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<tr>
<td>Focal children</td>
<td>Children with autism spectrum disorder (ASD) who exhibit social competence skills difficulties (i.e., children who rarely initiate social interactions with peers, respond to peers’ initiations, or engage in social interactions with peers).</td>
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<td>Generalization probes</td>
<td>Sessions conducted once a week across the study to determine if, and when, changes in the focal children’s target behaviors generalized across peers.</td>
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<td>Initiations</td>
<td>Verbal or gestural behaviors (that are not preceded in the previous three seconds by another social behavior) directed toward a focal child or peer in an attempt to obtain the other child’s attention, access to the other child’s materials or objects, engage the other child in a mutual activity, or to elicit a social response from the other child. Examples of initiations include calling a child’s name, a child giving directions to another child on how to play with a toy, verbally greeting a child, or pointing to a picture for a child to look at.</td>
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<td>Interactions</td>
<td>A sequence of three social behaviors between a focal child and a peer within three seconds of each other. A social interaction begins (i.e., behavior’s onset) after an initiation-response sequence with the third behavior in the sequence (i.e., initiation-response-interaction).</td>
</tr>
<tr>
<td>Multiple stimulus without replacement preference assessment</td>
<td>A preference assessment in which an experimenter places an array of stimuli (i.e., tangibles or edibles) in front of an individual and allows the individual to select one of the stimuli. After the individual manipulates or consumes the stimulus, the experimenter removes it from the stimuli array. Each time the experimenter allows the individual to choose a stimulus from the stimuli array is considered as one trial. The experimenter conducts trials until there are no stimuli left in the stimuli array or until a criterion is reached indicating that no more selections will be made by the individual (DeLeon &amp; Iwata, 1996).</td>
</tr>
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<td>Peer-mediated intervention</td>
<td>Intervention in which socially competent peers are systematically taught how to initiate, prompt, or reinforce social responses from children with ASD as a means to engage children with ASD in positive social interactions with them and thus, help children with ASD to acquire peer-related social competence skills (Katz &amp; Girolametto, 2013, 2015; Thiemann &amp; Goldstein, 2004).</td>
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<td>Peers</td>
<td>In this study, each focal child was paired with two peers. One peer received training on how to respond to the focal child’s initiations and was paired with the focal child during the peer-mediated intervention sessions. The other peer did not receive training and was paired with the focal child solely during generalization probe sessions.</td>
</tr>
<tr>
<td>Term</td>
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<td>Preference assessment session</td>
<td>A preference assessment session consists of an individual selecting each of the stimuli presented to him or her in the stimuli array or until a criterion is reached indicating that no more selections will be made by the individual. In this study, preference assessment sessions consisted of a maximum of six trials or until participants refused to make a stimulus selection within 30 seconds of being allowed to choose a stimulus from the stimuli array.</td>
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<tr>
<td>Preference assessment trial</td>
<td>A preference assessment trial consists of an experimenter allowing an individual to choose a stimulus from a stimuli array.</td>
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<tr>
<td>Preferred stimulus</td>
<td>The stimulus for each focal child with the highest score across preference assessment sessions, which was based on the number of times that it was chosen across sessions and the order in which it was chosen in each session.</td>
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<td>Responses</td>
<td>Verbal or gestural behaviors directed to an initiating peer or focal child that overtly acknowledge the other child’s initiation within three seconds of the initiation. This includes a child verbally responding to a peer’s or focal child’s initiation, joining an activity once asked to join, or helping to complete a task once asked to do so. Responses also include a focal child or peer orienting himself or herself toward the initiating child after the occurrence of the initiation. Responses include declining initiations.</td>
</tr>
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<td>Restricted and repetitive behaviors</td>
<td>A broad range of behaviors that have been conceptually and empirically grouped into lower order motor behaviors and higher order cognitive behaviors. Lower order motor behaviors (i.e., stereotyped movements, repetitive manipulation of objects, and repetitive forms of self-injurious behaviors) are characterized by repetition of movement while higher order cognitive behaviors (i.e., compulsions, rituals and routines, insistence on sameness, and circumscribed interests) are characterized by a rigid adherence to certain rules or mental sets (Boyd, McDonough, &amp; Bodfish, 2012).</td>
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<td>Social competence</td>
<td>The ability to select social behaviors that are appropriate and effective in achieving interpersonal social goals (Guralnick, 1992, 2010).</td>
</tr>
<tr>
<td>Social competence difficulties</td>
<td>Difficulties initiating social interactions with peers, responding to peers’ initiations, or engaging in social interactions with peers (Guralnick, 2010; Guralnick &amp; Groom, 1987).</td>
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<tr>
<td>Social competence interventions</td>
<td>Interventions implemented with the goal of decreasing the social competence skills difficulties exhibited by individuals with disabilities (e.g., individuals with ASD).</td>
</tr>
<tr>
<td>Socially competent peer</td>
<td>A child who frequently demonstrates appropriate social interactions with others and uses age appropriate language and communication skills (Thiemann &amp; Goldstein, 2004).</td>
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Children with autism spectrum disorder (ASD) often exhibit difficulties in peer-related social competence (e.g., do not to initiate social interactions with peers). Peer-related social competence has been shown to be vital for appropriate childhood development and, without appropriate intervention, peer-related social competence difficulties may have long lasting consequences. Therefore, it is imperative to implement interventions that are effective in addressing the peer-related social competence needs of children with ASD.

Peer-mediated interventions have been shown to be effective in addressing the peer-related social competence needs of young children with ASD (e.g., they have been shown to be effective in increasing the frequency and duration of social interactions between children with ASD and their peers). Nonetheless, more peer-mediated intervention research is warranted. Particularly, more peer-mediated intervention research that is primarily focused on increasing the social interactions initiated by children with ASD is needed, given that this is the most understudied area in this literature base. When young children with ASD initiate social interactions, they are able to develop the social skills necessary to independently navigate their social environment, which is required to access critical learning opportunities. Therefore, it is
important for peer-mediated intervention research to focus on how to effectively promote positive social initiations in young children with ASD toward their peers.

The purpose of the present study was to examine the effects of a peer-mediated intervention on the peer-related social behaviors of young children with ASD, particularly their initiations toward peers. The peer-mediated intervention included teaching children with ASD how to initiate positive social interactions with socially competent peers, teaching socially competent peers to wait for the initiations made by the children with ASD and to effectively respond to those initiations, and conducting preference assessments to identify and embed the preferred toys of the children with ASD in the intervention. The results suggest that the intervention was effective in increasing the peer-related social behaviors exhibited by the children with ASD (e.g., increasing the initiations made by these children toward their peers). Moreover, the results suggest that the effects of the intervention on the peer-related social behaviors of the children with ASD maintained after the intervention ended. However, the effects of the intervention did not generalize across peers. Future studies should examine the conditions that need to be met to ensure that the effects of the intervention generalize across settings and peers. Future studies should extend the outcomes of this study to a sample of children with ASD who exhibit different characteristics than the children that participated in this study.
CHAPTER 1
INTRODUCTION

The purpose of this chapter is to provide an introduction and a foundation for the current study by briefly reviewing the literature on the use of peer-mediated interventions as a means to address the peer-related social competence needs of young children with autism spectrum disorder (ASD). First, an introduction to ASD will be offered with a description of the prevalence of the disorder and the characteristics associated with it. Second, an overview of the peer-related social competence difficulties exhibited by young children with ASD will be offered. Third, an introduction to peer-mediated interventions will be provided. This chapter concludes with the study’s conceptual framework, the specific research questions that are addressed in the study, and a discussion of the contributions that this study makes to both research and practice.

Overview of Autism Spectrum Disorder

The number of children diagnosed with ASD has increased considerably over the past decade. According to the Centers for Disease Control and Prevention (CDC) and the Developmental Disabilities Monitoring Network, the prevalence of ASD in the United States is estimated at 1 in 68 births (CDC, 2016), making it the fastest-growing developmental disability in the United States (Autism Society of America, 2015). Federal mandates require children with disabilities, including children with ASD, be educated in inclusive settings (e.g., general education classrooms) to the greatest extent possible (Individuals with Disabilities Education Act [Public Law 108-446]). As a result, the number of children with ASD being educated in general education classrooms has also increased considerably over the past decade (Koegel, Kuriakose, Singh, & Koegel, 2012; Kohler, Strain, Hoyson, & Jamieson, 1997).
The social competence difficulties as well as the restrictive and repetitive behaviors (RRBs) exhibited by children with ASD (American Psychiatric Association, 2013) interfere with their ability to engage in positive social interactions and develop stable friendships with peers, which is vital for appropriate childhood development (Bauminger-Zviely, 2014; Katz & Girolametto, 2015). Children who do not engage in appropriate social interactions with peers during childhood often have behavioral difficulties and social maladjustment later in their lives (e.g., adolescence; Brown, Odom, & Holcombe, 1996). Given the increased percentage of time children with ASD are spending with peers who are developing typically in inclusive settings and the importance of positive social interactions to childhood development, there is a need to evaluate the efficacy of interventions aimed at increasing positive social interactions between children with ASD and their peers (Chan et al., 2009; Zhang & Wheeler, 2011).

**Overview of Peer-Related Social Competence**

Social competence is the ability to select social behaviors that are appropriate and effective in achieving interpersonal social goals (Guralnick, 1992, 2010; Odom, McConnell, & Brown, 2008). As children interact with peers in early childhood settings (e.g., schools), they begin to develop social behaviors (e.g., requesting items from peers) and are provided with opportunities to acquire a wide range of social, language, and cognitive skills referred to as peer-related social competence (Guralnick, 2010). Peer-related social competence has been shown to be a significant contributor to the appropriate development of young children and it is often used as an indicator of children’s overall social competence (Brown & Conroy, 2011; Odom et al., 2008).

Although many children develop peer-related social competence through observing and engaging in social interactions with peers during ongoing activities and routines, children with ASD seem to be unusually vulnerable to peer-related social competence difficulties (Brown et
al., 1996; Guralnick, 2010; Guralnick & Groom, 1987; McConnell & Odom, 1999; Odom, 2005; Whalon, Conroy, Martinez, & Werch, 2015). Children with ASD often do not initiate social interactions with peers, respond to peers’ initiations, or engage in social interactions with peers (Koegel et al., 2012). Peer-related social competence difficulties may lead young children with ASD to social isolation, which is associated with poor developmental outcomes, increased risk for psychopathology later in life (e.g., adolescence), difficulties in obtaining and maintaining employment, and decreased participation in inclusive settings (e.g., general education classrooms; Church, Alisanski, & Amanullah, 2000; Garrison-Harrell, Kamps, & Kravits, 1997; Koegel et al., 2012).

The implementation of interventions targeting peer-related social competence difficulties in children with ASD have increased over the past decade (e.g., video-self modeling, social stories, self-management, and peer-mediated interventions) due to the importance of peer-related social competence on early childhood development (Rogers, 2000; Whalon et al., 2015). Given the impact that peer-related social competence difficulties have on the development of young children with ASD, coupled with the increased number of these children being educated in inclusive settings, researchers have increased their focus on the use of peers as change agents when implementing social competence interventions within these settings (i.e., peer-mediated interventions; Bass & Mulick, 2007; Rogers, 2000).

Peer-mediated interventions have unique advantages over other social competence interventions. The availability of peers in inclusive settings translates to an increased number of change agents available to implement peer-mediated interventions, which increases the likelihood of children with ASD receiving intervention opportunities (Chan et al., 2009; Watkins et al., 2015). Peer-mediated interventions also increase the number of opportunities that children
with ASD have to interact and practice peer-related social competence skills with a variety of communication and social partners, increasing the probability of generalization and maintenance of those skills (Chan et al., 2009; Watkins et al., 2015). Finally, peer-mediated interventions can be incorporated into the daily activities and routines of children with ASD and their peers, making them practical (Chan et al., 2009). Given the aforementioned advantages of peer-mediated interventions, they may be preferred over other social competence interventions (e.g., video-self modeling or social stories) as a means to address the peer-related social competence needs of young children with ASD and thus, improve these children’s developmental outcomes (Bass & Mulick, 2007; Chan et al., 2009; Rogers, 2000).

**Overview of Peer-Mediated Interventions**

Peer-mediated interventions are interventions focused on increasing positive social interactions between children with ASD and their peers as well as increasing the quality of those social interactions (Thiemann & Goldstein, 2004). Peer-mediated interventions are considered an evidence-based practice (Odom et al., 2013), an early intervention/early childhood special education recommended practice (Division of Early Childhood [DEC], 2014), and are one of the more effective interventions available for addressing the peer-related social competence needs of young children with ASD (Odom et al., 2013; Rogers, 2000). When implementing peer-mediated interventions, socially competent peers (i.e., children who frequently demonstrate appropriate social interactions with others and use age-appropriate language and communication skills; Thiemann & Goldstein, 2004) are systematically taught how to initiate, prompt, or reinforce social responses from children with ASD as a means to engage children with ASD in positive social interactions with them and thus, help children with ASD to acquire peer-related social competence skills (Garrison-Harrell et al., 1997; Katz & Girolametto, 2013, 2015). Once peers successfully learn the strategies taught to them, they are given the opportunity to interact with
children with ASD using play materials that promote age-appropriate social interactions (Katz & Girolametto, 2013).

The peer-mediated intervention literature base indicates that peer-mediated interventions are effective in increasing peer-related social competence skills in individuals with ASD (Rogers, 2000). Zhang and Wheeler (2011) conducted a meta-analysis to examine the efficacy of peer-mediated interventions in increasing peer-related social competence skills in young children with ASD (i.e., children under eight years of age). A total of 45 single case research design studies published between 1977 and 2006 were included in the meta-analysis and Cohen’s $d$ effect sizes were calculated for all of the included studies. According to the authors, the overall intervention effect sizes suggested that peer-mediated interventions are highly effective in increasing the frequency with which children with ASD and their peers engage in social interactions (i.e., $d = 1.46$) as well as increasing the duration of the social interactions between children with ASD and their peers (i.e., $d = 1.27$). These results were consistent with the results of other literature reviews also examining the efficacy of peer-mediated interventions on the peer-related social competence skills of individuals with ASD (Chang & Locke, 2016; Odom et al., 2013). Chan and colleagues (2009) conducted a more comprehensive literature review (i.e., this review was not restricted to a specific experimental research design or to a specific age group of individuals with ASD) examining and summarizing the outcomes (i.e., no effect sizes were calculated) of peer-mediated interventions on the peer-related social competence skills of individuals with ASD. A total of 42 studies published between 1977 and 2009 were included in this review. Similar to other literature reviews, Chan and colleagues (2009) concluded that peer-mediated interventions are an effective intervention approach for addressing the peer-related social competence needs of individuals with ASD.
More recently, Watkins et al. (2015) conducted a literature review that focused on summarizing 14 peer-mediated intervention studies published between 2009 (i.e., the last year included in the Chan and colleagues’ [2009] literature review) and 2014. Similar to Chan and colleagues’ (2009) literature review, this review was not restricted to a specific experimental research design or to a specific age group of individuals with ASD. However, only studies conducted within inclusive settings were included in this review (i.e., settings in which individuals with ASD normally interacted with and shared activities with typically developing peers; Watkins et al., 2015). The results of this review (i.e., no effect sizes were calculated in this review either) were also consistent with the results of past literature reviews. Taken together, the findings of these literature reviews suggest that peer-mediated interventions are effective in addressing the peer-related social competence needs of individuals with ASD.

