Other Health Impaired. There was one target student within each classroom that individual data would be collected on as the tootling intervention was taking place. None of these target students were receiving special education services; however, they were all identified as demonstrating greater disruptive behavior than their peers. The researchers used an ABAB withdrawal design along with a multiple baseline design across three classrooms. The purpose of this study was to determine the effectiveness of tootling on decreasing disruptive behavior and increasing academic engagement for the entire class, as well as individual target students' behavior.

This is also the first tootling study to look at the effectiveness of the behavioral intervention on an academic dependent variable. Similarly, this study found that tootling was effective in decreasing class-wide and individual target student disruptive behavior. They also found that tootling increased class-wide and individual academically engaged behavior.

A more recent study conducted by McHugh Dillon et al. (2019) sought to evaluate the effect of tootling, with the modification of including ClassDojo technology on class-wide disruptive behavior and academically engaged behavior. This study included three 5th-grade classrooms. Three students received special education services in the first classroom under Other Health Impaired and one student under Autism Spectrum Disorder. No students in the second classroom received special education services and five students in the third classroom received special education services under Specific Learning Disability and Other Health Impaired. Tootles were recorded through the use of the ClassDojo website and displayed to students via a projector. An ABAB withdrawal design in three classrooms was used. Results indicated that tootling with the use of ClassDojo technology is effective in decreasing disruptive behavior and increasing academically engaged behavior in the classroom.

Middle School. Tootling was most recently implemented in a middle school setting (Chaffee et al., 2020). This study sought to examine the effectiveness of tootling across two middle school classrooms on decreasing disruptive behavior and increasing academically engaged behavior. Two general education middle school classrooms participated in this study. One classroom had one student with a 504 plan for attention-

deficit/hyperactivity disorder, and the other classroom had four students receiving special education services. Three of those students were receiving services under Other Health Impairment and one under Traumatic Brain Injury. It was thought that the use of positive peer reporting within a middle school setting could have the potential of being rejected as adolescents may assert independence from adults. However, the researchers also suggested that social pressure and self-growth also occurring during adolescence may lend to its effectiveness. This study demonstrated that tootling was effective in increasing academic engaged behavior and decreasing disruptive behavior in each middle school classroom.

High School. Also, until recent years, tootling had mostly been implemented in elementary general education classrooms. Previous researchers had mentioned that future research should be conducted to determine if public prosocial comments may be embarrassing to older students (Cihak et al., 2009; Lambert et al., 2015). There had been concerns about the effectiveness of tootling for this population. The effectiveness of tootling in secondary settings was first addressed by a group of researchers who implemented tootling in three high school general education classrooms using an ABAB withdrawal design with follow-up in each of the three classrooms (Lum et al., 2017). The researchers did not specify if any of the students in the three classrooms had a disability, but all three classrooms were chosen based on high levels of disruptive behavior. Tootling was shown to be effective in decreasing class-wide disruptive behaviors and increasing on-task behavior across classrooms. The results from this study are important because it is the first example of published literature of implementing tootling in high

school general education classrooms, which provides an initial indication that it may be effective among older students. Additionally, the researchers found that tootling implementation led to an increase in academic engagement.

In 2019, Lum et al. conducted another study that examined the effects of tootling on three high school general education classrooms in decreasing disruptive behavior and increasing academically engaged behavior. Three students in the first classroom received special education services for Specific Learning Disability, no students in the second classroom received special education services, and four students in the third classroom received special education services for Specific Learning Disability and one received services for Other Health Disabilities. A withdrawal design was used for all three classrooms. This time, a randomized independent group contingency was used to reward students instead of an interdependent group contingency. Teachers, at the end of the class, drew three submitted tootles and rewarded the students for whom the tootle was written about. They also drew the names of two students who wrote a tootle and rewarded them as well. All three classrooms had decreases in disruptive behavior and increases in academically engaged behavior in their classrooms during the tootling phases. This study suggests that a modified tootling procedure may be effective in improving behavior in high school classrooms.

After-School Program. An additional extension of the tootling research was conducted by Kirkpatrick et al. (2019). This study sought to determine if tootling decreased antisocial/disrespectful interactions of four, teacher-nominated, 3rd-grade students in an after-school setting. This after-school program consisted of students who

were considered "at-risk" and who were frequently mean and disrespectful to each other and staff. There were academic activities and other non-academic activities implemented during the after-school program. The intervention was implemented in a 3rd-grade classroom which included 18 students. Direct observation was collected on four African American students, two boys and two girls. None of the four students were receiving special education services, but three were receiving additional reading instruction. Results from this study showed that tootling decreased antisocial/disrespectful behaviors in an after-school setting, during an academic period. This study was intended to be different from tootling interventions within the typical school day in several ways. For example, activities and routines were more varied, consequences for inappropriate behavior were less consistent, students were mixed with other students not in their typical classrooms, teachers were part-time volunteers, and researchers were responsible for implementing the intervention.

College Students. One study has been conducted on the use of tootling in a postsecondary setting (Lipscomb et al., 2018). Tootling was implemented in a comprehensive transitional program at a major university with seven emerging adult students with intellectual disabilities. This study evaluated the effectiveness of using ClassDojo alone and ClassDojo in combination with tootling. The researchers found that ClassDojo alone was more effective in reducing problem behavior in the classroom as a whole and with most individual students. However, the combination of ClassDojo and tootling was also effective in comparison with baseline measures.

Target Behaviors

Initial tootling studies used increased reports of prosocial behaviors (tootles) during the tootling intervention as their dependent variable (Skinner et al., 2000; Cashwell et al., 2001) instead of observing its effects on prosocial behavior, disruptive behavior, and on-task behavior. However, researchers later included observable student behaviors as dependent measures, because measuring the number of tootles does not determine whether or not tootling increased the rates of prosocial behavior in the classroom (Cihak et al., 2009; Lambert et al., 2015; Lum et al., 2017). These studies demonstrated tootling's effectiveness in increasing prosocial behaviors and on-task behaviors, as well as decreasing disruptive behaviors in the classroom.

Prosocial Behavior. The first tootling study published (Skinner et al., 2000), determined the effectiveness of tootling on increasing prosocial behavior by counting the number of instances of peers helping classmates that were reported each day (i.e., tootle slips). However, the authors indicated that measuring the number of tootles is only the first step in determining the effectiveness of tootling changing the behavior of the students. The second study published used the same measure of prosocial behavior (Cashwell et al., 2001). More recently, researchers have used observable behaviors as their dependent measures (i.e., on-task behavior, disruptive behavior, and prosocial behavior), as tracking reports of tootles does not determine whether or not tootling increased the rates of prosocial behavior in the classroom (Chaffee et al., 2020; Cihak et al., 2009; Lambert et al., 2015; Lum et al., 2017). Lambert and colleagues (2015) were the first researchers to use an observable measure of appropriate behavior during tootling. Appropriate behavior was defined as the student being actively involved or attending to

independent seatwork, teacher instruction, designated classroom activities, and/or engaging in task-related vocalizations with teachers and/or peers. They found that tootling is effective in increasing appropriate behavior in the classroom. One major limitation of this is that the definition of appropriate behaviors includes much more than prosocial behaviors. No published study has used an observational measure of prosocial behavior to determine the impact of tootling on increasing the rate of prosocial behavior in the classroom.

Disruptive Behavior. Cihak et al. (20009) were the first researchers to determine the effectiveness of tootling on decreasing disruptive behavior in the classroom. Many subsequent studies used disruptive behavior as a dependent variable to determine the effectiveness of tootling. Disruptive behavior was defined as any of the following behaviors: talking out, out of seat without teacher's permission, and engaging in any motor behavior that interfered with another student's studying. The teacher calculated the total number of disruptive behaviors performed by the entire class by using a bracelet that contained all the initials of students in her classroom. When a student engaged in disruptive behavior, the teacher marked a tally next to the student's name. The mean number of daily disruptive behaviors per students across baseline and interventions phases were also recorded.

Lambert et al. (2015) also defined disruptive behavior as a student demonstrating at least one of the following: out of seat without permission, inappropriate vocalizations, and engaging in any motor movements unrelated to the task at hand. Chaffee et al. (2020) used the same operational definition of disruptive behavior for their study. McHugh et al.

(2016) defined disruptive behavior as a student exhibiting one or more of the following: inappropriate vocalizations, out of seat/area, or playing with objects. These behaviors were specifically chosen since they encompassed a wide variety of behaviors that the teachers indicated were most problematic in their classrooms. A latter study (McHugh Dillon et al., 2019) also used the same definition for class-wide disruptive behaviors.

Lum and colleagues (2017) also measured the effects of tootling on disruptive behaviors in the classroom. However, they determined the definition of disruptive behavior using a modified Problem Identification Interview (Kratochwill & Bergan, 1990). The three most frequent disruptive behaviors in the class according to the teacher were: inappropriate vocalizations, being out of seat, and playing with objects. Lum et al. (2019) used the same procedures to determine the three most frequent disruptive behaviors in the high school classrooms. All three teachers selected being out of seat, inappropriate vocalizations, and playing with objects as the most frequent behaviors that disrupted their class.

Kirkpatrick and colleagues (2019) also measured disruptive behavior from students but used a different operational definition to define these instances of disruptive behavior. They defined antisocial/disruptive interactions as students engaging in disrespectful or aggressive behaviors directed toward staff or other students, such as physical aggression, verbal aggression, disrespectful interactions and/or body language, statements of rejection, accusing or blaming peers, interrupting or speaking while a peer or teacher is speaking, and preventing peers from joining in games or other activities. In summary, many researchers have studied the effects of tootling on disruptive behavior in

the classroom; however, there has not been a general consensus of an operational definition for disruptive behavior across studies.

On-Task/Academically Engaged. McHugh and colleagues (2016) were the first researchers to measure the effects of tootling on academically engaged behaviors. They defined academically engaged behaviors as the student actively involved or participating in independent seatwork, group activities, and/or attending to teacher instruction, which may require vocalizations relevant to the task. Additionally, a latter study (McHugh Dillon et al., 2019) used a similar definition of academically engaged behavior, which included a student attending to teacher instruction or participating in independent seatwork and group activities.

Lum et al. (2017) measured academically engaged behavior as well and defined it as the student being actively involved or attending to independent seatwork, teacher instruction, designated classroom activities, and/or engaging in task related vocalizations with teacher and/or peers. The same operational definition of academically engaged behavior was used for their second study (Lum et al., 2019). These authors also measured passive off-task behavior. This was defined as the student not attending to the assigned task but not being disruptive.

Chaffee et al. (2020) used both passive and active academic engagement within their operational definition. Active engagement was defined as when the student was actively involved with academic tasks and/or speaking with a teacher or peer about the assigned material. Passive engagement was defined as attending to the assigned work.

