Altering Activities to Enhance the Effects of Social Skills Training and Tootling on Elementary Students Performance of Recently-Trained Social Skills

Kristen Fowler
University of Tennessee, Knoxville, kfowle24@vols.utk.edu

Follow this and additional works at: https://trace.tennessee.edu/utk_graddiss

Recommended Citation
https://trace.tennessee.edu/utk_graddiss/8745

This Dissertation is brought to you for free and open access by the Graduate School at TRACE: Tennessee Research and Creative Exchange. It has been accepted for inclusion in Doctoral Dissertations by an authorized administrator of TRACE: Tennessee Research and Creative Exchange. For more information, please contact trace@utk.edu.
To the Graduate Council:

I am submitting herewith a dissertation written by Kristen Fowler entitled "Altering Activities to Enhance the Effects of Social Skills Training and Tootling on Elementary Students Performance of Recently-Trained Social Skills." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in School Psychology.

Christopher H. Skinner, Major Professor

We have read this dissertation and recommend its acceptance:

Marion Coleman-Lopatic, Merilee McCurdy, Robert D. Richardson

Accepted for the Council:

Dixie L. Thompson

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)
Alterig Activities to Enhance the Effects of Social Skills Training and Tootling on Elementary Students Performance of Recently-Trained Social Skills

A Dissertation Presented for the
Doctor of Philosophy
Degree
The University of Tennessee, Knoxville

Kristen Michaela Fowler
August 2023
Acknowledgements

During the process of completing my dissertation, I have been supported by numerous people. First, I would like to thank my dissertation committee chair, advisor, and mentor, Dr. Chris Skinner. Dr. Skinner, thank you for encouraging my research interests, building my skillsets, sharing your knowledge, and providing support through the years. I have enjoyed our work together. To my committee members, Dr. Mari Beth Coleman, Dr. Merilee McCurdy, and Dr. Rob Richardson, thank you for your support, guidance, and ideas through this process. I am honored that you served on my committee, and I am grateful for your mentorship. To my teachers and professors through the years, thank you for sharing your knowledge and encouraging me to pursue my academic interests. To the staff at the after-school program where I collected data, thank you for your willingness to work with me on this project.

To my colleagues who laid the groundwork for this research before me, Shelby Wright and Margaret Crewdson, I am grateful for your mentorship and guidance. I also want to thank Caroline Cole for her assistance in data collection. To my cohort members, thank you for your reassurance, support, and friendship. You all made this process more enjoyable, and I am grateful for the built-in sounding board.

To my parents, Gary and Susan Fowler, thank you for your constant support of my academic pursuits. From preschool to graduate school, you have instilled in me a love of learning and an unbridled belief that I can accomplish anything I want to do. To my sisters, Jessica Corzine and Karon Fowler, thank you for being such strong role models and for encouraging me every step of the way. Finally, to my fiancé, Nick Riem, thank you for your truly endless support, encouragement, and patience. You have been a constant during the very tumultuous nature of graduate school, and I cannot fully express how integral you are to my success.
Abstract

Researchers have found that Social Skills Training (SST) does not consistently enhance students’ performance of trained skills in authentic social contexts. Recently, researchers have demonstrated that supplementing SST with positive peer reporting (PPR), specifically Tootling, can enhance students’ performance of recently trained skills as they engage in various small group activities. During these studies, the activity that students engaged in while Tootling may have influenced performance of recently trained social skills.

In the current study, SST training was provided and Tootling was applied as elementary students completed math assignments in small-groups. As students worked in these groups, researchers collected data on student performance of the recently trained social skills (i.e., complimenting and encouraging). The primary independent variable was not SST or the Tootling intervention; rather, the purpose was to evaluate the effects of the activity students were engaged in while Tootling. Thus, following SST and while Tootling, students engaged in three different small-group math activities, (a) a control activity where Tootling was not applied, (b) an independent seat-work condition where students answered math problems individually, and (c) a group work condition in which students took turns completing math problems. A no-treatment series alternating treatments design was used to contrast social skill performance across conditions.

Results provided another demonstration of the effectiveness of supplementing SST with Tootling, as both treatment conditions led to consistently higher levels of both targeted skills relative to no treatment. Results also showed differences between the two treatment conditions, with the group condition producing a higher number of intervals scored with both targeted social skills relative to the independent condition. Differences between conditions were clearer for the
skill of encouragement, and more nuanced with compliment-giving. Together, these findings suggest that the addition of PPR to SST can increase students’ performance of recently trained skills, and that these increases are significantly impacted by the task structure of the activity that student engage in while Tooting. Discussion focuses on implications of the current study, limitations, and considerations for future researchers.
# Table of Contents

Chapter I Introduction and Literature Review ........................................................................1
  Social Skills Development ..................................................................................................1
  Social Skills Training .........................................................................................................2
  Acquisition and Performance Deficits ..............................................................................3
  Performance Deficits and Peer Mediated Interventions ...................................................6
  Tasks that Might Provide Opportunities for Addressing Performance Deficits ...............10
Cooperative Learning .........................................................................................................13
  Academic Achievement Outcomes ..................................................................................13
  Social and Interpersonal Outcomes ................................................................................14
  Task Structure and Reward Structure ...........................................................................15
  Contingencies ..................................................................................................................17
Summary and Purpose of Current Study .............................................................................19
Chapter II Methodology .....................................................................................................21
  Participants and Setting .....................................................................................................21
  Materials ............................................................................................................................23
  Independent and Dependent Variables .........................................................................24
  Design ..............................................................................................................................26
  Procedures ........................................................................................................................27
  Analysis Procedures .........................................................................................................33
  Procedural Integrity and Interobserver Agreement .........................................................35
Chapter III Results .............................................................................................................37
  Whole Class Data .............................................................................................................37
  Group Level Data .............................................................................................................38
  Statistical Analysis ..........................................................................................................41
  Acceptability ......................................................................................................................43
Chapter IV Discussion ........................................................................................................45
  Theoretical and Applied Implications ..............................................................................48
  Limitations and Future Research .....................................................................................53
  Conclusions .......................................................................................................................57
References ............................................................................................................................58
Appendices ...........................................................................................................................70
  Appendix A: Tables ..........................................................................................................70
  Appendix B: Figures ...........................................................................................................73
  Appendix C: Positive Peer Reporting Materials ..............................................................78
  Appendix D: Tooting Game Training Protocol .................................................................79
  Appendix E: Student Acceptability Form ........................................................................80
  Appendix F: Teacher Acceptability Form .........................................................................81
  Appendix G: Integrity Checklists .......................................................................................82
  Appendix H: Sample Math Worksheet .............................................................................83
  Appendix I: Parent Information Sheet and Consent Form .................................................84
  Appendix J: Student Assent Form ....................................................................................86
Vita ..........................................................................................................................................87
List of Figures

Figure 1. Percent of Intervals Scored with Compliments Under Each Condition for Whole Class ................................................................. 73
Figure 2. Percent of Intervals Scored with Encouragements Under Each Condition for Whole Class ................................................................. 73
Figure 3. Percent of Intervals Scored with Compliments Under Each Condition for Group A ................................................................. 74
Figure 4. Percent of Intervals Scored with Encouragements Under Each Condition for Group A ................................................................. 74
Figure 5. Percent of Intervals Scored with Compliments Under Each Condition for Group B ................................................................. 75
Figure 6. Percent of Intervals Scored with Encouragements Under Each Condition for Group B ................................................................. 75
Figure 7. Percent of Intervals Scored with Compliments Under Each Condition for Group C ................................................................. 76
Figure 8. Percent of Intervals Scored with Encouragements Under Each Condition for Group C ................................................................. 76
Figure 9. Percent of Intervals Scored with Compliments Under Each Condition for Group D ................................................................. 77
Figure 10. Percent of Intervals Scored with Encouragements Under Each Condition for Group D ................................................................. 77
Chapter I

Introduction and Literature Review

Social Skills Development

Social skills are conceptualized as a set of learned behaviors that allow a person to interact effectively with others in a socially desirable way (Gresham, 1998). The development of social skills in turn leads to a child’s ability to establish and maintain interpersonal relationships with peers and adults, which is often referred to as social competence (Gresham, 1998). Gresham and colleagues (2001) conceptualize social competence as an evaluative term, meaning that a student’s social skills are being judged by another in some way (e.g., compared to peers; compared to normative data; as perceived by stakeholders in the child’s life) to determine if the student is building and maintaining social relationships in a satisfactory way.

Students with disabilities, including learning disabilities, neurodevelopmental disabilities, and cognitive delays often have difficulty with social skill development (e.g., Gresham, 1981a; Kavale & Mostert, 2004; McIntosh et al., 1991). Many researchers targeting social skill development include students with disabilities as participants (Gresham, 1981a; Kavale & Mostert, 2004). However, the development of strong social skills has important implications for both students with and without disabilities, including predictions of standardized test scores, GPA, peer acceptance, fewer relationship problems, personal adjustment later in life, and positive adult relationships (de Mooij et al., 2020; Henricsson & Rydell, 2006; Ng et al., 2018; Parker & Asher, 1987; Wentzel, 1993). Thus, the development of social skills is associated with various desired outcomes across academic, social, and behavioral variables for diverse student populations.
Underdeveloped social skills are associated with negative outcomes in childhood and adolescence. During childhood, social skills have been found to be one moderator between a child’s exposure to stress and development of childhood depression, such that lower social skills increase the likelihood of depression (Jaureguizar et al., 2018). Weak social skills are also associated with lower academic achievement in later elementary school, especially when underdeveloped social skills are paired with early reading problems (Cooper et al., 2014). Additionally, social skills deficits are associated with various problems in adulthood across culturally diverse populations, including increased psychosocial stress (e.g., depression, loneliness), difficulty developing meaningful relationships, and decreased happiness (Demir et al., 2012; Segrin & Flora, 2000). Given the various negative outcomes related to social skills deficits, and the myriad positive outcomes of strong social skill development, ensuring that all children learn and develop social skills is important for promoting positive short-term and long-term outcomes for children across various areas of their lives (e.g., academic success, mental health).

**Social Skills Training (SST)**

Social skills training (SST), sometimes referred to as Social Skills Instruction (SSI), is a type of explicit instruction that often occurs in small-groups and typically involves modeling and describing social skills, followed by opportunities to practice the skill with teacher-provided prompts, feedback/coaching, and reinforcement (Gresham, 1998; Simpson & Lewis, 2021; Walker & Barry, 2018). SST has four primary objectives, as outlined by Gresham (1998), which include promoting skill acquisition, enhancing skill performance, removing competing behaviors, and facilitating generalization and maintenance.
Despite its popularity as an intervention, SST has not been shown to consistently produce large or socially significant effects, nor does it consistently produce long-term or generalized changes in behavior (de Mooij et al., 2020; Gresham, 1998; Gresham et al., 2001; January et al., 2011). SST effects have been particularly weak for students with disabilities, which could be due to insufficient time allocated to SST in order to see treatment gains (Gresham et al., 2001; Kavale & Mostert, 2004). Other researchers posit that modest treatment effects may be correlated with imprecise targeting of specific social skills (Kavale & Mostert, 2004; Walker & Barry, 2018).

Several researchers have posited that SST alone is insufficient for enhancing student performance of the trained social skills in natural contexts (Gresham et al., 2001; January et al., 2011). In a recent meta-analysis of SST with non-clinical populations, researchers found that one of the most effective components of an SST package is increased skill-building opportunities; however, these opportunities still occurred within the SST context (de Mooij et al., 2020). Although students are able to perform social skills within the training environment, students may have difficulty engaging in incidental social skills within their natural environment (Skinner et al., 2002).

**Acquisition and Performance Deficits**

There is an important difference between social skills acquisition deficits (i.e., “can’t do” problems) and performance deficits (i.e., “won’t do” problems; Gresham, 1981a; Gresham et al., 2001). Acquisition deficits are associated with insufficient conceptual, procedural, or contextual knowledge of the skill, which in turn prevents adequate performance. Performance deficits occur when a student has acquired the skill but does not demonstrate the skill to an adequate level in a naturalistic context. Some indicators of performance deficits include the student’s level of
motivation to perform the skill and the student’s ability to perform the skill in a variety of contexts (Walker & Barry, 2018). Gresham et al. (2001) also propose a third difficulty with social skill development, which is a fluency deficit. Fluency deficits are theorized to result from insufficient rehearsal or practice of the skill, low rates of or inconsistent reinforcement for use of the skill, or insufficient models of the social behavior (Gresham et al., 2001). Fluency deficits are apparent when a student performs the skill, but in an awkward or unpolished way (Gresham et al., 2001; Walker & Barry, 2018).

The type of intervention that is effective for remediating social skills deficits is directly linked to the type of deficit that is present, which aligns with other skill development hierarchy models (Gresham et al., 2001; Haring & Eaton, 1978). Indeed, greater effects have been demonstrated for SST when treatment or intervention is matched to the specific type of social skill deficit (Gresham et al., 2001). To address acquisition deficits, Gresham et al. (2001) recommend modeling, rehearsal, and feedback. To address performance deficits, Gresham et al. recommend altering antecedents and consequences within the environment. To address fluency deficits, a remediation approach using behavioral rehearsal and feedback is recommended (Gresham et al., 2001). Children may often have a combination of these deficits, and a training model that incorporates elements to address each difficulty in a hierarchical structure (e.g., targeting acquisition before performance) is recommended (Gresham, 1998).

