Evaluating the Generality and Social Acceptability of Early Friendship Skills

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EVALUATING THE GENERALITY AND SOCIAL ACCEPTABILITY OF EARLY FRIENDSHIP SKILLS

by

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A DISSERTATION

Presented to the Faculty of
University of Nebraska Graduate College
In Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy

Medical Sciences Interdepartmental Area
Graduate Program
(Appplied Behavior Analysis)

Under the Supervision of Professor Kevin C. Luczynski

University of Nebraska Medical Center
Omaha, Nebraska

April, 2020

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ACKNOWLEDGEMENTS

These last four years have truly tested the persistence of my behavior, and this dissertation serves as the culmination of my graduate school experience. As I taught four wonderful children early skills to facilitate friendships, I was lucky to spend the past four years building life-long relationships. This achievement is dedicated to my support system. To my colleagues and mentors at Munroe-Meyer Institute: thank you so much for the countless learning opportunities and your willingness to help with sessions and data collection. I extend my deepest gratitude to my advisor, Dr. Kevin Luczynski, who provided an abundance of formative opportunities to develop my behavior academically and professionally. I also thank Dr. Tara Fahmie for laying the stepping stones to get me here and her willingness to continue to support me through my doctoral program. Thank you both for your investment in making me into a strong scientist-practitioner. I am especially grateful to the children I had the pleasure to work with and learn from. They filled each day with so much joy. Thank you to Sean and Regina Smith for always being a phone call and short drive away. You have become family, and I cannot thank you enough for your humor and help picking up the pieces. To my dad, Cameron: thank you for choosing me. You are the most hardworking person I know, and you taught me the value of perseverance. To my sister, Saoirse, and brother, Aidan: being your big sister was the reason I finished this program. Together, we can get through anything. Finally, to my mom: thank you so much for the important life lessons. I would give anything to continue to learn from you, and I wish you were here to celebrate this milestone. I know I have made you proud. My dissertation is utmost dedicated to you, your love, and your kindness. You were my best friend.

Ciobha McKeown
The development of prosocial skills is considered pivotal to childhood development. The friendship unit of the Preschool Life Skills program teaches early prosocial skills likely to facilitate socially desirable behaviors in young children; however, the friendship unit is the most understudied unit and has produced modest, inconsistent outcomes across children. The current study aimed to evaluate procedures necessary to (a) teach friendship skills to four children, with and without developmental disabilities, in an applied context and (b) promote the use of the skills with a same-aged peer. Teaching five friendship skills in a one-on-one approach and adding tangible reinforcement, if necessary, was efficacious at increasing friendship skills with an adult. Additional tactics were necessary to promote prosociality with peers. We discuss refinements to the teaching procedures and additional considerations to improve the social acceptability and durability of prosocial skills.
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<tr>
<td>BST</td>
<td>behavioral skills training</td>
</tr>
<tr>
<td>PLS</td>
<td>preschool life skills</td>
</tr>
<tr>
<td>RTI</td>
<td>response-to-intervention</td>
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</table>
INTRODUCTION

The Importance of Teaching Prosocial Skills

Identifying teaching procedures that establish and maintain prosocial skills in young children is essential to future success. Indeed, the development of prosocial behaviors has been correlated with improved academic and social competence, which, in turn, is associated with an overall increased quality of life (Malecki & Elliot, 2002; Tobin et al., 2014). Inversely, deficits in prosocial skills are associated with low self-esteem, anxiety, depression, higher rates of school dropout, and an increased likelihood of involvement with the police and drugs before adulthood (Bagwell et al., 1998; Jones et al., 2015). Beirman and Erath (2006) argued deficits in prosocial skills compound over time due to restricted social learning opportunities and the negative impact of peer criticism. In response, government agencies like the National Research Council and Institute of Medicine suggest the development of prosocial skills is pivotal to a successful childhood (NRC & IOM, 2009).

Preschool Life Skills

Since 2007, the Preschool Life Skills (PLS) program, developed by Hanley, Heal, Tiger, and Ingvarsson, has been implemented in classrooms and homes to reduce problem behavior and increase functionally equivalent social skills for nearly 100 children. The program comprised four skill units. The selection of skills in the first three units (instruction following, functional communication, and delay tolerance) were informed by research on the assessment and treatment of severe problem behavior (Fisher et al., 1993; Hanley et al., 2003). The selection of skills in the last unit (friendship skills) was informed by research on kindergarten readiness and increasing classroom morale (Lin et al., 2003). Children in this seminal application demonstrated a four-fold increase in social skills and an impressive 74% reduction in problem behavior. Similar results were obtained in Hanley et al. (2014) in which there was a reduction in problem behavior and an increase in social skills for most children (Fahmie & Luczynski, 2018). Furthermore, the PLS
program prevented the development of problem behavior in a randomized clinical trial (Luczynski & Hanley, 2013). The success of PLS likely can be attributed to its active teaching approach. That is, unlike other approaches that recommend avoiding common challenging situations, PLS carefully arranges challenging situations for children to practice engaging in appropriate behavior rather than problem behavior. In addition, preteaching and postteaching measures are obtained based on direct observation, which is considered a more valid and reliable measure of behavior rather than indirect measures (e.g., assessments, surveys; Kahng et al., 2011).

Although multiple studies have replicated and extended the first three units of the PLS program, based on the brief review by Fahmie and Luczynski (2018), and more recent replications and extensions of PLS (Falligant & Pence, 2017; Gunning et al., 2020; Robison et al., 2020), the friendship skills unit has been the most understudied. Additional evaluations on the friendship unit are warranted because modest outcomes were achieved in the seminal application and its replication. The skills in the friendship unit were saying, “thank you” after receiving an item, acknowledging or complimenting a newcomer (e.g. a new child arriving to the play area), offering or sharing toys upon a newcomer’s arrival, and comforting others in distress (e.g., another child crying). Across the 16 children who participated in the seminal application, five (31%) to 12 (75%) children showed no improvement per friendship skill after the classwide application.

The modest effects in the friendship skills unit were likely due to several variables. First, opportunities for friendship skills occurred in the context of play during free-play periods or learning centers in Hanley et al. (2007; 2014). Playing with toys may reduce the likelihood of a child attending to their surroundings and opportunities for friendship skills may be missed, such as not noticing a peer shared a toy. In addition, engaging in friendship skills within a play context often requires either the termination or at least a temporary pause of a preferred activity. As such,
a friendship opportunity may approximate a transition from a rich (playing with toys) to a lean context (engaging in a friendship skill). Second, Tremblay et al. (1981) conducted a descriptive analysis of preschooler’s interactions during play, and the majority of reactions by peers were either negative (e.g., name calling, refusing to play) or no response. Taken together, it is reasonable to speculate with young children that the reinforcing value of consequences that immediately follow friendship skills is less than that derived from ongoing play. As a result, the addition of supplemental reinforcement for friendship skills may be necessary. Third, the dose of teaching was low; children received up to 13 learning opportunities per skill with an average of 10 opportunities between preteaching and postteaching. More robust acquisition across children may be achieved if additional teaching opportunities are programmed. Fourth, postteaching performance was assessed during only two opportunities per skill for each child. Collecting a larger sample of performance may provide a more accurate account of the effects produced by the PLS program.