Even though peer-mediated interventions are considered an evidence-based and recommended practice and have been shown to be effective in addressing the social competence needs of children with ASD, there continues to be a need for further peer-mediated intervention research. Past literature reviews (Chan et al., 2009; Chang & Locke, 2016; Zhang & Wheeler, 2011) have found that most peer-mediated intervention research has not systematically measured treatment integrity, particularly when studies were conducted within natural settings (e.g., classrooms) where treatment integrity is probably more difficult to achieve (Chang & Locke, 2016). Past reviews have also found that a limitation in the peer-mediated intervention research has been the lack of measurement of whether or not the effects of the interventions are maintained over time and whether or not the effects of the interventions generalize to different settings or peers (Chan et al., 2009; Zhang & Wheeler, 2011). One of the more concerning limitations in this literature base is that few studies have specifically targeted the initiations made
by the children with ASD to their peers (Chan et al., 2009; Zhang & Wheeler, 2011). Most studies have primarily focused on increasing the responses made by the children with ASD to their peers’ initiations and on increasing the social interactions between the children with ASD and their peers (Chan et al., 2009; McConnell, 2002). Research suggests that initiating appropriate social interactions with peers may be a relative weakness in children with ASD when compared to responding to peers’ initiations (Katz & Girolametto, 2015; Koegel et al., 2003). Moreover, when children with ASD initiate social interactions with others (e.g., peers), they are more likely to develop the social skills necessary to independently navigate their social environments, which is required to access critical learning opportunities (Rotheram-Fuller et al., 2010; Whalon et al., 2015). Therefore, more peer-mediated intervention research that is primarily focused on increasing the social interactions initiated by children with ASD is needed.

The inclusion of strategies within peer-mediated interventions to promote positive social interactions initiated by young children with ASD may be beneficial for future studies to explore. Given the evidence that indicates that young children with ASD are more likely to initiate social interactions, respond to higher proportions of initiations, and engage in longer social interactions with their peers when activities or materials within the activities are ones they prefer (Kamps et al., 2014, 2015; McConnell, 2002; Peck, Sasso, & Jolivette, 1997; Stichter, Randolph, Kay, & Gage, 2009), incorporating stimuli likely to promote peer-related social competence skills in children with ASD (e.g., preferred toys) in peer-mediated interventions may be an effective approach to do so. Preference assessments (i.e., systematic assessments designed to identify individuals’ relative preferences to various stimuli; DeLeon & Iwata, 1996) could be used to systematically identify children’s preferred stimuli and embed those stimuli within peer-mediated interventions in order to encourage children with ASD to engage in appropriate peer-
related social behaviors. To date only one study has used preference assessments as a means to systematically identify and embed the preferred stimuli of young children with ASD into peer-mediated interventions (i.e., Shafer, Egel, & Neef, 1984).

The purpose of the study conducted by Shafer and colleagues (1984) was to evaluate the effects of a peer-mediated intervention on the frequency and duration of the social interactions between young children with ASD and their peers. Preference assessments were conducted prior to implementing the intervention in order to identify the preferred toys of the children with ASD. Once the preferred toys were identified, they were added to the peer-mediated intervention sessions. The authors concluded that the peer-mediated intervention significantly increased the social interactions between the children with ASD and their peers. Moreover, the authors concluded that the use of the preferred toys of the children with ASD during the interventions sessions increased the probability that these children responded to the peers’ initiations and maintained social interactions with them (Shaffer et al., 1984). The results of that study provide evidence that conducting systematic assessments (e.g., preference assessments) to identify and embed preferred stimuli (e.g., preferred toys) of young children with ASD in peer-mediated interventions may be an effective approach to promote appropriate social interaction initiated by children with ASD. Given that this is the only study that has used preference assessments to identify and embed preferred stimuli of young children with ASD in peer-mediated interventions, more studies examining the effects of embedding preferred stimuli in peer-mediated interventions, as identified by preference assessments, on the social competence skills of children with ASD are needed.

**Statement of the Problem**

The peer-related social competence difficulties exhibited by children with ASD interfere with their ability to engage in positive social interactions and develop stable friendships with
peers, which is vital for appropriate childhood development (Bauminger-Zviely, 2014; Katz & Girolametto, 2015). Not engaging in appropriate social interactions with peers during childhood predicts behavioral difficulties and social maladjustment later in life (Brown et al., 1996). Therefore, there is a need to evaluate the efficacy of interventions aimed at increasing positive social interactions between children with ASD and their peers (Chan et al., 2009; Zhang & Wheeler, 2011).

Research has shown that peer-mediated interventions may be one possible intervention approach to address the peer-related social competence needs of young children with ASD (Rogers, 2000; Zhang & Wheeler, 2011). Nonetheless, there continues to be a need for further research in this area. Particularly, more peer-mediated intervention research that is primarily focused on increasing the social interactions initiated by children with ASD is needed, given that is the most concerning limitation in this literature base (Chan et al., 2009; McConnell, 2002).

When young children with ASD initiate social interactions they are able to develop the social skills necessary to independently navigate their social environments, which is required to access critical learning opportunities (Katz & Girolametto, 2015; Rotheram-Fuller et al., 2010; Whalon et al., 2015). Therefore, more peer-mediated intervention research that is primarily focused on increasing the appropriate social interactions initiated by children with ASD is needed.

There is evidence that indicates that young children with ASD are more likely to initiate social interactions and engage in appropriate social behaviors with their peers during peer-mediated interventions that include stimuli they prefer (e.g., preferred toys; Kamps et al., 2015; McConnell, 2002; Peck et al., 1997; Stichter et al., 2009). Therefore, incorporating stimuli likely to promote peer-related social competence skills in children with ASD (e.g., preferred toys) in peer-mediated interventions may be an effective approach to promote positive social interactions
initiated by young children with ASD. Preference assessments could be used to systematically identify children’s preferred stimuli and embed those stimuli within peer-mediated interventions in order to encourage children with ASD to engage in appropriate peer-related social behaviors. To date, only one study has incorporated preferred stimuli, as identified by preference assessments, in peer-mediated interventions as a means to increase the likelihood of young children with ASD engaging in peer-related social behaviors (i.e., Shafer et al., 1984). Consequently, more studies examining the effects of embedding preferred stimuli in peer-mediated interventions, as identified by preference assessments, on the social competence skills of children with ASD, particularly on their social initiations to peers, are needed.

**Significance of the Study**

Peer-related social competence difficulties interfere with the ability of young children with ASD to appropriately and effectively interact with peers (Guralnick, 1992, 2010). Positive interactions with peers provide young children with a foundation for developing an array of social, language, and cognitive skills that set the stage for social adjustment later in life (Odom et al., 2008). Without acquiring the skills necessary to engage in positive social interactions with peers, young children with ASD are at a distinct disadvantage in accessing critical learning opportunities (Brown et al., 1996; Katz & Girolametto, 2015; Odom, 2005; Odom et al., 2008; Rotheram-Fuller et al., 2010; Whalon et al., 2015). Research has shown that without intervention, the peer-related social competence difficulties exhibited by young children with ASD may persist over time (Guralnick, 2010), having life-long implications such as increased risk for psychopathology, difficulties in obtaining and maintaining employment, or decreased participation in inclusive settings (Church et al., 2000). The present study is of significance because it has the potential to alter this developmental trajectory of young children with ASD by
implementing a peer-mediated intervention focused on increasing the peer-related social competence skills of these children, particularly social initiations to peers.

The present study uses an ecobehavioral analytic approach (Carta & Greenwood, 1985; Greenwood, Carta, & Atwater, 1991) to address the peer-related social competence needs of young children with ASD. This approach focuses on conducting systematic assessments to identify antecedent variables that are likely to impact individuals’ target behaviors (Greenwood et al., 1991; Kontos, Burchinal, Howes, Wisseh, & Galinsky, 2002). The variables identified in those assessments are then incorporated into interventions that contain behavior analytic strategies to effectively address the absence or excess of individuals’ behavior (Greenwood et al., 1991; Kontos et al., 2002). The ecobehavioral analytic approach has been shown to be an effective approach to address the social, behavioral, and academic needs of children in early childhood settings (Greenwood & Carta, 1987; Kontos et al., 2002), making it a well-suited approach for the development of the intervention implemented in this study (see Figure 1-1).

Specific to this study, preference assessments were conducted to systematically identify the preferred toys of the children with ASD that participated in the study. The preferred toys were then incorporated into the intervention sessions as a means of increasing the likelihood of these children engaging in peer-related social behaviors. Moreover, behavioral analytic strategies were used to teach the children with ASD how to appropriately and effectively initiate social interactions with their peers and to teach the peers how to elicit and maintain the use of those behaviors in the children with ASD. The social contingencies for engaging in the social behaviors taught to the children with ASD and their peers were manipulated as a means to increase the likelihood of the children engaging in those behaviors and thus, increase and maintain appropriate social interactions between children with ASD and their peers.
Purpose of the Study

The purpose of this study was to extend the peer-mediated intervention research by addressing one of the more concerning limitations found in this literature base (i.e., the lack of focus on social interactions initiated by children with ASD). Specifically, the purpose of this study was to examine the effects of a peer-mediated intervention on the peer-related social behaviors of young children with ASD, with the primary focus on the initiations made by these children to their peers. To increase the likelihood of children with ASD initiating toward their peers, the intervention implemented in this study included teaching the children with ASD how to initiate positive social interactions with their peers, teaching the peers to wait for the initiations made by the children with ASD and to effectively respond to those initiations, and conducting preference assessments to identify and embed the preferred toys of the children with ASD in the intervention. The specific research questions addressed in this study were:

1. What are the effects of a peer-mediated intervention on the initiations, responses, and interactions of young children with ASD and their peers?

2. Do the effects of a peer-mediated intervention on the initiations, responses, and interactions of young children with ASD and their peers maintain over time?

3. Do the effects of a peer-mediated intervention on the initiations, responses, and interactions of young children with ASD and their peers generalize across peers?

4. How do the initiations, responses, and interactions of young children with ASD compare to the initiations, responses, and interactions of same-aged peers prior to and after receiving a peer-mediated intervention?
Figure 1-1. Ecobehavioral approach to address peer-related social competence needs in young children with ASD.
CHAPTER 2
LITERATURE REVIEW

The purpose of this chapter is to provide a review of the literature focusing on studies that have implemented peer-mediated interventions with the aim of addressing the peer-related social competence needs of young children with ASD. First, an introduction to ASD will be offered with a description of the prevalence of ASD and the characteristics associated with it. Second, an overview of the peer-related social competence difficulties exhibited by young children with ASD will be offered. Third, an introduction to peer-mediated interventions will be provided. This will be followed by a review of the empirical literature regarding the use of peer-mediated interventions as a means to increase the peer-related social competence skills of young children with ASD. This chapter will conclude with a discussion of the findings of the literature review in order to relate them to the current study’s specific research questions.

Overview of Autism Spectrum Disorder

The number of children diagnosed with ASD has increased considerably over the past decade. According to the CDC and the Developmental Disabilities Monitoring Network, the prevalence of ASD in the United States is estimated at 1 in 68 births (CDC, 2016), making it the fastest-growing developmental disability in the United States (Autism Society of America, 2015). Federal mandates require children with disabilities, including children with ASD, be educated in inclusive settings (e.g., general education classrooms) to the greatest extent possible (Individuals with Disabilities Education Act [Public Law 108-446]). As a result, the number of children with ASD being educated in general education classrooms has also increased considerably over the past decade (Koegel et al., 2012; Kohler et al., 1997).

The social competence difficulties as well as the RRBs exhibited by children with ASD (American Psychiatric Association, 2013) interfere with their ability to engage in positive social
interactions and develop stable friendships with peers, which is vital for appropriate childhood development (Bauminger-Zviely, 2014; Katz & Girolametto, 2015). Not engaging in appropriate social interactions with peers during childhood predicts behavioral difficulties and social maladjustment later in life (Brown et al., 1996). Given the increased percentage of time children with ASD are spending with peers who are developing typically in inclusive settings and the importance of positive social interactions to childhood development, there is a need to evaluate the efficacy of interventions aimed at increasing positive social interactions between children with ASD and their peers (Chan et al., 2009; Zhang & Wheeler, 2011).

**Overview of Peer-Related Social Competence**

Social competence is the ability to select social behaviors that are appropriate and effective in achieving interpersonal social goals (Guralnick, 1992, 2010; Odom et al., 2008). As children interact with peers in early childhood settings (e.g., schools), they begin to develop social behaviors (e.g., requesting items from peers) and are provided with opportunities to acquire a wide range of social, language, and cognitive skills referred to as peer-related social competence (Guralnick, 2010). Peer-related social competence has been shown to be a significant contributor to the appropriate development of young children and it is often used as an indicator of children’s overall social competence (Brown & Conroy, 2011; Odom et al., 2008).

Although many children develop peer-related social competence through observing and engaging in social interactions with peers during ongoing activities and routines, children with ASD seem to be unusually vulnerable to peer-related social competence difficulties (Brown et al., 1996; Guralnick, 2010; Guralnick & Groom, 1987; McConnell & Odom, 1999; Odom, 2005; Whalon et al., 2015). Children with ASD often do not initiate social interactions with peers, respond to peers’ initiations, or engage in social interactions with peers (Koegel et al., 2012).
Peer-related social competence difficulties may lead young children with ASD to social isolation, which is associated with poor developmental outcomes, increased risk for psychopathology later in life (e.g., adolescence), difficulties in obtaining and maintaining employment, and decreased participation in inclusive settings (Church et al., 2000; Garrison-Harrell et al., 1997; Koegel et al., 2012).