Haring and Eaton’s (1978) learning hierarchy aligns well with Gresham’s (2001) outline of the differences between acquisition and performance. However, per Haring and Eaton’s hierarchy, it is not sufficient to have the skill and be automatic or fluent with it, but rather a student must also decide when to use it and how to adapt to it to various environments. Skill generalization and adaptation therefore represent further development that is required for a
student to achieve mastery (Haring & Eaton, 1978). Within the language of social skills development, mastery would be considered social competence (Gresham et al., 2001).

While a student may be proficient in their social skills (e.g., demonstrate use of them within the classroom during SST), this does not indicate that the student will transfer that performance to a novel environment (generalization), nor does it indicate that the student will modify their responses to various contexts (adaptation; Haring & Eaton, 1978). Gresham et al. (2001) note that SST rarely trains for generalization, and often removes children from a natural social context (e.g., deliver SST in small-group pull-out settings), which in turn further diminishes the likelihood of generalization (Stokes & Baer, 1977). A contextual approach to SST that emphasizes incidental teaching in naturalistic settings has been suggested as an alternative to formal, small-group SST that does not in and of itself adequately train for generalization (Gresham, 1998; Walker & Barry, 2018).

In order to engage in successful skill generalization and adaptation, a student must discriminate (Haring & Eaton, 1978). To promote discrimination and generalizations and skill adaptation, a learner must also be provided opportunities to use and practice the skill in many different environments or contexts (Haring & Eaton, 1978). This ability to discriminate, generalize, and adapt social skills can allow one to accrue the benefits associated with social competence. One proposed method to address generalization and adaptation is to explicitly train for both within the natural environments of the child, which allows for incidental social interactions to practice and refine skills (Skinner et al., 2002).

Competing behaviors also may interfere with students performing social skills in authentic contexts (Gresham et al., 2001; Horner & Billingsley, 1988). If competing behaviors, which are often pre-existing problem behaviors prior to SST, continue to be more efficient and
reliable for gaining reinforcement, students will be unlikely to demonstrate the newly learned social skills. This difficulty with competing behaviors is well documented across target behaviors and contexts and can often be ameliorated with the correct reinforcement strategies (Cooper et al., 2007).

**Performance Deficits and Peer-Mediated Interventions**

One way to ameliorate performance deficits is a contextual approach to SST that emphasizes incidental teaching in naturalistic settings (Gresham et al., 2001). Within these naturalistic settings, students are provided the opportunity to interact with their peers in authentic ways; thus, peer-mediated interventions can address Gresham et al.’s concerns, while also providing many additional advantages for students and their peers. Hawkins and colleagues (2021) conceptualize peer-mediated interventions as a process in which peers serve as change agents within school-based interventions.

Peer-mediated interventions have several advantages, such as reducing the burden on teachers (e.g., reducing time and effort spent monitoring, prompting, and reinforcing skills), providing increased opportunities to respond, and programming for generalization (Hawkins et al., 2021; Skinner et al., 2002). Positive peer interaction can also serve as a natural reinforcer (Hawkins et al., 2021). Peer-mediated interventions have been demonstrated to have myriad positive outcomes, including desirable effects on academic achievement and social behavior (Dart et al., 2014; Hawkins et al., 2021).

Peer-mediated interventions are effective for a variety of target behaviors, including increasing social skills (Collins et al., 2016; Simpson & Lewis, 2021). Peer-mediated interventions are helpful for promoting recently learned social skills, as peers model, prompt, and reinforce others’ use of appropriate social skills within a naturalistic setting (Skinner et al., 2000;
Simpson & Lewis, 2021; Watkins et al., 2015). Therefore, when peers are used within SST, the intervention is more effectively programmed for generalization (Simpson & Lewis, 2021).

**Positive Peer Reporting**

One type of peer-mediated intervention is positive peer reporting (PPR), in which students are given a structured opportunity to provide praise to a target student on their positive behaviors that have been intentionally monitored by peers during a prescribed amount of time (Ervin et al., 1996; Morrison & Jones, 2007; Skinner et al., 2002). This intervention is conceptualized as the opposite of tattling, in that it encourages students to report their peers’ positive behaviors, rather than their rule-breaking behaviors (Cashwell et al., 2001; Skinner et al., 2002). PPR has been shown to improve peer perceptions and peer interactions, especially with socially neglected or withdrawn students (e.g., Bowers et al., 1999; Moroz & Jones, 2002). Its effectiveness has been demonstrated across various ages and settings, including general education and special education classrooms, as well as residential treatment programs (e.g., Bowers et al., 1999; Morrison & Jones, 2007; for a review, see Murphy & Zlomke, 2014).

Teachers are often over-burdened with handling problem behaviors and are unable to catch covert prosocial behaviors; thus, they are less likely to reinforce expected social behaviors (Skinner et al., 2000). Within a PPR system, teachers are not solely responsible for “catching students being good” (Skinner et al., 2000). Instead, PPR interventions can increase the reinforcement that students receive for prosocial behaviors by allowing for reinforcement from peers within the natural environment. At the end of the PPR session, peers publicly share the prosocial behaviors they noticed from the target student (Skinner et al., 2002). Thus, by using peers as a reinforcement agent, children will be more consistently reinforced for incidences of prosocial behavior (Skinner et al., 2000).
**Tootling.** Tootling, which is a specific, class-wide adaptation of PPR, is an intervention used to encourage students to monitor and report classmates’ prosocial behaviors across typical classroom activities (Morrison & Jones, 2007). Within Tootling, an interdependent group contingency is employed, which results in classwide reinforcement for reporting any peers’ prosocial behaviors within the given time frame (Skinner et al., 2000; Skinner et al., 2002). Rather than using public reports, reports are recorded on index cards that can be turned in at any time during the Tootling intervention (Skinner et al., 2002).

In its original conceptualization, the number of Tootles recorded are tallied, and the class is informed whether or not they met their goal set for a class-wide reward (Skinner et al., 2002). A later study using a Tootling procedure used the number of different students Tootled on, rather than the total number of Tootles submitted, as the reward criterion (Kirkpatrick et al., 2019). Using a reward structure that best fits the needs of the student group, Tootling procedures allow for consistent reinforcement of positive peer reports of prosocial behaviors. When incidental learning experiences are not reinforced, they are less likely to occur again (Cooper et al., 2007; Skinner et al., 2002). Thus, Tootling provides an opportunity to reinforce desirable social behaviors that are occurring but may otherwise go without consistent reinforcement (Skinner et al., 2002).

During early Tootling studies, elementary students were taught to report student-helping–student (S-H-S) behaviors, and students were then reinforced for submitting these reports (Cashwell et al., 2001; Skinner et al., 2000). Results of these initial studies indicated that the interdependent group contingency component was needed to maintain reporting of S-H-S behaviors. With additional Tootling studies, researchers concluded that Tootling was effective in decreasing disruptive classroom behaviors (e.g., calling out), decreasing undesirable social
behaviors (e.g., name calling), and increasing on-task behavior (Cihak et al., 2009; Kirkpatrick et al., 2019; Lambert et al., 2015; Lum et al., 2017; McHugh et al., 2016).

In an extension of previous Tootling research, Wright et al. (2021) combined Tootling procedures with SST to reinforce first-grade students for reporting compliments, given that complimenting was recently taught within an SST framework. In this withdrawal design study, students earned a class-wide reward if they met the criteria for number of Tootles (i.e., peer reports of classmates complimenting other classmates) submitted during an hour-long typical classroom procedure, which was a small-group math game. Feedback on group performance was also publicly posted. Researchers found that the combination of SST and Tootling procedures increased students’ compliment-giving behaviors during the math game, as these verbal behaviors were directly measured by observers during each session. Wright et al. also found that when the Tootling intervention was withdrawn, complimenting decreased. These results demonstrated that the Tootling intervention was a necessary component of the SST to maintain the recently taught skill. Given that the target behavior was directly observed and recorded by trained observers, Wright et al. demonstrated that Tootling can increase both peer reports of target behavior, as well as the actual occurrence of the target behavior (e.g., students complimenting classmates in an authentic social context).

In a subsequent study, Wright et al. (2022) demonstrated that a Tootling intervention packaged with SST could target multiple social skills, as demonstrated in a multiple baseline across behaviors design. Researchers sequentially added peer reports of three social skills (complimenting, encouraging, and saying thank you) made by first-grade students while engaged in parallel play (i.e., playing with Legos), as well as sequentially adding possible criteria for a group reward. Although treatment effects were not as large as the Wright et al. (2021) study, this
study demonstrated that multiple social skills could be targeted sequentially within the Tootling intervention framework.

Crewdson et al. (in press) replicated and extended the research on combining SST and Tootling intervention procedures. In Crewdson et al.’s study, two social skills (complimenting and encouraging) were simultaneously targeted during small-group cooperative play using a modified Jenga® game with small-groups of first-grade students. This intervention procedure included unknown criteria for the group reward (compliments or encouragements), such that students were incentivized to report across both target behaviors (e.g., Popkin & Skinner, 2003; Richardson et al., 2021). Results indicated immediate increases in students’ complimenting and encouraging behaviors each time the Tootling intervention was applied, and an immediate decrease when Tootling was withdrawn. This finding aligns with Wright et al.’s (2021) finding that Tootling was necessary to maintain performance of a newly learned social skill. This study also provided a clearer demonstration of Tootling treatment effects separate from SST, given that SST was conducted prior to baseline, further clarifying that Tootling was a necessary component to enhance performance of the targeted social skills (Crewdson et al., in press). This finding aligns with previous studies that indicate that SST alone is not sufficient for student demonstration of learned social skills over time (Gresham et al., 2001).

**Tasks that Might Provide Opportunities for Addressing Performance Deficits**

*Structured non-academic tasks*

Antecedent control of social behavior is one proposed way to intervene when students display performance deficits in social skills (Gresham, 1981a). Arranging the environment in such a way to occasion more social interaction between peers subsequently allows more opportunities to practice learned social skills. One antecedent control strategy that can likely
occasion more opportunities for peer-based social interaction is the use of cooperative tasks (Gresham, 1981a). Quilitch and Risley (1973) examined the effects of the availability of “social” toys (i.e., toys that multiple children typically played with at one time) and “isolate” toys (i.e., toys that were used primarily for individual play) on children’s social play with one another. Differences in amount of time engaged in social or cooperative play were found to be directly related to the toys that were present during a free play session, such that “social” toys occasioned more social play behaviors (Quilitch & Risley, 1973).

Several previous applied behavior analysis studies yielded results that indicated that task structure matters as a way to gain antecedent control of social behaviors (Bay-Hinitz et al., 1994; Mithaug & Wolfe, 1976). When tasks are structured with a cooperative component, Bay-Hinitz and Wilson (2005) assert that it creates a social environment that is foundational for positive social interactions. Cooperative game play has been demonstrated to have many positive effects on student outcomes, including decreased aggression behaviors, increased cross-racial interactions, and increased performance of specifically trained social skills (Bay-Hinitz et al., 1994; Crewdson et al., in press; Finlinson et al., 2000; Rogers et al., 1981).

Crewdson et al. (2022) sought to extend Tootling research to determine if the task completed while engaged in the Tootling intervention affected the demonstration of recently taught social skills. In this alternating treatments design (ATD) with a no-treatment series, students engaged in a Tootling intervention across two different tasks: Yeti in my Spaghetti® and Legos®. A Bingo game that was typical classroom procedure was used without Tootling as a no-treatment condition. While Bingo and Legos® promoted competitive or parallel play, respectively, Yeti® provided an opportunity for cooperative play. This study was converted into a group design for statistical analysis following the closing of schools due to the COVID-19
pandemic. Results of a two-way repeated measures ANOVA indicated that there were significant differences in intervals scored with compliments across all three activities, with the highest number of intervals with compliment-giving occurring during cooperative play (i.e., Yeti®), and the least number occurring during the individual competition (i.e., Bingo). For encouragements, the cooperative play activity yielded a higher number of intervals scored than both the parallel play and the individual competition conditions. Results indicated that the task given when students are expected to practice recently trained social skills likely impacts their performance; however, Crewdson et al. (2022) were unable to separately evaluate the effects of different task and reward structures.

**Academic tasks**

Wright et al. (2021) sought to extend research on Tootling applied to specific social skills; however, Wright et al. (2022) found smaller treatment effects than Wright et al. (2021). One possible explanation for smaller treatment effects across Wright et al.’s (2021) original study and Wright et al.’s (2022) follow-up study was the task structure across studies (i.e., small-group math game or parallel play activity; Crewdson et al., 2022). Crewdson et al. (2022) noted that the small-group math game may have provided additional opportunities to practice newly trained social skills given the nature of the task, especially when compared with Legos® that promote parallel play. The academically oriented task in Wright et al.’s (2021) study promoted enhanced social skill performance, but further research is needed to determine whether task structure contributed to smaller effects between studies. While embedded and practicing SST during academic tasks may seem to compete with academic skill development, Walker and Barry (2018) assert that it should instead be viewed as a proactive measure to decrease problem behaviors that ultimately take away from instructional time. One type of academic task structure
that has been demonstrated to promote positive social development, as well as academic growth, is cooperative learning (Kyndt et al., 2013; Mendo-Lázaro et al., 2018; Mithaug & Wolfe, 1976; Slavin, 1990).