In response to barriers and areas of improvements identified from the classwide applications, researchers have extended PLS to teaching formats influenced by a response-to-intervention (RTI) model (Fahmie & Luczynski, 2018). An RTI model (also referred to as a multi-tier system of support; Shepley et al., 2020) is tiered such that the severity of the presenting problem or skill deficit is matched by the intensity of the intervention. For example, multiple PLS studies approached teaching in a small group (Tier 2) or one-on-one (Tier 3) format instead of a class-wide application (Tier 1). In the small-group and one-on-one formats, authors have increased the number of learning opportunities and used performance-based, rather than time-based, criteria to determine when to end teaching. In addition, supplemental reinforcement in the form of toys, stickers, and edibles has been incorporated to enhance acquisition and maintenance (Beaulieu et al., 2012, 2013; Beaulieu & Hanley, 2014; Falligant & Pence, 2017; Hanley et al., 2014; Kraus et al., 2012; Robison et al., 2020). However, the effects of introducing supplemental
reinforcement was not systematically evaluated. Therefore, a critical next step is to evaluate the efficacy of a one-on-one teaching approach and the use of supplemental reinforcement on the acquisition and maintenance of friendship skills.

Testing for the Generality of the Acquired Skills

Because a one-on-one teaching approach is typically conducted with an adult only (Jones et al., 2013), testing the generality of the acquired skills with peers in nontraining contexts is warranted. Generality tests should be conducted without adults present because it is not feasible for teachers to always be nearby when opportunities for friendship skills occur with peers. Therefore, the presence of a teacher associated with teaching (programming a common stimulus; Stokes & Osnes, 1981) may promote the friendships skills with peers in a manner that would not mimic the applied endpoint. Generality tests also should evaluate the durability of the acquired skills in the face of non-ideal peer responses given that peers often do not react positively (Tremblay et al., 1981). It is important, for example, to evaluate if the child will stop offering toys to peers if the skill is ignored (e.g., the peer begins playing with other toys instead of accepting the offered toy).

Purpose

In summary, the purpose of this study was three-fold. First, we sought to evaluate the necessity of procedural components to teach five early friendship skills in a one-on-one format, and, in doing so, we replicated and extended the types of friendship skills taught in the PLS program. Second, we evaluated the transfer of the skills to a same-aged peer. Third, we evaluated the social acceptability of our outcomes with the children’s caregivers.
CHAPTER 1: METHOD

Participants and Setting

Four preschool and kindergarten-age children participated; child characteristics are in Table 1. Children were enrolled because their caregivers reported they rarely engaged in the targeted friendship skills and were interested in improving their child’s social interactions with adults and peers. Inclusion criteria were echoing at least three-word strings, consistent toy play, and compliance with instructions during play (as determined through preassessments below); an exclusion criterion was severe problem behavior (e.g., biting). A fifth child was recruited, but he did not meet our inclusionary criteria due to high levels of severe problem behavior. Two children, Milo and Gabe, had a diagnosis of autism spectrum disorder (ASD) as determined by an Autism Diagnostic Observation Schedule, second edition (ADOS-2; Lord et al., 2012) by an independent evaluator. We characterized each child’s incoming repertoire, first, through the Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP; Sundberg, 2008). Second, caregivers completed the Social Skills Improvement System: Social Emotional Learning (SSIS SEL; Gresham & Elliott, 2017) rating scale and the Social Responsiveness Scale, second edition (SRS-2; Constantino & Gruber, 2005). The SSIS SEL included questions about the child’s competencies with social skills and levels of problem behavior. The SRS-2 was used to quantify the severity of social impairments associated with ASD and related disabilities (i.e., social awareness, social cognition, social communication, social motivation, and restricted interests and repetitive behavior).

The evaluation took place in a classroom (7.32-m by 6.55-m) at a university-based clinic. Sessions occurred at a large child-sized activity table. Generalization with peers was assessed in a different room with an observation window that was not associated with teaching. All teaching and generalization sessions comprised a play-based format.
TABLE 1

Table 1: Participants’ Gender, Ages, Diagnosis, and Assessment Scores.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Gender</th>
<th>Age</th>
<th>Diagnosis</th>
<th>Average VB-MAPP Level</th>
<th>Tact</th>
<th>Listener</th>
<th>Play</th>
<th>Social</th>
<th>SSIS-SEL&lt;sup&gt;a&lt;/sup&gt;</th>
<th>SRS-2&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luke (Male, 3 years 5 mo., NT)</td>
<td>Male</td>
<td>3</td>
<td>NT</td>
<td></td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>93</td>
<td>42</td>
</tr>
<tr>
<td>Cy (Male, 4 years 5 mo., NT)</td>
<td>Male</td>
<td>4</td>
<td>NT</td>
<td></td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>105</td>
<td>43</td>
</tr>
<tr>
<td>Milo (Male, 3 years 8 mo., ASD)</td>
<td>Male</td>
<td>3</td>
<td>ASD</td>
<td></td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>66</td>
<td>77</td>
</tr>
<tr>
<td>Gabe (Male, 5 years 1 mo., ASD)</td>
<td>Male</td>
<td>5</td>
<td>ASD</td>
<td></td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>82</td>
<td>92</td>
</tr>
</tbody>
</table>

Note. ASD = autism spectrum disorder; NT = neurotypical; SSIS-SEL = Social Skills Improvement System- Social Emotional Learning; SRS-2 = Social Responsiveness Scale-2

<sup>a</sup>Mean score for standard score is 100 with a standard deviation of 15.

<sup>b</sup>T-scores 59 and below are considered within normal ranges. Anything above 60 is considered possible of an ASD diagnosis. Standard deviation is 10.

Preassessments

Skill and Compliance Assessment

The experimenter assessed if the child could engage in the five friendship skills when prompted in a play-based context. The purpose of this assessment was to (a) evaluate the child’s instruction following, (b) ensure the child could echo multi-word responses, and (c) determine whether the interruption of toy play followed by demands would result in severe problem behavior. Each friendship skill was assessed twice; there were 12 trials, instead of 10, in a session because the component skills of acknowledging and complimenting others were assessed separately. In a trial, for example, the experimenter secured the child’s attending by stopping the child’s play and prompted the child to “Look at me and say ‘thank you!’” without preceding the instruction with an item delivery or compliment. In other words, the child could not learn the conditions under which to engage in the skills during this assessment. Descriptive praise was delivered after a correct response during the first trial or a practice trial. If there was an incorrect response or no response, the experimenter re-presented the prompt up to five times. The inclusion criteria were (a) 10 of 12 trials with a correct response during the first trial or a re-presentation
trial across two consecutive sessions, and (b) if two incorrect responses occurred, they could not pertain to the same skill. A correct response during a re-presentation trial was included as part of the criteria because it indicated the child could engage in the skill after several prompts, which was an aspect of the teaching procedures.

Preference Assessments

Caregivers completed the Reinforcement Assessment for Individuals with Severe Disabilities (RAISD; Fisher et al., 1996) to identify preferred tangible items. If tangible reinforcement was programmed, the child selected four of the eight top-ranked items from the RAISD before each block of sessions. The four selected items were placed in a bin, and the bin was immediately presented after a correct response (e.g., Fisher et al., 1997) during teaching and generalization sessions.

A multiple stimulus without replacement assessment (MSWO; Carr et al., 2000) was conducted to identify playsets that evoked consistent engagement without problem behavior (e.g., throwing toys). There were thirty-four playsets composed of multiple items (e.g., dolls, cars, instruments). After each selection, 2 min of access to a playset was provided, rather than a shorter duration such as 30 s, in case the value of the playset was influenced by temporally-extended engagement with the materials (e.g., building a tower with Lego; DeLeon et al., 2014). Each time a playset was selected, it was presented in the same form as at the end of the previous selection (e.g., we presented the Lego with the tower that the child previously built). During the 2-min reinforcement period, toy engagement and problem behavior were measured using partial-interval recording with 10-s intervals (Kang et al., 2010; Pisman & Luczynski, in press). A playset was removed if the child played with the items for less than 50% of the reinforcement period (i.e., less than 1 min). Prior to beginning a session, the child chose two playsets from an array of 16 to 20 playsets. Children were offered new playsets between each session within a research block and were asked to pick a new playset if they stopped playing for 2 min. Playsets that were not
selected across 10 research blocks were replaced with other playsets.