Future Directions for Research

Tootling has demonstrated effectiveness in the general education classroom setting on a variety of behaviors, including prosocial behavior, disruptive behavior, and academic engagement, and at a variety of age levels, from 2nd-grade to college-level students. However, research on the effectiveness of tootling for students with disabilities is lacking (Cihak et al., 2009; Lambert et al., 2015; Lum et al., 2017), both in the general education classroom setting or in a special education classroom setting. Several studies included students with disabilities in their study; however, the researchers did not run a separate analysis for these students due to the small sample size of students with disabilities.

Additionally, researchers have yet to identify the causal mechanism(s) or most important component(s) of tootling. Since tootling is a multicomponent intervention, it is important to analyze how each of the components contributes to the effectiveness of tootling in increasing prosocial behavior and academic engagement, as well as decreasing disruptive behaviors in classrooms. Specifically, research has not isolated the effects of the tootling components which have been previously shown to be effective on their own in improving behavior. One previous study investigated the effect of adding the interdependent group contingency component, which may provide additional reinforcement for students' reports of their peers' prosocial behaviors (Cashwell et al., 2001). However, these researchers only examined how adding the group contingency component to tootling affected the number of tootles that were reported, not the actual occurrence of prosocial and disruptive behaviors. Other components within tootling have not been analyzed separately.

In order to address the limitations mentioned previously, future research should investigate the effectiveness of tootling in increasing prosocial behaviors and decreasing disruptive behaviors for students with a range of disabilities and needs. As the number of students with disabilities increases, specifically students with behavioral problems, it is more important for researchers to investigate positive behavioral interventions that address these behaviors (Conroy et al., 2008). Therefore, future studies should continue to evaluate the effectiveness of tooling outside of general education settings, including in special education classrooms, alternative education classroom settings, or juvenile detention centers. Additional research could also evaluate the effectiveness of tootling for students with specific disabilities, such as Emotional/Behavioral Disorders, Autism Spectrum Disorder or Attention-Deficit/Hyperactivity Disorder. This will facilitate the generalization of tootling to a wider variety of settings and populations.

Additionally, since tootling is a multicomponent intervention, future research should evaluate the effectiveness of each of these components in the intervention. For example, research could analyze the separate impact of the peer-mediation component, the training procedures utilized, the interdependent group-oriented contingency, and the different aspects of feedback utilized. The following sections will discuss several individual components of tootling that have demonstrated effectiveness in creating positive behavioral change.

Analysis of the Positive Reinforcement Components of Tootling

Tootling is a class-wide, behavioral intervention with multiple components combined with the goal of creating positive behavioral change (Skinner et al., 2000).

Several of these components include rewarding stimuli in an attempt to positively

reinforce appropriate behavior. Positive reinforcement is the addition of a reinforcing

stimulus that increases the probability of the behavior occurring again in the future

(Miltenberger, 2016). Therefore, in order to consider these components of tootling

positive reinforcement components, one is assuming that the rewards being provided are

in fact positive reinforcing to students. Positive reinforcement has been shown to

decrease problem behavior and improve prosocial behavior as well as increase in

academic achievement for all students (Horner & Macaya, 2018; Reinke et al., 2007).

Additionally, by teaching positive social skills, acknowledging when students engage in

positive behaviors, and positively reinforcing those positive behaviors, students who are

at risk for problem behavior often demonstrate improvements in their behavior. The

components within tootling that include rewarding stimuli in an attempt to provide

positive reinforcement are (a) interdependent group-oriented contingency, (b) public

posting of progress feedback, and (c) specific verbal feedback and praise.

Interdependent Group-Oriented Contingency

The first component of tootling that attempts to positively reinforce students using

rewarding stimuli is the interdependent group-oriented contingency (Skinner et al., 2000).

During the training session(s), the class decides on a total number of tootles needed to

receive a class-wide reward. The students, in collaboration with the classroom teacher,

decide on the reward that will be earned by reaching the predetermined number of

tootles. Tootling facilitates cooperation among students by having them work toward a

common goal. Once the students reach their predetermined number of tootles, the entire

class earns their reward and the number of tootles resets to zero and the process repeats, beginning with the teacher and students determining another goal and interdependent group contingency. The effectiveness of the interdependent group-oriented contingency as positive reinforcement is dependent on the value that the student places on the class-wide reward, meaning that if the student considers the class-wide reward as a rewarding stimulus, then they will be more likely to write tootles again in the future. In this case, the quantity of tootles from students as a group is directly reinforced.

Group-oriented contingencies have been shown to be an effective and efficient way to manage student behaviors (McKissick et al., 2010). Copious amounts of research have supported the evidence to support the effectiveness of using contingent rewards to enhance the quality of performance for children (Skinner et al., 2004). Specifically, when children are given access to reinforcers that are contingent upon performance of a target behavior or meeting a criterion, they exhibit improved performance in these areas. Educators can also increase the probability that students will choose to engage in appropriate behaviors by improving the rates, quality and immediacy of the reinforcement for the appropriate behaviors as well as decreasing the rate of inappropriate behaviors. Group-oriented contingency programs have been shown to decrease disruptive behavior across a wide range of students from preschool to high school, as well as students with disabilities (Ling et al., 2011).

One common difficulty associated with reinforcement programs, such as group contingencies, is that many educators disagree with providing tangible rewards contingent upon positive behavior (Skinner et al., 2004). Additionally, there are concerns

with students consistently not meeting the criterion and becoming frustrated (Ling et al., 2011). However, there are many beneficial aspects to implementing a group-oriented contingency program in a classroom setting. These interventions require less time and effort for teachers because students are receiving a reward based on an overall group contingency, not a contingency for a specific individual. Second, students are not singled out and reinforced for the appropriate behavior related to their individual contingency. Finally, group-oriented contingencies use peer influence and attention as a way to improve classroom behaviors and decrease unwanted, inappropriate behaviors.

      Three types of group-oriented contingency programs can be implemented to increase appropriate behavior and decrease inappropriate behavior by students: independent, dependent, and interdependent group-oriented contingencies (Skinner et al., 2004). These types of group-oriented contingency programs differ in how students are reinforced based on individual and group performance. Independent group-oriented contingencies consist of individuals receiving rewards based on their own behaviors meeting a criterion; however, the target behaviors, criteria, and rewards are the same for all students. Dependent group-oriented contingencies consist of all individuals receiving or not receiving access to a reward based on an individual student's or a few students' behavior; therefore, the access to the reinforcement is not based on a student's own behavior, but that of a select few in the larger group. Finally, interdependent group-oriented contingencies, which is used during tootling, involve an entire group/classroom earning a reward based on the entire group meeting a specific goal or criterion. In this

case, the access to the reward is based on the individual's behavior as well as their

classmates.

Research has demonstrated the additional benefits of using an interdependent

group-oriented contingency (which tootling utilizes) over the other two types of group-

oriented contingency programs (Ling et al., 2011). This type of contingency encourages

students to work together to reach a common goal or reward. This enables cooperation

and increased prosocial interactions between the students in the classroom. It has also

been identified as easier to implement for teachers since only one contingency is in place

and all students receive the same reward based on the performance of their entire group.

Additionally, interdependent group-oriented contingencies reduce the possibility of

jealousy and peer rejection since the entire group either receives the award or not based

on the entire group performance (Murphy et al., 2007). Interdependent group-oriented

contingency programs have demonstrated effectiveness in decreasing disruptive

behaviors and increasing on-task behaviors for students of a variety of grade levels (Ling

et al., 2011). Tootling uses the interdependent group contingency with the expectation

that it will increase the motivation of students to engage in the intervention by writing

tootles in order to receive a reward (Lum et al., 2017).

Feedback

The next two components of tootling that attempt to positively reinforce students

using rewarding stimuli are the provision of feedback, both through public posting of

progress toward group contingencies and verbal feedback from the teacher (Skinner et al.,

2000). Daily progress toward the goal number of tootles is tracked using visual

representation of tootles (i.e., a thermometer tracking the number of tootles needed to reach their goal, and a clear container in which students place their tootles). The visual representation allows students to see their progress toward receiving the interdependent group-oriented contingency. Students can see the class's progress towards their goal which, if the students find the visual cue reinforcing, should provide additional reinforcement and encouragement for students to write tootles on their peers' prosocial behaviors (Cashwell et al., 2001).

Additionally, during tootling, teachers at the end of the school day or the beginning of the following school day will often read aloud some of the tootles that were written and provide specific feedback and praise to the students who wrote the tootles, the students that engaged in the prosocial behavior, and to the whole class on their progress toward the tootle goal. Students also provide specific feedback through the writing of tootles on their peers' prosocial behaviors. For this component, if students find attention from the teacher reinforcing, both for writing a tootle and engaging in prosocial behavior, students will be more likely to write a tootle and engage in prosocial behavior in the future.

Feedback is one of the most influential factors in changing behavior, learning, and achievement (Hattie & Timperley, 2007). Feedback can be defined as "information provided by an agent regarding aspects of one's performance or understanding" (Hattie & Timperley, 2007, p. 81). By including feedback into the classroom environment, classroom behavior can improve dramatically. Performance feedback that contains elements of praise, immediacy, specificity, and public posting of progress have been

shown to be effective in improving positive behaviors as well as academic achievement (Van Houten et al., 1975). Feedback is also considered most effective when it is visually presented, auditorily presented, or computer-assisted and when it relates to specific goals that have been set (Hattie & Timperley, 2007). Tootling incorporates effective feedback components of public posting of progress feedback and specific verbal teacher feedback and praise throughout the implementation of the intervention. Each of these elements will be discussed in the following sections.

Public Posting of Progress Feedback. Feedback regarding progress toward reaching a goal has been shown to increase effectiveness of an intervention. Research has also found public posting of feedback effective in improving positive behavior in a variety of settings and for a variety of individuals (Van Houten et al., 1975), such as psychiatric aides, tutors, teachers, and elementary school students (Van Houten & Van Houten, 1977). It is also seen as a simple and effective way to manage classroom behavior. One study documented how publicly posting the names of children who returned to class quickly after recess led to a decrease in the number of students who were late for class (Hall et al., 1970). Research also shows how posting both individual and team/class performance is more effective than posting just individual performance (Van Houten & Van Houten, 1977). Finally, public posting of progress was also linked to an increase in on-task behaviors and an increase in feedback from peers (Kastelen et al., 1984). Students were also interested in seeing how they were performing based on the posted feedback, which demonstrates the social validity of public posting of progress feedback. Progress toward the group's tootle goal is publicly posted in the tootling

intervention, which according to past research, should be motivating for students and may help them reach their goal.