**Cooperative Learning**

Cooperative learning typically involves tasks in which students work together to help one another learn academic skills or concepts (Slavin, 1991). Cooperative learning differs from traditional instructional formats in that a classroom is divided into small teams that are made interdependent by a task structure and/or a reward structure (Kagan, 1985). Although the various types of cooperative group learning formats can differ significantly from one another, the common thread is positive interdependence among student groups (Kagan, 1985). Common types of cooperative learning strategies include team learning, expert groups, collaborative task completion, and collaborative problem-solving or investigation (Nastasi & Clements, 1991). Different strategies may lend themselves to different subject areas or desired outcomes (Kagan, 1985; Nastasi & Clements, 1991).

**Academic Achievement Outcomes**

Cooperative learning tasks have been shown to enhance many student outcomes, with much of the available research focused on increases in academic achievement, which is also the outcome variable with the most significant and robust effect sizes (Gillies & Ashman, 1998; Kyndt et al., 2013; Slavin, 1990). In Kyndt et al.’s (2013) meta-analysis of cooperative learning, the researchers found the effect size for achievement outcomes had practical significance, aligned with previously published effect size estimates, and was relatively large compared to other outcome variables measured (ES=0.54).
Cooperative learning has been applied across ages and grades, including young elementary students, secondary students, and post-secondary students (Kyndt et al., 2013; Mendo-Lázaro et al., 2018). When students are placed into cooperative learning groups at the elementary school level, the goal is for students to work together on acquisition, fluency, and/or generalization of academic skills that were originally introduced by the teacher prior to the cooperative task (Slavin, 1990). In Kyndt et al.’s (2013) meta-analysis, they found that non-linguistic topics (e.g., math and science) may be the most effective topics for cooperative learning groups, likely due to their hierarchical, sequential, and concrete nature that lends itself to assistance from other group members.

Social and Interpersonal Outcomes

Cooperative learning tasks have been demonstrated to have positive social and interpersonal outcomes for students, including sustained increases in cooperative and helping behaviors, willingness to engage with more diverse peer groups, enhanced motivation and attitude towards learning, increased social interaction and social communication, and enhanced interpersonal relationships (Gillies, 2000; Gillies, 2002; Gillies & Ashman, 1998; Jordan & Métais, 1997; Nastasi & Clements, 1991; Rutherford et al., 1998). Cooperative learning groups are unique environments in which social skills can be both acquired and practiced (Mendo-Lázaro et al., 2018; Mithaug & Wolfe, 1976).

Despite positive effects on social interactions, baseline level difficulties with social skills can make this type of group work challenging, and social skills may need to be explicitly taught prior to academically-oriented cooperative group work (Goodwin, 1999; Mendo-Lázaro et al., 2018; Nastasi & Clements, 1991; Sturmey & Crisp, 1986). Some researchers have recommended that cooperative groups be used to *teach* social skills (e.g., the group task is learning a social
skill; Bay-Hinitz & Wilson, 2005; Goodwin, 1999). This use of cooperative learning is especially pertinent for groups that contain students with and without disabilities, given that several different types of disabilities (e.g., Autism Spectrum Disorders, Attention Deficit Hyperactivity Disorder) can make learning social skills more challenging (Goodwin, 1999). Despite these potential difficulties, cooperative learning groups have been demonstrated to be an effective strategy for all learners, including those with and without disabilities (Madden & Slavin, 1983; Putnam et al., 1989).

**Task Structure and Reward Structure**

Within cooperative learning structures, there are myriad ways to approach how the task is set up, the reward structure, and the amount of information and cooperation needed to complete the task (Kagan, 1985). Thus, cooperative learning structures may include different task structures and/or different reward structures, which can in turn enhance positive social relations and demonstration of prosocial behaviors (Kagan, 1985; Slavin, 1980; Slavin, 1991).

The use of interdependent and cooperative task structures to occasion social behaviors has been well documented (e.g., Bay-Hinitz et al., 1994; Kagan, 1985; Mithaug & Wolfe, 1976). For example, Bay-Hinitz et al. (1994) determined that it is not the particular game or activity, but whether it is arranged cooperatively or competitively that affects learner outcomes. In one study that compared task independence or interdependence on verbal interactions among students, the researchers found that task independence did not occasion verbal interactions, whereas task interdependence did (Mithaug & Wolfe, 1976). The researchers concluded that task interdependence can increase social responding for students with intellectual disabilities (Mithaug & Wolfe, 1976).
Comparisons of task structure can also be made within cooperative learning group strategies. Jigsaw I and Jigsaw II are two commonly referenced cooperative learning formats that can help delineate some differences in task structure. Within Jigsaw I, there is positive interdependence established, in which students must rely on one another succeed (e.g., relying on another student is the only way to finish the task; Kagan, 1985). Positive interdependence that is the foundation of Jigsaw I can be contrasted with positive facilitation (i.e., the foundation of Jigsaw II), wherein students are motivated to work together, and it is in their best interest to do so, but they could succeed on their own (i.e., they have all necessary components to complete the task alone; Kagan, 1985). With Jigsaw II, group performance is rewarded, as is individual performance within the group (Kagan, 1985). Importantly, with Jigsaw II, students have access to the whole curriculum or activity, such that they are not reliant on peers to teach to them or provide to them something they cannot access elsewhere (i.e., the task structure of Jigsaw I; Kagan, 1985).

In addition to differences in task structure, differences in reward structure can also be found when comparing cooperative learning to other traditional instructional methods. Cooperative learning procedures are designed so that students work on academic activities in small-groups, wherein group performance is rewarded or recognized, rather than individual performance alone (Kagan, 1985; Slavin, 1980). In Kyndt et al.’s (2013) meta-analysis of cooperative learning studies, the researchers found no significant difference between individual and group rewards. This differs from Johnson and Johnson’s (2009) finding that group rewards were necessary for promoting positive interdependence; however, these researchers were noted to not differentiate between task and reward structure (e.g., the degree to which the task is designed for the group to work together compared to the outcome or reward of the group work;
Kyndt et al., 2013). It should be noted that some cooperative learning structures build in both group and individual rewards (Kagan, 1985), and Kyndt et al. (2013) recommended using both reward structures. This recommendation is consistent with Slavin’s (1991) earlier finding that the success of cooperative learning appears to hinge on both individual accountability and a group reward.

**Contingencies**

Contingencies underpin the reward structure of cooperative learning tasks, such that contingencies within cooperative groups are theorized to motivate students to work together to in turn meet reward criteria (Slavin, 1991). According to Slavin, contingencies can account for the achievement gains and other positive outcomes associated with cooperative learning tasks.

Group-oriented contingencies are a classwide behavioral management strategy wherein a group of students work towards a certain criterion in order to earn a reward (Litow & Pumroy, 1975). Group-oriented contingencies are often divided into three distinct categories: dependent, independent, and interdependent (Litow & Pumroy, 1975). In a dependent group-oriented contingency, the performance of a subset of the whole determines whether or not the whole receives the reward (Litow & Pumroy, 1975; Popkin & Skinner, 2003). In an independent group-oriented contingency, the same reward criteria are set for all group members, but rewards are delivered contingent on individual performance (Litow & Pumroy, 1975; Popkin & Skinner, 2003). Therefore, group members are not dependent on their peers’ performance in order to access the reward (Litow & Pumroy, 1975). Finally, an interdependent group-oriented contingency is designed to where a whole-group reward is contingent upon whole-group performance meeting the set criteria (Litow & Pumroy, 1975; Popkin & Skinner, 2003).
While all three types of group-oriented contingencies have been shown to be effective for a variety of target behaviors across a variety of ages and student populations (e.g., Little et al., 2015), interdependent group-oriented contingencies may ameliorate some concerns about group-oriented contingencies (Litow & Pumroy, 1975; McCurdy et al., 2020; Popkin & Skinner, 2003). Of the types of group contingencies, cooperative learning tasks mostly rely on interdependent group contingencies, just as they also rely on interdependent task structures (Kagan, 1985; Slavin, 1991). However, some cooperative learning tasks include multiple contingencies that reward both individual and group performance (Kagan, 1985; Slavin, 1991).

Within cooperative learning groups, interdependent group-oriented contingencies (e.g., all members receive the reward when a group-oriented criteria is met) encourage cooperation within the group instead of competition within the group, since the group is working together towards a common goal (Kagan, 1985; Skinner et al., 2002). However, competition-based contingencies with winners and losers differ from cooperation-based contingencies (e.g., working together to win as a team), and lead to substantially different outcomes, including increased aggressive behaviors during competitive games and increased cooperative behaviors during cooperative games (Bay-Hinitz et al., 1994).

Cooperative learning groups often have group-oriented contingencies that are centered on academic learning outcomes (e.g., Slavin, 1991). However, when a group reward is somehow contingent on individual student learning within groups, then peer interaction within groups is more frequent (Slavin, 1991). Thus, a natural next step within this line of research would be to reward appropriate peer interactions within cooperative learning groups, given that performance deficits in social skills often occur because the environment does not consistently reinforce appropriate social behavior (Gresham, 1981a).
Summary and Purpose of Current Study

A recent line of research has demonstrated that games that include cooperative components (e.g., turn taking) allow students more opportunities to engage in recently trained social skills (Crewdson et al., 2022). Similarly, educators have made several recommendations and published case studies involving socially based (e.g., not academic) activities completed within cooperative groups to enhance social skill development (Goodwin, 1999; Jordan & Métais, 1997). Rutherford et al. (1989) empirically demonstrated that socially based problem-solving activities within a cooperative learning group can enhance social skill development. Bay-Hinitz et al. (1994) found that cooperative games lend themselves to eliciting more cooperative behaviors and fewer aggressive behaviors from students when compared to competitive games.

It is well documented that cooperative learning tasks are linked to increases in social skill acquisition and performance, given that they provide increased social interactions and opportunities to practice newly learned or developed skills (Rutherford et al., 1998). However, few to no empirical studies, to our knowledge, directly measuring this correlation have been conducted using academically based cooperative learning tasks. Studies that involved academic tasks relied on self-report measures of increased social skills as a product of cooperative learning conditions (e.g., Mendo-Lázaro et al., 2018), but did not directly assess social skill differences across conditions.

As demonstrated by Wright et al. (2021), Wright et al. (2022), Crewdson et al. (in press), and Crewdson et al. (2022), a modified Tootling intervention may effectively address social skills performance deficits by enhancing student engagement in recently taught social skills outside the SST environment. These previous studies have demonstrated that a modified Tootling intervention within socially based games may provide more opportunities to respond
compared to games that are independent in nature (Crewdson et al., 2022). While Wright et al. (2021) demonstrated that SST and a Tootling intervention can increase the performance of recently trained social skills during a cooperative academic task, there was not a comparison treatment to demonstrate the control of the task structure itself on intervention effectiveness.

Thus, the current study was designed to extend this research by evaluating the effects of SST and Tootling on the performance of two different social skills simultaneously taught and measured in at-risk third-grade students while they engaged in a small-group academic task or an independent seat-work task. An alternating treatment design with a no-treatment series was employed to determine if the task structure (i.e., independent seat-work or group work) impacts student performance of recently trained social skills when completing an academic task.
Chapter II

Methodology

Participants and Setting

This study was conducted during the after-school program at a K-5 University-assisted community school (UACS) in an urban area of the Southeastern United States. The after-school program is designed for at-risk students to receive enrichment programming and academic supports with the goal of improving academic, behavioral, and social-emotional skills. Students are typically accepted into the program due to social-emotional or behavioral difficulties, school attendance concerns, academic deficits, and other risk factors. Most students are from low-income households. Approximately 102 students were enrolled in the after-school program during the 2021-2022 school year, with roughly half of the students presenting as female and the other half presenting as male. The program had a diverse student population, with 48% Black, 26% White non-Hispanic, 16% multi-race, and 9% Hispanic students. Approximately 18% of students enrolled received special education services and 3% of students had a 504 plan in place during the regular school day. Three enrolled students were English language learners.

There were 15 students in the third-grade academic hour. There were 5 female-presenting students and 10 male-presenting students. Approximately 33.3% of students were Black, 33.3% of students were White non-Hispanic, 20% of students were multi-race, and 13.3% of students were Hispanic. Based on the regular school day benchmarking data, 3 students were performing at a first-grade level in math, 8 students were performing at a second-grade level, and 4 students were performing on grade-level. Of the 15 students in the classroom, consent was obtained for 14 students (see Appendix I). The student for whom consent was not obtained still participated in
the small-groups during the study. However, no data is reported for this student; thus, Group C data only represents two of three students in the group.

Teaching responsibilities were split between two teachers across the school days. The primary teacher was a third-grade general education teacher at the elementary school where the after-school program was housed, so some of her students from the typical school day were also in the after-school program with her. The other individual who worked with third grade students during academic hour had a bachelor’s degree in biology and was currently working towards a Master’s level teaching certificate. Academic hour took place from 3:30 to 4:30 on Mondays, Wednesdays, and Thursdays. Prior to academic hour, students had a snack immediately after dismissal from school.

Students were assigned to small groups of three to four students each, with group assignment based on teacher recommendation. Teacher recommendations were made by considering which students were frequently absent and which students had high levels of conflict with one another. The lead third-grade teacher also obtained students’ benchmarking data and indicated the approximate grade level that each student was working on in math. The students were grouped primarily by their current math skills so that fluency-based tasks were appropriately difficult for each group. Of the four groups, one group was working on third-grade level problems (e.g., single digit multiplication), two groups were working on second-grade level problems (e.g., 2-digit by 2-digit addition), and one group was working on first-grade level problems (e.g., fact families). Each group spent approximately 10 min at the intervention station during their academic hour, with daily variation ranging from 7 min to 12 min.