**Dependent Measures, Interobserver Agreement, and Procedural Fidelity**

We made several extensions to the skills from the friendship unit in Hanley et al. (2007). First, the evocative situation for saying “thank you” was expanded from receiving an item to also receiving a compliment. Second, a friendship skill was scored as correct after a newcomer’s arrival only if the child acknowledged and complimented the newcomer. Offering a toy after a newcomer’s arrival was scored separately, as in Hanley et al. Last, we taught empathizing with joy, a skill not targeted in Hanley et al., due to its prevalence in other social skills curricula and assessments (Gresham & Elliott, 1990, Gresham & Elliot, 2008, Ladd et al., 2006; Leaf et al., 2012).

The target antecedent of a skill, referred to as an *evocative situation*, served as a distinct opportunity for observers to score a friendship skill, an approximation, a nontarget behavior, an omission error, or problem behavior (see definitions and evocative situations in Table 2). Scoring of these measures was mutually exclusive. For omission errors, the experimenter and secondary data collector scored whether there was no attempt to respond (i.e., continued playing) or if the child looked at the experimenter or peer and then returned to play. Using paper and pencil, observers recorded the timestamp at which an evocative situation occurred. Then, the observer recorded the evocative situation and the child’s response. The percentage of opportunities per session with a correct response for each friendship skill was graphed; the number of opportunities with a friendship skill was divided by the total number of opportunities, and the quotient was converted to a percentage.
### Definitions for Friendship Skills and Errors (Omission, Approximation, Nontarget, and Problem Behavior)

<table>
<thead>
<tr>
<th>Child’s response</th>
<th>Operational Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Friendship Skill</strong></td>
<td></td>
</tr>
<tr>
<td>1. <em>Saying “thank you.”</em> Given an item or compliment* delivery, the child orients toward the giver and says “thanks” or “thank you” within 5 s (Hanley et al., 2007; Kamps et al., 1992).</td>
<td></td>
</tr>
<tr>
<td>2. <em>Acknowledging and complimenting others</em>. Given a newcomer’s arrival (i.e., within 1 m proximity), the child acknowledges (e.g., “Hi!”) and compliments (e.g., “I like your shoes”) the newcomer within 10 s (Hanley et al., 2007)</td>
<td></td>
</tr>
<tr>
<td>3. <em>Offering</em>. Given a newcomer’s arrival, the child approaches the newcomer, extends arm with a toy in hand, and asks “Do you want to play?” within 10 s (Hanley et al., 2007; Kamps et al., 1992).</td>
<td></td>
</tr>
<tr>
<td>4. <em>Empathizing with distress</em>. Given a statement or gesture of distress, the child approaches the individual and asks “Are you okay?” within 10 s (Argott et al., 2017; Hanley et al., 2007).</td>
<td></td>
</tr>
<tr>
<td>5. <em>Empathizing with joy</em>. Given a statement and gesture of joy, the child engages in an appropriate vocal response (e.g., “Cool”) within 5 s (Argott et al., 2017).</td>
<td></td>
</tr>
<tr>
<td><strong>Omission</strong></td>
<td>No response</td>
</tr>
<tr>
<td><strong>Approximation</strong></td>
<td>Approximation of the desired response (e.g., inappropriate autoclitic frame, intonation, complimenting the wrong clothing item)</td>
</tr>
<tr>
<td><strong>Nontarget</strong></td>
<td>Verbal and nonverbal behaviors that are neither approximation or problem behavior</td>
</tr>
<tr>
<td><strong>Problem behavior</strong> (Hanley et al., 2007)</td>
<td></td>
</tr>
<tr>
<td><strong>Vocal Disruption</strong></td>
<td>Saying “no” to an adult instruction, yelling or screaming while indoors, swearing, rudeness, name calling</td>
</tr>
<tr>
<td><strong>Motor Disruption</strong></td>
<td>Throwing items, tearing books, swiping items off tables, kicking items, knocking over structures, grabbing materials from others, running away, standing on furniture, sitting on tables, opening classroom doors</td>
</tr>
<tr>
<td><strong>Aggression</strong></td>
<td>Kicking, hitting, pinching, shoving, spitting, forceful grabbing, scratching, biting, throwing things toward another person</td>
</tr>
</tbody>
</table>

*Note:*  
*Additional evocative situation added, b Children had to engage in all three behaviors rather than one or the other, c New evocative situation and skill added*
Interobserver agreement (IOA) was calculated for at least 33% of sessions across all phases. Observer records were compared using a time-window analysis (Mudford et al., 2009). An agreement was scored if both observers recorded the same response within 10 s of each other’s timestamp (Sloman et al., 2005). A disagreement was scored when both observers recorded a different response within 10 s of each other’s timestamp or either observer recorded a timestamp for which the other observer did not within 10 s. An IOA score was calculated by dividing the number of agreements by the number of agreements plus disagreements and converting the quotient to a percentage. The IOA scores from all the sessions across children in a given condition were averaged to yield a single percentage. For example, the mean percentage for baseline with the peer was calculated from the combined number of IOA scores across Luke, Cy, Milo, and Gabe, which included 4, 3, 3, and 3 sessions, respectively (i.e., 11 total IOA scores). Mean agreement was 98% (range, 92 – 100%) for baseline with the peer, 97% (range, 83 – 100%) for baseline with the experimenter, 97% (range, 75 – 100%) for trial-based teaching, 100% for remedial trial-based teaching, 98% (range, 77 – 100%) for session-based teaching, 96% (range, 77 – 100%) for postteaching with the experimenter, 90% (range, 77 – 100%) for postteaching with the peer, 93% (range, 77 – 100%) for rule, 99% (range, 92 – 100%) for rule plus session-based teaching (first opportunity), 100% for rule plus session-based teaching (all opportunities), and 93% (range, 77 – 100%) for rule plus session-based teaching (first opportunity) plus kind responses.

Procedural fidelity was calculated for at least 33% of sessions across all phases, and IOA of the fidelity measures was obtained for half of those sessions. Fidelity was reported as the percentage of opportunities with correct implementation of all fidelity components. The number of opportunities in which all components were implemented with fidelity was divided by the total number of opportunities in a session (Higgins et al., 2017). Fidelity measures for all components were 100% for baseline, 99.9% (range, 92 – 100%) for trial-based teaching, 100% for remedial
trial-based teaching, 99.9% (range, 92 – 100%) for session-based teaching, and 100% for postteaching. Mean agreement of procedural fidelity between observers was 100% across phases. The peer’s fidelity in programming the evocative situations and consequences also was calculated and was 99% (range, 92 – 100%) across phases, and mean agreement between observers was 99%.

**Experimental Design**

A multiple probe design across skills (Horner & Baer, 1978) was used to evaluate the effects of the teaching procedures and to control for history and testing as threats to internal validity. After teaching a skill, baseline probes of the next skill were conducted before teaching. In addition, the additive effects of descriptive praise and descriptive praise plus a highly preferred item were systematically evaluated; this approach determined the necessity of teaching components (Hanley et al., 2000).