      Specific Verbal Feedback and Praise. Research also shows that feedback must be specific to the task, process, and performance of the individual or group. Specifically, the feedback should address the following questions: (1) Where am I going? (2) How am I going? (3) Where to next? (Hattie & Timperley, 2007). First, the specific feedback given should address where the students need to go in order to be successful. This can be done through setting challenging but specific goals. By setting a goal, students know where they need to be and can monitor their performance in order to reach this goal. Second, in providing feedback on how a student is going, the teacher should provide information related to the task at hand or a performance goal that has been set. Lastly, in providing feedback to address where to next, the teacher can provide information that allows for greater possibilities for learning, such as greater self-regulation of the task, fluency of the task, and an increased understanding of the task. Each of these three questions should be answered when providing specific feedback to give students information about their performance, specifying what was done well, what needs improvement, and how to improve (Elliot et al., 2000).

      Researchers have examined the effects of different forms of feedback, including specific positive feedback, specific negative feedback, non-specific positive feedback, non-specific negative feedback, and no feedback (Orluwene & Ekin, 2015). They found that students who received specific feedback, whether positive or negative, improved significantly on academic related tasks than those who received non-specific feedback.

This corresponds with other findings on specific feedback being more effective in enhancing learning in the classroom (Chase & Houmanfar, 2009). Specific feedback allows for students to understand how they performed and how they can improve (Orluwene & Ekin, 2015).

Research has also demonstrated the effectiveness of teachers using verbal praise in improving social skills and academic performance (Reinke et al., 2013). Specifically, verbal praise from teachers has been shown to increase appropriate behavior of disruptive students, decrease off-task behavior, decrease disruptive behavior, and increase academic engagement of all students (Reinke et al., 2007; Reinke et al., 2013). Additionally, verbal praise increases the intrinsic motivation of students by helping them feel more confident in their abilities (Reinke et al., 2007). By increasing positive interactions with students, even the most challenging students demonstrate improvements in compliant and positive behavior. Not only do teachers have the ability to modify behavior through praise, students may also positively reinforce one another through facial expressions, comments, or subtle gestures (Maag, 2001). Peer feedback has been found to be effective in improving class performance (Van Houten & Van Houten, 1977). In fact, peer-mediated feedback provides many benefits in improving positive social behavior from students (Ragland et al., 1981), such as a cost-free resource that is plentiful in a classroom environment and being time-efficient due to feedback alone being able to produce behavioral change from peers. When peers as well as adults in the classroom serve as sources of feedback, the rate of feedback and the classroom environment may improve.

Purpose of Present Study

Tootling has been found to be effective in improving a variety of behaviors in the general education classroom setting, including prosocial behavior, disruptive behavior, and academic engagement, and at a variety of age levels, from 2nd-grade to post-secondary. However, as previously mentioned, researchers have yet to identify the causal mechanism(s) or most important components of tootling (Cihak et al., 2009; Lambert et al., 2015; Lum et al., 2017). Since tootling is a multicomponent intervention, it is important for researchers to analyze how each of the components contributes to the effectiveness of tootling in increasing positive behaviors (i.e., academic engagement and prosocial behaviors) and decreasing disruptive behaviors in classrooms. Researchers have not separated the effects of the individual components that comprise tootling which have been previously shown to be effective on their own in improving behavior. One previous study investigated the effect of adding the interdependent group contingency component, which may provide additional reinforcement for students' reports of their peers' prosocial behaviors (Cashwell et al., 2001). However, these researchers only examined how adding the group contingency component to tootling affected the number of tootles that were reported, not the actual occurrence of prosocial and disruptive behaviors. Other components within tootling have not been analyzed separately.

The current study seeks to analyze the individual effectiveness of the three positive reinforcement components of tootling: interdependent group-oriented contingency, public posting of progress feedback, and specific verbal feedback and praise. These three components were selected for the component analysis for several reasons. First, each component utilizes positive reinforcement, which is beneficial for

behavioral change. Additionally, each of these components can be removed or added

depending on their effectiveness, the resources available, feasibility, and teacher

preference. Each of these components has beneficial contributions to the intervention but

should be evaluated to understand the primary drivers of behavioral change from tootling.

The following questions will be used to guide the present study:

1. To what extent does the interdependent group-oriented contingency impact

   classroom behaviors during tootling?

2. To what extent does the addition of public posting of progress feedback impact

   classroom behaviors during tootling?

3. To what extent does the addition of specific verbal feedback and praise impact

   classroom behavior during tootling?

4. To what extent is tootling considered to be acceptable, effective, and useful, as

   indicated by the classroom teacher's response to an acceptability survey and

   students' utilization of tootling?

   Several hypotheses were proposed in this study. First, it was predicted that the

interdependent group-oriented contingency would account for the most positive

behavioral change when implemented by increasing on-task behavior and decreasing

disruptive behavior. Group-oriented contingencies have been shown to improve

classroom behaviors and decrease unwanted, inappropriate behaviors (Ling et al., 2011).

Interdependent group-oriented contingencies encourage students to work together to

reach a common goal or reward. This enables cooperation and increased prosocial

interactions between the students in the classroom. Second, it was hypothesized that the

classroom teacher would find the overall tootling intervention and each individual component acceptable and effective to use with their students, as previous research has identified tootling as an acceptable intervention (Cihak et al., 2009; Lambert et al., 2015). Finally, it was predicted that the students' utilization of tootling would follow a similar trend to the addition and removal of the positive reinforcement components of tootling due to initial tootling research using tootle reports as an indication of positive behavioral change (Cashwell et al., 2001; Skinner et al., 2000).

Chapter 2

Method

Participants and Setting

Prior to the start of the study, the researcher met with the principal at a middle

school in the upper Midwest. The middle school contained a total of 906 students in

grades 5th through 8th. The study was described and a request for potential participants

was made. The administrator granted approval of the study and suggested a 5th-grade

teacher that she thought would be excited and willing to participate in the study. An

introductory email was sent to the teacher, describing the basis of the study and tootling

intervention, and requesting her participation in the study. A meeting was set with the

teacher to discuss the intervention procedures.

During the initial meeting, the researcher introduced tootling again, the

effectiveness of the intervention for similar settings, and what the intervention would

look like in her classroom (i.e., listing all the components, expected timelines,

expectations from the teacher and students, and possible rewards for students). The

teacher mentioned she had done something similar last year for her students and was

interested in doing it again due to the positive effect it had on their classroom behavior.

Consent forms that explained the tootling intervention were then sent to all

parents by the students' classroom teacher using parents' preferred method of contact

(Appendix A). This consent form discussed the tootling procedure that would be

implemented in the classroom, what data the researchers would be collecting, and the

potential benefits to participation. The consent form stated there are few foreseeable risks

and that no individual data would be collected regarding their child. All students in the classroom would participate in the intervention and data would only be collected on the classroom as a whole. Contact information for the researcher was provided so that parents/guardians could ask any questions or concerns. A waiver of documented consent was obtained from the university's Institutional Review Board since no personally identifiable data were collected and tootling is a typical educational practice. The researcher waited two weeks to start data collection to allow time for parents to contact the researcher with any questions or concerns.

Participants included students and a classroom teacher in one 5th-grade general education classroom within a middle school in the upper Midwest. Specifically, the teacher's Social Studies class was suggested for implementation due to the amount of social interaction expected during lessons while working on group projects and assignments. This Social Studies class occurred during the last hour of the day (2:15pm - 3:00pm). This classroom was an inclusive classroom, with five students receiving special education services in the class and 34 students total. The teacher reported to the researcher at the beginning of the year that this class struggled to stay on-task during a given class period and had difficulty with following school-wide expectations. She was concerned about the lack of academic engagement and levels of disruptive behavior with the students in this class.

The classroom teacher had a bachelor's degree in Elementary Education, an Elementary Education license (1st – 6th grade), and over 30 years of experience teaching

in an elementary or middle school setting; however, this was her first year teaching

Social Studies due to staff reductions from the previous school year.

Observations were conducted during the first 15 minutes of class instruction

during the period, starting around 2:15pm and ending at 2:30pm. Typical instruction or

activities during this time were group projects and assignments, individual projects,

content-related short videos, and whole-class instruction with multiple opportunities to

respond.

Research Design

This study used a multiple treatment reversal design within one classroom.

Specifically, an A/AB/A/AB/ABC/AB/ABC/ABCD/ABC/ABCD reversal design was

used for the implementation of the different tootling component combinations within the

one classroom. Phase changes occurred when the data of the primary dependent variable

(on-task behavior) was stable and at least three data points had been collected. Each

phase included a specific combination of components. Component A consisted of tootling

through only the writing and collecting of tootles, and all other components were then

added to this. Component B was the interdependent group-oriented contingency

component, Component C was the public posting of progress feedback component, and

Component D was the specific verbal feedback and praise component. When the

components were combined (i.e., ABC and ABCD), they were implemented

simultaneously. These components and combinations of components will be described in

greater detail in the procedures section.

Materials

Materials used for this study included tootle cards for the students to report their peers' prosocial behavior, a tootle box to collect tootles, a dry-erase thermometer for publicly posted feedback, rewards for the students when they reached their goals, the data collection sheet filled out during each observation session, the fidelity checklist completed by the observer, and the social validity measures completed by the classroom teacher and students.

Tootle Cards

For this study, tootle cards were used when a student witnessed an instance of prosocial behavior by a peer (see Appendix B). The card included space for the tootler's name, the peer's name (who performed the prosocial behavior), and the prosocial behavior observed. Each tootle card was one-third of an 8" x 11" paper. These cards were placed next to the tootle box on a podium that was easily visible when students arrived to class. Per the classroom teacher request, students were only allowed to grab tootles at the beginning of the class period. Once the bell rang and instruction was about to begin, the teacher put the tootles in a drawer and did not allow students to grab one throughout the rest of the class period. Allowing students to only grab tootles at the start of class decreased the classroom disruption, as compared to allowing students to obtain tootling materials throughout the class period. Students were permitted to place the tootles in the tootle box during the last 5 min of class, before the bell rang. Tootle cards were used in all phases of the intervention.

Tootle Box

After recording a tootle, the students placed their tootle card in a large, opaque container with the label "Tootles" that was kept in an easily accessible and visible area of the classroom. Using an opaque container prevented students from seeing the number of tootles written and collected that day. The tootle box was used in all phases of the intervention.

Dry-Erase Thermometer

A large, dry-erase poster with an image of a thermometer (see Appendix C) was displayed in the front of the classroom during the "public posting of progress feedback" component (component C, during phases ABC and ABCD) to provide students with feedback regarding the daily number of tootles reported. This also served as a reminder of the number of tootles required to reach the class goal.

Rewards

Rewards were selected by the students, teacher, and researcher during the "interdependent group-oriented contingency" component (component B, during phases AB, ABC, and ABCD). The class, as a whole, was asked to come up with four reward suggestions (rewards had to require a reasonable amount of time and carried out at a reasonable cost to be considered). After four reward suggestions were listed, students voted for the reward they wanted most. Students put their heads on their desks and raised their hands to vote. The reward that received the most votes was provided to the entire class upon reaching their tootle goal. After the reward was earned, a new list of rewards was generated, and a new vote was taken.