Due to the ongoing COVID-19 pandemic, students and staff were required to wear masks during academic hour during the first 10 sessions of data collection. Masks were no longer
required after day 10, and the majority of student participants stopped wearing masks. The primary and secondary researcher continued to mask when working with the students. No other restrictions were in place (e.g., physical distancing); however, increased absences among teachers and students relative to a typical school year were noted.

**Materials**

Materials included academic activities provided by the primary researcher. The academic tasks were printed worksheets from SpringMath (VanDerHeyden, 2022) with 20-50 problems per page (see Appendix H for a sample). If students completed a worksheet while still at the intervention station, the researcher provided another grade-appropriate worksheet such that students never ran out of problems to complete. Earlier assessments (benchmark scores) were used to approximate grade-appropriate math skills that students had acquired (i.e., could complete accurately); thus, reducing the need for immediate accuracy feedback (Haring & Eaton, 1978). Therefore, current skill practice was designed to increase students’ rates of accurate responding. After observing a similar error across students in two groups, the researcher provided a brief reteaching on carrying when adding two-digit numbers. This reteaching allowed students to continue to work on fluency with accurate responding. Worksheets were created with grade-appropriate math problems of equivalent difficulty, with at least 10 alternative forms that were rotated each day so students were given unique items sets relative to their previous worksheet and relative to their other small-group peers.

Positive peer reporting slips were similar to those used in Crewdson et al. (in press), and they included the words “Student name” with a blank for students to write their peer’s name, as well as the words “compliment” and “encouragement,” along with corresponding images (see Appendix C). Slips were ¼ of an 8 ½ x 11 piece of paper. A shoe box decorated with colorful
wrapping paper and a slot cut in the lid was used to submit PPR slips completed by students. The researcher also printed the random reward criteria on slips that were kept in a letter-size envelope with the words “Today’s Goal” that was placed out of student reach during each session. Consistent with previous studies conducted within this after-school program (e.g., Wright et al., 2021), the teacher selected small, individually wrapped pieces of candy as a highly desired and rarely received reward that most or all students would enjoy.

**Independent and Dependent Variables**

Intervention components included SST, PPR training, and the application of a modified Tootling intervention while students completed an academic task. The intervention was similar to that used by Wright et al. (2021), Wright et al. (2022), Crewdson et al. (in press), and Crewdson et al. (2022). During the current Tootling intervention, two different social skills were targeted: compliment-giving and providing encouragements. The academic task was presented in two different conditions: an independent seat-work procedure and a cooperative learning group procedure that involved turn-taking. In the independent seat-work condition, each student was given math problems to complete on their own. In the cooperative group condition, each table of 3-4 students was given a single worksheet to complete as a group using turn-taking procedures.

Each student was observed for approximately 10 min (range 7-12 min) while their group either completed the independent seat-work task or the cooperative group task, and researchers used partial interval (20 s intervals) time sampling to record verbal compliments and encouragements. Partial interval time sampling was used because verbal behaviors do not always have a clear beginning or end. The primary dependent variable was the percentage of total observed intervals across all students that were scored with a either a compliment or encouragement.
Operational definitions of compliments were similar to those used by Wright et al. (2021) and Crewdson et al. (in press). Compliments were operationally defined as positive, verbal statements that demonstrated approval of another student personally or of another student’s completed action. Examples of compliments that demonstrated approval of a student personally included, “I like your shirt,” or “You are good at math.” Examples of compliments that demonstrated approval of another student’s completed action included, “Good job,” or “You did it.” Positive affirmations of correct answers on the academic tasks (e.g., “That’s right!”) were counted as compliments. Non-examples of compliments included “Yes!” or “Yay!” because these were often related to the individual’s own performance or task completion instead of being directed at a peer. The definition of encouragements is also consistent with previous researchers’ operational definitions (e.g., Crewdson et al., in press; Wright et al., 2021). Encouragements were operationally defined as positive, verbal statements that appear to support, cheer on, or increase the confidence of another student before they engage in a behavior or during the behavior. Examples of encouragements included, “You can do it,” or “Try that one.” Non-examples of encouragements included, “Don’t do that,” and statements included in the definition of compliment-giving behavior. Providing an answer to a peer was not counted as encouragement.

Compliments and encouragements were only scored if they were at an audible level and directed toward another peer within their small-group at the table. Therefore, a compliment or encouragement directed at a student in another group or directed at an adult was not scored. If a peer from another group engaged in any target behaviors (e.g., walking by the table and providing a compliment on the group’s progress), this was not scored. Nonverbal compliments or
encouragements (e.g., high-fives, thumbs-up) were not included in operational definitions, as these were often also accompanied by verbal behavior or not consistently directed toward a peer.

**Design**

An alternating treatments design (ATD) with a no-treatment series (Skinner et al., 2022) was used to examine the effects of the Tootling intervention on complimenting and encouraging while students completed academic tasks either individually or as a group. This design allows for multiple demonstrations of experimental control (Kazdin, 2011). The decision on when to change from the baseline phase to the alternating treatments (AT) phase was made based on visual analysis of class-wide baseline phase data that were plotted on repeated measures graphs. Specifically, decisions were based on baseline phase trends, levels, and variability. At least seven points across both treatment conditions were planned in the AT phase. However, only six data points in each treatment condition were collected given conflicting end-of-year school activities.

This design still meets recommendations regarding the minimum number of data points of five per treatment (What Works Clearinghouse, 2020; Wolery et al., 2018). Additionally, at least seven no-treatment condition sessions were included across both the baseline and AT phases (Skinner et al., 2022).

Prior to beginning the AT phase, condition order was determined based on a set of rules created by the researchers. Treatments were not alternated daily, but rather randomly selected such that the same treatment might be delivered on two consecutive days, but no more than two consecutive days. Return to baseline conditions (no-treatment) was interspersed in this same randomized way to ensure a total of seven no-treatment data points across the baseline and AT phase. This arrangement could resemble the following pattern after baseline was established: A, B, B, C, A, B, C, A, A, C, B, C, A, and so on. These rules and decisions align with current
practice guidance (e.g., Wolery et al., 2018). On some occasions, the intervention was not run as scheduled (e.g., conflicting program-wide events, teacher addressing behavioral problems for more than 10 min of the allotted intervention time). In these instances, treatment was continued as pre-planned the following day that data were able to be collected.

**Procedures**

Prior to beginning the study, the primary researcher and research assistant(s) assisted with classroom procedures as needed, observed the classroom environment, learned student names, and allowed students to become familiar with the researchers being present. The primary researcher also met with the teacher(s) to explain the research study and form student groups to rotate through stations.

After groups were formed in consultation with the teacher(s), parent consent (see Appendix I) and student assent (see Appendix J) were collected. The primary researcher met parents in the car pick up line at the end of the day to briefly explain the study and request consent. If a parent or guardian did not pick up the child, the child was given the information sheet (see Appendix I) and consent form to take home in their backpack and return to the school. The primary researcher and research assistant collected student assent in the classroom during academic hour.

Following collection of parent consent and student assent, study procedures were implemented. Students either rotated through stations as part of typical classroom procedures, or they were pulled for a small-group with the researcher during whole-class or independent seat-work activities planned by their after-school teacher. During the small-group with the primary researcher, baseline data on compliments and encouragements were collected. Next, students engaged in an SST session on complimenting and encouraging at the beginning of academic

27
hour. Then, students were immediately trained on Tootling procedures and introduced to the Tootling game. Immediately after Tootling training, the intervention was installed and students began to complete math worksheets during one small-group with the primary researcher.

**Baseline Phase and Assessment Procedures**

During baseline, students were given math worksheets to complete independently. The primary researcher used partial-interval recording with 20s intervals to record verbal behavior data for each student within a small-group. For each student, an interval was scored if a student delivered a verbal compliment or provided verbal encouragement within the interval. Each student was monitored individually throughout the 10 min small-group period, and data were collected on individual verbal behaviors of each student. When the 10 min period for the station was over, students rotated to their next station with direction from the classroom teacher. This procedure was repeated for each group of students within the classroom, such that each small-group came to the math worksheet station once per day. Occasionally, the students engaged in a whole-group activity during academic hour, so students were pulled to complete their small-groups and then they returned to the whole-group activities.

**Social Skills Training**

The primary researcher provided one day of SST at the beginning of the academic hour. SST included defining compliments and encouragements, soliciting and providing examples and non-examples, and modeling the use of the target social skills. Examples of when each behavior would be appropriate (i.e., when to use compliments and encouragements) were provided, with additional examples solicited from students. The primary researcher also discussed the tone of the verbal behaviors based on Crewdson et al.’s (in press) work in which students sometimes used a negative or sarcastic tone of voice, although the words used would be considered
compliments or encouragements. Finally, students were asked to share how it feels to give and receive compliments and encouragements. Throughout the SST session, praise and feedback were provided following student responses.

**Tootling Training**

Following baseline data collection and SST, the primary researcher also provided Tootling intervention training for one session at the beginning of academic hour. First, students were introduced to the Tootling game and the rules for playing. Specifically, students were trained on reporting their peers’ compliments and encouragements by using PPR slips. Students were instructed to not complete slips for themselves or adults (e.g., teachers, classroom volunteers), and to only complete slips during their station with the primary researcher.

Next, students were shown the slips, how to fill them out, and where to submit them. Students were instructed to write the name of the peer in their small-group that provided the compliment or encouragement, and then circle either the word “compliment” or “encouragement” at the bottom of the slip to specify which behavior their peer performed. The primary researcher specified that only one student name and one behavior should be written/circled on a slip. Students were instructed that any slip filled out incorrectly did not count toward their goal for the day and did not help them win the Tootling game. Examples and non-examples of properly completed slips were shown. The students were shown the decorated shoe box to place their slips into, and informed that it would be located at the primary researcher’s station.

Once students were familiar with the slips and how to complete them, the primary researcher explained the procedures for the game. The researcher explained to the students that at the end of academic hour, all of the slips completed by each group during academic hour and
placed in the decorated box would be counted. Students were informed that compliments and encouragements were counted separately, such that a total number of Tootling slips for compliments and a total number of Tootling slips for encouragements was recorded. The researcher showed the students the goal envelope and how a random criterion for winning the game as a class would be selected. Students were instructed that there were many criteria slips, which were evenly divided among compliments and encouragements. For each behavior (i.e., compliment or encouragement), the slip contained a single numerical criterion to indicate the number of Tootles that need to be submitted for that specific behavior to win the game. Criteria ranged from 1-20, though students were told that the numbers were a mystery each day and were not told specific criteria ranges. Students were shown two examples, one with a compliment slip and one with an encouragement slip to ensure that they understood the difference in goals.

The researcher explained that no one would know what the day’s goal (number of Tootles submitted nor the goal behavior) was until the end of academic hour. The students were taught that once the primary researcher counted PPR slips, the researcher would reveal the goal and if the students met or exceeded that goal. Students were taught that if the class met or exceeded their goal, each student in the class would receive a special reward. The researcher emphasized that this was a class-wide reward, so either everyone won, or no one won, regardless of individual or small-group performance. Tootling training protocols can be seen in Appendix D.

**Alternating Treatments (AT) Phase**

During the AT phase, several procedures were consistently implemented at the start of the academic hour regardless of the treatment condition used during the session. First, the researcher reminded all students that they would be playing the Tootling game. The researcher selected a random criterion slip to add to the Goals envelope, did not show students the selected
slip, and reminded students that Tootles would be counted at the end of academic hour to see if the class met their goal. As small groups came to the researcher’s area, they quickly reviewed the rules of the Tootling game with reminders and questions posed by the researcher. These questions, aligning with Crewdson et al.’s (in press) work, were: “How many names do you write on each slip?” “How many behaviors do you circle on each slip?” “Do you fill out a slip for yourself?” and “When do you fill out a slip?” Once the students correctly answered these questions and any additional student questions or concerns about the game were addressed, the students started with one of the treatment tasks (i.e., either independent work or group work) and the researcher(s) began data collection. Across treatment conditions, if students asked the researcher(s) for help, they were encouraged to try their best. If students tried to engage the researcher(s), they were redirected back to the task. Occasionally, researchers had to intervene to provide redirection (e.g., prompting students to return to small-group area, redirecting students who were arguing with one another or upset). When disruptions occurred, these intervals were not scored. At the end of the small-group session across both treatments (group and independent), students were reminded to submit their Tootling slips.

At the end of academic hour, the primary researcher counted the number of correctly completed PPR slips for compliments, and the number of correctly completed slips for encouragements. The researcher then announced to the class what the randomly selected criteria slip from the Goal envelope was for that day (e.g., 2 compliments; 6 encouragements) and asked the students if they believed they met that goal as a group. Then, students were told how many of the target behavior slips (compliments or encouragements) they turned in as a class. If the class met or exceeded their goal, the researcher gave each student a piece of candy to put in their
backpack. If the class did not meet their goal, students were encouraged to try to meet their goal the next time they played the Tootling game.