**General Procedure**

The mean session duration with the experimenter was 10 min, and three to four sessions were conducted in a research block per day, 3 to 5 days per week. Sessions with the peer ranged from 10 min to 30 min depending on the child’s performance and condition, and research blocks occurred twice per month on average, which depended on the availability of the peer. During sessions with the experimenter, the experimenter engaged in parallel or joint play with the child between evocative situations. During parallel play, the experimenter described toys (e.g., names, colors, sounds) and play actions (e.g., “I’m building a tower,” “I put the vegetables in the pot”) without initiating interactions with the child. During joint play, the experimenter delivered specified forms of attention dependent on the child’s actions with, and descriptions about, toys. For example, the experimenter delivered enthusiastic praise for novel forms of play, elaborated on vocalizations, imitated play actions, or described the child’s ongoing play. During sessions with the peer, interactions between the children were not structured. Anecdotally, the children
engaged in more parallel rather than joint play. Prior to beginning a session, the child independently played for 30 s to 60 s. A session began when the experimenter or peer entered the room and stopped approximately 1 m from the child. This served as the evocative situation for acknowledging and complimenting others as well as offering a toy, and this was the only opportunity for both skills. For each of the other three skills, four opportunities were programmed throughout the session, and evocative situations for each skill were alternated (i.e., an opportunity for the same skill was not programmed successively). At least 30 s but no more than 2 min elapsed between skill opportunities. The number of programmed opportunities per skill in a session remained consistent throughout the evaluation. Session duration was extended until the specified number of opportunities for each skill were programmed.

For opportunities to say “thank you,” the experimenter and peer gave the child an item or a compliment, and two opportunities were provided for each. For the opportunity to acknowledge and compliment a newcomer’s arrival, the experimenter and peer wore a clothing item with name brands and aspects reported by the child’s caregiver to be highly preferred. This was done to increase the saliency of the clothing items and potentially establish the reinforcing value of complimenting the newcomer’s appearance. For example, based on caregiver report, the experimenter wore a PAW Patrol hat with pictures of characters from the children’s television series. Six clothing items were worn across sessions in baseline and postteaching with the experimenter and peer; twelve different items were worn during trial- and session-based teaching conditions. The experimenter changed clothing items between trials or between sessions. Items included three hats, three tops (shirts or sweaters), three bottoms (pants or skirts), and three forms of footwear (socks and shoes). During baseline and generalization sessions, the experimenter and peer wore one to two items from each clothing type (hats, tops, bottoms, footwear; six total

1 If an unprogrammed opportunity for a skill arose naturally during play that met the definition of the evocative situation (e.g., the child requested the experimenter or peer give them a toy; the evocative situation for saying, “thank you”), data were collected and the number of opportunities for that skill increased (this occurred four total times). Unprogrammed opportunities occurred twice for saying “thank you” and once for empathizing with joy with Luke and once for empathizing with joy with Milo.
items). For opportunities to empathize with distress and joy, the experimenter and peer programmed different indices of distress or joy so the same index was not repeated during the same session. The experimenter and peer programmed similar indices as Argott et al. (2017). For empathizing with distress, the experimenter and peer programmed at least two opportunities where they were located over 3 m away from the child to set the occasion for the child to stop playing and approach the experimenter or peer as part of the skill.

**Baseline**

**Peer**

Baseline measures were conducted with a neurotypical peer who was within one year of the children’s ages. The neurotypical peer and the children did not have a prior history and only interacted in the context of the study. Sessions with the child and the peer occurred in a room with a one-way observation window at the university-based clinic; no adults were in the room. Prior to the start of the experiment, the experimenter used behavioral skills training (BST; Beaulieu et al., 2013; Miltenberger, 2012) to teach the peer how to program the evocative situations and deliver consequences. Following a skill or incorrect response, the peer responded in a manner that was not specific to the skill, which took the form of immediately returning to play, beginning play after 10 s, or continuing to program the evocative situation for 10 s depending on the skill. In addition to BST, the experimenter delivered real-time instructions using a Bluetooth earpiece to ensure procedural fidelity during sessions. If the peer programmed an opportunity incorrectly, it was re-programmed; neither the peer nor child’s behavior were recorded. This occurred for 30 of 2,665 (1%) opportunities across the children.

**Experimenter**

Following a skill, the experimenter provided a skill-specific consequence and enthusiastic descriptive praise that detailed the evocative situation and skill (e.g., “Nice job looking at me and
saying ‘thank you’ when I gave you a toy!’). Skill-specific consequences included saying “you’re welcome,” (saying “thank you”), saying “hi” (acknowledging), saying “thank you” (offering a toy and empathizing with joy), saying “I’m okay; thank you for asking” (empathizing with distress). Following an incorrect response, there was no change in the experimenter’s behavior (i.e., she continued playing with toys, returned to playing, or continued to program the evocative situation).

**Teaching with the Experimenter**

*Trial-based Teaching (TBT)*

Each skill was taught using BST, and one skill was taught at a time (e.g., Hood et al., 2017; Pisman & Luczynski, in press). That is, saying “thank you,” empathizing with distress, and empathizing with joy were taught individually in trial-based teaching and immediately assessed in session-based teaching; acknowledging and complimenting others and offering a toy were taught sequentially during trial-based teaching before returning to session-based teaching because both skills shared the same evocative situation (a newcomer’s arrival). Rationale for and a description of each skill were provided when introduced. For example, when teaching saying “thank you,” the experimenter told the child that it is nice to say “thank you” after receiving an item or a compliment from someone. Next, the experimenter demonstrated (modeled) the skill. The child, then, practiced the skill across 12 trials in the context of play. Following a correct response, the experimenter provided a skill-specific consequence and descriptive praise. Following an incorrect response, the experimenter interrupted the child’s play and provided a tailored description of the skill (also described as a rule reminder) and re-programmed the evocative situation (i.e., created the opportunity for a remedial trial). For example, if the child acknowledged the newcomer but did not provide a compliment, the experimenter said “Nice job saying ‘Hi’ to me but remember to say something nice when someone walks over while you are playing. For example, say ‘I like your shoes.’ Let’s practice.” The experimenter repeated the rule reminder followed by remedial trials until the child engaged in the skill or five remedial trials were conducted. Trial-based
teaching continued until the child engaged in the skill for at least 91% (11 out of 12) of the trials across two consecutive sessions.

**Echoic Controlling Prompt (Gabe and Milo).** When teaching was initiated for saying “thank you,” Milo and Gabe made nontarget errors in the form of echoing the experimenter’s vocal discriminative stimulus (“Here you go,” or “I like your–,”). In response, the children participated in a controlling prompts training, wherein their echoic responses were brought under the control of a point and “say” prompt. The experimenter established the prompt as a controlling stimulus by beginning with intraverbal questions the child had previously learned (e.g., “What color is the sky?”). The training sequence included a 0-s PD to the point prompt that was immediately followed by a 0-s PD to “say” plus a point prompt. Then, the training sequence was applied across vocal stimuli from which the child was prompted to respond to questions the child did not have a history with (e.g., “what goes tick-tock? Say ‘a clock’”) and then vocal stimuli with an un-related vocal response (e.g., “The sky is blue. Say, ‘I’m happy’”). This part of the training was conducted to evaluate if the child’s behavior could discriminate what aspects of the experimenter’s feedback described what behavior the child needed to engage in, similar to the feedback provided during teaching (e.g., “Remember, when someone is gives you a toy, look at them and say, “thank you.”). After high levels of echoic responding following the point and “say” prompt, the point prompt was removed so that the “say” prompt was used alone. Each session comprised 12 opportunities, and mastery criteria were 91% correct responding across two consecutive sessions.