The implementation of interventions targeting peer-related social competence difficulties in children with ASD have increased over the past decade (e.g., video-self modeling, social stories, self-management, and peer-mediated interventions), due to the importance of peer-related social competence on early childhood development (Rogers, 2000; Whalon et al., 2015). Given the impact that peer-related social competence difficulties have on the development of young children with ASD coupled with the increased number of these children being educated in inclusive settings, researchers have increased their focus on the use of peers as change agents when implementing social competence interventions within these settings (i.e., peer-mediated interventions; Bass & Mulick, 2007; Rogers, 2000).

Peer-mediated interventions have unique advantages over other social competence interventions. The availability of numerous peers in inclusive settings translates to an increased number of change agents available to implement peer-mediated interventions, which increases the likelihood of children with ASD receiving intervention opportunities (Chan et al., 2009; Watkins et al., 2015). Peer-mediated interventions also increase the number of opportunities that children with ASD have to interact with peers and practice peer-related social competence skills with a variety of communication and social partners, increasing the probability of generalization and maintenance of those skills (Chan et al., 2009; Watkins et al., 2015). Finally, peer-mediated interventions can be incorporated into the daily activities and routines of children with ASD and
their peers, making them practical (Chan et al., 2009). Given the aforementioned advantages of peer-mediated interventions, they may be preferred over other social competence interventions (e.g., video-self modeling or social stories) as a means to address the peer-related social competence needs of young children with ASD and thus, improve these children’s developmental outcomes (Bass & Mulick, 2007; Chan et al., 2009; Rogers, 2000).

**Overview of Peer-Mediated Interventions**

Peer-mediated interventions are interventions focused on increasing positive social interactions between children with ASD and their peers as well as increasing the quality of those social interactions (Thiemann & Goldstein, 2004). According to Rogers (2000), peer-mediated intervention research has been influenced by the work of Goldstein, Odom, Strain, and their colleagues, who have worked to develop and improve peer-mediated interventions for the past forty years (e.g., Goldstein, Kaczmarek, Pennington, & Shafer, 1992; Odom & Strain, 1984, 1986; Sainato, Goldstein, & Strain, 1992; Strain, Kerr, & Ragland, 1979; Strain, Shores, & Timm, 1977; Thiemann & Goldstein, 2001, 2004). Peer-mediated interventions are considered an evidence-based practice (Odom et al., 2013), an early intervention/early childhood special education recommended practice (DEC, 2014), and are one of the more effective interventions available for addressing the peer-related social competence needs of young children with ASD (Odom et al., 2013; Rogers, 2000).

When implementing peer-mediated interventions, socially competent peers are systematically taught how to initiate, prompt, or reinforce social responses from children with ASD as a means to engage children with ASD in positive social interactions with them and thus, help children with ASD to acquire peer-related social competence skills (Garrison-Harrell et al., 1997; Katz & Girolametto, 2013, 2015). Once peers successfully learn the strategies taught to them, they are given the opportunity to interact with children with ASD using play materials,
typically selected a priori, that promote age-appropriate social interactions (Katz & Girolametto, 2013). For example, in one of the first peer-mediated intervention studies conducted, Strain and colleagues (1977) taught children who were developing typically how to initiate toward children with ASD through verbal (e.g., “Let’s play!”) and non-verbal (e.g., rolling a ball to a child) means in order to engage the children with ASD in social play with them. After the peers learned the initiation strategies, they were given the opportunity to play with the children with ASD in a playroom equipped with a large assortment of manipulative toys, dress-up clothes, and gross-motor equipment. Instructing peers to increase their social initiations to the children with ASD resulted in increases in the social interactions and social play between the children with ASD and the peers (Strain et al., 1977).

Since this study was conducted, an abundance of research on peer-mediated interventions has been conducted that indicates that they represent an effective intervention for the acquisition of peer-related social competence skills in individuals with ASD (Rogers, 2000). Zhang and Wheeler (2011) conducted a meta-analysis to examine the efficacy of peer-mediated interventions in increasing peer-related social competence skills in young children with ASD (i.e., children under eight years of age). A total of 45 single case research design studies published between 1977 and 2006 were included in the meta-analysis and Cohen’s $d$ effect sizes were calculated for all of the included studies. According to the authors, the overall intervention effect sizes suggested that peer-mediated interventions are highly effective in increasing the frequency with which children with ASD and their peers engage in social interactions (i.e., $d = 1.46$) as well as increasing the duration of the social interactions between children with ASD and their peers (i.e., $d = 1.27$). These results were consistent with the results of other literature reviews also examining the efficacy of peer-mediated interventions on the peer-related social
competence skills of individuals with ASD (Chang & Locke, 2016; Odom et al., 2013). Chan et al. (2009) conducted a more comprehensive literature review (i.e., this review was not restricted to a specific experimental research design or to a specific age group of individuals with ASD) examining and summarizing the outcomes (i.e., no effect sizes were calculated) of peer-mediated interventions on the peer-related social competence skills of individuals with ASD. A total of 42 studies published between 1977 and 2009 were included in this review. Similar to other literature reviews, Chan and colleagues (2009) concluded that peer-mediated interventions are an effective intervention approach for addressing the peer-related social competence needs of individuals with ASD. More recently, Watkins et al. (2015) conducted a literature review that focused on summarizing the efficacy of 14 peer-mediated intervention studies published between 2009 (i.e., the last year included in the Chan and colleagues’ [2009] literature review) and 2014. Similar to the Chan and colleagues’ (2009) literature review, this review was not restricted to a specific experimental research design or to a specific age group of individuals with ASD. However, only studies conducted within inclusive settings were included in this review. The results of this review (i.e., no effect sizes were calculated in this review either) were also consistent with the results of past literature reviews (i.e., peer-mediated interventions are effective in addressing the peer-related social competence needs of individuals with ASD).

Together, the findings of these literature reviews suggest that peer-mediated interventions are effective in addressing the peer-related social competence needs of individuals with ASD. However, only one literature review has examined the efficacy of peer-mediated interventions on the peer-related social competence skills of young children with ASD (i.e., Zhang & Wheeler, 2011). Moreover, that literature review was conducted over a decade ago (i.e., included studies published between 1977 and 2006). Given the negative developmental outcomes associated with
the peer-related social competence difficulties exhibited by young children with ASD, a recent literature review focusing on the efficacy of peer-mediated interventions on the peer-related social competences skills of these children is warranted. Therefore, the purpose of the review conducted for the present study is to: 1) describe the characteristics and outcomes of studies that have implemented peer-mediated interventions with the aim of increasing peer-related social competence skills in young children with ASD; 2) highlight the contributions of recent research to this literature base; and 3) identify gaps and limitations in the peer-mediated intervention literature base as a means to inform the development of the present study.

**Peer-Mediated Interventions Literature Review**

To identify relevant studies to include in the literature review, the PsycINFO, Educational Resources Information Center (ERIC), and PubMed electronic databases were searched for peer-reviewed studies published in English containing the following search terms: 1) “autis*” or “aspirer*” or “asperger*” or “pdd*”; 2) “social skill*” or “social interaction*” or “social initiation*” or “social engagement”; and 3) “peer mediated intervention” or “peer mediated instruction” or “peer mediated social skills training” or “peer*”. Additionally, to identify relevant studies potentially missed by the electronic databases search, ancestry searches of the reference lists of past peer-mediated interventions literature reviews (e.g., Chan et al., 2009; Zhang & Wheeler, 2011) and studies that met the inclusion criteria were conducted. A search of authors who typically conduct peer-mediated intervention research was also conducted (i.e., Goldstein, Kamps, Katz, Koegel, Kohler, Odom, Peck, Schreibman, Stitcher, Strain, & Thiemann).

Studies were included in the literature review if they met the following a priori-determined criteria: a) included at least one participant diagnosed with ASD (i.e., autism, Asperger syndrome, or pervasive developmental disorder-not otherwise specified [PDD-NOS]); b) children with ASD were younger than eight years old at the time the study began; c)
implemented a peer-mediated intervention with the goal of increasing the peer-related social competence skills (e.g., initiations, responses, or social interactions) of the children with ASD; d) employed a single case experimental research design that allowed for direct analysis of the effects of the intervention on the participants’ target behaviors (e.g., multiple baseline design or alternating treatments design); and e) were published in English in peer referred journals between 2006 and 2016. Studies were excluded if they did not contain quantitative data (e.g., qualitative case studies), used non-experimental single case research designs (e.g., ABC designs), used group experimental designs, or did not address outcomes related to peer-related social competence. For articles containing multiple studies, data from each study were extracted and coded separately. A total of 34 studies, across 33 articles, met the inclusion criteria. See Figure 2-1 for a flow diagram of the literature search procedures.

Data Extraction

Information extracted from the reviewed studies was coded into four broad categories: characteristics of the children with ASD, characteristics of the peers, characteristics of the peer-mediated intervention, and methodological quality of the study. See Appendix A for the coding manual containing the operational definitions and procedures used to extract the data from the studies included in the review.

Characteristics of the Children with ASD

The following characteristics of the children with ASD (i.e., children in the studies who exhibited peer-related social competence difficulties and were the focal children of the interventions; Goldstein, Schneider, & Thiemann, 2007) were coded within this category: a) gender, coded as the gender of each child; b) age, coded as the chronological age of each child; c) diagnosis, coded as autism, Asperger syndrome, or PDD-NOS; d) cognitive functioning level, based on the schema provided by Reichow and Volkmar (2010), coded as lower functioning (i.e.,
children with limited or no verbal language skills and an IQ score below 55), moderate functioning (i.e., children with an IQ between 55 and 85 and with rudimentary verbal communication skills), higher functioning (i.e., children with an IQ above 85 and well developed verbal communication), or cognitive functioning level not reported; e) peer-related social competence assessment method, coded as the method used, if any, to determine the social competence ability of the children (e.g., teacher interview, direct observations, or standardized assessments); f) peer-related social competence difficulties (i.e., the specific peer-related social competence skills difficulties exhibited by the children, as reported by the authors in the studies), coded as initiations difficulties (i.e., children that do not or rarely exhibit spontaneous verbal or nonverbal attempts to gain attention or responses from peers; Whalon et al., 2015), responses difficulties (i.e., children that do not or rarely respond either verbally or nonverbally to peers’ initiations; Whalon et al., 2015), interactions difficulties (i.e., children that do not or rarely appropriately and actively participate or interact with peers during play or other social activities; Whalon et al., 2015), or multiple difficulties exhibited (e.g., initiations and responses difficulties).

**Characteristics of the Peers**

The following characteristics of the peers (i.e., children in the studies who were taught strategies focused on facilitating social interactions with the children with ASD; Goldstein et al., 2007) were coded within this category: a) gender, coded as the gender of each peer; b) age, coded as the chronological age of each peer; c) disability, coded as whether or not each peer had an identified disability (e.g., learning disability); d) selection criteria, coded as the criterion or criteria, if any, by which the peers were chosen (e.g., teacher nomination, age-appropriate social and language skills, or good compliance with directions and rules); e) peer-related social competence assessment method, coded as the method used, if any, to determine the peer-related
social competence ability of the peers (e.g., teacher interview, direct observations, or standardized assessments); f) matching, coded as the method used, if any, to match the children with ASD to the peers (e.g., social or cognitive ability, grade level, or gender); and g) grouping, coded as the manner in which the children with ASD were grouped with the peers during the intervention sessions (e.g., one peer for each child with ASD or three peers for each child with ASD).

**Characteristics of the Peer-Mediated Intervention**

The following features of the peer-mediated intervention implemented in each study were coded within this category: a) assessment-based, coded as whether or not the peer-mediated interventions were developed through a systematic assessment approach (i.e., studies in which assessments were conducted prior to implementing the interventions to identify antecedent or consequence variables/stimuli likely to increase peer-related social behaviors in children with ASD with the aim of incorporating those variables/stimuli in the interventions; Peck et al., 1997); b) assessment method, coded as the method(s) used, if any, to determine which variables/stimuli to incorporate in the interventions (e.g., teacher interview, direct observations, structural analyses, or functional analyses); c) variables/stimuli, coded as the antecedent or consequence variables/stimuli incorporated in the interventions, if any, as a means to increase the likelihood of children with ASD engaging in peer-related social behaviors; d) method of training peers, coded as the method(s) used to train the peers on the intervention procedures (e.g., direct instruction, role playing); e) training mastery criteria, coded as the criterion or criteria, if any, that peers needed to achieve before they were allowed to implement the intervention procedures (e.g., peers demonstrating appropriate use of the intervention strategies with an adult playing the role of a child with ASD with 80% accuracy on two of three consecutive training days); f) trainer, coded as the individual who trained the peers on the intervention procedures; g) trainer role, coded as
the role(s) of the trainer during the intervention sessions (e.g., prompting peers to initiate toward children with ASD); h) intervention strategy (i.e., strategy or strategies taught to the peers to increase the social interactions between them and the children with ASD), coded following the categorization used by Chan et al. (2009) as initiations (i.e., peers were taught to initiate social interactions with the children with ASD), responses (i.e., peers were taught to respond to the social initiations made by the children with ASD), prompting (i.e., peers were taught to prompt specific social behaviors from the children with ASD), reinforcing (i.e., peers were taught to reinforce specific social behaviors exhibited by the children with ASD), proximity (i.e., peers were taught to stay in close proximity of the children with ASD), persistence (i.e., peers were taught to persist in their attempts to initiate and maintain social interactions with the children with ASD), multiple strategies used, or intervention strategy not reported; i) intervention setting, coded as natural (i.e., interventions delivered in settings in which the participants spent most of their time in, such as the participants’ classrooms), contrived (i.e., interventions delivered in settings outside of the participants’ usual environments, such as in an empty classroom or a hallway; Watkins et al., 2015), combined settings, or setting not reported; j) target behaviors (i.e., peer-related social competence skill[s] targeted for each child with ASD), coded as increases in initiations toward peers, increases in responses to peers’ initiations, increases in social interactions between children with ASD and peers, or multiple social competence skills targeted; k) secondary target behaviors, coded as the behaviors, if any, targeted in the studies in addition to the peer-related social competence skills; and l) outcome of the intervention for each target behavior, coded following the evidence-based standards developed by the Council for Exceptional Children (2014) as positive (i.e., a functional relationship was established between the intervention and the target behavior[s], resulting in a meaningful, therapeutic change in the
target behavior[s]), negative (i.e., a functional relationship was established between the intervention and the target behavior[s], resulting in a nontherapeutic change in the target behavior[s]), or no change (i.e., a functional relationship was not established between the intervention and the target behavior[s]).