Observation Data Collection Form

Throughout all phases, a data collection form created by the researcher was used for this study (Appendix D). The form included operational definitions of each dependent variable observed, as well as numbered intervals with boxes labeled for each behavior (on-task and disruptive) for observers to record during each 10-second interval. A free interval timer application on a smart phone and headphones were used. The app made a sound indicating the beginning of a new interval to notify the researchers when to observe behavior. There were a total of 90 observation intervals during each 15-min observation period.

Fidelity Checklist

An implementation fidelity checklist was used during one observation period of each phase to monitor the teacher's implementation across all tootling components and combinations (Appendix E). This fidelity checklist included each component and aspects of the components that needed to be included during that phase as well as aspects that should not be included or completed during that specific phase. This fidelity checklist was also provided to the teacher to serve as a guide for successful implementation for each component and combination of components to ensure the intervention was implemented as intended.

Social Validity Measures

A modified version of the Intervention Rating Profile-15 (IRP-15; Martens et al., 1985) was used to assess social validity information from the teacher (Appendix F). The IRP-15 is a rating scale used to assess various aspects of overall acceptability of an intervention. The scale uses a 6-point Likert scale (1 = strongly disagree to 6 = strongly

agree). There is a total of 15 items on the scale, with overall scores range from 15 to 90, and higher scores indicating greater acceptability. Interventions rated above 52.5 are considered acceptable (Von Brock & Elliott, 1987). The IRP-15 is a reliable measure of intervention acceptability (Martens et al., 1985) and minor modifications have not been found to affect its psychometric properties (Freer & Watson, 1999).

The measure gathered information regarding five dimensions of social validity: the acceptability, risk, time needed for implementation, generalization to other children, and the skill needed for implementation. All 15 questions were asked regarding tootling overall. A shortened version of the survey, in which one item was selected for each social validity dimension, was provided for each of the specific tootling components (interdependent group-oriented contingency, public posting of progress, and verbal praise).

The researcher also provided the classroom teacher with a list of questions to ask the students in the classroom about their feelings about tootling (i.e., acceptability, things they liked, things they did not like, and things they would change). The teacher asked these questions to the whole class while the researcher was observing in the classroom.

Dependent Measures

On-task Behavior

Students' on-task behavior was the primary dependent variable in this study and was used to decide when phase changes should occur (discussed in more detail in the next section). On-task behavior was defined as a student being engaged (e.g., passively or actively) in an assigned activity. Examples included a student sitting in their seat,

following along in a book, answering teacher-asked questions, sitting quietly while the teacher is talking, working independently at their desk, and raising their hand to ask a question. Non-examples included playing with items not related to the task, talking to peers when the student is expected to be attending to the teacher or task, and putting their head on the desk. On-task behavior was measured using 10-s momentary time sampling procedures in which on-task behavior was observed at the start of each observation interval.

Disruptive Behavior

Disruptive behavior was a secondary dependent variable and was recorded when the target student was engaged in any behavior that is distracting to the class. Examples included yelling, cursing, throwing objects, non-compliance, and aggression. Non-examples included inaudibly asking a peer for assistance on a task, doodling, daydreaming, and looking out the window or around the room. A partial-interval recording system was used to measure disruptive behavior, such that if disruptive behavior was observed during any portion of a 10-s interval, it was recorded.

Data Collection

Data was collected during 15-min sessions during each phase. Observers collected data from an unobtrusive location in the classroom to avoid distracting students. For all behaviors, observers selected a student to begin observing, and the student being observed changed for each interval. All students in the classroom were observed, and all students were observed multiple times during each observation. The rotation for observation changed each observation session to ensure that all students were observed

approximately equal. A 10-s momentary time sampling recording procedure was used to measure students' on-task behavior. Therefore, on-task behavior was either marked as present or absent at the moment that a timed interval began. Momentary time sampling provides the least biased estimate of behavior (i.e., provides the most accurate estimate of the actual incidence of behavior and does not over- or underestimate) and thus was chosen for measuring the primary dependent variable (i.e., on-task behavior; Johnston & Pennypacker, 2009).

Disruptive behavior was measured using partial interval recording. Partial interval recording is a form of interval recording in which the behavior is scored as having occurred if at least one instance of the target behavior is observed during any part of the interval (Johnston & Pennypacker, 2009). Partial interval recording is useful when observing behaviors that occur at relatively low rates or behaviors that are somewhat inconsistent in duration, thus making it a useful method for measuring disruptive and prosocial behaviors (Hintze et al., 2002). During data collection, an interval timer application was used on researchers' phones with a set of headphones to notify observers of the start of each interval.

Procedures

Teacher Training

The classroom teacher was trained individually in the use of the tootling intervention by the researcher during one 30-min session before school prior to the start of data collection. The researcher described what tootling is, how it is implemented and how the different tootling phases would be implemented in their classroom. The

protocols for student training and each tootling phase were shared with the teacher, all questions were answered prior to the start of the study, and role play sessions were conducted prior to beginning a new phase to ensure 100% fidelity of implementation.

Student Training

Prior to the implementation of the tootling procedures, the researcher and classroom teacher conducted one 30-min training session with the students in the classroom, while following a script (Appendix G). During the training session, the students were provided with examples and non-examples of positive peer helping behaviors and were taught the initial tootling procedures, including the purpose of the tootle box. Students were asked to provide their own examples of positive peer helping behaviors verbally to the class. Then, each student wrote their own practice tootle. The researcher and teacher checked each tootle and provided praise for a properly written tootle and corrective feedback when needed. All students demonstrated understanding of writing a proper tootle by checking in with the researcher or teacher prior to implementation of the intervention.

Tootling

The tootling intervention components are described in this section. Tootling was implemented in the classroom as described within the "Research Designs" section. Specifically, the order of implementation was as follows: A/AB/A/AB/ABC/AB/ABC/ABCD/ABC/ABCD. Below is a description of each combination of components included in the study.

Component A. After training the students and teachers, the researcher provided the teacher the tootle cards and the tootle box to collect tootles for the first phase of the intervention. Tootling was implemented solely through the writing and collecting of tootles during this component. For example, at the beginning of class, students grabbed a tootle card and when they wanted to write a tootle, they would do so at their desk. Then, within the last 5 min of class, students would walk to the tootle box and deposit their tootle as necessary. No discussion was held on the number of tootles collected, no feedback or praise was provided by the teacher, and no reward was received.

Combination B. Combination AB consisted of adding the interdependent group-oriented contingency to the tootling intervention (Component A). Before implementing this phase, the researcher met with the teacher and students as a whole to agree on the class-wide reward that would be obtained after reaching their tootle goal. Students verbally provided reward preferences to the researcher. Then, the class voted on their most preferred reward. The reward that received the most votes was chosen. The tootle goal was set at 40 tootles initially due to the number of tootles written within the first phase without any class-wide rewards provided. The goal continued to be adjusted according to the classroom's success of reaching the previous goal with an approximately 10% increase each time. When the class met their tootle goal, the researcher provided the whole class with their reward, the tootle goal was reset, and a new reward was chosen. Within this component, the teacher did not provide additional feedback and praise and there was no public posting of progress. The teacher informed the class every morning on their current number of tootles and if they have reached their goal. Rewards provided

during the study included an ice cream sundae party, a pizza party, a donut party, and a cupcake party.

Combination ABC. The combination of Component B and Component C consists of both the interdependent group-oriented contingency and the public posting of progress feedback added to the tootling intervention (Component A). Component B was already being implemented in the classroom, so the researcher provided the teacher/classroom with the dry-erase thermometer and posted it in the front of the classroom where it was visible to all students. The researcher trained the teacher in the process of recording their progress toward their goal on the thermometer at the beginning of every class period. The teacher was required to add up all the tootle cards that were written the previous day and mark it on the thermometer. This was done at the beginning of every class period with all students present. The teacher informed the class of their current number of tootles submitted the previous day and how many more are needed to reach their goal. No specific praise or feedback was given in this phase. The students were able to see the progress they were making toward their tootle goal. Once their goal was reached, they received their agreed-upon reward, the goal was reset, the thermometer was erased, and the process started over.

Combination ABCD. The final combination ABCD consisted of all the components implemented together (Components B, C, and D in addition to component A). Before this phase, the researcher trained the teacher on how to provide specific feedback and praise during one 15-minute training session. The teacher read three randomly selected tootles from the previous day aloud to the classroom at the beginning

of the class period. The teacher then provided praise to the students who wrote a tootle

and who engaged in the prosocial behavior. Specific feedback was also provided by the

teacher regarding the proper writing of tootles. Through this component, students also

received praise from peers indirectly as the teacher read the tootles aloud. Overall, within

this final combination, tootling was implemented with an interdependent group-oriented

contingency, public posting of progress, and specific verbal feedback and praise. Students

continued to write tootles and put them in the tootle box. At the beginning of each class

period, the teacher read three randomly selected tootles aloud. The teacher provided

specific feedback and praise during this process. After this was done, the teacher

recorded how many tootles were written the previous day on the dry-erase thermometer.

The students were able to see how close they were to reaching their goal through this

visual. This process continued until they reached their tootle goal. When they reached

their goal, the researcher provided the classroom with the reward they agreed upon as a

class, the goal was reset, and the process repeated.

Data Analysis

Visual Analysis

Visual analysis was the primary method of analysis used to determine phase

changes and used alongside effect size data to determine the effectiveness of each

component or combination of components in increasing on-task behavior and decreasing

disruptive behavior in the classroom. Data were analyzed for changes in level, trends of

behavior during each component or combination, variability of the data within each

phase, and the immediacy of effect after implementing an additional component.

To support visual analyses, descriptive data and percentage of non-overlapping data (PND) were calculated. Descriptive data included the range and average percent of on-task behavior in each phase. PND (Scruggs et al., 1987) was also used to determine effectiveness of each component within each phase. The proportion of overlapping data can often be easily computed and provides a good measure of intervention effectiveness in most single-case studies (Kazdin, 1978). PND was calculated by determining the number of data points that do not overlap between baseline (previous phase) and subsequent intervention phases (phases with additional components). First, the highest data point in the previous phase was identified. Then, the percentage of data points in the subsequent intervention phase (with an additional component) that exceeds the highest point in the previous phase was determined. The same process was applied when behavior was expected to decrease; however, the percentage of data points that are below the lowest data point in the previous phase were calculated. PND scores can range between 0% (when the highest baseline data point exceeds all intervention data points) and 100% (when all intervention data points exceed the highest point in baseline; Rakap, 2015). PND scores above 90% represent very effective treatments, scores from 70% to 90% represent effective treatments, scores from 50% to 70% are questionable, and scores below 50% are ineffective (Scruggs & Mastropieri, 2001, p. 230).