**Addition of Tangibles.** In addition to descriptive praise, tangible items were delivered following the friendship skill if there was (a) no improvement in performance across the first two or three sessions of trial-based teaching and (b) omission and nontarget errors comprised a greater percentage of trials than approximation errors. If tangible items were programmed during trial-based teaching, they also were programmed during session-based teaching and postteaching.
**Remedial Trial-based Teaching (Gabe and Milo).** If the five-trial cap for remedial trials was met and there was no improvement in performance across at least two sessions, playsets were removed and the prompting and error-correction procedures were modified. We removed the playsets to eliminate this competing source of reinforcement and, in turn, increased the likelihood of the child attending to the evocative situation and enhanced the value of the praise and tangible reinforcement associated with a correct response. The experimenter implemented a progressive-prompt delay to minimize errors; a 0-s prompt delay to a model was introduced and progressed to a 5-s or 10-s prompt delay (dependent on the skill). If a correct response did not occur as the progressive prompt delay increased, the experimenter (a) reminded the child of the rule; (b) re-programmed the opportunity and immediately modeled the skill (described by Frampton et al., 2016 as a *transfer trial*) for the child to imitate; and (c) re-programmed the remedial opportunity again but at the target prompt delay. For acknowledging and complimenting others and empathizing with distress, the vocal or the vocal plus physical prompt was provided by a second experimenter sitting behind the child, respectively. The mastery criteria and session duration were the same as trial-based teaching. After the mastery criteria were met, performance during trial-based teaching was assessed (i.e., playsets were re-introduced and the second experimenter was absent) before returning to session-based teaching. Transfer trials as part of the error-correction procedures continued to be programmed during trial- and session-based teaching with Milo and Gabe.

**Booster Teaching (Luke and Gabe).** Trial-based teaching was implemented a second time after a skill was mastered if the form of the skill changed in a way that could compromise social acceptability (also see booster teaching for John in Hood et al., 2019). Luke engaged in the target skills following a newcomer’s arrival, but the skills occurred out of sequence. He complimented the experimenter and offered a toy before he said “Hi.” Luke was taught to acknowledge the newcomer’s arrival first. When offering a toy following a newcomer’s arrival,
Gabe added the statement “It’s time to give you a toy.” Gabe was taught to say “Here you go” while handing over a toy.

**Session-based Teaching (SBT)**

Session-based teaching was used to teach the child to exhibit the friendship skill taught in a discrete format during trial-based teaching in an ongoing play session (as arranged in baseline), and flexibly engage in multiple skills throughout a session (Hood et al., 2017; 2019; Pisman & Luczynski, *in press*). For example, after learning to say “thank you” during trial-based teaching (first skill taught), 4 opportunities (instead of 12) and longer periods of play between opportunities were programmed during session-based teaching. After mastery criteria for saying “thank you” were met, the experimenter programmed another baseline opportunity for acknowledging and complimenting others and offering a toy before teaching the skills during trial-based teaching. After learning to acknowledge and compliment others and offer a toy during trial-based teaching (second and third skills taught), the evocative situations for all three skills were programmed in a session. This progression continued until all skills were programmed during a play-based session. The consequences for a skill and incorrect responses were the same as in trial-based teaching. Mastery criteria were five nonconsecutive sessions at 75% responding (i.e., no more than one error) across all the skills taught (Luczynski & Hanley, 2013). This meant the child had to demonstrate mastery of all skills by responding to four separate, discrete evocative situations in a play-based context.

**Postteaching with Experimenter**

The purpose was to assess maintenance of the skills in the absence of error-correction procedures. The consequences were the same as programmed in baseline.

**Generalization with Peer**

We returned to baseline with a peer to evaluate the generality of the acquired skills
produced by the teaching procedures. This was the first interaction between the peer and child since baseline. The child did not see the experimenter during initial generalization tests to avoid the teaching history with the experimenter influencing the child’s performance (i.e., exerting stimulus control). If sufficient performance was not observed (i.e., a decreasing trend or no skill occurrence), we evaluated the effects of tactics that varied along a continuum of less- to more-resource intensive. That is, we sought to promote transfer of the skills to peers using an approach that could be feasible for teachers or caregivers to implement.

**Rule**

We evaluated whether providing a rule to engage in the friendship skills with peers would improve performance. At the start of each research block, the experimenter gave a rule that specified the evocative situation and behavior for each of the skills (as described when each skill was introduced and during rule reminders). This tactic would be similar to an adult reminding the child to be friendly with others when they arrived at school or before a playdate.

**Session-based Teaching (First Opportunity)**

In addition to the rule, the experimenter entered the room to deliver the same consequences for a skill (i.e., delivery of praise and a tangible, if applicable) or an incorrect response (i.e., rule reminder followed by remedial trials) as described during session-based teaching but only during the first opportunity for each skill. Because the skills following a newcomer’s arrival occurred only once in a session, the teaching procedures for acknowledging and complimenting others and offering a toy were identical with session-based teaching with the experimenter. By contrast, the consequences for the remaining opportunities in a session for the other three skills were the same as described in baseline with the peer. This tactic would be similar to an adult intermittently observing a child during free play at school or during a playdate and delivering feedback when opportunities to be friendly occur.
**Session-based Teaching (First Opportunity) Plus Kind Responses**

Instead of not responding toward friendship skills, the peer provided the same skill-specific consequence as the experimenter did for correct performance for all skills, except for acknowledging and complimenting others during which the peer only responded if the child also offered a toy. That is, the peer said “thank you” if the child did both skills. Following an incorrect response, there was no change in the peer’s behavior (i.e., he began playing with toys, returned to play, or continued to program the evocative situation). The purpose of this condition was to rule out differences in performance based on how the peer and experimenter reacted to friendship skills.

**Session-based Teaching (All Opportunities)**

The consequences for a skill or incorrect response were programmed as described during session-based teaching with the experimenter (i.e., during all opportunities). The experimenter remained in the room. To avoid distractions associated with delivering instructions to the peer via Bluetooth in setting up evocative situations, the experimenter discreetly held up cards detailing which evocative situation to program. The experimenter ensured the child was playing and not looking when a card was held up.

**Remedial Trial-based Teaching for a Newcomer’s Arrival (Milo and Gabe)**

The procedures were the same as in remedial trial-based teaching with the experimenter, except the peer programmed the evocative situations. First, remedial trial-based teaching was conducted, and then, trial-based teaching (playsets were re-introduced and second experimenter was absent) was conducted before returning to session-based teaching with the peer.

**Changed Antecedent for a Newcomer’s Arrival (Milo)**

The peer engaged in a hierarchy of common greeting actions when approaching the child upon arrival. The peer’s action changed if the child did not engage in the skills. First, the peer
walked in and stood within 1 m of the child for 10 s, which was how the evocative situation for
the skill was typically programmed. Second, the peer said “Hi” and waited 5 s. Third, the peer
said “Hi, Milo” and waited 5 s. Last, the peer tapped on the child’s shoulder and said “Hi, Milo”
and waited 5 s. If the child engaged in the skill following any of the peer’s actions, reinforcement
was delivered. If the skills were not observed after the final peer action, error correction
procedures were implemented. The purpose of this condition was to assess whether typical
greeting actions, in addition to simply approaching the child quietly, would occasion the skills.

Social Validity

The child’s caregivers viewed videos of their child and completed a questionnaire
regarding their satisfaction. The scope of the questionnaire was narrow: We were interested in
caregivers’ satisfaction only with how the skill looked (qualitative features) with a peer at the end
of the study rather than in combination with the frequency or consistency (quantitative features)
with which it occurred. Evaluating the face validity of the skill topography would help determine
if operational definitions should be modified in the future to enhance social acceptability.

Because the density of opportunities for three of the five skills during a session was greater than
what would occur in the applied setting (i.e., the experimenter or peer gave a compliment or item,
showed indices of distress, and showed indices of joy four times across a 10-min period), the
current evaluation was not suitable to evaluate preference for how often or reliably a skill should
occur. Lastly, an assessment of satisfaction of improvement relative to baseline was not
conducted because obtaining social validity data of only postteaching performance, without
baseline as an anchor, may be more predictive of how other adults will feel after experiencing or
witnessing the friendship skills.