**Methodological Quality of the Study**

The methodological quality of each study was coded according to the evidence-based criteria for single case experimental research design developed by Horner and colleagues (2005). The purpose of these evidence-based criteria is to offer a concise description of the features (i.e., quality indicators) that can be used to judge the quality of single case experimental research studies and to offer a standard for determining if an intervention is validated as evidence-based via single case experimental research design.

There are seven quality indicators that must be met by studies in order for them to be considered methodologically sound (i.e., without meaningful threats to the validity of the findings; Horner et al., 2005): 1) description of participants and settings (i.e., studies must describe participants with sufficient detail to allow others to select participants with similar characteristics and must provide sufficient information regarding the critical features of the settings in which they were conducted); 2) dependent variable (i.e., studies must describe the dependent variable with operational precision and the method used to measure the dependent variable must be valid and defined with replicable precision); 3) independent variable (i.e., studies must describe the independent variable with operational precision and must systematically manipulate the independent variable under the control of the experimenter); 4) baseline (i.e., studies must describe baseline conditions with replicable precision); 5) experimental control/internal validity (i.e., studies must provide at least three demonstrations of an experimental effect at three different points in time and must document a pattern that
demonstrates experimental control); 6) external validity/generalization (i.e., studies must replicate experimental effects across participants, settings, or materials); and 7) social validity (i.e., studies must have a dependent variable that is socially important and the magnitude of change in the dependent variable resulting from the intervention must be socially important). In addition to the aforementioned quality indicators, the studies were coded as whether or not they measured if the effects of the intervention were maintained over time (i.e., maintenance) and whether or not they measured treatment integrity using direct and reliable measures (i.e., treatment integrity measures).

Using the evidence-based criteria for single case experimental research design developed by Horner and colleagues (2005), interventions are classified as evidence-based if a minimum of five studies that meet all of the quality indicators and document experimental control have been published in peer-reviewed journals, the studies are conducted by at least three different researcher groups across at least three different geographical locations, and a minimum of 20 participants are included across the studies.

**Results of the Literature Review**

A total of 34 studies met the criteria for inclusion in the literature review. Most of the reviewed studies used a multiple baseline design ($n = 24; 70.5\%$) to examine the effects of the intervention on the participants’ target behaviors. Seven (20.5\%) studies used a reversal/withdrawal design and one (3\%) study used an alternating treatments design. Two (6\%) studies used two single case research designs within a single study (i.e., a multielement design embedded within a multiple baseline design and an alternating treatments design embedded in a reversal design) to assess the effects of the intervention on the participants’ target behaviors.
Characteristics of the Children with ASD

A total of 89 children with ASD participated across all of the reviewed studies. A specific age was reported for 80 (90%) of the children. The mean age of the children for whom a specific age was reported was 6 years (range = 3-8). There were a total of 79 (89%) male and 10 (11%) female participants with ASD included in the reviewed studies. Eighty-three (94%) children were reported to have a diagnosis of autism, three (3%) were reported to have a diagnosis of Asperger syndrome, and another three (3%) children were reported to have a diagnosis of PDD-NOS. Twenty (59%) studies conducted assessments (e.g., teacher interview, direct observations, or standardized assessments) to determine the peer-related social competence ability of the children with ASD while 14 (41%) of the studies did not do so. Most of the children with ASD exhibited difficulties initiating toward peers (n = 32, 36%) followed by difficulties maintaining social interactions with their peers (n = 25, 28%). See Table 2-1 for information regarding the functioning level of the children with ASD, the specific peer-related social competence difficulties exhibited by these children, and the assessment methods used to identify the peer-related social competence difficulties exhibited by the children with ASD.

Characteristics of the Peers

Thirty-one studies (91%) reported the number of peers that participated in them. Across those studies, a total of 226 peers were included with an age range between 3 and 11 years. A specific age was reported for 63 (28%) of the 226 peers. The mean age of the peers for whom a specific age was reported was 5 years (range = 3-11). The gender of 92 (41%) peers was reported while the gender of 134 (59%) peers was not reported. Out of the 92 peers for whom gender was reported, there were a total of 51 (55%) male and 41 (45%) female participants. Two-hundred and five (91%) peers did not have a disability while 21 (9%) were reported to have a disability. However, information on the specific disabilities or diagnoses of the peers reported to have a
disability were not provided by any of the reviewed studies. Twenty-four studies (70.5%) used a criterion or criteria to select the peers that participated in the intervention. Six (18%) studies conducted assessments (e.g., teacher interview, direct observations, or standardized assessments) to determine the peer-related social competence ability of the peers while 28 (82%) studies did not do so. Peers were matched to the children with ASD in five (15%) studies. Out of those five studies, three (60%) studies matched the participants based on their gender, one (20%) based on the children’s age, and one (20%) study matched the participants based on the children’s age and gender. See Table 2-2 for information regarding the peer selection criteria used in each study, the method used in each study to assess the peer-related social competence skills of the peers, and how children with ASD were grouped with the peers during the intervention sessions of each study.

**Characteristics of the Peer-Mediated Intervention**

Three studies (9%) implemented peer-mediated interventions that were based on a priori assessments. Out of those three studies, one (33.3%) study used direct observations (Haring & Lovinger, 1989), one (33.3%) used teacher interviews (Kohler et al., 2007), and the other study (33.3%) used preference assessments (Shafer et al., 1984) to determine which variables or stimuli to incorporate in the interventions. All of these three studies incorporated preferred materials/activities of the children with ASD in the intervention sessions in order to increase the likelihood of these children engaging in social behaviors with their peers. Peers in eleven (32%) studies had to meet a mastery criterion or criteria before they were allowed to implement the intervention. Peers were trained by researchers in 23 (68%) studies while teachers were the trainers of the peers in 11 (32%) studies. Initiating toward the children with ASD ($n = 31, 34\%$), reinforcing the social behaviors exhibited by children with ASD ($n = 23, 25\%$), and responding to the social behaviors of the children with ASD ($n = 15, 16\%$) were the intervention targets most
commonly taught to the peers in order to engage the children with ASD in social interactions with them. The intervention was implemented in natural settings in 26 (76.5%) studies while it was implemented in contrived settings in eight (23.5%) studies. The majority of the studies targeted increases in the social interactions between the children with ASD and their peers ($n = 19, 56\%$), followed by studies that targeted more than one peer-related social behavior in the children with ASD (e.g., initiations and responses; $n = 11, 32\%$). Three (8%) studies targeted increases in the number of initiations made by the children with ASD to their peers and one (3%) study targeted increases in the frequency of responses made by the children with ASD to their peers’ initiations.

Most of the interventions were effective in increasing the target behaviors of the children with ASD. However, six (18%) studies reported that the intervention implemented in them were not effective in increasing some of the target behaviors (Barber, Saffo, Gilpin, Craft, & Goldstein, 2016; Kamps et al., 2014; Kuhn, Bodkin, Devlin, & Doggett, 2008; Odom & Strain, 1986; Thiemann & Goldstein, 2004; Tsao & Odom, 2006). Specifically, three studies (8%) reported that the peer-mediated intervention did not produce changes in the frequency of the initiations made by the children with ASD toward their peers and three (8%) studies reported that the intervention was not effective in increasing the social interactions between the children with ASD and their peers. See Table 2-3 for a further description of the methods used by each study to train the peers on the intervention procedures, the roles of the trainers during the intervention sessions, the specific peer-related social behaviors targeted in each child with ASD, and the specific intervention strategies taught to the peers to increase the social interactions between them and the children with ASD.
Methodological Quality of the Study

Nine (26%) of the reviewed studies met all of the quality indicators proposed by Horner et al. (2005) and thus, were considered methodologically sound (Gonzalez-Lopez & Kamps, 1997; Kamps et al., 2014; Katz & Girolametto, 2013, 2015; Lee & Lee, 2015; Lee, Odom, & Loftin, 2007; Mason et al., 2014; Thiemann & Goldstein, 2014; Tsao & Odom, 2006). Out of the seven quality indicators, the ones addressed by the least number of studies were the indicators regarding social validity (n = 13, 38%), external validity/generalization (n = 16, 47%), and description of the participants and settings (n = 23, 68%). Most of the studies addressed the rest of the quality indicators. Specifically, most studies addressed the quality indicators regarding the description and measurement of the dependent variable (n = 34; 100%), description of the baseline conditions (n = 34; 100%), description of the independent variable (n = 34, 100%), and experimental control (n = 31, 91%). Maintenance was measured in 14 (41%) studies and treatment integrity was measured in 15 (44%) studies. Thirteen (87%) of the 15 studies that measured treatment integrity measured the integrity of the trainers during the peer training sessions (i.e., sessions in which the peers were trained on the intervention procedures) and intervention sessions, one (6.5%) study measured the integrity of the peers implementing the intervention procedures (Odom & Strain, 1986), and one (6.5%) study measured the integrity of both the trainer and the peers across all phases of the study (Harper, Symon, & Frea, 2007). Nine (69%) of the 13 studies that measured social validity measured teachers’ perceptions regarding the feasibility and practicality of implementing the intervention in their classrooms, three (23%) studies measured the perception of independent observers (i.e., graduate students unfamiliar with the purpose of the study) on the impact of the intervention on the children’s target behaviors, and one (8%) study measured peers’ perceptions regarding the intervention procedures as well as teachers and independent observers perceptions regarding the outcome of the intervention.
According to Horner et al. (2005), peer-mediated interventions are considered an evidence-based practice (i.e., more than five studies that met all of the quality indicators and documented experimental control have been published in peer-reviewed journals, the studies have been conducted by more than three different researchers across more than three different geographical locations, and more than 20 participants have been included across the studies). Table 2-4 offers a summary of the methodological quality of the reviewed studies.

**Summary and Critique of the Current Literature**

The purpose of this literature review was to summarize the characteristics and outcomes of studies that have implemented peer-mediated interventions with the aim of increasing peer-related social competence skills in young children with ASD. Data were extracted from 34 studies published between 1984 and 2016 identified though a previously described set of criteria. Overall, the outcomes of the reviewed studies indicate that peer-mediated interventions are effective in addressing the peer-related social competence needs of young children with ASD. Moreover, the findings of this literature review suggest that peer-mediated interventions may be effective in addressing other behavioral needs in young children with ASD (e.g., decreasing the RRBs exhibited by these children).

**Characteristics of the Peer-Mediated Intervention**

**Target behaviors**

The peer-related social behaviors targeted across the reviewed studies include increases in the social interactions between children with ASD and their peers, increases in the responses made by children with ASD to their peers’ initiations, and increases in the initiations made by children with ASD to their peers. Increasing the frequency of initiations toward peers was the target behavior for 31 (26%) of the children with ASD included in this review. For 10 (32%) of the children with ASD for whom initiations were targeted, peer-mediated interventions were not
effective in changing the frequency with which they initiated toward their peers (Barber et al., 2016; Kamps et al., 2014; Odom & Strain, 1986). For example, Barber and colleagues (2016) conducted a study to examine the efficacy of a peer-mediated intervention on the social initiations made by three young children with ASD (i.e., three and four years old) toward their peers. Three typically developing children were paired with the children with ASD (i.e., one peer for each child with ASD) and the peers were taught how to stay in close proximity to the children with ASD, how to play appropriately with the children with ASD, and how to appropriately talk to the children with ASD about what they were doing/playing with during the intervention sessions. The authors concluded that although the intervention was effective in increasing the responses of the children with ASD to their peers’ initiations, it was not effective in increasing the initiations made by the children with ASD to their peers (Barber et al., 2016).

Given that appropriately initiating social interactions with others may be a relative limitation in children with ASD when compared to responding to others’ initiations (Katz & Girolametto, 2015; Koegel et al., 2003) and the low number of peer-mediated studies that have targeted initiations, more peer-mediated intervention research that is primarily focused on increasing appropriate social interactions initiated by young children with ASD is needed. Teaching young children with ASD how to effectively initiate toward others (e.g., peers) is of importance because it ensures that these children develop the social skills necessary to independently navigate their social environments, which is required to access critical learning opportunities (Katz & Girolametto, 2015; Rotheram-Fuller et al., 2010; Whalon et al., 2015).

Secondary target behaviors

Few studies included in this review targeted secondary behaviors (e.g., disruptive behaviors or RRBs). Two studies examined the collateral effects of peer-mediated interventions on the challenging behaviors (e.g., aggression or noncompliance) exhibited by children with
ASD (Gonzalez-Lopez & Kamps, 1997; Oke & Schreibman, 1990), while two other studies examined the collateral effects of peer-mediated interventions on the RRBs exhibited by these children (Lee & Odom, 1996; Lee et al., 2007). More peer-mediated research is needed in order to determine if these interventions are effective in addressing the social competence needs of young children with ASD while also addressing other behavioral needs in these children.

It was surprising to find few studies have examined the relationship between peer-related social behaviors and RRBs, given the relevance of these two behaviors to the diagnosis of ASD. As previously mentioned, only two studies included in this review targeted RRBs exhibited by the children with ASD as well as their peer-related social behaviors (Lee & Odom, 1996; Lee et al., 2007). Both of these studies found that as the social interactions between the children with ASD and their peers increased, the RRBs (e.g., motor stereotypy) exhibited by the children with ASD decreased. Therefore, the authors concluded that peer-mediated interventions might be effective in addressing the peer-related social competence needs of children with ASD as well as effective in decreasing the RRBs exhibited by them. Given the small literature base, these results should be taken with caution. More peer-mediated intervention research examining the relationship between social competence and RRBs exhibited by young children with ASD is needed.