**Cooperative learning (group) condition.** Within the cooperative learning condition, students were given one math worksheet to complete as a group. The worksheet included more problems than could likely be completed in the 10-min period; however, the researcher had additional worksheets available to cycle through should students complete more problems than anticipated. The primary researcher selected a student to start with the first question on the sheet during each session. Students were reminded the order of turn-taking (clockwise from the starting student), and that each student needed to take their turn. Students were reminded that the goal was to beat their group’s best previous number of correctly answered items. Before students started working, they were told whether or not they beat their previous high score of items answered correctly as a group the last time they worked together. Students were then encouraged to try to beat their best group score during the current work session. Each time, students were praised for their effort and encouraged to keep trying to beat their best group score. Researchers then began data collection. Researchers only intervened if students needed a reminder to take turns, by saying “Make sure you are going in order and everyone gets a turn.”

**Independent seat-work (independent) condition.** Within the independent seat-work condition, students were each given a math worksheet to complete individually. The worksheet included more problems than could likely be completed in the 10-min period, with more worksheets available if needed. Each student within a group was given an alternate form with problems of an equivalent difficulty to avoid concerns with students working together and providing answers to peers. Students were reminded that they were meant to complete the work individually, and not work together as a group that day. Students were reminded that the goal
was to beat their own best number of correctly answered items. Each student was told if they beat their own previous high score of items answered correctly. Each time, students were praised for their effort and encouraged to keep trying to beat their best individual score. Data collection began after reminders from the researcher. Researchers only intervened if students needed a reminder to work independently, by saying “Remember we are working by ourselves today, not as a group.”

**No-treatment condition.** Within this condition, baseline procedures described above were followed during the AT phase. The Tootling intervention was not present during this condition. If students asked about Tootling, the primary researcher said, “We are not playing the game today.” If students asked about their group or individual math goals, they were just encouraged to try their best during these no-treatment days.

**Social Validity**

Immediately following the last intervention session, the primary researcher collected social validity data. Before students left the small-group rotation with the primary researcher, the researcher read aloud the five dichotomous (yes or no) items identical to those used in Crewdson et al. (in press)’s study (see Appendix E). Students circled their responses while following along with the researcher. Both after-school teachers were also asked to complete a Likert scale social validity scale (see Appendix F). Given the teachers’ rotating schedule, they were both emailed a copy of the scale to complete and return back via email.

**Analysis Procedures**

After each day of data collection, the class average of the percent of intervals scored with compliments and the class average of percent of intervals scored with encouragements were plotted separately on repeated measures graphs. These averages were obtained by using
individual student data collected during small groups. For each social skill, the total number of intervals when that skill was observed was divided by the total number of intervals that the intervention was implemented that day (i.e., intervals when the specific social skill was observed plus intervals when it was not) across all students. Visual analysis of the two independent class-wide graphs (e.g., variability, trends, level, and immediacy of effects) was used to make phase change decisions between baseline and the AT phase, and to evaluate the effectiveness of the treatments within the AT phase. Phase changes were also informed by best practice recommendations for the minimum number of data points per phase (e.g., Kratochwill et al, 2010). Using procedures described earlier, decisions regarding the alternation of the two treatment conditions and the no-treatment condition during the AT phase were made based on a set of pre-determined rules developed by the researchers before data collection began.

Effect size indicators are used to supplement and support visual analysis results; however, there is little consensus over which methods are appropriate for various SSDs, with limitations noted across options (e.g., Wolery et al., 2010). Percentage of all non-overlapping data (PAND) was used to calculate effect size estimates across all three conditions (group, independent, no-treatment) by treating each condition as an adjacent phase. With PAND data, 50% is considered chance level of overlap, with a scale from 50%-100% (100% indicating complete non-overlap; Parker et al., 2007; Parker et al., 2011). PAND does not indicate the relative difference between two non-overlapping data clusters (e.g., it does not differentiate how great the magnitude is between nonoverlapping data; Parker et al., 2007). Note that PAND effect size estimates also do not account for trending data that were present in this study. The current study’s data do not meet the recommended minimum threshold of data points (20) posited by
Parker et al. (2007), with only 19 data points available in the current study; thus, conversion to Phi coefficients would not be appropriate.

Given the limitations of using PAND with our dataset, percent of non-overlapping data (PND) was also calculated. While this method also has weaknesses and some researchers have called to abandon its use, it is still widely reported (e.g., Parker et al., 2011). Guidelines for interpretation of PND are as follows: >70% suggests effective interventions, 50% to 70% indicates questionable effectiveness, and <50% indicates no observed effects (Scruggs & Mastropieri, 1998).

**Procedural Integrity and Interobserver Agreement**

One independent observer took procedural integrity data for SST and Tootling trainings, as well as treatment integrity data (see Appendix G). Procedural integrity was 100% for each training. Treatment integrity for the Tootling intervention was collected twice during the group condition and once during the independent condition for a total of three (21.4%) of the treatment sessions with Tootling installed. Treatment integrity was 100% each day that data was collected. On one day (day 13), students did not meet their goal and earn a reward, so the last step (handing out rewards) was not checked; however, this was intentional and accurate since students did not meet their goal.

The primary researcher and a second independent observer collected data on two baseline phase sessions (28.6%), two group condition treatment phase sessions (33.3%), and two independent condition treatment phase sessions (33.3%). For each session across conditions, interobserver agreement (IOA) was calculated by comparing behavior-specific data (i.e., compliments or encouragements) scored during each interval for each student, and then dividing the number of agreements by the number of agreements plus disagreements, and then
multiplying by 100. During baseline, the whole class mean IOA was 100% for compliments and 100% for encouragements (range = 100%). For the independent condition in the AT phase, the classwide mean IOA for compliments was 99.4% (range = 99.1% - 99.6%) and 99.5% (range = 99.4% - 99.6%) for encouragements. For the group condition in the treatment phase, the classwide mean IOA for compliments was 98.5% (range = 98.4% - 98.7%) and 98.1% (range = 97.1% - 99.7%) for encouragements.
Chapter III

Results

Whole Class Data

Figure 1 displays a repeated measures graph of classwide data on percent of intervals scored with compliments across conditions, with the vertical axis ranging from 0%-26% of intervals scored. Baseline data did not depict an increasing or decreasing trend and had little variability (range 0%-0.55%). Visual analysis of the data shows an immediate effect of both treatment conditions relative to no treatment. During the AT phase, intervals scored with compliments in the no-treatment condition ranged from 0.44%-0.51%, intervals scored with compliments in the independent condition ranged from 2.51% to 9.05%, and intervals scored with compliments in the group condition ranged from 4.21%-14.45%. An immediate return to baseline levels during the no-treatment condition during the AT phase is also evident, demonstrating adequate control for threats to internal validity, including carry-over effects. Between conditions in the AT phase, the group condition data line is consistently superior to both the independent and the control conditions. The independent condition is inferior to the group condition, but superior to no-treatment (control). Both treatment conditions show an upward trend during the AT phase, with slightly more variability across data in the independent condition.

Figure 2 is the repeated measures graph of classwide data on percent of intervals scored with encouragements across conditions. Baseline data were stable with no encouragements during four of the five baseline days (range 0%-0.55%). The no-treatment condition during the AT phase demonstrates expected returns to baseline levels (range 0%-0.44%). During the AT phase, intervals scored with encouragements in the independent condition ranged from 0.91% to
5.36%, and intervals scored with encouragements in the group condition ranged from 2.81%-10.32%. In the AT phase, group condition data demonstrate consistently superior levels of encouragements relative to both the independent and the no-treatment conditions. Beyond the first day of the group condition, data show a consistently higher level and stability across days with little trend. The independent condition data follows a slight upward trend, but remains consistently below the level of the group condition data.

**Group Level Data**

Group level data is presented for each small-group (Figures 3-10). Consistent with previous research findings, variability and trends for each small-group makes visual analysis of the group level data is less clear relative to classwide data (e.g., Crewdson et al., in press; Wright et al., 2021).

**Group A**

Figure 3 shows the repeated measures graph of Group A’s intervals scored with compliments. Baseline data demonstrate stable, near-zero levels of compliments across days, with no compliments the last three days of baseline. No immediacy treatment effects are evident in the AT phase, with both treatment conditions remaining at or near baseline levels following installation. About halfway through the AT phase (day 11), Group A demonstrates a sharp increase in their intervals scored with compliments during the group condition. This trend continues slightly upward and then stabilizes. On day 17, the independent condition data follows a similar pattern of a sudden increase in slope, but then trends downward. There is more variability in the independent treatment condition data. While the group condition data appeared to stabilize at a high level following the initial spike on day 11, there are no clear differences in effectiveness between the two treatments.
Figure 4 displays the repeated measures graph for Group A’s intervals scored with encouragements. Baseline data demonstrate stable, near-zero levels of encouragements across days, with four of the five baseline days having 0% intervals scored. The independent condition shows no immediacy effects when first installed, and levels remain similar to baseline levels throughout the AT phase. Data variability was noted on day 17 with an increase in level; however, data dropped back to similarly low levels the next day of the independent treatment condition. The group condition has a consistently higher level than the other two conditions, but there is variability in the data with a downward trend at the end of the AT phase.

**Group B**

Visual analysis of Group B’s compliment data (see Figure 5) demonstrates an immediate effect of both treatment conditions following installation in the AT phase. Baseline phase levels were consistently at zero. Both the independent condition and the group condition remain higher than no-treatment levels, though there is a less clear distinction between the no-treatment condition and the independent condition. The group condition is consistently higher in level than the other conditions in the AT phase. There is no clear increasing or decreasing trend for either the independent condition or the group condition, with variability in both. The no-treatment condition is stable and demonstrates the effectiveness of both treatment conditions relative to no treatment.

Figure 6, which shows Group B’s data for encouragements across conditions, indicates no immediate effects of the independent condition following installation in the AT phase. Again, baseline phase levels were consistently at zero. Data for the independent condition remains near baseline levels of encouragement for the first half of the AT phase, with levels increasing at day 16. Following the increase in level, there is no clear increasing or decreasing trend. The group
condition showed an immediate effect following installation and had an upward trend for the majority of the AT phase, with a possible outlier at the end of the phase. While treatments were clearly delineated after initial installation, there is unclear relative effectiveness given the converging data across the two treatment conditions.

**Group C**

Visual analysis of Group C’s data on compliments (see Figure 7) shows no immediate effect of either treatment condition (independent or group), with levels remaining at the baseline level, with no instances of either skill demonstrated. Around day 11, sharp increases in slope across treatment conditions were noted, with little stability in the data and no clear increasing or decreasing trend following the sharp increase. No-treatment data on day 14 demonstrates adequate control of both treatment conditions and rules out threats to internal validity that could otherwise explain this sudden increase in intervals scored with compliments.

Figure 8 displays the repeated measures graph for Group C’s intervals scored with encouragements. Baseline phase levels of encouragements were consistently at zero. Similar patterns to those in Figure 7 are noted, with no immediate effect of either treatment, and increases in intervals scored with encouragements around days 11-13 with trends remaining at a higher level for the remainder of the AT phase. The group condition data appears to stabilize some at a higher level following the increasing trend noted on days 11 and 12. The independent condition data does not show an increasing or decreasing trend with substantial variability in the data. Similar to the data presented on compliments for Group C, the no-treatment condition on day 14 rules out other explanations for increases in intervals scored (e.g., history), despite no immediate effects of either treatment condition.
Group D

Figure 9 displays the repeated measures graph for Group D’s intervals scored with compliments. Baseline levels had some variability but remained at a consistently low level of intervals scored with compliments (range 0%-1.1%). Immediate effects of both treatment conditions were evident following installation in the AT phase. Overall, no clear differences can be noted between the two treatments (independent and group), though both are consistently superior to the no-treatment condition. In the independent condition, the data on day 13 may be an outlier, as levels dropped back to near-baseline levels that day, but then increased again, maintaining a higher level on subsequent days of that treatment condition. The final data points for each condition appear to diverge from one another, with a higher percentage of intervals with compliments in the group condition; however, no relative effectiveness conclusions can be drawn from the overall data.

Visual analysis of Group D’s data on encouragements (see Figure 10) shows small, immediate effects of both treatments following installation in the AT phase. Baseline levels were consistently near-zero, with the last four data points in the baseline phase at 0. While the group condition had a generally higher level than the independent condition during the AT phase, both show high levels of variability.

Statistical Analysis

Table 1 displays descriptive statistics for the percent of intervals scored for each dependent variable (compliments and encouragements) for each student for each condition, as well as classwide grand means and standard deviations across conditions. Classwide data indicate that students engaged in both targeted skills (complimenting and encouraging) the most during the group condition (compliments grand X=7.19, SD=5.04; encouragements grand
In the individual seat-work condition, students engaged in the targeted social skills less than in the group condition (compliments grand $X=4.91$, $SD=3.60$; encouragements grand $X=3.04$, $SD=2.76$), but more than in baseline conditions (compliments grand $X=0.36$, $SD=0.43$; encouragements grand $X=0.19$, $SD=0.43$). Individual student data demonstrates more variability across conditions, with 8 of 14 students’ data following the overall patterns (i.e., most intervals scored with each skill in the group condition, followed by the independent condition, with the fewest intervals scored during the no-treatment condition). Across conditions, each student provided at least one compliment, and all but one student (i.e., student 10) provided at least one encouragement.