The caregivers were informed the videos were of their child’s criterion performance. The
video comprised clips of the last five opportunities when their child engaged in the friendship
skill correctly. All videos were spliced so only the evocative situation and friendship skill were
shown, and caregivers reported their satisfaction after viewing clips for one evocative situation at a time (acknowledging, complimenting, and offering a toy were evaluated in combination). Prior to viewing each video, caregivers read a description of the skill. After viewing each video, caregivers reported their satisfaction using a 7-point Likert scale. We also asked caregivers to report the reason for their rating and aspects of their child’s skill performance they disliked.
CHAPTER 2: RESULTS

During baseline with the peer and experimenter, Cy, Milo, and Gabe did not engage in the five friendship skills (Figures 1, 2, 6, and 7). With Luke, there was a moderate level (experimenter) or decreasing trend (peer) with saying “thank you,” and he either acknowledged (peer) or complimented (experimenter) after a newcomer’s arrival; Luke did not offer a toy, empathize with distress, or empathize with joy with experimenter and peer (Figures 1 and 6, top five panels). During baseline, all children attended to, and sometimes commented on the preferred items worn by the experimenter and peer (e.g., saying “I like Pikachu!” or calling the experimenter Pete because she was wearing a Pete the Cat shirt).
Figure 1

Note. Percentage of opportunities with a correct response for each friendship skill across sessions with the experimenter for Luke and Cy. Teaching of each skill (i.e., trial-based teaching) occurred within the phase line and the data are depicted in a separate graph.
Note. Percentage of opportunities with a correct response for each friendship skill across sessions with the experimenter for Gabe and Milo. Teaching of each skill (i.e., trial-based teaching) occurred within the phase line and the data are depicted in a separate graph. Booster teaching was
conducted after postteaching and before returning to session-based teaching with Gabe.

Did the Teaching Result in Skill Acquisition, and How Often was Tangible Reinforcement Introduced?

During trial-based teaching, children were taught one friendship skill at a time. Luke engaged in a moderate to high percentage of trials with a correct response within the first session for all skills except for empathizing with joy (Figure 3, top five panels). Luke learned all skills without supplemental tangible reinforcement. Cy engaged in a moderate to high percentage of trials with a correct response within the first session for all skills (Figure 3, bottom five panels). Cy learned four skills without supplemental tangible reinforcement, and tangible reinforcement was included for empathizing with joy. With Milo, robust effects were observed for offering a toy, and gradual effects were observed for empathizing with joy (Figure 4, top five panels). No effect or low levels of performance were observed for the remaining skills. For saying “thank you,” echoic controlling prompt training reduced the frequency of Milo’s nontarget errors (i.e., echoing the experimenter), and remedial trial-based teaching was included to teach Milo to say “thank you.” Tangible reinforcement was included during remedial trial-based teaching for saying “thank you.” Tangible reinforcement was included for three other skills. Milo acquired one skill (empathizing with joy) without supplemental tangible reinforcement. With Gabe, robust effects were observed for offering a toy and empathizing with joy (Figure 4, bottom five panels). There was no effect or low levels of performance for the remaining three skills. Echoic controlling prompt training and tangible reinforcement were needed to teach Gabe to say “thank you.” In addition, remedial trial-based teaching was implemented for acknowledging and complimenting others and empathizing with distress. For empathizing with distress, the efficacy of tangible reinforcement was evaluated prior to remedial trial-based teaching because Gabe initially showed some levels of correct responding. Gabe learned three skills without supplemental tangible reinforcement. After learning the skills in trial-based teaching, all children demonstrated a high
level of skill performance during session-based teaching. Also, each child continued to respond at mastery levels with previously mastered friendship skills after a new friendship skill was taught.
Note. Percentage of correct friendship skills during trial-based teaching for Luke and Cy. SBT = session-based teaching. Prior to the first session, the skill was introduced with a rationale and
model of ideal performance. The slashes on the x-axis indicate passage of time (i.e., return to session-based teaching) before returning to trial-based teaching to teach the next skill.
Note. Percentage of correct friendship skills during trial-based teaching for Gabe and Milo. SBT = session-based teaching. rTBT = remedial trial-based teaching. Transfer trials were introduced when teaching saying “thank you” and were immediately programmed for subsequent skills. Prior to the first session, the skill was introduced with a rationale and model of ideal performance. The slashes on the x-axis indicate passage of time (i.e., return to session-based teaching) before returning to trial-based teaching to teach the next skill.

**Did the Skills Maintain in the Absence of Error-Correction Procedures?**

During postteaching, error-correction was removed to assess maintenance of skill performance similar to baseline (Figures 1 and 2). Contingent on a skill, praise and tangible (if applicable) reinforcement were delivered. All children exhibited a decrement in performance for one to two skills. However, performance still represented an improvement over baseline (Figure 5). With Luke, there was a decrement in acknowledging a newcomer’s arrival and greater variability in empathizing with distress (Figure 1, second and fourth panels). With Cy, there was a decrement in saying “thank you” with eye contact (Figure 1, sixth panel). With Milo, there was a decrement in empathizing with joy (Figure 2, fifth panel). With Gabe, there was greater variability in acknowledging and complimenting others and offering a toy (Figure 2, seventh and eighth panels). The reintroduction of error correction within session-based teaching improved performance with all skills across children, except with Luke’s performance for acknowledging others. The reintroduction of error correction improved performance in acknowledging others within but not across research blocks (i.e., there was no skill occurrence for the first session of the day). Booster teaching was implemented to strengthen the sequence of skills evoked by the newcomer’s arrival before evaluating the generality of the acquired skills with a peer (i.e., wherein error correction was removed again). After booster teaching, Luke consistently acknowledged others and did so across research blocks. During booster teaching, Gabe was taught to say “here you go” to replace “it’s time to give you a toy” when offering a newcomer a toy.
Note. The mean percentage of opportunities for each skill during the last three sessions in baseline, postteaching, and the final peer generality phase with the adult and peer across children.
Did Teaching with Adult Lead to Generalization and Maintenance of Skills with Peers?

Teaching with the experimenter resulted in no occurrence or a fleeting effect with the peer across nearly all skills and children (Figures 6 and 7, postteaching). Although the teaching procedures did not produce durable performance with the peer, there was an initial increase in correct responding for saying “thank you” for Cy, Milo, and Gabe. In addition, teaching produced increased levels of correct responding for empathizing with joy and empathizing with distress and joy for Gabe and Milo, respectively. Luke, Cy, and Milo demonstrated mastery levels of performance during the reversal back to session-based teaching with the experimenter, and then, similar or worse performance with the peer compared to their initial postteaching performance.

Did the Additive Tactics Lead to Improved Performance with Peers?

Each child experienced an additive approach with the peer on a continuum of less-to-more resource-intensive teaching tactics. Due to Gabe’s early-intervention services ending and his family living an hour away from the university-based clinic, Gabe did not experience the reversal back to session-based teaching with the experimenter or the additive-tactic approach. Visual inspection of stability, level, and trend were used to determine when to change conditions.

A rule was delivered at the beginning of the research block with Luke (Figure 6, top five panels) and Cy (Figure 6, bottom five panels). The rule had a fleeting or no effect across all skills. Next, the consequences from session-based teaching were implemented during the first opportunity for each skill with Luke, Cy, and Milo. There was improved performance for saying “thank you” with eye contact and a fleeting effect for acknowledging and complimenting others, offering a toy, and empathizing with distress and joy with Luke. There was improved performance for all skills with Cy; the effect of session-based teaching for the first opportunity resulted in a gradual increase in saying “thank you” with eye contact. There was no improvement for any skill with Milo (Figure 7, top five panels).