**Assessment-based peer-mediated interventions**

As previously described, three studies (9%) conducted assessments to identify and incorporate stimuli within intervention sessions as a means to increase the likelihood of children with ASD engaging in appropriate peer-related social behaviors. Each study conducted a different type of assessment including direct observations (Haring & Lovinger, 1989), teacher interviews (Kohler, Greteman, Raschke, & Highnam, 2007), and preference assessments (Shafer et al., 1984). The authors of all three studies concluded that the interventions were effective in
addressing the social competence needs of the children with ASD that participated in them. For example, Shafer and colleagues (1984) conducted a study to evaluate the effects of a peer-mediated intervention on the frequency and duration of the social interactions between young children with ASD and their peers. Preference assessments were conducted prior to implementing the intervention in order to identify the preferred toys of the children with ASD and add them to the peer-mediated intervention sessions. The authors concluded that the peer-mediated intervention significantly increased the social interactions between the children with ASD and their peers. Moreover, the authors concluded that the use of the preferred toys of the children with ASD during the interventions sessions increased the probability that these children responded to the peers’ initiations and maintained social interactions with them (Shaffer et al., 1984).

The results of the Shafer and colleagues’ (1984) study coupled with the evidence in the literature indicating that young children with ASD are more likely to engage in peer-related social behaviors when activities or materials within activities are ones they prefer (Kamps et al., 2015; McConnell, 2002; Peck et al., 1997), provide evidence that conducting systematic assessments (e.g., preference assessments) to identify and embed preferred stimuli (e.g., preferred toys) of young children with ASD in peer-mediated interventions may be an effective approach to increase the likelihood of these children initiating appropriate social interactions with their peers. Preference assessments have been successfully used in natural settings (e.g., schools) to identify the preference for various stimuli (e.g., preferred toys) in individuals with disabilities, including young children with ASD (Cooper, Heron, & Heward, 2007). Therefore, preference assessments could be used to identify and embed preferred stimuli of young children with ASD in peer-mediated interventions. Given that the Shafer and colleagues’ (1984) study is
the only peer-mediated intervention study that has done so, more studies examining the effects of embedding preferred stimuli in peer-mediated interventions, as identified by preference assessments, on the social competence skills of children with ASD are needed.

**Methodological Quality of the Study**

It was concerning to find the lack of treatment integrity data collected across the reviewed studies (i.e., 15 [44%] studies measured treatment integrity). Most of the studies that assessed treatment integrity measured the integrity of the trainers when implementing a given component of the intervention (e.g., training peers on the intervention procedures), but did not measure the integrity of the peers in implementing the intervention procedures. Given that children (i.e., peers) act as change agents in peer-mediated interventions, measuring the integrity of these children in the implementation of the intervention procedures is of importance (Chan et al., 2009). Specifically, peer-mediated interventions rely on the ability of children to implement the intervention procedures with fidelity as opposed to traditional change agents (e.g., researchers or graduate students) with professional training on how to design and implement interventions (Chan et al., 2009). Some of the studies that did not measure treatment integrity trained peers to mastery criteria or reported data collected during the training of the peers as evidence that the intervention was implemented with integrity (e.g., Kohler, Strain, Maretsky, & DeCesare, 1990; Kohler et al., 1995; Pierce & Schreibman, 1995). It cannot be determined, however, from those data if the peers implemented the intervention procedures with fidelity once the training ended and the intervention began (i.e., sessions in which the peers had to use the strategies taught to them as a means to maintain social interactions with the children with ASD).

Most of the reviewed studies did not measure the maintenance of the intervention effects over time or the generalization of the intervention effects to different settings or peers. Given that maintenance and generalization of acquired skills are considered an important feature of
effective interventions (Timler, Vogler-Elias, & McGill, 2007), there is a need for additional research to examine if the effects of peer-mediated interventions maintain over time and if the effects of peer-mediated interventions generalize across different settings and individuals. Finally, few of the reviewed studies collected social validity data. Measurement of social validity is important because it allows researchers to measure the importance of the outcomes of the interventions as well as the feasibility of implementing interventions (Chan et al., 2009). Future research needs to measure the social validity of peer-mediated interventions.

**Literature Review Discussion and Future Research Directions**

It is imperative to identify interventions that are effective in addressing the social competence needs of young children with ASD in order to increase the likelihood of these children successfully participating in a variety of settings across society (Lee et al., 2007; Loftin, Odom, & Lantz, 2008). The findings of this literature review suggest that peer-mediated interventions are effective in addressing the social competence needs of young children with ASD. Nonetheless, more peer-mediated research is needed. As previously mentioned, few of the reviewed studies focused on increasing the social interactions initiated by the children with ASD (i.e., n = 3, 8%). Moreover, these studies reported that the peer-mediated interventions implemented in them were more effective in increasing the responses made by the children with ASD to their peers’ initiations and thus, the overall interactions between the children, than in increasing the social initiations made by the children with ASD to their peers. Consequently, there is a need for future peer-mediated intervention research to examine how to effectively promote positive social initiations in young children with ASD toward their peers. It is important for young children with ASD to be able to initiate toward their peers as research has shown that when these children initiate social interactions, they are able to navigate independently their social environments, which is required to access critical learning opportunities and to participate
in meaningful ways in broad societal contexts (Katz & Girolametto, 2015; Lee et al., 2007; Loftin et al., 2008; Rotheram-Fuller et al., 2010; Whalon et al., 2015).

The inclusion of strategies within peer-mediated interventions to promote positive social interactions initiated by young children with ASD may be beneficial for future studies to explore. Incorporating stimuli likely to promote peer-related social competence skills in children with ASD (e.g., preferred toys) may be an effective approach to do so. For example, a study conducted by Kamps and colleagues (2015) found that young children with ASD (i.e., six years old) made more initiations toward their peers during sessions that included free-play time with multiple toys and games than during times in which less toys and games were available. Although systematic assessments were not conducted prior to the intervention to determine stimuli likely to promote peer-related social competence skills in the children with ASD, the authors reported that the children with ASD usually played with their preferred toys during the free-play sessions. The researchers suggested that the increases in the initiations of the children with ASD toward their peers in these free-play sessions were likely due to the children playing with their preferred toys. Specifically, the authors suggested that children with ASD engaged in mutually reinforcing toys with their peers during these sessions and thus, the children with ASD were more likely to engage in peer-related social behaviors (Kamps et al., 2015). As evidenced by this study, peer-mediated interventions may be more effective in increasing the social initiations made by children with ASD to their peers if they include these children’s preferred stimuli in them (e.g., preferred toys).

Preference assessments could be used to systematically identify preferred stimuli of young children with ASD and incorporate them into peer-mediated interventions as a means to increase the frequency of initiations made by these children to their peers as well as to increase
these children’s overall peer-related social competence skills (Shafer et al., 1984). However, to date, only one study has conducted preference assessments as a means to systematically identify and embed preferred stimuli of young children with ASD into peer-mediated interventions (Shafer et al., 1984). More research examining the effects of embedding preferred stimuli, as identified by preference assessments, in peer-mediated interventions on the social competence skills of children with ASD, particularly on their social initiations to peers, are needed.

In addition to being effective in addressing the peer-related social competence needs of young children with ASD, the findings of this literature review suggest that peer-mediated interventions may be effective in addressing other behavioral needs in these children. For example, Oke and Schreibman (1990) found collateral decreases in the disruptive behaviors exhibited by a child with ASD after a peer-mediated intervention was implemented and the child’s social interactions with his peer increased. Similarly, Pierce and Schreibman (1995) observed collateral improvements in toy play and language use of children with ASD after their social interactions with their peers increased. More recently, Lee and colleagues (2007) examined the effects of a peer-mediated intervention on the social interactions between young children with ASD and their peers as well as on the stereotypic behaviors exhibited by the children with ASD. The researchers taught the peers to initiate toward the children with ASD during the intervention sessions. Lee and colleagues (2007) found that the peer-mediated intervention was effective in increasing the social interactions between the children with ASD and their peers. Moreover, the researchers found that as the social interactions between the children with ASD and their peers increased, the stereotypic behaviors exhibited by the children with ASD decreased.
The results of the study conducted by Lee et al. (2007) replicated the results of previous studies that examined collateral changes in RRBs exhibited by children with ASD during peer-mediated interventions (Lee & Odom, 1996; Lord & Hopkins, 1986). Collectively, these studies indicate that peer-mediated interventions have the potential to teach children with ASD appropriate peer-related social competence skills while also addressing the absence or excess of behaviors exhibited by these children (Lee et al., 2007; Loftin et al., 2008). However, more peer-mediated intervention research examining the relationship between social competence and other behaviors (e.g., RRBs) exhibited by young children with ASD is needed, given the small number of studies that have examined this relationship.

Methodological limitations across the reviewed studies included lack of data collected on treatment integrity, generalization, maintenance, and social validity. Future studies should include direct measures of treatment integrity across all phases of the studies (e.g., during baseline, training, and intervention sessions) to ensure that they are carried out with integrity (i.e., as intended). Future studies should also examine if the effects of peer-mediated interventions are maintained over time and if the effects of the interventions generalize across different settings and individuals, which are considered key features of effective interventions (Timler et al., 2007). Use of measures of social validity measures would allow researchers to determine if the targeted behaviors and amount of behavior change produced by the interventions are socially important. Therefore, researchers are encouraged to measure the social validity of peer-mediated interventions in future studies.

**Purpose of the Study**

The purpose of the present study was to extend the peer-mediated intervention research by addressing one of the limitations identified as part of the review (i.e., the lack of focus on social interactions initiated by children with ASD). Specifically, the purpose of this study was to
examine the effects of a peer-mediated intervention on the peer-related social behaviors of young children with ASD, with the primary focus on the initiations made by these children to their peers. In order to increase the likelihood of children with ASD initiating toward their peers, the intervention included teaching the children with ASD how to initiate positive social interactions with their peers, teaching the peers to wait for the initiations made by the children with ASD and to effectively respond to those initiations, and conducting preference assessments to identify and embed the preferred toys of the children with ASD in the intervention. The specific research questions addressed in this study were:

1. What are the effects of a peer-mediated intervention on the initiations, responses, and interactions of young children with ASD and their peers?

2. Do the effects of a peer-mediated intervention on the initiations, responses, and interactions of young children with ASD and their peers maintain over time?

3. Do the effects of a peer-mediated intervention on the initiations, responses, and interactions of young children with ASD and their peers generalize across peers?

4. How do the initiations, responses, and interactions of young children with ASD compare to the initiations, responses, and interactions of same-aged peers prior to and after receiving a peer-mediated intervention?
Table 2-1. Characteristics of the participants with ASD.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Number of Participants</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive Functioning Level$^{a}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low functioning</td>
<td>30</td>
<td>34</td>
</tr>
<tr>
<td>High functioning</td>
<td>19</td>
<td>21</td>
</tr>
<tr>
<td>Moderate functioning</td>
<td>13</td>
<td>15</td>
</tr>
<tr>
<td>Not reported</td>
<td>27</td>
<td>30</td>
</tr>
<tr>
<td>Method used to Assess Social Competence Difficulties$^{a}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standardized Assessments</td>
<td>31</td>
<td>35</td>
</tr>
<tr>
<td>Direct observations</td>
<td>20</td>
<td>23</td>
</tr>
<tr>
<td>Parent interviews</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Teacher interviews</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Not reported</td>
<td>32</td>
<td>36</td>
</tr>
<tr>
<td>Peer-Related Social Competence Difficulties$^{a}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initiations</td>
<td>32</td>
<td>36</td>
</tr>
<tr>
<td>Interactions</td>
<td>25</td>
<td>28</td>
</tr>
<tr>
<td>Initiations and interactions</td>
<td>13</td>
<td>15</td>
</tr>
<tr>
<td>Initiations, responses, and interactions</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Responses</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Initiations and responses</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Responses and interactions</td>
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<td>3</td>
</tr>
</tbody>
</table>

Note: $^{a}$ Denotes that these categories are mutually exclusive.
Table 2-2. Characteristics and selection of the peers.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Number of Studies</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selection Criteria\textsuperscript{a}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher nomination</td>
<td>18</td>
<td>53</td>
</tr>
<tr>
<td>Age-appropriate social skills</td>
<td>16</td>
<td>47</td>
</tr>
<tr>
<td>Good compliance with requests</td>
<td>13</td>
<td>38</td>
</tr>
<tr>
<td>Regular school attendance</td>
<td>11</td>
<td>32</td>
</tr>
<tr>
<td>Frequent social interactions with FC</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>Willingness to participate</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Flexibility in play activities</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Previously participated in a PMI</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>No selection criteria used</td>
<td>10</td>
<td>29</td>
</tr>
<tr>
<td>Method used to Assess Social Competence Difficulties\textsuperscript{b}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standardized Assessments</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>Parent interviews</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Not reported</td>
<td>28</td>
<td>82</td>
</tr>
<tr>
<td>Grouping\textsuperscript{b}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two peers for each FC</td>
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<td>38</td>
</tr>
<tr>
<td>One peer for each FC</td>
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<td>Three peers for each FC</td>
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<td>6</td>
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<tr>
<td>Four peers for each FC</td>
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<td>3</td>
</tr>
<tr>
<td>Five peers for each FC</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Not reported</td>
<td>4</td>
<td>12</td>
</tr>
</tbody>
</table>

Note: FC = focal child; PMI = peer mediated intervention. \textsuperscript{a}Denotes that the categories are not mutually exclusive. \textsuperscript{b}Denotes that the categories are mutually exclusive.
Table 2-3. Characteristics of the peer-mediated intervention.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method of Training Peers&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct instruction</td>
<td>26</td>
<td>76</td>
</tr>
<tr>
<td>Practice</td>
<td>25</td>
<td>73</td>
</tr>
<tr>
<td>Modeling</td>
<td>21</td>
<td>62</td>
</tr>
<tr>
<td>Role play</td>
<td>20</td>
<td>59</td>
</tr>
<tr>
<td>Feedback</td>
<td>11</td>
<td>32</td>
</tr>
<tr>
<td>Reinforcement</td>
<td>7</td>
<td>21</td>
</tr>
<tr>
<td>Visual aids</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>Role of Trainer&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prompting</td>
<td>27</td>
<td>79</td>
</tr>
<tr>
<td>Reinforcing</td>
<td>14</td>
<td>41</td>
</tr>
<tr>
<td>Feedback</td>
<td>9</td>
<td>26</td>
</tr>
<tr>
<td>Monitoring</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Not reported</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Strategies Taught to Peers&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initiations</td>
<td>31</td>
<td>91</td>
</tr>
<tr>
<td>Reinforcement</td>
<td>23</td>
<td>68</td>
</tr>
<tr>
<td>Responses</td>
<td>15</td>
<td>44</td>
</tr>
<tr>
<td>Persistence</td>
<td>13</td>
<td>38</td>
</tr>
<tr>
<td>Prompts</td>
<td>7</td>
<td>21</td>
</tr>
<tr>
<td>Proximity</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Participants’ Target Behaviors&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interactions</td>
<td>70</td>
<td>58</td>
</tr>
<tr>
<td>Initiations</td>
<td>31</td>
<td>26</td>
</tr>
<tr>
<td>Responses</td>
<td>20</td>
<td>16</td>
</tr>
</tbody>
</table>

Note: <sup>a</sup> Denotes that the categories are not mutually exclusive.
Table 2-4. Methodological quality of the studies.