Table 2 shows the whole-class and small-group means, standard deviations, and ranges of the percentage of intervals scored with each social skill (compliments and encouragements). For the whole-class data, intervals scored with each social skill (both compliments and encouragements) are highest in the group condition (compliments: $X=7.32\%$, $SD=3.78$; encouragements: $X=7.19\%$, $SD=2.50$), followed by the independent condition (compliments: $X=5.32\%$, $SD=2.60$; encouragements: $X=2.62\%$, $SD=1.67$), with the fewest intervals scored during no-treatment condition (compliments: $X=0.32\%$, $SD=0.23$; encouragements: $X=0.14\%$, $SD=0.24$). This same pattern is evident for Groups A, B, and D, where the group condition resulted in the highest percent of intervals scored across both social skills. Group C’s intervals scored with compliments and encouragements are highest in the independent condition, followed by the group condition, with the fewest intervals scored also during no treatment.

PAND and PND effect size estimates are shown in Table 3. Note, these data must be interpreted with caution as both treatment condition series are trending in the AT phase. Both PAND and PND classwide data indicate significant effects of both treatment conditions.
(independent and group) relative to the no-treatment conditions, with 100% non-overlapping data. Between the two treatment conditions, PAND of 83% for compliments and 92% for encouragements indicates above chance levels of non-overlapping data between conditions, with less overlap between treatment conditions for encouragements. PND indicates large effects for the difference between treatments when measuring encouragements (83%), but no meaningful differences between the two treatments when measuring compliments (17%). Group level PAND data for Groups A, B, and D is generally consistent with the whole class data, aligning with visual analysis results. Group C’s PAND effect size estimates indicate chance levels of overlap between treatment conditions, such that there is not a significant difference among independent and group conditions for Group C. Group-level PND suggests no significant differences between the two treatments (e.g., all small-group PND is below 50% between independent and group conditions). Group-level PND continues to align with whole-group data where differences were noted between baseline and each treatment condition (e.g., independent or group), though there is significant variability between groups (PND range 17%-100%).

Acceptability

When acceptability data were collected, 12 of the 14 total students participating in the study were present. The average acceptability responses for the students were 85% across the five dichotomous (agree or disagree) items with a range of 56% to 100% for “yes” responses (see Appendix E for items and response summary). All students reported that their peers were nicer to them when playing the game, and all students also reported that Tootling helped them learn to give compliments and encouragements. Most students (83%) reported liking Tootling and that they were nicer to their peers when playing the game. The least agreed upon statement related to if students would want Tootling to take place in all of their classes (58% endorsed “yes”).
On the six-item, Likert scale (rating from 1 strongly disagree to 6 strongly agree) for teacher acceptability, the responses between the two teachers varied (see Appendix F for items and responses). Note that one teacher was with the students two of the three days of data collection per week, and the other with them once per week during intervention installation. Differences in ratings between teachers may be due to their frequency of exposure to the intervention. Teachers were also not aware of which condition was installed each day of the AT phase, and condition differences demonstrated by current results could have impacted their overall impressions of Tootling. When averaged, the two teachers rated all items between 3.5-4.5. The highest agreement (4.5) was that students were not as nice to each other when not Tootling. Taken together, these results suggest that both the students and the teachers found the intervention acceptable.
Chapter IV
Discussion

This study was designed to evaluate the effects of SST, Tootling, and task structures while Tootling on the performance of two different social skills simultaneously taught and measured while third-grade students completed academic tasks either independently or as a group. The primary purpose of this research was to determine if the task structure of activities provided after SST impacts student performance of the recently trained social skills. Across conditions, 100% of students provided at least one compliment and 93% (13/14) of students provided at least one encouragement. These data indicate that all students had acquired the social skill of complimenting, and nearly all had demonstrated acquisition of the social skill of providing encouragement. Thus, when students did not perform these skills in the no-treatment condition, this is a clear demonstration of performance deficits, rather than acquisition difficulties (e.g., Gresham et al., 1998).

Visual analysis of whole class data showed immediate and sustained increases in compliments and encouragements in both treatment conditions in which the Tootling intervention was applied. PAND and PND effect size estimates at the whole class level support conclusions from visual analysis. The no-treatment condition controls for threats to internal validity, such as carry-over effects or history effects, and provides multiple demonstrations of experimental control (Kazdin, 2011; Skinner et al., 2022). Thus, the current study provides another demonstration of the positive effects of Tootling on performance of recently trained social skills, such that both conditions in which Tootling was installed resulted in high rates of performance of the recently trained social skills relative to the no-treatment condition. These data support previous research that suggests Tootling is an effective intervention to address deficits in
social skill performance by providing opportunities to practice skills in natural social contexts (e.g., Crewdson et al., in press; Crewdson et al., 2022; Wright et al., 2021; Wright et al., 2022).

Visual analysis of whole class data shows that the group condition data level is superior to both the independent and the control conditions for both skills. The independent condition is inferior to the group condition, but superior to no-treatment (control). PAND effect size estimates also support these visual analysis conclusions. PND effect size estimates support these conclusions for the dependent variable of encouragements only (e.g., compliments were not above 50% between the two treatments). Results suggest that task structure may have more of an effect on skill demonstration dependent on the social skill that is being targeted. For compliment-giving, both the independent condition and the group condition resulted in steady increases in compliments relative to the no-treatment condition. Many compliments given were unrelated to the task at hand (i.e., physical compliments); thus, compliment-giving may not be solely influenced by the task structure. However, more consistent differences (with greater magnitude) in visual analysis of repeated measures graphs were evident for encouragements, such that the group task structure resulted in a consistently higher number of intervals scored with encouragements relative to the independent condition. Both treatment conditions were superior to the no-treatment condition, with the group condition showing the highest percentage of encouragements given across intervals scored. Effect size estimates support conclusions that this effect between treatment conditions is large (PND=83% for encouragements).

There were three occasions in which only three out of the four groups had data collected. On two days, there was only one student in attendance from a small-group; therefore, that one student did not complete the activity with the researcher, and no data were collected for that group. On the other day, the lead teacher allotted too much time to group rotations and did not
leave sufficient time for the last group to rotate to the Tootling station. Thus, there are limitations and challenges to interpreting small-group data; however, nuances between group performance are important to consider and unique patterns within groups may serve as inspiration for future research.

Group level data is consistent across three of four groups, with Groups A, B, and D consistently producing more compliments and encouragements during the group condition relative to the independent condition, and both treatment conditions having a higher percent of intervals scored with both social skills relative to the no-treatment condition. The difference between conditions is more apparent for encouragements, with smaller and less consistent effects for compliments. Group C’s intervals scored for both social skills were higher during the independent condition than the group condition, with both treatments higher than no-treatment. However, PAND and PND effect size estimates for Group C indicate significant overlap between the two treatments, with overlap at a chance level.

Several differences with Group C are noted and considered when interpreting the differences in their data compared to the other three groups. First, Group C had one group member for whom consent could not be obtained; therefore, two students’ data is presented, but three students were in the group interacting with one another. There were some days (6 of 19) in which one student with consent was absent from the group; therefore, only one student’s data is used to represent group level data. Thus, Group C’s data often had a low number of intervals scored in the denominator, which can more easily influence the magnitude of percentages. In addition to these unique group composition dynamics, skill level of the group should also be considered. This group had the lowest math skill level based on their benchmarking data. Though they were given appropriate material for their current skill level, participating in the Tootling
intervention while also completing academic tasks may have been challenging for them. This is addressed further in the implications and future research section.

The current findings support previous research that demonstrates the impact of Tootling to supplement SST (e.g., Crewdson et al., in press; Wright et al., 2021). Results of the current study suggest that task structure (i.e., independent seat-work or group work) impacts student performance of recently trained social skills when completing an academic task, such that group work promoted the most consistent performance of both skills, with clearer relative effects between treatment conditions for the dependent variable of providing encouragement. Thus, the current study furthers previous research that suggests task structures may impact performance of trained social skills (Crewdson et al., 2022), with particular skills (e.g., encouragements) potentially more impacted by task structure than others (compliments). Importantly, average responses on acceptability measures completed by students and both classroom teachers suggest that the students and the teachers found the intervention acceptable.

**Theoretical and Applied Implications**

Peer-mediated interventions have been demonstrated to be effective in promoting use of social skills, given that peers can model, prompt, and reinforce others’ use of appropriate social skills (Skinner et al., 2000; Simpson & Lewis, 2021; Watkins et al., 2015). In the current study, peers demonstrated many of these behaviors, especially prompting and reinforcing their peers’ use of targeted social skills. Students would often solicit compliments or encouragements from their peers (e.g., asking a peer if they had given an encouragement yet). One student would routinely say, “Does anyone like my shirt?” when at the small-group math station. Students also copied each other’s use of a social skill. For example, if one student said “you can do it!,” it was
not unusual for other in the group to echo the same encouragement statement immediately after hearing it (e.g., “Yeah, you can do it, Johnny!”).

Additionally, idiosyncratic language was noted during sessions. For example, one student said, “You are really going beast mode,” which was counted as a compliment. Given that students were exposed to these novel types of compliments or encouragements, they had the opportunity to learn new variations of the skill introduced in SST. Through observing and reporting on their peers’ social skills, PPR may further promote response generalization.

The current study provides a clear demonstration of the difference between performance and acquisition deficits in social skill development (Gresham et al., 2001). Given that nearly all students performed each targeted social skill at least once, students demonstrated that they had acquired the target skills. However, in the no-treatment condition, performance of the social skills reduced to near-zero levels. This further demonstrates that SST alone is insufficient to occasion use of acquired social skills, and that students may require additional environmental supports (e.g., tasks that occasion use of the social skill, contingencies, reinforcement) to perform the acquired skills. Our findings also support previous findings that combining SST with Tooting can increase students’ performance of recently trained social skills (Crewdson et al., in press; Wright et al., 2021).

Our findings provide another demonstration, consistent with Crewdson et al.’s (2022) work, that certain task structures may occasion use of recently trained social skills. Specifically, Crewdson et al.’s findings suggested that encouragement-giving may have been more task-dependent. While the researchers determined that both compliments and encouragements were highest in the turn-taking game, they did note instances of compliment-giving during parallel play. These previous findings, in conjunction with current findings, have implications for how to
best occasion social skill performance following SST. Specifically, these findings suggest that teachers may benefit from selecting activities with specific task structures to occasion the use of certain social skills, but not necessarily all social skills. Some social skills may be easily occasioned across tasks (e.g., compliments can be provided unrelated to task), while other social skills may be more task-dependent (e.g., encouragement). Given that some skills may be occasioned more with group-oriented tasks, and other skills may be occasioned by either group-oriented or individually-oriented tasks, educators will likely benefit from choosing group-oriented tasks to complete following SST to increase the likelihood of all taught skills being occasioned. By supplementing SST with group-oriented activities and peer-mediated interventions (e.g., Tootling), educators can address social skill performance deficits by encouraging social skill performance in natural social contexts (e.g., Wright et al., 2021).

When students did not beat their best math score in either condition (i.e., independent seat-work or turn-taking), they appeared discouraged and often asked about the consequences of not meeting their goal. Students were reminded that they could try to beat their best score today. Despite only being given vectoral information regarding their performance (e.g., you did/did not answer more problems correctly last time) instead of a specific number (a known goal), a couple of students would count the number of problems they completed before handing in their worksheet, and then only complete one additional problem during the next session. The primary researcher reminded them that it was the number of correct problems completed, but students seemed confident in their responses and therefore often did not put forth their best effort. Rather, they only provided enough responses to be confident in exceeding their personal goal. This observation aligns with previous research that indicates when goals are known, students may
work to criteria, as opposed to doing their best (Popkin & Skinner, 2003; Richardson et al., 2021).

During the independent condition, students naturally created a competitive environment (e.g., saying, “she is beating us!” or “who is going to win?”) by looking at their peers’ progress and trying to race to complete problems. Students were reminded that they were trying to beat their own best score, and to focus on their own work. However, in the independent seat-work condition, students in one group (Group A) also began using the game to sabotage their peers’ performance on the math worksheets and prevent them from meeting their individual math goal. A student would sabotage another’s performance by giving compliments or encouragements in rapid succession and then the student needed to take time to complete multiple Tootling slips. Thus, in addition to knowing that a group goal produced more consistent opportunities to practice learned social skills, teachers should also consider that a group goal reduces the likelihood of this unforeseen use of the Tootling game when students naturally gravitate to competition when completing academic work. Future researchers should explore ways to increase prosocial behaviors within competitive tasks or activities, given that students seemed inclined towards this type of task structure.

The math worksheets provided were intended to be appropriate for the current math skills of each group in order to provide additional opportunities for practice to increase fluency of academic skills (Haring & Eaton, 1978). Previous researchers have posited that when cognitive resources are consumed by academic skills that are not fluent, cognitive resources are not freed up for other higher-level academic tasks (e.g., a student will struggle with reading comprehension if they cannot read fluently; Fuchs et al., 2001; LaBerge & Samuels, 1974; Therrien, 2004). Attention, a cognitive resource, is assumed to be needed prior to a skill
becoming automatic (LaBerge & Samuels, 1974). The research on automaticity of academic skills provides a possible explanation of why Group C was delayed in their use of the Tootling game. This group had the lowest math skills based on benchmarking data collected during their typical school day. Although each group was given math tasks of an appropriate difficulty based on their grade-level equivalent from classroom math assessments, these students likely had the least fluent math skills. Thus, they likely needed to focus more of their cognitive resources (e.g., attention) on the math task, and they may have had fewer cognitive resources to allot to the Tootling game when it was originally introduced. However, as they were provided more practice with the targeted math skills through repeated intervention days, they may have become more automatic in their skills and freed up cognitive resources to devote to the Tootling game. An alternative explanation would be that they shifted their cognitive resources to devote to the Tootling game and focused less on the academic work, which could account for the rapid increase in their performance of the social skills. Indeed, data collected on number of problems completed by groups and individuals to inform math-related goals supports this explanation, as students in Group C stopped meeting their individual and group math goals during the last half of data collection.