The inclusion of kind responses was efficacious for empathizing with distress with Luke
(Figure 6, fourth panel). In addition, there was an overall increase in responding toward the peer’s arrival. Luke consistently empathized with the peer’s joy when he attended. That is, there was a 91% probability of empathizing with joy given attending when kind responses were included compared to a 67% probability of a correct response given attending during rule plus session-based teaching for the first opportunity. Gabe experienced teaching with the rule, session-based teaching for the first opportunity, and kind responses. The additive set of tactics resulted in improved performance for saying “thank you,” empathizing with distress, and empathizing with joy (Figure 7, sixth, ninth, and tenth panels). With Gabe, remedial trial-based teaching plus tangible reinforcement was needed to acquire acknowledging and complimenting others and offering a toy when the peer arrived (praise and remedial trials were sufficient for acquisition with the experimenter).

Given that Milo exhibited zero levels of correct responding during session-based teaching in the first opportunity, it was unlikely he would contact the change in consequences in terms of the kind responses (Figure 7, top five panels). Therefore, we provided the rule and implemented session-based teaching in all opportunities during a session. This teaching condition improved performance for saying “thank you,” empathizing with distress, and empathizing with joy. For a newcomer’s arrival, remedial trial-based teaching was implemented and the peer greeted Milo with a hierarchy of actions during session-based teaching (Figure 7, second and third panels). After these modifications, Milo exhibited a high level of performance with acknowledging and complimenting others and offering a toy.
Note. Percentage of correct friendship skills implemented across phases during peer generalization for Luke and Cy. BL = baseline. PT = postteaching. SBT = session-based teaching. Circles depict sessions with the experimenter. Triangles depict sessions with the peer. Teaching with the experimenter occurred within the phase line and the data are depicted in a separate graph.
Note. Percentage of correct friendship skills implemented across phases during peer generalization for Gabe and Milo. BL = baseline. PT = postteaching. SBT represents session-based teaching. TBT = trial-based teaching. rTBT = remedial trial-based teaching. Circles depict sessions with the experimenter. Triangles depict sessions with the peer. Teaching with the experimenter occurred within the phase line and the data are depicted in a separate graph. Changed antecedent: 0 = the child responded when the peer walked in, 1 = the child responded after the peer said “Hi,” 2 = the child responded after the peer said, “Hi, Milo,” and 3 = the child responded after the peer said “Hi, Milo,” while tapping Milo’s shoulder.

How Satisfied Were the Caregivers with the Final Skill Topography?

Caregivers reported moderate to high satisfaction of their child’s performance across all skills (Table 3). Caregivers reported high satisfaction with how their child said “thank you” (M = 6.5; range, 6 to 7). Luke’s grandmother enjoyed how Luke “looked at the giver each time” and “…said thank you even when he did not need the toy.” When asked about what they did not like about their children’s performance, Cy and Milo’s caregivers reported concerns with prosody. Cy’s mother said he sounded “a little scripted, but this could be due to watching repeated exemplars,” and Milo’s mother did not like how “enthusiastically” he said “thank you.”

Caregivers reported moderate satisfaction with how their child acknowledged, complimented, and offered a toy following the peer’s arrival (M = 5.5; range, 4 to 6). They reported the skill looked “scripted,” “insincere,” or “dishonest.” For example, Luke’s grandmother reported that he “only cared once or twice about the [peer’s arrival].” Also, although the peer wore clothing with preferred stimuli, Gabe’s mother wished there was a way to “teach the meaning behind complimenting. That’s a hard thing to grasp, I’m sure.” Milo’s mother did not like that he offered a toy because the “[peer] did not ask for a toy. Don’t want [Milo] thinking he needs to offer a toy every time someone says ‘Hi’.”

Caregivers reported high satisfaction with how their child empathized with distress (M = 6.5; range, 6 to 7). Luke’s grandmother would “love for him to be the person asking me if I am okay. He actually looked like he would help.” Like how Cy and Milo’s caregivers felt about how their child said “thank you,” they shared similar concerns with how their child empathized with
distress. Cy’s mother reported his response looked “exasperated,” and Milo’s mother did not like how loudly he asked “Are you okay?” Caregivers reported moderate satisfaction with how their child empathized with joy ($M = 5.75; \text{ range 5 to 7}$). Milo’s mother reported his response looked “adorable,” and Gabe’s mother reported that he “looks like he is genuinely saying ‘cool’ and like he understands the reasoning behind saying ‘cool’.” By contrast, Luke’s grandmother and Cy’s mother reported that their responses looked “disingenuous,” and Luke, in particular, “was not too interested in being interrupted with what he was doing.”

### Table 3

**Social Validity from Caregivers**

<table>
<thead>
<tr>
<th>Statements</th>
<th>Luke</th>
<th>Cy</th>
<th>Milo</th>
<th>Gabe</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am satisfied with how my child said “thank you” after receiving a toy of compliment.</td>
<td>7</td>
<td>6</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>I am satisfied with how my child acknowledged, complimented, and offered a toy to the peer.</td>
<td>6</td>
<td>6</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>I am satisfied with how my child said “are you okay?” to the peer who acted distressed.</td>
<td>7</td>
<td>6</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>I am satisfied with how my child responded to the peer who made statements and gestures of joy.</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

*Note. The caregivers used a 7-point Likert scale with the following relations: 7 = highly agree, 4 = no opinion, 1 = highly disagree*
CHAPTER 3: DISCUSSION

Four preschool and kindergarten-aged children learned five friendship skills in a play context with highly preferred toys. Furthermore, each child exhibited a different friendship skill across four qualitatively distinct situations over a 10-min period. We implemented the same skill-acquisition procedures as used in classwide applications of PLS (i.e., descriptive praise and remedial trials; Hanley et al., 2007; 2014), but teaching took place in a one-on-one format with performance-based criteria. This approach was efficacious with both neurotypical children, with Luke learning all skills and Cy learning four of five skills without teaching modifications. By contrast, teaching modifications were required for both children with ASD to learn three of five skills, which highlights the flexibility of a one-on-one format in terms of being responsive to child performance (Falligant & Pence, 2017; Robison et al., 2020).

Despite extensive teaching with the experimenter, the children did not consistently exhibit the friendship skills with the peer until additional tactics were implemented. The inclusion of feedback (i.e., reinforcement and error correction) in the first skill opportunity was sufficient to improve performance for four skills with Luke and all skills with Cy. Similar to modifications (e.g., remedial trial-based teaching) used to promote acquisition with the experimenter, more intensive tactics were necessary to improve the performances of both children with ASD when interacting with the peer. In summary, each child acquired an early prosocial repertoire that may serve as an entry point for more extensive, and potentially, reinforcing interactions with adults and peers. Furthermore, all caregivers reported moderate to high satisfaction with the final form of their child’s friendship skills.

An aim of this evaluation was to teach toward an endpoint of applied significance. First, similar to Hanley et al. (2007; 2014), children learned the skills in the context of free-play, which is common at school and at home. Moreover, when children erred, the experimenter had the child practice the skill in the exact same situation. That is, remedial trials were programmed only after
the child reinitiated play so they could practice stopping play to engage in a friendship skill. The benefit of teaching in an applied context was demonstrated when children continued to show a high level of skill performance in session-based teaching after trial-based teaching, despite a lower dose of opportunities (i.e., 4 instead of 12) and the inclusion of previously mastered skills. Together, the higher dose of teaching and use of remedial trials was likely beneficial in teaching the children to attend to other people during play.