<table>
<thead>
<tr>
<th>Quality Indicators</th>
<th>Participants</th>
<th>Dependent Variable</th>
<th>Independent Variable</th>
<th>Baseline</th>
<th>Experimental Control</th>
<th>External Validity</th>
<th>Social Validity</th>
<th>Generalization</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Studies that addressed each</td>
<td>$n = 23$</td>
<td>$n = 34$</td>
<td>$n = 15$</td>
<td>$n = 34$</td>
<td>$n = 31$</td>
<td>$n = 34$</td>
<td>$n = 13$</td>
<td>$n = 16$</td>
<td>$n = 14$</td>
</tr>
<tr>
<td>indicator</td>
<td>(68%)</td>
<td>(100%)</td>
<td>(44%)</td>
<td>(100%)</td>
<td>(91%)</td>
<td>(100%)</td>
<td>(38%)</td>
<td>(47%)</td>
<td>(41%)</td>
</tr>
<tr>
<td>Studies that did not address</td>
<td>$n = 11$</td>
<td>$n = 0$</td>
<td>$n = 19$</td>
<td>$n = 0$</td>
<td>$n = 3$</td>
<td>$n = 0$</td>
<td>$n = 21$</td>
<td>$n = 18$</td>
<td>$n = 20$</td>
</tr>
<tr>
<td>each indicator</td>
<td>(32%)</td>
<td>(56%)</td>
<td>(9%)</td>
<td>(9%)</td>
<td>(62%)</td>
<td>(9%)</td>
<td>(53%)</td>
<td>(53%)</td>
<td>(59%)</td>
</tr>
</tbody>
</table>

Note. These quality indicators are based on the evidence-based criteria for single case experimental research design developed by Horner et al. (2005).
Records identified through searching PsycINFO, ERIC, and PubMed electronic databases:

(n = 777)

Records identified through additional sources:

(n = 107)

Total records identified (Before removing duplicates):

(n = 884)

Total records identified (After removing duplicates):

(n = 600)

Titles and abstracts screened:

(n = 600)

Full-text articles assessed for eligibility:

(n = 101)

A total of 33 articles, with 34 studies across them were included in the literature review

Full-text articles excluded due to:

- Experimental design (n = 8)
- Participants older than eight years (n = 21)
- Participants without an ASD (n = 12)
- Peer-mediated intervention not implemented (n = 21)
- Not social competence outcome (n = 6)

Figure 2-1. Literature search PRISMA flow diagram.
CHAPTER 3
METHOD

The purpose of this chapter is to describe the methods that were used to conduct the study and address the research questions. First, the criteria for selecting the participants, the setting in which the study was conducted, and the materials used to carry out the study will be reviewed. Second, the dependent measures, coding definitions, experimental procedures, including a description of the intervention, study design, and data analysis will be described. Finally, strategies to collect interobserver agreement, treatment integrity, and social validity data will be described.

Participants

Focal Children

Four 3-year-old boys with ASD (i.e., focal children) enrolled in a public prekindergarten exceptional student education program at a suburban elementary school in the southeastern United States participated in this study (see Table 3-1). The four focal children were recruited from the same classroom, which was a public school special education classroom serving children (ages 3-5) with mild-to-moderate developmental delays in cognitive, communication, motor, or social/emotional skills. Focal children were recruited with the assistance of their teacher and the school’s principal. Prior to participating in the study, Institutional Review Board (IRB) approval was obtained from the University of Florida. Upon IRB approval, the teacher was asked to nominate potential children to participate in the study using the Focal Child Nomination Checklist (see Appendix B). Consent forms were sent to the parents or caregivers of the children nominated to participate in the study. Once parents or caregivers signed consent forms for their children to participate in the study, child assent was obtained (see Appendix C for the consent forms and child assent script). Once consent and assent was obtained for each focal child, school
records review, teacher interviews, formal child assessment (i.e., Childhood Autism Rating Scale, 2nd Edition [CARS-2]; Schopler, Van Bourgondien, Wellman, & Love, 2010), and direct classroom observations were conducted to confirm that the children met the study inclusion criteria.

The study inclusion criteria for the focal children included: 1) eligible for special education services under the category of autism or developmentally delayed (i.e., according to the state board of education criteria for special education) and have a minimum score of 30 on the CARS-2 (Schopler et al., 2010), which is indicative of mild-to-moderate symptoms of ASD; 2) exhibit peer-related social competence difficulties (i.e., seldom initiate social interactions with peers, respond to peers’ initiations, or engage in social interactions with peers); 3) have the ability to functionally communicate to others using a minimum of two word utterances that are intelligible; and 4) have the ability to follow two to three words commands or requests.

Luke

Luke, who is a multiracial (i.e., Filipino-American) male, was 3 years and 5 months of age at the beginning of the study. According to his teacher, Luke’s socio-communicative skills included the ability to communicate with others through gestures and verbal language (i.e., using two to three word utterances). Luke required prompts (i.e., verbal prompts) to initiate to others. Luke’s T-score on the CARS-2 (Schopler et al., 2010) was a 47, which is indicative of mild-to-moderate symptoms of ASD (i.e., a T-score of 20 or below is indicative of minimal-to-no symptoms of ASD). His T-score on the Social Responsiveness Scale (2nd Edition [SRS-2]; Constantino & Gruber, 2011) was a 65, which is indicative of concerns in reciprocal social behaviors that are clinically significant and may lead to mild-to-moderate interference with everyday social interactions (i.e., a T-score of 59 and below is indicative of typical reciprocal social behavior). Luke’s T-score on the Battelle Development Inventory (2nd Edition [BDI-2];
Newborg, 2005) was a 35, which is indicative of a mild developmental delay (i.e., a T-score of 43 and above is indicative of a typical/average development).

**Zane**

Zane, an African American male, was 3 years of age and 7 months at the beginning of the study. According to his teacher, Zane’s socio-communicative skills included the ability to communicate with others through gestures and verbal language (i.e., using two to three word utterances). Zane required prompting (i.e., using verbal prompts) to initiate to others. Zane’s T-score on the CARS-2 (Schopler et al., 2010) was a 40, which is indicative of mild-to-moderate symptoms of ASD (i.e., a T-score of 20 or below is indicative of minimal-to-no symptoms of ASD). His T-score on the SRS-2 (Constantino & Gruber, 2011) was a 67, which is indicative of concerns in reciprocal social behaviors that are clinically significant and may lead to substantial interference with everyday social interactions (i.e., a T-score of 59 and below is indicative of typical reciprocal social behavior). Zane’s T-score on the BDI-2 (Newborg, 2005) was a 27, which is indicative of a significant developmental delay (i.e., a T-score of 43 and above is indicative of a typical/average development).

**Mike**

Mike, a Caucasian male, was 3 years and 6 months of age at the beginning of the study. According to his teacher, Mike’s socio-communicative skills included the ability to communicate with others through gestures and verbal language (i.e., using two to three word utterances). Mike required prompting (i.e., using verbal prompts) to initiate and respond to others in the classroom. Mike’s T-score on the CARS-2 (Schopler et al., 2010) was a 59, which is indicative of severe symptoms of ASD (i.e., a T-score of 20 or below is indicative of minimal-to-no symptoms of ASD). His T-score on the SRS-2 (Constantino & Gruber, 2011) was a 70, which is indicative of concerns in reciprocal social behaviors that are clinically significant and may lead to substantial
interference with everyday social interactions (i.e., a $T$-score of 59 and below is indicative of typical reciprocal social behavior). Mike’s $T$-score on the BDI-2 (Newborg, 2005) was a 31, which is indicative of a mild developmental delay (i.e., a $T$-score of 43 and above is indicative of a typical/average development).

Zach

Zach, an African American male, was 3 years and 3 months of age at the beginning of the study. According to his teacher, Zach’s socio-communicative skills included the ability to communicate with others through gestures and verbal language (i.e., using two-word utterances). Although Zach had the ability to communicate, his teacher reported that he needed to be prompted (i.e., using visual and verbal prompts) to initiate and respond to others most of the time at school. Zach’s $T$-score on the CARS-2 (Schopler et al., 2010) was a 54, which is indicative of severe symptoms of ASD (i.e., a $T$-score of 20 or below is indicative of minimal-to-no symptoms of ASD). His $T$-score on the SRS-2 (Constantino & Gruber, 2011) was a 75, which is indicative of concerns in reciprocal social behaviors that are clinically significant and may lead to substantial interference with everyday social interactions (i.e., a $T$-score of 59 and below is indicative of typical reciprocal social behavior). Zach’s $T$-score on the BDI-2 (Newborg, 2005) was a 33, which is indicative of a mild developmental delay (i.e., a $T$-score of 43 and above is indicative of a typical/average development).

Peers

Two peers for each focal child were selected to participate in the study (see Table 3-2). One peer received the peer-mediated intervention training (i.e., social skills training) and was paired with the focal child during the intervention sessions (i.e., including maintenance sessions). The other peer did not receive the training and was paired with the focal child solely during generalization probe sessions. One of the peers selected (i.e., Alicia) moved to a different school
before the study was finished. Therefore, another peer was recruited to take her place (i.e., Zane’s generalization peer) resulting in a total of nine peers participating in the study.

All peers were recruited from a state-funded pre-kindergarten classroom located next to the focal children’s classroom, which serves 4 and 5-year-old children. Peers were recruited with the assistance of their teacher and the school’s principal. Upon IRB approval, the pre-kindergarten teacher was asked to nominate peers to participate in the study using the Peer Nomination Checklist (see Appendix B). Consent forms were sent to the parents or caregivers of these children. Once parents or caregivers signed consent forms for their children to participate in the study, child assent was obtained (see Appendix C). Once consent and assent was obtained for each peer, school records review and direct classroom observations were conducted to confirm that the peers met the inclusion criteria.

The following inclusion criteria were used to select peers: 1) demonstrate the ability to frequently and appropriately initiate social interactions with peers, respond to peers’ initiations, and engage in social interactions with peers; 2) demonstrate the ability to cooperate with adults (e.g., able to follow directions/instructions from teachers); 3) have regular school attendance (i.e., no more than three absences per month); and 4) no identified developmental disability and not eligible for special education services under the category of autism or developmentally delayed (i.e., based on the state board of education criteria for special education).

Settings, Materials, and Change Agents

This study consisted of four phases: 1) pre-experimental assessment phase (i.e., structured teacher interviews, formal child assessments, and pre-experimental direct observations); 2) preference assessment phase; 3) intervention phase (i.e., baseline, focal child and peer training, intervention implementation, generalization, and maintenance); and 4) post-experimental direct observations. This section describes the settings in which each phase of the
study took place, the change agents who conducted the experimental procedures during each phase, and the materials that were used to conduct the study during each phase.

Settings

Structured interviews with the focal children’s teacher were conducted in the focal children’s classroom one afternoon after the children were dismissed for the day. These interviews were designed to identify factors that may influence the focal children’s peer-related social behaviors at school. Formal child assessments (e.g., CARS-2, Schopler et al., 2010) were completed by the teacher, with the assistance of the student principal investigator (PI), immediately after the structured interviews. The peers’ teacher completed the formal child assessments (i.e., the Social Skills Improvement System Rating Scales [SSIS-RS]; Gresham & Elliot, 2008) in her classroom one afternoon after the children were dismissed for the day (i.e., the PI also assisted this teacher, as needed, in the completion of these assessments).

Pre-experimental direct observations of the focal children were conducted in their classroom across three child-directed activities (e.g., morning centers) identified by their teacher as conductive to social interactions between them and other children with disabilities in the classroom. Similarly, pre-experimental direct observations of the peers were conducted in their classroom across three child-directed activities identified by their teacher as conductive to social interactions between them and other children in the classroom. Phases 2 and 3 of the study took place in an area of the focal children’s classroom that was designated for play. The focal children’s teacher was asked to select the area during the structured interviews (i.e., play area deemed by her as an area where peer interactions naturally occurred and was minimally disruptive to classroom activities). Similar to the first phase of the study, the post-experimental direct observations of the children (i.e., focal children and peers) conducted in Phase 4 were
conducted across three child-directed activities identified by each teacher as conductive to social interactions between the children in the classroom.

**Materials**

During Phase 1, an adapted version of the Social Skills Interview questionnaire (Asmus, Conroy, Ladwig, Boyd, & Sellers, 2004), a structured interview developed to identify factors that may influence children’s social behaviors amongst peers at school, was completed with the focal children’s teacher (see Appendix D). Additionally, the PI used the Social Skills Screening Instrument (adapted from Brown, Odom, & Buysee, 2002; see Appendix E) during the pre-experimental direct observations to collect data on the children’s (i.e., focal children and peers) peer-related social behaviors (i.e., initiations, responses, and social interactions) during naturally occurring activities within their classrooms. During these observations, the PI used an iPhone application (i.e., Interval Timer; Deltaworks, 2013) to keep track of one-minute intervals while collecting data. In this phase of the study teachers completed the rating booklet of the CARS-2 (Schopler et al., 2010) to confirm that the focal children met the first inclusion criteria mentioned above, the SRS-2 (Constantino & Gruber, 2011) as a means to collect standardized data on the focal children’s social skills, and the SSIS-RS (Gresham & Elliot, 2008) as a means to collect standardized data on the peers’ social and behavioral skills.