Baseline Corrected Tau

Baseline Corrected Tau (BC-Tau; Tarlow, 2017) was used alongside visual analyses (and accompanying descriptive information) as a supplementary quantitative measure of effect size. BC-Tau was designed to address several limitations of the popular

method of baseline correction and effect size measurement, Tau-*U* (Parker et al., 2011).

Tau-*U* does not directly account for a preexisting baseline trend, and results of this

analysis may be distorted if an individual's performance is improving or decreasing prior

to the implementation of the intervention (Tarlow, 2017). Additionally, Tau-*U* is not

confined between the conventional bounds of -1 and +1, which raises interpretation

questions. BC-Tau provides more interpretable effect size estimates within the bounds of

-1 to +1 and controls for baseline trend, which deems it as a reasonable alternative to

Tau-*U*.

   BC-Tau first determines if there is a baseline trend. If the baseline trend is

statistically significant, the researcher corrects for the baseline trend through the use of a

Theil-Sen regression (Sen, 1968; Tarlow, 2017; Theil, 1950). If baseline trend is not

statistically significant, no baseline correction is used and the effect size is calculated

with Kendall's (1962) method to yield a Tau value. Tau values greater than zero indicate

a positive association between the intervention and outcome variable, and Tau values less

than zero indicate the opposite. Statistical significance of the effect size is also helpful to

interpret, with the null hypothesis indicating no relationship between the intervention and

outcome. When interpreting BC-Tau, interpretation guidelines for Tau-*U* were used

(Vannest & Ninci, 2015). Tau-U scores between 0.00 and 0.20 are interpreted as small

effects, scores between 0.20 and 0.60 are considered moderate effects, scores from 0.60

to 0.80 are considered a large effect, and scores from 0.80 to 1.00 indicate "large to very

large change, depending on the context" (Vannest & Ninci, 2015, p. 408).

In this study, BC-Tau was estimated comparing each phase to the preceding phase, beginning with the second phase. A web-based calculator (Tarlow, 2016) was used to calculated BC-Tau. Baseline correction was used when the statistical significance of the baseline trend was less than $p = .05$. Only statistically significant and large effect sizes were reported.

Interobserver Agreement and Procedural Integrity

Interobserver agreement (IOA) was calculated for 30% of total observation sessions and at least 20% of sessions within each phase. During these sessions, two data collectors observed the students' behavior in the classroom. Data collectors discussed before the observation period the order that students will be observed in the classroom to ensure observation of the same students in each interval throughout the whole observation session. IOA was calculated separately for each dependent variable (on-task and disruptive). IOA for on-task behavior was 98.6% (report range by observation) and IOA for disruptive behavior was 100%. IOA was calculated as total agreement of occurrence and nonoccurrence of behavior, by interval. The total number of agreements were divided by the combined number of agreement and disagreements, and then multiplied by 100 to get a percentage.

Prior to the study, all observers were trained on all observation procedures and behavioral definitions of target behaviors. Observers were one school psychology graduate student, a special education teacher, and a special education building coordinator. Observers were required to attain at least 90% IOA during training with the primary investigator viewing the same classroom. The training sessions were conducted

by viewing a YouTube clip of a classroom lesson while using the observation form created by the researcher for the study to fill out observed on-task and disruptive behaviors using the same momentary time sampling and partial-interval recording procedures used in the study. Each observer's data were compared to an answer key to calculate IOA. IOA for these training sessions were 100% for all observers.

Implementation fidelity of the tootling intervention was calculated for 25% of sessions, ensuring that at least 20% of the sessions in each phase were observed for implementation fidelity. Fidelity of implementation was calculated through the use of a checklist made by the researcher (see Appendix A) specific to each component and combination of components corresponding to the classroom. The researcher was present during all phases that the teacher completed the tootling update to the students when fidelity is being collected. Implementation fidelity throughout all phases was 100%.

Chapter 3

Results

Classroom Observation Data

Results of class-wide direct observation of on-task behavior and disruptive behavior are presented in Figure 1. Data are graphed the percent of intervals in which targeted behaviors were observed during observation. The average percent and range of on-task behavior during each phase, in addition to Tau effect size estimates, are presented in Table 1.

Figure 1

Effect of Positive Reinforcement Components on Class-wide On-Task and Disruptive Behavior

Note: Closed data points represent class-wide on-task behavior and open data points represent class-wide disruptive behavior. IGC = interdependent group-oriented contingency, PP = public posting of progress feedback, and VFP = specific verbal feedback and praise.

Overall, there was an increasing trend across phases in the percentage of intervals of on-task behavior in the classroom. The average percent of class-wide on-task behavior during the first phase of the study (tootling without any additional components, Component A) was 67.39% (range = 66.67%-67.80%). In the final phase (tootling with all three added components, Combination ABCD), the average class-wide on-task behavior was 88.34% (range = 86.67%-90.00%). Similarly, an overall decreasing trend in class-wide disruptive behavior was observed across phases. However, disruptive behavior was low throughout the study with an overall range of 0%-5%. Due to the overall low levels of disruptive behavior observed throughout the course of the study, visual analyses were conducted and described when appropriate. Additional analyses (i.e., PND) were not conducted based on these data to describe the relationship between the tootling intervention components and disruptive behavior in the classroom, as effect sizes would be difficult to interpret.

Table 1

Average Percentage of Intervals with On-Task Behavior

Phase	On-Task Behavior	Range

Component A	67.39%	66.67-67.80%
Combination AB	78.17%	72.00-87.00%
Component A	65.28%	60.00-70.00%
Combination AB	76.39%	63.33-94.44%
Combination ABC	75.26%	72.20-80.00%
Combination AB	79.94%	77.78-82.00%
Combination ABC	85.27%	83.33-90.00%
Combination ABCD	88.06%	86.67-88.89%
Combination ABC	86.21%	83.33-88.89%
Combination ABCD	88.34%	86.67-90.00%

The largest change in behavior occurred in the beginning of the study, when the interdependent group-oriented contingency was first implemented (Component A to Combination AB) and then removed (Combination AB to Component A). During Component A, on-task behavior remained stable with a mean of 67.39% of observation intervals (range = 66.67%-67.80%). When Combination AB was introduced, there was a small immediate increase in on-task behavior with an increasing trend ($M = 78.17\%$; range = 72.00%-87.00%). The percentage of nonoverlapping data (PND) from Component A to Combination AB was 100%. Lower levels of disruptive behaviors were also observed during Combination AB. Once the interdependent group-oriented contingency was removed (return to Component A), there was an immediate decrease in on-task behavior ($M = 65.28\%$; range = 60.00%-70.00%). Again, PND from Component B to Component A was 100%, and the removal had a large and significant effect (Tau = -0.756, $p = .030$) in decreasing on-task behavior. In addition, with this removal, class-wide disruptive behavior had an increasing trend, reaching the highest overall percentage of

disruptive behavior observed during the study (5.55%). When the interdependent group-oriented contingency was re-introduced (Combination AB), an immediate change in level was not observed, although there was an increasing trend ($M = 76.39\%$; range = 63.33%-84.44%). PND from Component A to B was 75%. Disruptive behavior during this phase also decreased immediately and remained stable upon the re-introduction of the interdependent group-oriented contingency, with a range of 0%-1.11%.

Next, the public posting of progress feedback was added to the interdependent group-oriented contingency (Combination ABC). There was not an immediate change in the level of on-task behavior, and a decreasing trend was observed ($M = 75.26\%$, range = 72.20%-80.00%). PND from Combination AB to Combination ABC was 0%, and there was an overall decrease in on-task behavior with the addition of the public posting of progress feedback component. Once the public posting of progress feedback was removed (Combination AB), there was an immediate increase in on-task behavior. This phase also showed a slight decreasing trend and low variability ($M = 79.94\%$; range = 77.78%-82.00%). PND from Combination ABC to Combination AB was 50%. The public posting of progress feedback component was re-introduced (Combination ABC) and there was an immediate increase in on-task behavior; however, there was a slightly decreasing trend throughout this phase ($M = 85.27\%$; range = 83.33%-90.00%). PND from Component B to Combination BC was 100%, and the addition of this component had a large and significant effect (Tau = 0.770, $p = .029$) in increasing on-task behavior. In addition, disruptive behavior during this phase remained stable at 0% during all observation sessions.

After this phase, specific verbal feedback and praise was added to the interdependent group-oriented contingency and the public posting of progress feedback (Combination ABCD). There was a slight immediate increase in on-task behavior with a stable trend and low variability among observation sessions ($M = 88.06\%$; range = 86.67%-88.89%). PND from Combination ABC to ABCD was 0%. When specific verbal feedback and praise was removed (Combination ABC), there was no initial change in on-task behavior. However, there was a slightly lower level of on-task behavior overall, and higher variability was observed ($M = 86.21\%$; range = 83.33%-88.89%). PND from Combination ABCD to ABC was 40%. Disruptive behavior during this phase also remained stabled at 0% during all observation sessions. With the re-introduction of specific verbal feedback and praise (Combination ABCD), there was a slight immediate increase in on-task behavior from the previous data point. During this phase, there was an overall increasing trend with a slight decrease during the last observation period. However, variability among sessions was low ($M = 88.34\%$; range = 86.67%-90.00%) and PND from Combination ABC to ABCD was 25%.

Tootles

Results of the average number of tootles collected during each phase are presented in Table 2. Data are reported on the average number of tootles collected during each phase, the tootle goal selected during each phase (if applicable), whether the tootle goal was met during that phase, and the class-wide reward that was provided to the class upon reaching their tootle goal.

Table 2

Average Number of Daily Tootles Collected

Phase	Average Number of Daily Tootles Collected	Tootle Goal	Reinforcement Provided (Yes/No)	Reward
Component A	11	N/A	N/A	
Combination AB	10.89	40* and 50*	Yes (2 times)	Ice Cream Sundae and Pizza
Component A	2.33	N/A	N/A	
Combination AB	3.33	60*	No	
Combination ABC	7.37	60	Yes	Donuts
Combination AB	0.83	65*	No	
Combination ABC	2.29	65	No	
Combination ABCD	8.5	65	Yes	Cupcakes
Combination ABC	0.33	65*	No	
Combination ABCD	1.5	65	No	

Note: *Indicates a new tootle goal

Throughout the study, there was an overall decreasing trend in the number of tootles written by the students in the classroom. However, during the initial implementation of each new component, there was an increase in the average number of tootles collected compared to the subsequent implementations of the same component.

The class met their tootle goal four times throughout the study and received their agreed upon class-wide reward the following day (i.e., ice cream sundae party, pizza party, donut party, and cupcake party). When interpreting these results, one should note that the number of school days within each phase does not equal the number of data points within each phase given that observational data were not collected each school day.