From a single-subject study design perspective, the current study also provides further support for the use of a no-treatment condition in ATDs to more clearly control for threats to internal validity and provide multiple demonstrations of experimental control (Sindelar et al., 1985; Skinner et al., 2022). When analyzing group level data, especially for Group C where immediate treatment effects were not evident, the no-treatment series continued through the AT phase allowed us to rule out maturation, carry-over, or history effects. In lieu of the no-treatment
series, we would not have been able to make causal claims regarding the effectiveness of Tootling as an intervention to increase social skill demonstration.

**Limitations and Future Research**

This study took place in an after-school program with one classroom of same-grade students. Additional research is needed with various ages, settings, and populations. For example, a more typical classroom environment may lead to different findings given the relaxed nature of the after-school program in which students are not expected to be silent during independent seat-work. This study was not designed to address causal mechanisms of findings. Future research can also focus on component analysis to determine the relative effects of various intervention components in isolation on social skill performance, including task structure, goal structure, components of Tootling (e.g., interdependent group contingencies, rewards, PPR), and peer-mediation.

While the current study controlled for many threats to internal validity by using a no-treatment series, one uncontrolled factor is multitreatment interference, which is a known threat for ATDs, given that both treatments (group and independent) are targeting the same behaviors (Wolery et al., 2018). Therefore, overall behavior change cannot be totally attributed to one, and only one, treatment (Wolery et al., 2018). However, causal effects between treatments can still be evaluated (Wolery et al., 2018). Given that Tootling was employed during both treatment conditions and a no-treatment condition was used, our data allows another demonstration of the effectiveness of Tootling in changing behavior (e.g., can make claims about overall behavior change related to Tootling installation). We cannot yet make claims about overall behavior change being dependent on one task structure alone. However, previous researchers employing other designs (e.g., Crewdson et al., 2022; Crewdson et al., in press) also demonstrated potential
differences skill demonstration dependent on task structure. Thus, future researchers can continue to more clearly delineate these effects by using a variety of SSDs to further evaluate the role of task structures alone on performance of recently-trained social skills.

In the turn-taking procedures, students had time to complete their Tootling slips while waiting for peers to complete their math problems; however, in the independent seat-work condition, students were required to stop working on their math in order to complete Tootling slips. Future researchers should explore the isolated effects of the turn-taking itself, the group goal, or the available down time between turns to complete slips.

After students had played the game for several weeks, they started to provide compliments or encouragements in rapid succession to one peer. They would often make comments about ensuring they met the mystery goal (e.g., stating that they had not given many encouragements, and then providing multiple encouragement statements to one peer quickly). On day 13 (independent condition), students did not meet their goal and thus did not earn their reward playing the Tootling game. On day 15 when the Tootling game was re-implemented after a no-treatment condition day, students recalled not winning the last time they played, and they seemed motivated to try again. The students won the game all other days, but they did not appear to become habituated to winning. The mystery goal continued to motivate students to try their best while Tootling. Criteria included in a mystery pool should be further explored by future researchers. Habituation to winning, responses to not winning, and the balance between winning and not winning based on the available pool are areas for further exploration.

Given that students began providing compliments and encouragements in rapid succession to increase their likelihood of winning the Tootling game, the difference between treatment conditions became muddied for some groups as treatment progressed. It appeared that
the power of the reinforcer for the contingency in the Tootling game (a small piece of candy) overshadowed potential effects of task structure as students became more comfortable with and focused on Tootling. Compliments were mainly physical in nature (e.g., “I like your shirt”) and not often related to the task at hand, regardless of condition. Several future research ideas can address this problem. First, future researchers may consider lowering the power of the reinforcer associated with the Tootling group contingency. Also, researchers may consider eliminating physical compliments from their operational definitions to better determine the influence of the task and goal structures on social skill performance. Instead, future researchers can focus their definitions on compliments that are related to performance in the target game or activity.

Additionally, students frequently asked their peers if they needed help and then counted this as encouragement in the Tootling game. They were also observed to make more positive general comments (e.g., “Thank you for being my friend”) before prompting their peer to complete a slip for them. These types of comments were not scored as a compliment or encouragement by the researchers, as they were not included in the operational definitions. While this demonstrates an overgeneralized use of Tootling slips that did not align with the initial SST on the two specific social skills, this overgeneralization of prosocial behaviors is still a positive outcome. On a no-treatment condition day, one student asked the primary researcher, “Are we not doing the kindness thing today?” Although students were only taught to report on their peers’ compliment- and encouragement-giving behavior (two specific social skills), they appeared to generalize Tootling to a broader application of prosocial behaviors. Based on observations of other prosocial behaviors demonstrated during data collection, future researchers should also consider targeting other social skills during academic tasks, such as asking for and providing help appropriately, in lieu of targeting compliment-giving.
Students easily discriminated between treatment conditions given that they either worked on one worksheet together (group), each had their own worksheet (independent), or did not have Tootling materials (no-treatment). Further, students were given a verbal cue (e.g., “working as a group” or “working by yourself today”). This stimulus discrimination is a key component to ATDs (Wolery et al., 2018). However, task structure related goals (i.e., beat your best score on math worksheets) and Tootling related goals (i.e., provide unknown number of compliments and encouragements) were sometimes confusing to students. As noted, when students tried to sabotage peer performance, the student would often state, “I probably didn’t meet my math goal because I had to fill out these slips.” Some groups were initially confused about the outcome of beating their math goals compared to the outcome of winning the Tootling game. Future studies should continue to explore ways to make the difference between these goals more salient.

Another future research idea would be to change goal structure from independent to cooperative during a generalization measure where Tootling is not present. Previous researchers have shown the power of Tootling for practicing newly taught social skills (e.g., Crewdson et al., in press), but generalization of these findings has not yet been explored. Researchers may find that effects of task and/or goal structure are more salient when Tootling is not implemented with an additional goal structure (i.e., interdependent group contingency).

Researchers should also explore the intersection of academic skill development and implementing the Tootling game. Group C, as noted, was the group with the lowest math performance, and they had the most initial difficulty with the Tootling game. Researchers may try to replicate these findings to determine ideal ages and skill levels for implementing Tootling while completing academic tasks. Researchers may also wish to explore the trade-offs between
conditions in which social skills may be more readily occasioned, but students have fewer opportunities for learning trials in a fixed amount of time given that they are taking turns.

**Conclusions**

Our current findings provide another demonstration that SST alone is insufficient to occasion the performance of recently trained social skills, and that implementation of a Tootling intervention is effective for increasing use of acquired social skills. Regarding task structure of activities presented following SST, our findings support that some social skills (specifically encouraging) may be more easily occasioned during tasks in which turn-taking is involved. More nuanced effects between task structures for compliment-giving were found. These results suggest that Tootling itself may be an important addition for any activity, regardless of its task and goal structures, to address performance deficits across various social skills following SST. However, certain task structures may further enhance the effects of Tootling for some specific social skills (e.g., encouragements). Researchers should continue to explore the various components of tasks presented after SST that can occasion performance of acquired skills to address the performance deficits that SST alone cannot ameliorate (Crewdson et al., 2022; Crewdson et al., in press; Gresham et al., 2001; Wright et al., 2021).
References


generalization and maintenance of adaptive behavior in applied settings. In R. H. Horner,
G. Dunlap, & R. L. Koegel (Eds.), Generalization and maintenance: Life-style changes in
applied settings (pp. 197–220). Paul H. Brookes Publishing.


Jaureguizar, J., Garaigordobil, M., & Bernaras, E. (2018). Self-concept, social skills, and
resilience as moderators of the relationship between stress and childhood
depression. School Mental Health, 10(4), 488-499. https://doi.org/10.1007/s12310-018-9268-1


Practice, 38, 67–73. https://doi.org/10.1080/0013188970390101

Research, 39(1), 3-21. https://doi.org/10.1080/0013188970390101

cooperating to learn (pp. 67-96). Springer, Boston, MA.


Tootling on classwide disruptive and academically engaged behavior of general-education high school students. Psychology in the Schools, 54, 370-384.

https://doi.org/10.1002/pits.22002.


https://doi.org/10.2307/1170220


https://doi.org/10.1080/1045988X.2019.1678008.


https://doi.org/10.1002/bin.1447.


https://doi.org/10.1177/002221949102400802


https://doi.org/10.3389/fpsyg.2018.01536


https://doi.org/10.1177/00224669070400040101

https://doi.org/10.1177/0145445511399147

https://doi.org/10.1080/02796015.2003.12086199

https://doi.org/10.1177/001440298905500609

https://doi.org/10.1901/jaba.1973.6-573


https://doi.org/10.3102/00028312018004513


Appendix A

Table 1

Means of Percent Intervals Scored with Compliments (Comp.) and Encouragements (Enc.) Under Each Condition for Each Student and Across Student Means and Standard Deviations

<table>
<thead>
<tr>
<th>Student</th>
<th>No Treatment</th>
<th>Independent</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student 1</td>
<td>0.6</td>
<td>0.0</td>
<td>9.5</td>
</tr>
<tr>
<td>Student 2</td>
<td>1.4</td>
<td>0.6</td>
<td>2.6</td>
</tr>
<tr>
<td>Student 3</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Student 4</td>
<td>0.0</td>
<td>0.0</td>
<td>11.0</td>
</tr>
<tr>
<td>Student 5</td>
<td>0.5</td>
<td>0.0</td>
<td>0.6</td>
</tr>
<tr>
<td>Student 6</td>
<td>0.6</td>
<td>0.0</td>
<td>3.9</td>
</tr>
<tr>
<td>Student 7</td>
<td>0.0</td>
<td>0.0</td>
<td>0.6</td>
</tr>
<tr>
<td>Student 8</td>
<td>0.0</td>
<td>0.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Student 9</td>
<td>0.0</td>
<td>0.0</td>
<td>9.2</td>
</tr>
<tr>
<td>Student 10</td>
<td>0.0</td>
<td>0.0</td>
<td>6.5</td>
</tr>
<tr>
<td>Student 11</td>
<td>0.7</td>
<td>0.0</td>
<td>7.4</td>
</tr>
<tr>
<td>Student 12</td>
<td>0.0</td>
<td>0.0</td>
<td>6.8</td>
</tr>
<tr>
<td>Student 13</td>
<td>0.5</td>
<td>0.5</td>
<td>5.5</td>
</tr>
<tr>
<td>Student 14</td>
<td>0.7</td>
<td>1.5</td>
<td>3.7</td>
</tr>
<tr>
<td>Grand Means</td>
<td>0.36</td>
<td>0.19</td>
<td>4.91</td>
</tr>
<tr>
<td>SD</td>
<td>(0.43)</td>
<td>(0.43)</td>
<td>(3.60)</td>
</tr>
</tbody>
</table>
Table 2
Descriptive Statistics for Percent of Intervals Scored with Compliments and Encouragements

<table>
<thead>
<tr>
<th></th>
<th>No Treatment</th>
<th>Independent</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
</tr>
<tr>
<td></td>
<td>[Range]</td>
<td>[Range]</td>
<td>[Range]</td>
</tr>
<tr>
<td>Whole Class</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliments</td>
<td>0.32 (0.23)</td>
<td>5.23 (2.6)</td>
<td>7.32 (3.78)</td>
</tr>
<tr>
<td></td>
<td>[0.0-0.55]</td>
<td>[2.51-9.05]</td>
<td>[4.21-14.45]</td>
</tr>
<tr>
<td>Encouragements</td>
<td>0.14 (0.24)</td>
<td>2.62 (1.67)</td>
<td>7.19 (2.50)</td>
</tr>
<tr>
<td></td>
<td>[0.0-0.55]</td>
<td>[0.91-5.36]</td>
<td>[3.81-10.32]</td>
</tr>
<tr>
<td>Group A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliments</td>
<td>0.43 (0.55)</td>
<td>6.03 (6.81)</td>
<td>7.2 (5.55)</td>
</tr>
<tr>
<td></td>
<td>[0.0-1.20]</td>
<td>[0.0-16.20]</td>
<td>[0.0-12.20]</td>
</tr>
<tr>
<td>Encouragements</td>
<td>0.14 (0.38)</td>
<td>0.77 (1.52)</td>
<td>2.72 (1.63)</td>
</tr>
<tr>
<td></td>
<td>[0.0-1.00]</td>
<td>[0.0-3.80]</td>
<td>[0.60-4.40]</td>
</tr>
<tr>
<td>Group B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliments</td>
<td>0.24 (0.42)</td>
<td>2.37 (1.01)</td>
<td>4.28 (1.54)</td>
</tr>
<tr>
<td></td>
<td>[0.0-0.90]</td>
<td>[1.10-3.90]</td>
<td>[2.80-6.90]</td>
</tr>
<tr>
<td>Encouragements</td>
<td>0.0 (0.0)</td>
<td>1.83 (1.94)</td>
<td>4.20 (2.64)</td>
</tr>
<tr>
<td></td>
<td>[0.0-0.0]</td>
<td>[0.0-4.80]</td>
<td>[2.00-8.60]</td>
</tr>
<tr>
<td>Group C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliments</td>
<td>0.0 (0.0)</td>
<td>7.78 (7.17)</td>
<td>6.53 (6.17)</td>
</tr>
<tr>
<td></td>
<td>[0.0-0.0]</td>
<td>[0.0-18.30]</td>
<td>[0.0-14.80]</td>
</tr>
<tr>
<td>Encouragements</td>
<td>0.0 (0.0)</td>
<td>2.45 (3.55)</td>
<td>1.75 (1.67)</td>
</tr>
<tr>
<td></td>
<td>[0.0-0.0]</td>
<td>[0.0-9.10]</td>
<td>[0.0-3.7]</td>
</tr>
<tr>
<td>Group D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliments</td>
<td>0.40 (0.51)</td>
<td>6.46 (3.95)</td>
<td>10.40 (6.89)</td>
</tr>
<tr>
<td></td>
<td>[0.0-1.10]</td>
<td>[0.90-10.30]</td>
<td>[6.00-24.20]</td>
</tr>
<tr>
<td>Encouragements</td>
<td>0.37 (0.64)</td>
<td>6.40 (5.11)</td>
<td>14.12 (7.08)</td>
</tr>
<tr>
<td></td>
<td>[0.0-1.50]</td>
<td>[2.60-15.20]</td>
<td>[3.70-24.20]</td>
</tr>
</tbody>
</table>
Table 3