During Phase 2, the Preference Assessment Data Collection Form (adapted from DeLeon & Iwata, 1996; see Appendix F) along with the stimuli (i.e., toys) identified by the focal children’s teacher during the interviews as stimuli that the children liked to play with while they were at school were used in the preference assessments. The stimulus confirmed in the preference assessment conducted with each focal child as his preferred stimulus was used during Phase 3 of the study. The focal child training protocol, the peer training protocol, the book *Franklin’s New Friend* (Bourgeois, 1997), and the intervention implementation protocol were
used during Phase 3 (see Appendix G for the focal child and peer training protocol as well as the intervention implementation protocol). Moreover, a treasure chest containing small items (e.g., small sticker booklets of popular cartoon characters) was used during this phase of the study. A digital video camera (i.e., Canon PowerShot G11) mounted on a tripod was used to record all experimental sessions of the study (i.e., Phases 2 and 3) and a portable computer (i.e., Dell Inspiron 14) was used to code the children’s target behaviors from those videos.

During Phase 4, the PI used the Social Skills Screening Instrument (adapted from Brown et al., 2002) along with Interval Timer (Deltaworks, 2013) to conduct the post-experimental direct observations of the focal children and peers. These direct observations were also focused on collecting data on the peer-related social behaviors (i.e., initiations, responses, and social interactions) exhibited by the focal children and peers during naturally occurring activities in their respective classrooms.

**Change Agents**

The PI, a doctoral candidate in the Special Education program with a focus in Early Childhood Studies in the School of Special Education, School Psychology, and Early Childhood Studies at the University of Florida, conducted Phases 1 and 2 of the study. In addition, the PI trained the focal children and the peers on the intervention procedures during Phase 3. Once trained, peers served as the change agents for the remainder of Phase 3. The PI conducted Phase 4 of the study.

**Dependent Measures, Coding Definitions, and Data Collection**

This part of the method section outlines the data that were collected on the children’s target behaviors, the specific definitions that were used to operationally define those behaviors, and the procedures that were used to collect data.
Dependent Measures

Data were collected on the frequency of independent initiations (i.e., for focal children and peers), prompted initiations (i.e., for focal children), independent responses (i.e., for focal children and peers), prompted responses (i.e., for peers), and the duration of the social interactions between the focal children and peers. Frequencies of initiations (i.e., independent and prompted) were converted into rate of initiations by dividing the total number of initiations made by each child in a session by the total duration of the session (i.e., in minutes). Frequencies of responses (i.e., independent and prompted) were converted into proportion of responses by dividing the total number of responses made by each child during a session by the total number of initiations made to him or her during the session. The duration of the social interactions between the focal children and peers in a session were converted into percent duration by dividing the total duration of the social interactions between the children in the session (i.e., in seconds) by the total duration of the session (i.e., in seconds). The study’s primary dependent measure was the rate of the focal children’s independent initiations toward their peers.

Coding Definitions

Coding definitions refer to the operational definitions that were used to code the children’s target behaviors during the study (see Appendix H for a complete list of the target behaviors, definitions, examples and non-examples of the target behaviors, and the guidelines for collecting data). The coding definitions used in this study were adapted from the Generalized Assessment Tools for Observing and Remediating Social Skills coding manual (Conroy & Asmus, 2006).

Focal child and peer independent initiations

Initiations were defined as verbal or gestural behaviors (that were not preceded in the previous three seconds by another social behavior) directed toward a focal child or peer in an
attempt to obtain the other child’s attention, engage the other child in a mutual activity, to elicit a social response from the other child, or to request help or a desired object from the other child. Examples of initiations included calling a child’s name, a child giving directions to another child on how to play with a toy, verbally greeting a child, or pointing to a picture for a child to look at.

**Focal child prompted initiations**

A verbal or gestural behavior exhibited by a focal child as a means to obtain the peer’s attention, engage the peer in a mutual activity, to elicit a social response from the peer, or to request help or a desired object from the peer within three seconds of the PI prompting the focal child to engage in the behavior.

**Focal child and peer independent responses**

Responses were defined as verbal or gestural behaviors directed to an initiating peer or focal child that overtly acknowledged the other child’s initiation within three seconds of the initiation. This included a child verbally responding to a peer’s or focal child’s initiation, joining a play activity once asked to join, or helping to complete a task once asked to do so. Responses also included a focal child or peer orienting himself or herself toward the initiating child after the occurrence of the initiation. Responses included declining initiations.

**Peer prompted responses**

A verbal or gestural behavior directed to an initiating peer or focal child that overtly acknowledges the other child’s initiation within three seconds of the PI prompting the peer or focal child to engage in the behavior.

**Social interactions**

Social interactions were defined as a sequence of three social behaviors between a focal child and a peer within three seconds of each other. A social interaction begins (i.e., behavior’s
onset) after an initiation-response sequence with the third behavior in the sequence (i.e., initiation-response-interaction).

**Data Collection**

Hardcopies of the Social Skills Interview questionnaire (Asmus et al., 2004) as well as hardcopies of the rating booklet of each formal child assessment (e.g., CARS-2; Schopler et al., 2010) were used during Phase 1 of the study. Additionally, the PI used hardcopies of the Social Skills Screening Instrument (adapted from Brown et al., 2002) during the pre-experimental direct observations to collect data on the percentage of intervals during 10-minute observations that the children exhibited peer-related social behaviors (i.e., initiations, responses, and social interactions). The aforementioned definitions of peer-related social behaviors were used when conducting the pre-experimental direct observations (see Appendix H). The application Interval Timer (Deltaworks, 2013) on the PI’s iPhone alerted the PI each time that a one-minute interval passed during those observations in order for the PI to record on the data collection sheet whether or not each target behavior occurred at any time during the interval (i.e., these data collection procedures were also followed during the post-experimental direct observations in Phase 4 of the study).

All sessions of Phases 2 and 3 were video recorded by the PI in order for trained graduate students (i.e., data collectors) to collect data from those videos. During Phase 2, data collectors watched the video of each preference assessment session (i.e., videos were played on Windows Media Player) and used the Preference Assessment Data Collection Form to record the order in which each stimulus presented to a focal child was selected by the child (i.e., data collectors used a hard copy of the Preference Assessment Data Collection Form and a pen or pencil to collect data for each preference assessment session). During Phase 3, data collectors used a portable computer equipped with Lily Collector (Tapp, 2010), a software program used to
collect behavioral observation data, to code the children’s target behaviors from the videos. Specifically, data collectors recorded the children’s target behaviors as they occurred in the videos by selecting the buttons on Lily Collector that corresponded to each target behavior (see Figure 3-1 for the Lily Collector setup that was used in this study). For initiations and responses (i.e., event codes), data collectors pressed the button corresponding to each behavior in Lily Collector as the children engaged in those behaviors in order to record the frequency with which the children engaged in each of those behaviors. For social interactions (i.e., duration code), data collectors pressed the button corresponding to social interactions in Lily Collector at the onset of each social interaction and once again at the offset of each social interaction (i.e., as defined on Appendix H) in order to record the duration of each social interaction between the children. The raw data files were exported from Lily Collector to the Multi-Option Observation System for Experimental Studies software program (MOOSES; Tapp, Wehby, & Ellis, 1995). MOOSES used the Lily Collector raw data files to calculate the total number of initiations and responses made by each child in a session as well as the total duration of the social interaction between the focal child and peer in a session.

**Study Design, Experimental Procedures, and Data Analysis**

The study design section describes the single case research design that was used to evaluate the effects of the intervention on the children’s target behaviors (i.e., initiations, responses, and social interactions). The experimental procedures section outlines the steps that were followed to conduct each phase of the study. The procedures that were used to analyze and evaluate the data are also described in this section.

**Study Design**

A multiple-probe across participants design (Horner & Baer, 1978) was used in this study to determine the effects of the intervention on the children’s target behaviors. Using this
experimental design, the intervention was implemented in a temporal sequence across participants in order to determine if changes in the dependent measures for each participant occurred following the implementation of the intervention (i.e., determine if changes in the participants’ target behaviors could be attributed solely to the implementation of the intervention; Kazdin, 2011). Specifically, this study began by collecting three data points of baseline data on all four focal children. Baseline sessions continued with the first focal child until three stable data paths were obtained. Once three stable data paths were obtained in the baseline condition of the first focal child, the intervention was implemented on that child while the other three focal children remained in the baseline phase. For the three children that remained in the baseline phase, one data point (i.e., probe) was collected per week. When the first focal child exhibited a stable pattern of behavior (i.e., three stable data paths) on the primary dependent measure (i.e., rate of independent initiations) in the expected direction, three consecutive baseline data points for the second focal child were collected (i.e., baseline probes continued with the third and fourth focal child). Once three consecutive data points were obtained in the baseline condition of the second focal child, the intervention was implemented with that child. This procedure was continued until the intervention was implemented on all of the focal children.

**Experimental Procedures**

This section outlines the steps that were followed to conduct each phase of the study: 1) pre-experimental phase; 2) preference assessment phase; 3) intervention phase; and 4) post-experimental phase.

**Phase 1: Pre-experimental assessment phase**

**Structured teacher interviews.** An adapted version of the Social Skills Interview (Asmus et al., 2004) was completed with the focal children’s teacher. These interviews were conducted in person in the focal children’s classroom one afternoon after the children were
dismissed for the day. The structured interview for each focal child took approximately 30 minutes to be completed.

**Formal child assessments.** The teacher of the focal children was asked to complete the CARS-2 (Schopler et al., 2010) in order to confirm that these children met the study’s inclusion criteria and the SRS-2 (Constantino & Gruber, 2011) to obtain descriptive data on these children’s social skills. The SSIS-RS (Gresham & Elliot, 2008) was completed by the peers’ teacher in order to collect descriptive data on the peers’ social competence skills. The PI was available to answer any questions teachers had while completing these assessments. Completion of each formal child assessment took approximately 30 minutes per child.

**Pre-experimental direct observations.** Direct classroom observations were conducted in order to collect data on the children’s (i.e., focal children and peers) peer-related social behaviors (i.e., initiations, responses, and social interactions) during naturally occurring classrooms social activities. The purpose of these observations was to confirm that the focal children and peers had the pre-requisite skills identified for participation in the study. In addition, the data collected during these observations were used to answer this study’s fourth research question (i.e., how do the initiations, responses, and interactions of young children with ASD compare to the social initiations, responses, and interactions of same-aged peers prior to and after receiving a peer-mediated intervention?). These observations were conducted over 3 days across three child-directed activities (e.g., morning centers) identified by the teachers as conductive to social interactions between the children in their classrooms. During these observations, the PI observed the children from an unobtrusive position that allowed him to clearly see and hear the children when interacting with their classmates and complete data collection.
Phase 2: Preference assessment phase

Multiple stimulus without replacement preference assessments (DeLeon & Iwata, 1996) were conducted in this study to identify each focal child’s preferred stimulus (i.e., preferred toy that each child liked to play with while he was at school) and incorporate it into the intervention sessions. During the preference assessments, focal children were allowed to select a stimulus from a stimuli array. The stimuli included in the array for each focal child were identified by the teacher during the interviews (i.e., there were no restrictions on the stimuli that the teacher could select for each focal child’s preference assessment). The stimuli were placed on a table in front of the children approximately one inch apart in a random order (i.e., randomization was done by assigning a number to each stimulus and then using the random number function in Excel to create a randomized list of the stimuli). Once the children played with the selected stimulus for 30 seconds, the stimulus was taken away from the children and was not placed back into the stimuli array (i.e., the stimulus was unavailable during the next stimuli array presentation). Each presentation of the stimuli array to the focal children was considered as one trial. The stimuli array presentation continued in that manner until there were no stimuli left in the array or until a criterion was reached indicating that no more selections were going to be made (i.e., children did not make a selection 30 seconds after the stimuli array was presented to them).

Data were collected on the order in which the focal children selected each of the stimulus presented to them during each preference assessment session. A score was assigned to each stimulus based on the order in which it was selected during a preference assessment session. For example, if a preference assessment session consisted of an array of six stimuli, the stimulus selected on the first trial was assigned a score of six. The stimulus selected on the second trial was assigned a score of five, the stimulus selected on the third trial was assigned a score of four, and so on. The stimuli not chosen during a preference assessment session were assigned a score
of zero (Ciccone, Graff, & Ahearn, 2005). Once all of the preference assessment sessions were conducted for each focal child, the scores assigned to each stimulus, across sessions, were added in order to obtain a total score for each stimulus. For example, if a stimulus was selected first during a preference assessment session that consisted of an array of six stimuli, it was assigned a score of six. If the same stimulus was chosen first in each subsequent preference assessment session, for a total of five sessions, the total score of that stimulus would be 30 (i.e., 6+6+6+6+6). Similarly, if a stimulus was chosen on the third trial of a preference assessment session, on the fourth trial of two sessions, and not chosen during two sessions, the total score for that stimulus would be 10 (i.e., 4+3+3+0+0). The preferred stimulus for each focal child was defined as the stimulus with the highest total score (Ciccone et al., 2005; Tullis, Cannella-Malone, & Fleming, 2012).

A total of five preference assessment sessions were conducted for each focal child. Five-session multiple stimulus without replacement preference assessments have been successfully used in the literature to identify participants’ preferences (e.g., Ciccone et al., 2005; DeLeon & Iwata, 1996; Tullis et al., 2012). See Appendix F for the protocol that was followed during each preference assessment session.

**Phase 3: Intervention phase**

The intervention phase consisted of baseline, focal child and peer training, intervention implementation, generalization, and maintenance.

**Baseline.** Baseline sessions were conducted in a play area of the focal children’s classroom designated by their teacher as an area where peer interactions naturally occurred and was minimally disruptive to other activities occurring in the classroom. Each focal child and peer were brought to the play area and told by the PI that they could play with the stimuli already present in the play area (e.g., toy cars, Lego blocks, or baby dolls) any way they wanted (i.e.,
focal children’s preferred stimuli were not used during baseline sessions). No attempts were made by the PI to facilitate social interactions between the focal children and peers (i.e., no prompts were provided to the children during baseline sessions). General praise was provided to the children at the end of each baseline session. Baseline sessions lasted 10 minutes. See Appendix G for the protocol that was followed during baseline sessions.