During the first phase (Component A), which was tootling with no additional components, the average number of tootles written and collected each day was 11 (range = 7-19). During the initial implementation of the interdependent group-oriented contingency (Combination AB), there was no observed increase in the number of tootles written and collected. The average daily tootles were 10.89 (range = 4-18), similar to the baseline phase. The initial goal set for the classroom was 40 total tootles based on the number of tootles written during Component A. The class met their initial tootle goal, submitting 48 tootles, in three days and received an ice cream sundae party as their agreed upon class-wide reward. A new goal was set at 50 tootles during this same phase, and the class reached this goal in five days, with 50 total tootles collected. The class received a pizza party as their agreed upon class-wide reward. Once the interdependent group-oriented contingency was removed, the average number of daily tootles collected during Component A was 2.33 (range = 2-4). The interdependent group-oriented contingency was then re-introduced (Combination AB) and the average number of tootles collected was 3.33 (range = 0-7). The class did not reach their goal of 60 tootles during this phase. Once the public posting of progress feedback component was added (Combination ABC), the average number of tootles collected increased to 7.37 (range =

2-19). The class reached their tootle goal of 60 within five days of the new phase, with a total number of 60 tootles collected and received a donut party as their agreed upon class-wide reward. During the reversal to Combination AB, the average number of tootles collected was 0.83 (range = 0-2). The class did not reach their new tootle goal of 65 during this phase. During the re-implementation of Combination ABC, the average number of tootles collected was 2.29 (range = 0-6); at the end of this phase the class had not yet reached their tootle goal. When the specific verbal feedback and praise component was added (Combination ABCD), the average number of tootles collected was 8.50 (range = 5-14). The class reached their tootle goal three days into the new phase and received a cupcake party. The tootle goal was set again at 65 tootles due to the amount of time needed to reach this goal previously. With the removal of specific verbal feedback and praise (Combination ABC), the average number of tootles collected was 0.33 (range = 0-2). The class did not reach their tootle goal during this phase. During the final phase, with the re-implementation of specific verbal feedback and praise (Combination ABCD), the average number of tootles written and collected was 1.5 (range = 0-6). The class had not reached their tootle goal at the end of the study.

Social Validity

The classroom teacher completed the modified version of the IRP-15 following the end of data collection. A rating above the cutoff score of 52.5 on this original scale suggests that the teacher considered the intervention to be acceptable (Martens et al., 1985). On the first 15 questions that address the overall tootling intervention, the teacher indicated tootling as a highly acceptable intervention, with an overall score of 80. After

reversing the score on the negative items, the teacher endorsed either Agree or Strongly Agree on all items. The classroom teacher indicated Strongly Agree on "I like the procedures used in tootling," "The use of tootling would NOT be harmful to students in the classroom," "The use of tootling would NOT have negative effects on children in the classroom," and "Tootling is practical for the amount of out-of-school time required for implementation."

Within the three additional sections that address each component implemented during tootling, the classroom teacher also indicated either Agree or Strongly Agree among all items after reversal of the negative items. For the interdependent group-oriented contingency component, the classroom teacher endorsed a score of 25 out of a possible 30 points, with all items indicated as Agree. For the public posting of the class's progress component, the classroom teacher endorsed a score of 28 out of a possible 30 points. Lastly, within the specific verbal feedback and praise component, the classroom teacher also endorsed a score of 28 points out of a possible 30 points. The higher score for public posting of progress and specific verbal feedback and praise resulted from ratings of Strongly Agree on items referencing the time needed for implementation dimension (i.e., Tootling with public posting of progress toward their goal/specific verbal feedback and praise to the class about tootles written is practical in the amount of out-of-school time required for record keeping) and the generalization to other children dimension (i.e., Use of tootling with public posting of progress toward the class-wide goal/specific verbal feedback and praise to the class about tootles written would NOT have negative effects on children in the classroom).

Informal input from students indicated that the majority enjoyed tootling. When asked their favorite part about tootling, responses included the rewards received, the focus on being kind to others, knowing the specific positive things that their peers were doing, and hearing kind things. A few students indicated that their least favorite part of tootling was some tootles not being true and having to physically write the tootles. Most students indicated that they thought tootling helped them and their classmates be more productive and on-task. The majority of students also indicated that they thought tootling helped them recognize positive things their peers were doing. When asked if there was one thing they could change about tootling, a few students suggested modifications to the submission of tootles, such as verbal or digital submission (on a Google Classroom discussion board). At the end of this discussion, the majority of the students confirmed that they would do tootling again if they were given the opportunity.

Chapter 4

Discussion

The purpose of this study was to evaluate the effectiveness of each positive reinforcement component of tootling: interdependent group contingency, public posting of progress, and specific verbal feedback and praise. Therefore, this current study extended the existing tootling literature by conducting a component analysis to determine which components and addition of components in tootling were the most effective in creating positive behavioral change. A multiple treatment reversal design was implemented in one classroom to investigate the impact of each of these components in increasing on-task behavior and decreasing disruptive behavior in a 5th grade general education classroom. In addition, this study examined tootling activity, teacher acceptability, and student acceptability for tootling and its components within this classroom.

Interdependent Group-Oriented Contingency

It was hypothesized that the implementation of the interdependent group-oriented contingency would be the most effective in increasing on-task behavior and decreasing disruptive behavior in the classroom. This hypothesis was supported as on-task behavior increased after the addition of the interdependent group-oriented contingency. With its initial implementation, on-task behavior increased from a mean of 67.39% of intervals during tootling without any additional components to 78.17% of intervals observed during tootling with the interdependent group-oriented contingency. Once the interdependent group-oriented contingency was removed, on-task behavior decreased to

65.28%, and the removal results in a large effect size, significant at the $p < .05$ level.

When the interdependent group-oriented contingency was implemented again, on-task

behavior increased back up to 76.39%. Visual analysis suggests the initial introduction

and re-implementation of the interdependent group-oriented contingency resulted in a

steady increase of on-task behavior throughout, although not an immediate increase upon

implementation.

These findings were consistent with previous research, which has shown that an

interdependent group-oriented contingency was effective in decreasing disruptive

behaviors and increasing on-task behaviors with a variety of students (Ling et al., 2011).

Additionally, these findings extended initial tootling research conducted by Skinner et al.

(2000) and Cashwell et al. (2001) that demonstrated the increased effectiveness of an

interdependent group-oriented contingency in the number of reports of prosocial

behaviors written by students during tootling.

Public Posting of Progress Feedback

The second research question sought to determine the effectiveness of the

addition of the public posting of progress feedback component of tootling. Within this

study, the public posting of progress feedback was added to the interdependent group-

oriented contingency component. Phases in which public posting of progress was

implemented and removed were compared. Results regarding the significance and impact

of the addition of the public posting of progress feedback component were mixed. During

tootling with the interdependent group-oriented contingency component, mean on-task

behavior was 76.39% of observed intervals. When the public posting of progress

feedback component was added, mean on-task behavior decreased slightly to a mean of 75.26% of observed intervals. Once the public posting of progress feedback component was removed, mean on-task behavior of observed intervals increased to a mean of 79.94%. These findings were unexpected due to the past research demonstrating the effectiveness of including publicly posted information of progress (Kastelen et al., 1984, Van Houten & Van Houten, 1977). However, when the public posting of progress feedback component was implemented a second time, mean on-task behavior increased to a mean of 85.27% of observed intervals. Effect size estimates were large, positive, and statistically significant, which aligns more with the research available on the impact of public posting of progress. The findings observed in this study are inconclusive as they pertain to public posting of progress.

Specific Verbal Feedback and Praise

The third research question was regarding the effectiveness of the addition of the specific verbal feedback and praise component. Within this study, the specific verbal feedback and praise component was added to tootling with both the interdependent group-oriented contingency component and the public posting of progress feedback component. Comparisons were made between the tootling package with and without the specific verbal feedback and praise component. When the specific verbal feedback and praise component was first introduced, on-task behavior increased from a mean of 85.27% of observed intervals to a mean of 88.06% of observed intervals. When the specific verbal feedback and praise component was removed, on-task behavior decreased to a mean of 86.21% of observed intervals. Finally, when the specific verbal feedback

and praise component was added again, mean on-task behavior increased back up to 88.34% of observed intervals. Visual analyses suggested somewhat higher and less variable levels of on-task before when specific verbal feedback and praise was added. Although these impacts are subtle, a potential ceiling effect was noted and these results were considered to be encouraging. These results are consistent with previous research demonstrating the effectiveness of specific feedback and praise (Orluwene & Ekin, 2015; Reinke et al., 2007; Reinke et al., 2013).

The Overall Effectiveness of Tootling

Although it was not posed as a research question given the issues with comparing nonadjacent phases, it is important to note the effectiveness of tootling with all positive reinforcement components (i.e., interdependent group-oriented contingency, public posting of progress, and specific verbal feedback and praise) compared to tootling with no positive reinforcement components (i.e., only writing and collecting tootles). Analyses were not conducted due to the inability to separate the effect of tootling as a whole (i.e., with all components) with the addition of the specific verbal feedback and praise component. Marked improvements in on-task behavior and disruptive behavior were observed from the beginning to the end of the study. Mean on-task behavior was 67.39% of observed intervals during the first phase of the study. Both study phases which included all tootling components had on-task behavior exceeding 88% of observed intervals on average. Disruptive behavior in the classroom also had an overall decreasing trend from the beginning to the end of the study, when all tootling components were combined. These results suggest that tootling with all components combined, which is

most commonly implemented in research, is more effective than tootling without any

additional components. These results are supported by past tootling studies that have

evaluated the effectiveness of tootling with only the writing and collecting of tootles and

with the addition of the interdependent group-oriented contingency and the public posting

of progress feedback (Cashwell et al., 2001; Skinner et al., 2000).

Tootles Collected

Tootling utilization was also monitored throughout the study as a secondary

measure of effectiveness. Overall, a decreasing trend in tootling utilization was observed

across phases of the study. The initial average number of tootles collected daily in the

first phase was 11, and the average number of tootles collected in the final phase daily

was 1.5. Zero tootles were collected on many days of the study. It seems that a novelty

effect may have influenced tootling utilization at the start of the study.

A potential novelty was also observed during the initial implementation of each

positive reinforcement component. Specifically, during the initial implementation of a

new component, the average number of tootles collected increased from the previous

phase and was also higher than the second implementation of the same component. For

example, with the initial implementation of the public posting of progress feedback, the

average number of tootles collected was 7.37, compared to the average number of tootles

collected being 3.33 in the previous phase with only the interdependent group-oriented

contingency. In addition, the average number of tootles collected was 2.29 during the

second implementation of the public posting of progress feedback component.

The average number of tootles collected also tended to increase noticeably the day before the class reached their goal. This indicates that the students in the classroom had the understanding that they were close to reaching their goal; therefore, they needed to write more tootles in order to do so. This often was a collective act, in which the students in the classroom would verbally report how close they were to reaching their goal and that all students should write a tootle on that day. No effect was observed on how many tootles were collected the day after receiving their class-wide reward.