*PAND Effect Size Data and PND Effect Size Data for Whole Class and Group-Level Percent of Intervals Scored with Each Social Skill Across All Conditions, Treated as Adjacent Phases*

<table>
<thead>
<tr>
<th></th>
<th>No Treatment to Independent</th>
<th>No Treatment to Group</th>
<th>Independent to Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole Class</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliments</td>
<td>100% 100%</td>
<td>100% 100%</td>
<td>83% 17%</td>
</tr>
<tr>
<td>Encouragements</td>
<td>100% 100%</td>
<td>100% 100%</td>
<td>92% 83%</td>
</tr>
<tr>
<td>Group A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliments</td>
<td>85% 67%</td>
<td>92% 80%</td>
<td>64% 0%</td>
</tr>
<tr>
<td>Encouragements</td>
<td>62% 17%</td>
<td>92% 80%</td>
<td>91% 40%</td>
</tr>
<tr>
<td>Group B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliments</td>
<td>100% 100%</td>
<td>100% 100%</td>
<td>91% 20%</td>
</tr>
<tr>
<td>Encouragements</td>
<td>85% 67%</td>
<td>100% 100%</td>
<td>91% 20%</td>
</tr>
<tr>
<td>Group C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliments</td>
<td>85% 67%</td>
<td>85% 67%</td>
<td>50% 0%</td>
</tr>
<tr>
<td>Encouragements</td>
<td>77% 50%</td>
<td>85% 67%</td>
<td>50% 0%</td>
</tr>
<tr>
<td>Group D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliments</td>
<td>100% 100%</td>
<td>100% 100%</td>
<td>64% 17%</td>
</tr>
<tr>
<td>Encouragements</td>
<td>100% 100%</td>
<td>100% 100%</td>
<td>91% 50%</td>
</tr>
</tbody>
</table>

Note: A PAND of 50% indicates chance levels of overlap, with a range of 50%-100% (Parker et al., 2007). PND of <50% indicates no effects, 50%-70% indicates questionable effectiveness, and >70% suggests effective treatments, with >90% suggestive of very effective treatments (Scruggs & Mastropieri, 1998).
Appendix B

Figure 1

Percent of Intervals Scored with Compliments Under Each Condition for Whole Class

Figure 2

Percent of Intervals Scored with Encouragements Under Each Condition for Whole Class
Figure 3

*Percent of Intervals Scored with Compliments Under Each Condition for Group A*

Figure 4

*Percent of Intervals Scored with Encouragements Under Each Condition for Group A*
Figure 5

*Percent of Intervals Scored with Compliments Under Each Condition for Group B*

Figure 6

*Percent of Intervals Scored with Encouragements Under Each Condition for Group B*
Figure 7

Percent of Intervals Scored with Compliments Under Each Condition for Group C

Figure 8

Percent of Intervals Scored with Encouragements Under Each Condition for Group C
Figure 9
Percent of Intervals Scored with Compliments Under Each Condition for Group D

Figure 10
Percent of Intervals Scored with Encouragements Under Each Condition for Group D
Appendix C

Positive Peer Reporting Materials\(^1\)

Student Name:

Compliment

Encouragement

\(^1\)Adapted from Crewdson et al. (in press)
Appendix D

Tootling Game Training Protocol

“Hello! I’m Miss Kristen and I am a student at the University of Tennessee. You have probably seen me and some of my friends in your class the past few weeks. I’m here today to tell you all about a game that I would like you to play during academic hour. The game is called Tootling and everyone in the class gets to play.”

Explain game:
For this game, we are going to report on our other classmates when we see them giving a compliment or encouraging someone. The way we will do that is by using these slips of paper (Show examples). First, I will pull a goal out of this envelope (show Goals envelope). This goal will be a secret until academic hour is over. On these pieces of paper, it will have a place to write your classmates’ names on the top and a picture of two people on the bottom that are either giving a compliment or holding a sign that says, “You can do it!” for encouragements. You will start by writing the name of someone in your group who you saw giving a compliment or encouragement. Then you will circle the picture at the bottom (circle picture) showing if that person gave a compliment or encouragement. After you have finished, you will put the pieces of paper in this box. (show box). When it’s your groups turn to work with me at a station, you will be using these slips and watching for others in your group to give compliments and encouragements. When it is time to switch groups, you will turn your slips of paper into this box. At the end of academic hour, I will count up how many slips you all turned in for compliments and encouragements. Then I will tell you all what our secret goal was. If you get that goal or higher, then everyone will win a reward! Remember, we won’t know if the goal is for compliments or encouragements or how many you need until the end. You will be playing this game during academic hour at Miss Kristen’s station only.

1Adapted from Crewdson et al. (in press)
### Tootling Game

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes (%)</th>
<th>No (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I liked the Tootling Game.</td>
<td>83</td>
<td>17</td>
</tr>
<tr>
<td>2. I would like to have the Tootling Game in all of my classes.</td>
<td>58</td>
<td>42</td>
</tr>
<tr>
<td>3. My classmates were nice to me when we played the Tootling Game.</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>4. I was nice to my classmates when we played the Tootling game.</td>
<td>83</td>
<td>17</td>
</tr>
<tr>
<td>5. The Tootling game helped me learn to compliment and encourage my classmates.</td>
<td>100</td>
<td>0</td>
</tr>
</tbody>
</table>

---

2 Adapted from Wright et al. (2021)
## Appendix F

Teacher Acceptability Form²

### Tootling

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Slightly Disagree</th>
<th>Slightly Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Tootling was a good intervention.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>2. I noticed that students were nicer to each other when playing Tootling.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>3. Tootling is feasible for a teacher to use in the classroom.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>4. I noticed that the students were not as nice to each other when they were not playing Tootling.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>5. There were less disagreements when the students played Tootling.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>6. I would recommend Tootling to other teachers.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

²Adapted from Wright et al. (2021)
### Procedural Integrity for Social Skills Lesson

**Date:** ___  **Observer:** ________________

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to a lesson on social skills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Defines Compliments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Ask students to give examples of compliments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Class discussion of examples and non-examples of compliments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Discuss the tone of compliments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Class discussion of examples of appropriate and inappropriate tone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Defines Encouragement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Ask students to give examples of encouragement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Class discussion of examples and non-examples of encouragement</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number of steps completed: ___/9  Percentage of steps completed: ___  Comments:

### Integrity for Peer Reporting Training

**Date:** ___  **Observer:** ________________

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to a new game to be implemented in class</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Go over rules of games</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Explain game procedures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Explain where to put peer reports and when they can do it</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Explain how to win the game</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Answer any questions from the students</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number of steps completed: ___/6  Percentage of steps completed: ___  Comments:

### Treatment Integrity for Tootling Game

**Date:** ___  **Observer:** ________________

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Review game instructions and answer any student questions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Select a criterion from the “Goals” envelope</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Provide social skills slips to students at the station</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Collect behavioral partial interval data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>At the end of each station rotation, prompt students to turn in their slips</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Add up the total number of turned in compliment and encouragement slips for the day and record in data sheet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Provide feedback to the class in regards to if they met their goal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Provide a piece of candy to the entire class if their goal was met</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number of steps completed: ___/8  Percentage of steps completed: ___  Comments:

---

3 Adapted from Lambert et al., 2015
Appendix H

Sample Math Worksheet

Fact Families: Add/Subtract 0-9

These are all addition and subtraction problems that have a missing number. Your job is to fill in the missing number. Let's do the first one together! Work the first problem with the student(s) to make sure student(s) understand the task. "When I say begin, start with the second problem on the first row and work across. Don't skip any problems. Work as many problems as you can before the time is up. Do you have any questions?" Set timer for 2 minutes, start timer, and say, "Begin." Stop student after 2 minutes and count up problems correct.

Total problems correct:_______
Appendix I

Parent Information Sheet and Consent Form

Dear Families,

As you know, increasing appropriate behavior and strengthening academic skills are important to us here at [Pond Gap] during the after school program. Ms. [Blaine] is working with researchers from the University of Tennessee to help our students do their best in our program. Our common goal is that students learn all they can from our program.

We want to share what we learn with other teachers and professors, so we will be writing articles for them to read, and we will make presentations at meetings. Sometimes it will be helpful in articles and presentations if we can tell how our children have improved, or share their grades or scores to show how much they have learned. If you give us permission, we would like to be able to use your child’s examples in articles and presentations. This will be completely confidential, and your child’s real name will never be used.

If it is okay with you for us to use your child’s examples in our articles and presentations, please sign and date both copies of this form, keep one for yourself, and return the other to the front office at [Pond Gap]. It is completely up to you and if you do not wish for us to use your child’s examples, it will make no difference at all –we will do our best job at helping everyone!

If you have any questions about our project, please feel free to contact us. We are very excited about working with your children this year!

Ms. [Sample]
Elementary
University Assisted Community School Coordinator [Name]

Dr. Merilee McCurdy
University of Tennessee
School Psychology Program Coordinator [Name]
Parent Permission Form

I understand that the purpose of this study is for Ms. and Dr. McCurdy to learn more about how to help my student do their best—in the classroom, during transition time, and in their relationships with teachers and peers at [school name]. I also understand that articles may be written and the researchers may make presentations to help other teachers and professors.

I understand that if I give my permission, my child’s grades or scores, educational record, and behavior data might be used in articles and presentations. It will be completely confidential and my child’s real name will never be used. Your child’s information will not be used or shared with other researchers for future research, even if identifiers are removed.

I understand that my child’s participation is completely voluntary and that the teachers and researchers at [school name] will do their best to help all children whether they are allowed to use the examples or not. If I change my mind, I can tell Ms. or Dr. McCurdy at any time and they will not use my child’s examples.

Note: In the case of school closures or limited access to visitors due to Covid-19, the researchers will carry out this project via Zoom, a video-conferencing platform. The Zoom sessions will be through secure University of Tennessee accounts to protect confidentiality and ensure security.

If I have any questions about my rights as a research participant, I may contact the IRB compliance officer at (865)-974-7697 or at utkirb@utk.edu.

I give permission for my child to participate.

_____________________________________________
Child’s name (please print)

_____________________________________________
Parent/Guardian’s Name (please print)

_____________________________________________  __________________________
Parent/Guardian’s Signature                     Date
Appendix J
Youth Assent Form
Implementing PBIS in an After School Setting

Examiner: Hello, my name is (examiner’s name). I’m a researcher at the University of Tennessee. Your guardian/parent and your teacher say you might be willing to help me with a research project. We are working with your teachers to help students behave appropriately in the classroom and we are trying out new things that might help with that. We are asking that you let us use data about your behavior in our research. If we do use your data, we would never use your name or even your school’s name. Anything that could identify you will be kept secret.

Are you willing to help me with this project and let me use your data in my research? (YES/NO)

Great! I think you will find this fun to do. If you decide that you don’t want to do this anymore, all you have to do is tell me.

I appreciate your help!

If you sign this form, it means you have decided to help me with this research project.

_______________________________________________________________ ________________________________
Signature of student Date

_______________________________________________
Signature of researcher
Vita

Kristen Fowler grew up in Marion, Illinois with her parents, Gary and Susan Fowler, and her two older sisters. She attended the University of Evansville in Evansville, Indiana for her undergraduate studies. She graduated Summa Cum Laude in 2018 with her Bachelor of Science degree in Psychology, with minors in Neuroscience and Ethics. Later that year, she began graduate school at the University of Tennessee pursuing her Ph.D. in School Psychology. Kristen obtained her Master of Science degree in Applied Behavior Analysis from the University of Tennessee in 2021. Her current research interests include applied academic and behavior interventions, including interventions designed to increase prosocial behaviors. Kristen will be completing her pre-doctoral psychology internship with the Tennessee Internship Consortium in 2022-2023. She will complete her doctoral degree in 2023. Kristen is immeasurably grateful to her family, friends, and faculty for their continued support of her academic pursuits.