Second, we tested children’s performance with a peer without the presence of an adult. Although initial transfers of skills to the peer were observed for the majority of skills with Cy, Milo, and Gabe, these effects did not maintain over time. The decrement in skill performance likely was due to the absence of feedback. It also is plausible that decrements in performance were due to what we characterized as non-ideal peer reactions. However, implementing reinforcement and error correction procedures resulted in improved skill performance for all skills with Cy and three skills with Milo. The differential effects of feedback and kind responses cannot be discerned for Gabe because we implemented a combined, rather than additive, set of tactics. With Luke, feedback produced increased and maintained performance for four of five skills. The effects of what we characterized as kind responses were notable for empathizing with distress. However, it is unknown whether the increase in performance was due to positive reinforcement associated with the peer saying “I’m okay; thank you for asking,” negative reinforcement associated with the peer’s termination of distress (crying), or the combination. Moreover, the condition with kind responses was the first time Luke experienced empathizing with distress resulting in the peer no longer crying, and we did not demonstrate functional control over the effect of this kind response.

Our results highlight the importance of measuring a larger sample of skill opportunities during postteaching. Given the variability in performance for several skills, it is plausible Hanley et al. (2007) may have observed better outcomes if performance was measured in more than two
opportunities. In addition to capturing variability in performance, another benefit of measuring performance across multiple sessions was capturing fleeting effects with a peer. If we made conclusions after the first two evocative situations for each skill with the peer, we would have reported better generality outcomes. Nonetheless, repeated measures are important in assessing the durability of friendship skills.

For a couple of skills across several children, the high level of performance observed with the experimenter was not replicated with the peer despite the experimenter delivering feedback in the presence of the peer. For example, Luke attended and empathized nearly every time when the experimenter showed joy; by contrast, Luke did not attend to half of the times when a peer showed joy. Milo exhibited the friendship skills after the experimenter’s arrival but required remedial trial-based teaching and a change in the antecedent to do so after the peer’s arrival. Differences in experimental (proximal) and extraexperimental (distal) histories with adults and peers may have influenced children’s performance. First, the experimenter established a history of delivering positive (praise or praise plus tangibles) and negative (avoiding or terminating remedial trials) reinforcement associated with the friendship skills. Children did not have this type of history with the peer given that the experimenter continued to provide feedback during the peer evaluation. Based on informal observation, children looked more at the experimenter (observing responses) during play (the periods of time between evocative situations) than compared to the peer. It is plausible children might have attended more reliability to evocative situations with the peer if the peer had delivered consequences. Second, differences in extraexperimental histories with adults and peers may have influenced the children’s performance. It is also plausible that the differences in levels of interactive play between the children and the experimenter and peer affected the probability of the child attending to the onset of evocative situations. That is, based on informal observation, the children engaged in more joint play with the adult but more parallel play with the peer. Nevertheless, practitioners may consider
targeting attending to a peer as a prerequisite skill to increase friendship skills with peers. As an alternative, practitioners also could assess the effects of changing the evocative situation, as we did with the newcomer’s arrival with Milo. Increasing the saliency of the evocative situation when programmed in the context of play may enhance the efficacy of the teaching procedures. For example, the brevity of the evocative situation for empathizing with joy (i.e., 2 to 3 s; “Yay! I built a tower!”) may have influenced Luke’s lower levels of performance with the peer. Similar to Leaf et al. (2012), children could be taught to respond after the peer recruits their attention (e.g., “Luke, look! I built a tower!”).

The success of the teaching procedures with the neurotypical children’s performance with the experimenter suggest that increasing the dose of teaching and using a performance-based criterion within the classwide application may increase its efficacy. If a subset of children do not learn the friendship skills from a classwide application of PLS, the current approach and format could be integrated as part of an RTI model (Fuchs & Fuchs, 2006). Our addition of teaching modifications (e.g., remedial trial-based teaching) only when warranted for skills with Milo and Gabe aligns with a RTI approach. Researchers may be able to use a more lenient mastery criterion and remedial trial cap to increase the efficiency and adoptability of the current approach. Similar to mastery criteria used by Robison et al. (2020), the skill could be considered mastered during trial-based teaching if the child demonstrates above 80% (10 out of 12 trials) correct responding in the first session after the rationale and model (as seen for four and two skills with Luke and Cy, respectively). This would not be detrimental as the children would continue to practice the skill during session-based teaching. Next, it is possible that similar acquisition could be achieved with a smaller number of remedial trials. For example, Falligant and Pence (2017) demonstrated acquisition of skills with children with ASD for the first three PLS units with a cap of three (instead of five) remedial trials. Decreasing the number of remedial trials would enhance the efficiency of implementing error correction.
The friendship skills children learned in our study are valued by Kindergarten teachers, who reported that sharing and empathizing with others (which encompasses three of our skills) are among the top five essential skills for school readiness. Moreover, all of the friendship skills are prevalent in social skill competency assessments (e.g., SSRS, Gresham & Elliott, 1990; SSIS, Gresham & Elliott, 2008; School Readiness Taxonomy, Ladd et al., 2006; ABLLS-R, Partington, 2008). Therefore, evaluating the social acceptability of these skills is important. All of the children’s caregivers reported moderate to high satisfaction with their child’s final skill performance. However, when asked about what they specifically disliked about their children’s performance, three of the caregivers were concerned with the prosody of their child’s responding and how some skills can be construed as lacking authenticity. Our decision to program a dense frequency of opportunities and collect numerous repeated measures with the same peer in the experimental preparation may have negatively affected the children’s prosody. Cy’s mother reported that he shows empathy when his brother looks distressed at home and does so in a genuine manner. Researchers should assess whether acquired skills may look more genuine when there is a larger, more natural period of time between opportunities for a skill. Furthermore, the skill may look more genuine when opportunities arise with a novel peer or in a novel situation. Perhaps it may be socially acceptable to say “thank you” only when there is a dramatic shift in the reinforcing value of the compliment and item received (e.g., an unexpected and new preferred toy). Arguably, some cultures may prefer children who always say “thank you,” even if the child is not grateful (e.g., Bergstorm et al., 2016). In addition, researchers may consider establishing additional socially desirable component responses. For example, Hood et al. (2017; 2019) taught participants to smile when saying “thank you.” Smiling along with the frequency and duration of eye contact when saying “thank you” may enhance social acceptability. We thought it was prudent to have children acknowledge, compliment, and offer a toy to a newcomer; however, teaching a child to engage in a variation of one, two, or all three skills when a newcomer arrives may enhance social acceptability while minimizing the scripted or rote nature of the child’s
responses. In addition to modifying the form of skill, researchers should determine what levels of friendship skills are desirable. First, descriptive analyses of children playing could inform common evocative situations and skill topographies to use during teaching and the appropriate level of responding. Then, experimental evaluations could determine adult and peer preferences regarding the level and form of the skills.

A societal goal should be to richly promote nurturing environments so prosocial behaviors (i.e., protective factors) on the individual, family, and community level are promoted (Biglan et al., 2012) and harmful psychological events (i.e., risk factors) are minimized or inoculated. However, the development, especially the durability, of prosocial behavior is not well understood (Schlinger, 1995). Early research suggests that vicarious reinforcement (also referred to as “treatment spillover” effects; Kazdin, 1973) is effective at increasing prosociality with non-targeted children (Kohler & Fowler, 1985). Researchers should evaluate the effects of vicarious reinforcement as part of the classwide application of the PLS program. If ineffective, practitioners may be able to promote the persistence of prosocial behavior by either improving the caregiver or teacher’s persistence in prompting positive social interactions between children (Hundert & Houghton, 1992) or by directly teaching children to be persistent (e.g., progressively increasing the delay to feedback and reinforcement; Fowler & Baer, 1981). Perhaps more important, additional research is needed to evaluate the direct benefits of children engaging in the friendship skills with peers. For example, future research should conduct an updated analysis of peer reactions and responses (Tremblay et al., 1981; Kohler & Fowler, 1985) to friendship skills. In addition, it may be meaningful to evaluate if friendship skills have a larger collateral effect on relationships (e.g., increased friendship nominations; Foster & Mash, 1999).
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https://doi.org/10.1007/s10864-012-9155-z