It should be noted as on-task behavior increased over the course of the study, tootling utilization generally decreased. Therefore, tootling utilization was not positively correlated with on-task behavior. Initial tootling studies used tooling utilization as the sole measure of the effectiveness of tootling in increasing positive behavioral change (i.e., prosocial behavior; Cashwell et al., 2001; Skinner et al., 2000). The results of this study call into question the validity of using tootling utilization as the primary indicator of behavioral change due to the inverse relationship between tootling utilization and on-task behavior within this study. Therefore, future research should continue to use observable measures of behavior as their primary dependent variables and use tootle reports as a supplemental measure of behavioral change. Continuous examination of this relationship is warranted.

Social Validity

Lastly, it was hypothesized that the general education classroom teacher and the students in the classroom would find the tootling intervention and its individual components acceptable and effective to use in their classroom. The hypothesis was

supported by the classroom teacher and informally by the group of students as a whole.

The classroom teacher considered tootling a highly acceptable intervention to use in her

classroom and for other teachers to use in their classrooms. In addition, the majority of

the class also deemed tootling as an acceptable intervention.

In regard to the individual components, the classroom teacher rated the public

posting of progress feedback and the specific verbal feedback and praise components as

the most acceptable, and the interdependent group-oriented contingency was rated

slightly lower. This may be due to the types of rewards requested by the students, which

required an expenditure. Expecting classroom teachers to consistently provide rewards of

monetary value to their students is often seen as unrealistic. Students informally indicated

the aspects they enjoyed, which included class-wide rewards, the focus on being kind to

others, knowing the positive things their peers were doing, and hearing the kind reports

from their peers.

Limitations and Implications for Research and Practice

Results from this study provide additional support for tootling and its positive

reinforcement components as an effective intervention for increasing on-task behavior

and decreasing disruptive behavior in a general education classroom setting. In addition,

this study demonstrates the individual effectiveness of tootling with the interdependent

group-oriented contingency component in increasing on-task behavior. The addition of

the specific verbal feedback and praise was also supported within this study as the

introduction of this component resulted in the highest levels of on-task behavior observed

during the study. The addition of public posting of progress feedback was not

conclusively supported, as visual analyses were generally ambiguous and during its initial

introduction, there was an overall decrease in on-task behavior.

Time and resources are limited in schools; therefore, it is important to consider

how to derive the greatest benefits from tootling given these constraints. Benefits and

drawbacks of each tootling component were apparent in this study. First, tootling with all

components combined had the highest mean percentage of on-task behavior, suggesting

that all components may be relevant to include for the highest degree of positive

behavioral change. However, this is also the most time- and resource-intensive tootling

implementation. Although more research is needed to determine the individual

effectiveness of these components, if a tootling intervention with fewer components is

needed, practitioners should consider tootling with only the addition of the

interdependent group-oriented contingency component due to its significant impact in

increasing on-task behavior. However, this tootling component was indicated as the least

acceptable to the classroom teacher, compared to the other two components (public

posting of progress feedback and specific verbal feedback and praise), although the rating

was still considered highly acceptable. This rating of acceptability could be due to the

types of rewards provided to the class, which were all of monetary value. It is unrealistic

to expect teachers will provide these types of rewards to their students within standard

practice. It is possible this rating of acceptability could have increased if more cost and

resource-friendly rewards were provided. As a result of these considerations, if time and

resources are limited, implementing tootling with specific verbal feedback and praise

may also be a feasible option for practitioners as the addition of this component led to the

highest levels of on-task behavior observed during the study. However, due to the limitations of the research design in determining the individual effectiveness of this specific component, future research should attempt to analyze the effectiveness of this component with only the writing and collecting of tootles.

This study also provided support for the implementation of tootling in a 5th-grade classroom, which in this case was located in a middle school. Specifically, tootling may be the most beneficial for middle school classrooms in need of additional classroom management support due to the degree of off-task behavior and disruptive behavior, which was the case in this study. In addition, this specific class had multiple students receiving special education support in the classroom. Although no specific data was collected on these students, the overall improvement of the classroom behavior suggested the benefits of implementing tootling in an inclusive classroom setting as well.

Finally, with the acceptability and effectiveness of the tootling intervention in mind, it may be beneficial to provide training on tootling to all educators and other school personnel so that it can be implemented as desired and when it is identified as potentially beneficial for a classroom that need additional behavior management support. Tootling is also consistent with School-Wide Positive Behavior Interventions and Supports (SWPBIS), a model of universal and preventative social behavioral support that has been implemented in a variety of school settings and grade levels (Sugai & Horner, 2009). Having these universal, positive, class-wide interventions on-hand can help to improve the overall school climate.

There are several limitations that should be taken into consideration when interpreting the results of this study. First, observers were not completely blind to the purpose of the study and proposed hypotheses. The primary investigator recruited two special education staff members employed at the middle school to assist in data collection. One of the individuals who volunteered to assist with data collection was the Special Education Building Coordinator for the middle school, and the other was a special education teacher who had a previously established rapport with the students in the classroom. Thus, it is possible the observation data could have been collected with bias. However, attempts were made to limit this potential bias by providing the operational definitions of the target behaviors on every data collection sheet and providing systematic training for data collection. Additionally, a high level of IOA was established, which provides evidence of the reliability of these data.

Second, although on-task behavior was initially of concern, levels of disruptive behavior were already low in this classroom. Low levels of disruptive behavior were established during the initial tootling phase, and a floor effect was observed. Visual analyses and effect size calculations were difficult due to the lack of abrupt change in levels of disruptive behavior throughout the study, although there was an overall decreasing trend throughout. Similarly, a ceiling effect for on-task behavior in the classroom may have occurred during later phases of the study. This may have impacted the observed effectiveness of tootling components implemented later in the study (e.g., visual posting of progress feedback and specific verbal feedback and praise). As previously mentioned, future research should focus on collecting data or implementing

tootling in classrooms that have lower levels of on-task behavior and higher levels of disruptive behavior to allow for more opportunities for behavior to improve during the tootling intervention conditions. Additionally, interviewing the classroom teacher beforehand and establishing the most commonly observed disruptive behaviors in the classroom may also improve the data collection process. Although the disruptive behaviors defined with each observation data collection sheet are typically common disruptive behaviors, these behaviors were rarely observed during the observation period.

A third limitation of this study was that only one classroom was recruited. Initial attempts were made to recruit a total of three classrooms for this study; however, these attempts were unsuccessful. Conducting this study in only one classroom creates difficulty in the generalization of the results to other classrooms and settings. Additionally, in terms of the research design, only the interdependent group-oriented contingency component was able to be compared to tootling without any additional components. The public posting of progress feedback component and the specific verbal feedback and praise component were only able to be compared to the tootling intervention with already established additional components. Future research should determine the effect of both the public posting of progress feedback component and the specific verbal feedback and praise component individually when added to tootling without any additional components. Similarly, future research should address if there is any difference in effectiveness in creating behavioral change depending on the order in which the components are combined. For example, is the addition of the specific verbal

feedback and praise component to the public posting of progress feedback component effective in increasing on-task behavior and decreasing disruptive behavior? Or, is the addition of the specific verbal feedback and praise component to the interdependent group-oriented contingency component effective in creating positive behavioral change in the classroom? Additional research should attempt to recruit at least three classrooms in order to account for all comparisons of the positive reinforcement components of tootling.

A fourth limitation of this study is also related to the use of only one classroom for data collection. Since this study was only conducted in one 5th grade general education classroom, these results may not be consistent with younger or older study groups. Similarly, although this study included special education students within the general education classroom setting, individual data was not collected on these students to determine if there were differences in effectiveness of components compared to their peers who were not receiving special education services. Different components may be more effective depending on the grade levels and abilities of the students, as well as educational settings. Additional research should be conducted in other settings and grade levels in order to provide more evidence in regard to which positive reinforcement component of tootling is most effective.

A fifth limitation of this study includes the constraints surrounding data collection. Observation data was only collected for 15 minutes during one class period, three to five times per week. This class period was the last class period of the day and occurred after a 15-minute recess. Since data collection was only conducted during this

specific time period, there is uncertainty whether the positive effects associated with the tootling intervention and its components generalized outside of this specific class period. Future research may investigate generalization of the positive effects of tootling in a particular class period or school setting to other class periods or school settings. Additionally, natural breaks occurred during the data collection period. With the beginning of data collection occurring in early October, scheduled school breaks occurred several times during the study, one of which exceeded one week (winter break). Due to lengthier breaks occurring throughout the duration of the study, the students may have been affected by extraneous factors (such as changes in routine) prior to and after these breaks. Since the data collection period for this study, and intervention studies in general, was substantial, it is unrealistic to avoid breaks altogether. However, future research should attempt to avoid these breaks as much as possible.

<div align="center">**Conclusion**</div>

The tootling intervention and its positive reinforcement components provided the general education teacher with an effective classroom management strategy that focused on recognizing and reinforcing appropriate and positive behaviors of students. Peer-mediated interventions, such as tootling, are an efficient and effective way to increase academic engagement and decrease disruptive behaviors in the classroom by allowing the students to be their own intervention agents. Research has demonstrated the effectiveness of tootling in increasing on-task behavior and prosocial behavior, while also decreasing disruptive behavior in the classroom. However, prior to this study, research had yet to look into the individual effects of the components that tootling employs. This study

extended the existing tootling literature by conducting a component analysis of the individual positive reinforcement components of tootling in a general education classroom setting. Overall, the addition of the interdependent group-oriented contingency component produced a significant and moderate increase in on-task behavior when added to tootling with only the writing and collecting of tootles. The addition of the specific verbal feedback and praise component was also moderately effective in increasing on-task behavior. Inconclusive results regarding the addition of the public posting of progress feedback component were obtained. Finally, tootling with all components combined appeared to be more effective than tootling with only the writing and collecting of tootles. However, continued research investigating the individual effectiveness of the components that tootling employs is needed to determine the components that are most effective in creating positive behavioral change.

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Appendix A

Consent Form

Investigating the Individual Effectiveness of the Positive Reinforcement Components of

Tootling

Dear Parent/Guardian,

Your child's classroom will soon begin a new Tootling procedure that will involve research by students and faculty from Minnesota State University, Mankato. Tootling is constructed from the word "tattling" and the expression "tooting your own horn." In tootling, students are taught to spot each other performing positive behaviors (e.g., opening doors, giving positive verbal comments, sharing materials). Then, students report their peers' positive behaviors on a notecard to submit to their staff. At the end of each day, the staff member shares examples of appropriate tootles that have been submitted to the "tootle box" and praises students for their participation and prosocial behaviors. The staff member then posts the group's progress toward a group goal. Once the group has met the goal, the group is awarded a prize.

The team in addition to Dr. Shawna Petersen-Brown, in the Department of Psychology, Minnesota State University, Mankato hope to document this intervention and assess its effectiveness in the hopes that it can be used effectively with other groups of students in the future. The researchers will be collecting class-wide data on on-task behavior as well as disruptive behavior of students. The number of tootles will also be collected by the researchers.

This research will not require anything additional from your child; he or she will continue to attend school and participate in the usual activities. Graduate students and faculty from Minnesota State University, Mankato will observe in the classroom during the same academic period every 3 days for 15 minutes to record students' behaviors and participation in the Tootling procedure. This will occur for up to 15 weeks. The graduate student researchers will not interact with children in any way. The researchers will only be there to observe. Data will be collected as a whole group and no individual child data will be collected.

The study has few foreseeable risks which solely includes failure of the class to reach their class reward that was decided on by the class. The researchers will collaborate with the supervisor and children to set realistic goals. Your child will not be asked to do anything different and will continue to attend the after-school program as scheduled.

There are benefits to participation. Your child may learn new social skills and engage in positive social interactions that he or she may not otherwise have had the opportunity to

experience. Your child will also receive a group reinforcement if the whole group reaches their agreed upon goal, such as a pizza party.

Confidentiality: The records of this study will be stored in a locked filing cabinet at Minnesota State University, Mankato. Only the investigator and one authorized graduate student will be allowed to access study materials. Assessments with student information will be kept for up to six months and then destroyed.

Contacts and Questions: Your decision whether or not to participate will not affect your relationship with Minnesota State University, Mankato, and refusal to participate will involve no penalty or loss of benefits. If you have questions about this research study, contact Shawna Petersen-Brown at 507-389-1353 or shawna.petersen-brown@mnsu.edu. If you have questions
about participants' rights and for research-related injuries, please contact the Administrator of the Institutional Review Board, at (507) 389-1242. You may also use this contact information to obtain a copy of this consent form.

You do not need to take any action beyond contacting Dr. Shawna Petersen-Brown with any questions you may have. We thank you for your consideration.

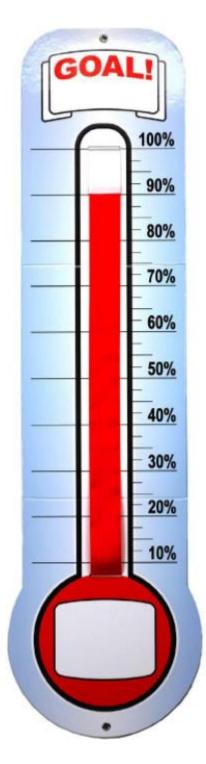**MSU IRBnet ID#: 1750105-2 Date of MSU IRB approval: 04/30/2021**

Appendix B

Tootle Ticket

Tootle Ticket

Who: _____

Did what: _____

Tootler: _____

Appendix C

Dry-erase Thermometer

Appendix D

Observation Form

Data collector(s): _____

Time and date: _____

- **On Task** *(momentary time sampling)*: Student is engaged in the assigned activity. Examples include sitting in seat, following along in a book, answering questions, sitting quietly while teacher is talking, working independently at his or her desk, raising hand to ask a question.
- **Disruptive** *(partial-interval)*: Student is engaged in any behavior that is disruptive to the class. Examples include yelling, cursing, throwing objects, non-compliance, and aggression.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT
Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis

16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT
Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis

31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT
Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis

46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT
Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis

61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT
Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis

76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT	OnT
Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis

Appendix E

Tootling Fidelity Checklist

Directions: Circle the component(s) being implemented in the classroom. As observed, check the steps that are completed by the teacher within the components that are being implemented. Total the number of steps completed and divide that by the number of total steps for a treatment integrity score.

Component	Steps	Completed (Yes/No)
A	1. Tootle cards are in the correct position	
	2. Tootle cards are visible to students	
	3. Tootle box is visible to students	
	4. Teacher does not provide praise	
	5. Teacher does not provide feedback	
	6. Teacher does not implement a reward	
	7. Teacher does not post the total number of tootles	
B	1. Tootle cards are in the correct position	
	2. Tootle cards are visible to students	
	3. Tootle box is visible to students	
	4. Tootle goal is/has been set	
	5. Class-wide reward is/has been decided	
	6. If class reaches their goal, reward is provided	
	7. If class reaches their goal, a new goal is set	
	8. If class reaches their goal, a new reward is decided	
	9. Teacher informs the class of their current number of tootles	
	10. Teacher does not provide specific feedback regarding tootles **(unless Component D is present)**	
	11. Teacher does not provide specific praise regarding tootles **(unless Component D is present)**	
	12. Teacher does not post the total number of tootles **(unless Component C is present)**	
C	1. Tootle cards are in the correct position	
	2. Tootle cards are visible to students	
	3. Tootle box is visible to students	
	4. Dry-erase thermometer is visible to the students	
	5. Range of number of tootles is written on thermometer	
	6. Teacher marks the number of tootles collected from the previous day on the thermometer	
	7. If the thermometer is full, the thermometer is erased	

		8. Teacher does not provide specific verbal feedback regarding tootles **(unless Component D is present)**	
		9. Teacher does not provide specific verbal praise regarding tootles **(unless Component D is present)**	
		10. Teacher does not implement a goal regarding tootles **(unless Component B is present)**	
		11. Teacher does not implement a reward regarding tootles **(unless Component B is present)**	
D		1. Tootle cards are in the correct position	
		2. Tootle cards are visible to students	
		3. Tootle box is visible to students	
		4. Teacher reads the tootles to the classroom in the morning (including the name of the tootler, prosocial behavior, and who engaged in the behavior)	
		5. Teacher provides specific praise to student who wrote the tootle	
		6. Teacher provides specific praise to student who received the tootle	
		7. Teacher provides corrective feedback when needed (for an incorrect tootle)	
		8. Teacher does not implement a reward regarding tootles **(unless Component B is present)**	
		9. Teacher does not post the total number of tootles **(unless Component C is present)**	
		10. No tootle goal is set **(unless Component B is present)**	

Total: _____

Treatment Integrity Score _____

Appendix F

INTERVENTION RATING PROFILE-15/MODIFIED VERSION

Please respond to each of the following statements thinking about the intervention you implemented (i.e., Tootling). Please then circle the number associated with your response. Be sure to answer all statements.

	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
I like the procedures used in tootling.	1	2	3	4	5	6
Tootling would result in negative side-effects for students in the class.	1	2	3	4	5	6
Tootling is practical in the amount of time required for record keeping.	1	2	3	4	5	6
Tootling would be disruptiv e to other students.	1	2	3	4	5	6
Teachers are likely to use tootling because it	1	2	3	4	5	6

requires little technical skill.					
Tootling was NOT a good way to handle the students' behavior.	1	2	3	4	5	6
Use of tootling would NOT be harmful to students in the classroom.	1	2	3	4	5	6
Tootling is NOT practical in the amount of time required to monitor the problem behavior.	1	2	3	4	5	6
Use of tootling would NOT have negative effects on children in the classroom .	1	2	3	4	5	6
Teachers are NOT likely to use tootling because it requires	1	2	3	4	5	6

training to implement effectively.						
Tootling would be threatening to children.	1	2	3	4	5	6
Tootling is practical in the amount of out-of-school time required for implementati on	1	2	3	4	5	6
Tootling would be difficult to implement in a typical classroom environmen t	1	2	3	4	5	6
Teachers are likely to use tootling because it requires little specialized knowledge to be used successfull y.	1	2	3	4	5	6
Overall, tootling was beneficial to all students.	1	2	3	4	5	6

I liked the procedures used when students were able to receive a class-wide reward within tootling	1	2	3	4	5	6
Use of a class-wide reward within tootling would NOT be harmful to children	1	2	3	4	5	6
Tootling with a class-wide reward is practical in the amount of out-of-school time required for implementatio n	1	2	3	4	5	6
Use of tootling with a class-wide reward would NOT have negative effects on children in the classroom	1	2	3	4	5	6
Teachers are NOT likely to use tootling with a class-wide reward because it	1	2	3	4	5	6

requires training to implement effectively						
I liked the procedures used when students were able to see their progress towards their goal posted publicly during tootling	1	2	3	4	5	6
Use of public posting of progress toward the goal during tootling would NOT be harmful to children	1	2	3	4	5	6
Tootling with public posting of progress toward their goal is practical in the amount of out-of-school time required for record keeping	1	2	3	4	5	6
Use of tootling with public posting of progress toward the	1	2	3	4	5	6

class-wide goal would NOT have negative effects on children in the classroom					
Teachers are NOT likely to use tootling with public posting of progress toward the class-wide goal because it requires training to implement effectively	1	2	3	4	5	6
I liked the procedures used when I could read aloud specific tootles and provide feedback and praise to my students	1	2	3	4	5	6
Providing specific verbal feedback and praise about the tootles written during tootling would NOT be harmful to children	1	2	3	4	5	6

Tootling with specific verbal feedback and praise to the class about tootles written is practical in the amount of out-of-school time required for record keeping	1	2	3	4	5	6
Use of tootling with specific verbal feedback and praise to the class about tootles written would NOT have negative effects on children in the classroom	1	2	3	4	5	6
Teachers are NOT likely to use tootling specific verbal feedback and praise to the class about written tootles because it requires training to implement effectively	1	2	3	4	5	6

Taken and adapted from, Martens, B.K., Witt, J.C., Elliott, S.N., & Darveaux, D. (1985). Teacher judgments concerning the acceptability of school-based interventions. Professional Psychology: *Research and Practice, 16*, 191-198.

Appendix G

Initial Training Script

- Define tootling
    - Say: We are going to talk about the opposite of tattling, called Tootling. When you are tootling, you are reporting when your classmates do something good or helpful instead of reporting when they do something wrong.
- Start a discussion with the class, asking for specific examples. Start the discussion by giving an example. Also include some unacceptable examples.
    - Say: One example of a tootle is, "Sarah shared her extra pencil with John." Now that we know what a tootle is, who can give me another example of a good thing that someone said or did.
- Teacher tells the class what to write on the tootle slips
    - Say: On each tootle slip, you will write the student's name and what he or she did or said that was good or nice, as well as your own name.
- Have each student write a practice tootle on a note card.
    - Say: I want everyone to write one tootle on an index card for practice. When you are finished, I will collect them and read it out loud so we can practice some more together.
    - Praise acceptable examples and provide feedback for inappropriate examples.
- Explain the procedure.
    - Say: Each day your teacher will place tootling slips on her podium for you to grab. Each time you see your classmate doing something good or nice during this class period, you can write it on the tootling slip.
    - Then say: Remember, when you write a tootle, be sure to put the person's name, what they did that was appropriate, and your own name.
- Tell the class they can put their tootle slips in the designated tootling box after class
    - Say: You can put your note cards in this box (hold up box) at the end of class.