**Focal child training.** Following baseline sessions, the PI conducted the training for each focal child in the study. Each focal child received training during 15-minute sessions (i.e., focal child-training sessions) across 3 days. Training occurred in the focal children’s classroom. Each focal child was trained on how to initiate social interactions with his peer by using the following social skills: a) how to greet the peer by making eye contact with him or her and using his or her name (e.g., “Hello Jon”); b) how to appropriately ask questions to the peer (e.g., “Do you want to play?”); c) how to make comments that are appropriate to an ongoing activity (e.g., “Chris! Look it’s a duck!”); and d) how to appropriately request for help or for a desired object (e.g., “Help! I want letter c!”). The aforementioned social initiations strategies were based on previous research which has demonstrated their effectiveness in increasing the social interactions initiated by peers during peer-mediated interventions (e.g., Gonzalez-Lopez & Kamps, 1997). Therefore, those social initiation strategies were chosen as a means to teach children with ASD how to effectively initiate social interactions. Peers were not included in any of the focal children’s training sessions. The procedures followed to train each focal child during each training session are described below (adapted from the training procedures used by Garrison-Harrell et al., 1997; Katz & Girolametto, 2013; Thiemann & Goldstein, 2004). See Appendix G for the focal child training protocol.
**Focal child-training session 1.** The PI explained to the focal child the purpose of the intervention (e.g., “I will help you learn how to make new friends while playing games and doing fun activities”) and discussed with him the importance of friendships. The PI then talked to the focal child about ways in which children are alike and different (e.g., “some children like to talk a lot and other children are mostly quiet, but they still may like to play with the same toys”), quality of friendships (e.g., “it is fun to be friends with people who like different things than us, we can learn a lot from them”), and activities they can do with other children to make new friends (e.g., “you can make friends while playing games”). The PI introduced the four social initiation strategies to the focal child. See Appendix I for the visual aids that the PI used when introducing and talking to the focal child about each of the aforementioned strategies. Each strategy was defined and modeled to the focal child by the PI (e.g., “you say hello to others by saying hello and then saying their names. Remember to always look at others in the eyes when talking to them”). At the end of the training session, the PI provided praise to the child for participating in the training session.

**Focal child-training session 2.** The PI and the focal child reviewed how to initiate social interactions with others. The focal child and the PI role-played while playing a game (i.e., chosen by the focal child) so he could practice initiating social interactions with others during play-based activities. Role-play continued until the focal child independently initiated social interactions with the PI using any of the social strategies at least three times (i.e., focal child initiated social interactions without directions or prompts from the PI to do so). At the end of the training session, the PI provided the focal child with verbal performance feedback and praise for participating in the training session.
Focal child-training session 3. The PI and the focal child reviewed how to initiate social interactions with others. The PI then explained to the focal child that if he did not initiate social interactions with his peer frequently during the peer-mediated intervention sessions, he would help him to do so (i.e., the PI provided prompts the focal children to initiate social interactions every 30-second interval that they did not do so during the intervention sessions). The PI provided vocal prompts to the focal children by telling them to initiate toward their peers using one of the strategies (e.g., “[Name of focal child], you can ask [name of the peer] to help you build the Lego tower”) while showing the children the corresponding visual of the strategy being prompted (see Appendix I). The focal child and the PI role-played while playing a game (i.e., chosen by the focal child) so he could further practice initiating social interactions with peers during play-based activities and for the focal child to get used to receiving prompts from the PI. Role-play continued until the focal child independently initiated social interactions with the PI using any of the social strategies at least three times. At the end of the training session, the PI provided the focal child with verbal performance feedback and praise for participating in the training session.

Peer training. The PI conducted the training for the four peers that received the peer-mediated intervention training\(^1\). Each peer received training during 15-minute sessions (i.e., peer-training sessions) across 3 days in the focal children’s classroom. Each focal child-peer dyad received training on the same days. Specifically, the days that each peer received his or her training were the same days that the focal child that he or she was paired with received his training (i.e., peer-training took place after the focal child-training). Each peer was trained on

\(^1\) Each focal child was paired with two peers. One peer received social skills training and was paired with the focal child during the intervention sessions (i.e., including maintenance sessions). The other peer did not receive training and was paired with the focal child solely during generalization probe sessions.
how to wait for an initiation made by the focal child and how to effectively respond to the initiation. Focal children were not included in any of the peers’ training sessions. The procedures that were followed to train the peers during each training session are described below (adapted from the training procedures used by Garrison-Harrell et al., 1997; Katz & Girolametto, 2013; and Thiemann & Goldstein, 2004). See Appendix G for the peer training protocol.

**Peer-training session 1.** The PI explained to the peer the purpose of the intervention (e.g., “as you have seen, [name of focal child], can be quiet/shy and needs to learn how to make friends, so we are going to help him learn ways to make friends”) and discussed with the peer the importance of friendships. The PI then talked about ways in which children are alike and different, quality of friendships, and activities the peer can do with other children to make new friends. The PI read the book *Franklin’s New Friend* (Bourgeois, 1997) to the peer. This book was read to introduce the peer to the concept of playing together with others and to emphasize various ways of developing friendships with children that may be different from him or her (i.e., the book is about a turtle that befriends a moose despite their differences; Katz & Girolametto, 2013). Similar to the procedures followed by Katz and Girolametto (2013), the peer was encouraged to verbally participate while reading the book by including cloze statements (i.e., saying a familiar phrase and leaving out a word, then waiting for the peer to fill in the blank; e.g., “Franklin was scared, because Moose was so___”), recall prompts (e.g., “What did Franklin do? He tried to___”), and Wh-questions (e.g., “Why was Franklin happy?”). After reading the book, the PI praised the peer for his or her participation in the training session.

**Peer-training session 2.** The PI taught the peer how to wait for an initiation from the focal child and then how to effectively respond to the initiation (i.e., respond to the initiation within three seconds). The PI then modeled examples and non-examples of responses to the peer.
Next, the peer and the PI role-played while playing a game (i.e., chosen by the peer) so he or she could practice waiting for and responding to initiations during play-based activities. Role-play continued until the peer independently waited for and responded to the PI’s initiations within 3 seconds at least five times. At the end of the training session, the PI provided the peer with verbal performance feedback and praise for participating in the training session.

**Peer-training session 3.** The PI reviewed with the peer how to wait and effectively respond to initiations made by the focal child. The PI then explained to the peer that he will remind him or her to wait for the focal child to initiate toward him or her and to respond to the focal child’s initiation each time that he or she forgets to do so (e.g., “[name of peer], remember to always respond to [name of focal child] questions quickly when playing with him”). The peer and the PI role-played while playing a game (i.e., chosen by the peer) so he or she could practice further the social skills taught to him or her during play-based activities and for the peer to get used to receiving prompts from the PI. Role-play continued until the peer independently waited for and responded to the PI’s initiations within 3 seconds at least five times. At the end of the training session, the PI provided the peer with verbal performance feedback and praise for participating in the training session.

Data collection on the children’s target behaviors (i.e., initiations, responses, and social interactions) continued during the focal children and peers training. Specifically, once each training session was finished for each focal child and peer dyad, the children were placed together in the same play area, with the same stimuli, used during baseline sessions. Similar to baseline sessions, the PI made no attempts to facilitate social interactions between the focal children and the peers (i.e., no prompts were provided) during these sessions and each lasted 10 minutes. Praise was provided to the focal children and peers at the end of each of these sessions.
**Intervention implementation.** Following the focal child and peer training sessions, the peer mediated intervention was implemented. Peer-mediated intervention sessions lasted 10 minutes and were conducted in the focal children’s classroom in the same play area as baseline sessions. Each of these sessions were conducted using each focal child’s preferred stimulus (i.e., the stimulus for each focal child with the highest score across preference assessment sessions, which was based on the number of times that it was chosen across sessions and the order in which it was chosen in each session). The PI told the focal child and peer to play with the stimulus and to interact with one another using the social skills that they learned in the training sessions. Only the focal children’s preferred toys were used during the intervention sessions (i.e., if the children tried to access different toys during the intervention sessions they were redirected back to the preferred toys by the PI). If the focal children did not initiate to the peers within 30-second intervals, verbal prompts (i.e., paired with the visual of the initiation strategy being prompted) were provided for them to do so. The PI used the application Interval Timer (Deltaworks, 2013) on his iPhone to keep track of 30-second intervals. Similarly, peers were provided with verbal prompts to wait for a focal child’s initiation or to respond to a focal child’s initiation each time that they did not do so. At the end of the peer-mediated intervention sessions, verbal performance feedback was provided to the focal children and peers. In addition, praise was provided to the children and they were allowed to choose an item from a treasure chest. See Appendix G for the protocol that was followed during the intervention sessions.

**Maintenance.** Maintenance sessions were conducted at a minimum of 1 week after the peer-mediated intervention sessions were completed in order to assess if the effects of the intervention were maintained over time. During each maintenance session, the peers and focal children were placed in the same area as the intervention sessions and were allowed to engage
with the focal children’s preferred stimuli, as in the peer-mediated intervention sessions. However, maintenance sessions were similar to baseline sessions in that the PI made no attempts to facilitate social interactions between the focal children and the peers (i.e., no prompts were provided). Each maintenance session lasted 10 minutes. Praise was provided to the focal children and peers at the end of these sessions. See Appendix G for the protocol that was followed during the maintenance sessions.

**Generalization probes.** The purpose of the generalization probes was to determine if, and when, changes in the focal children’s target behaviors generalized to untrained peers. Specifically, each focal child was paired with a peer, who did not receive social skills training, during generalization probes. Generalization probes were conducted once a week throughout Phase 3 of the study. During each generalization probe, each focal child and peer were placed in the same area as the baseline and intervention sessions. The children were allowed to engage with the stimuli already present in the play area during the generalization probes conducted while the focal children were in baseline and they were allowed to engage with the focal children’s preferred stimuli during the generalization probes conducted while the focal children were receiving the intervention. The PI told the children that they could engage with the stimuli in any way they want. No attempts to facilitate social interactions between the focal children and peers were made by the PI (i.e., no prompts were provided). Generalization probes lasted 10 minutes. Praise was provided to the focal children and peers at the end of these sessions. See Appendix G for the protocol that was followed during the generalization probe sessions.

**Phase 4: Post-experimental direct observations**

Direct classroom observations of the focal children and peers were conducted once again in order to collect data on their peer-related social behaviors during naturally occurring classrooms social activities following the implementation of the intervention. The data collected
during these observations, along with the data collected during the direct observations conducted in Phase 1 of the study, were used to answer this study’s fourth research question. Specifically, the data collected on each focal child’s peer-related social behaviors during the Phase 1 observations were compared to the data collected on his peers’ peer-related social behaviors during their Phase 1 observations. Similarly, the data collected on each focal child’s peer-related social behaviors during the Phase 4 observations were compared to the data collected on his peers’ peer-related social behaviors during their Phase 4 observations. This level of comparison was designed to serve as evidence of social validity of the outcome of the intervention (i.e., these comparisons allowed the PI to determine whether or not the intervention produced levels of peer-related social behaviors in the focal children that were similar to the levels of peer-related social behaviors exhibited by their same-aged socially competent peers).

Similar to the direct observations conducted in Phase 1, these observations were conducted across three child-directed activities (e.g., morning centers) identified by the teachers as conductive to social interactions between the children in the classrooms. During these observations, the PI observed the children from an unobtrusive position that allowed him to clearly see and hear the children when interacting with their classmates and complete data collection.

**Data Analysis**

Data on each dependent measure for each child within a dyad (i.e., rate of independent initiations, rate of prompted initiations, proportion of independent responses, proportion of prompted responses, and percent duration of social interactions) was graphed on Microsoft Excel using line graphs. These graphs were analyzed visually following the procedures outlined by Kazdin (2011) to determine phase changes and the effects of the intervention. Specifically, the data for each dyad were visually analyzed to determine: a) if there were stable patterns of
behaviors during the baseline phase; b) if there were changes in the level and trend of the primary dependent measure (i.e., rate of independent initiations made by the focal children toward their peers) following the implementation of the intervention; c) the immediacy of the changes in the primary dependent measure following the implementation of the intervention; and d) the variability within and across phases as well as the degree of overlap between the baseline and intervention phase (Kazdin, 2011). An intervention effect is demonstrated when changes in a participant’s dependent measure occur in the predicted direction solely after an intervention is implemented. In order to establish a functional relationship between a dependent measure and an intervention, there must be at least three demonstrations of an intervention effect at different points in time (Kazdin, 2011).

**Interobserver Agreement**

Interobserver agreement (IOA) is the extent to which two observers agree that a behavior occurred (i.e., when or how long the behavior occurred; Kazdin, 2011). IOA needs to be assessed in research studies to minimize observer biases that may develop over time, control for inconsistency of observers as one source of variation in data collection, and determine if the target behaviors are well-defined (Kazdin, 2011). It is recommended that IOA be collected for at least 30% of all observation sessions across the different experimental phases of a research study (Kazdin, 2011). This study adhered to that criterion as IOA was calculated on 30% of the observation sessions across each experimental phase (i.e., randomization across phases and participants was done by assigning a number to each observation session video and then using the random number function in Excel to create a randomized list of the videos of the observation sessions). In order to collect IOA data during Phase 2 of the study, a secondary data collector watched 30% of videos of preference assessment sessions previously scored by the primary data collector and used the Preference Assessment Data Collection Form to record the order in which
each stimulus presented to a focal child was selected by the child (i.e., hardcopies of the Preference Assessment Data Collection Form and a pen or pencil was used to collect IOA data during this phase of the study). An agreement was defined as both data collectors recording the same stimulus selection or no selection for each trial of a preference assessment session. IOA was calculated by dividing agreements by agreements plus disagreements and multiplying by 100. For Phase 3, IOA was calculated using a point-by-point time window agreement check (Bakeman & Quera, 2011) for both the duration and event codes. Using this approach, IOA is calculated by dividing the number of agreements on the occurrence and nonoccurrence of a given behavior by the number of agreements plus disagreements and multiplying by 100. An agreement, for duration and event codes, was defined as two observers independently recording the occurrence or nonoccurrence of the same behavior code within a plus/minus three-second window of time.

Prior to data collection, data collectors were trained on how to code the target behaviors using the aforementioned operational definitions. The training was conducted following the procedures proposed by Yoder and Symons (2010). Specifically, the PI conducted a didactic training session with the data collectors in order to explain to them the purpose and research questions of the study, how to code the target behaviors using the behavioral observation coding system developed for this study, practice collecting data with Lily Collector (Tapp, 2010) and MOOSES (Tapp et al., 1995), and watch exemplary videos of each of the target behaviors. After the didactic session, data collectors were given seven practice videos for them to further practice coding the target behaviors and collecting data using Lily Collector and MOOSES. After the practice videos, data collectors were given three criterion coding standard videos (i.e., videos from a previous study that used a similar intervention and groups of children) to code
independently. In order for data collectors to be considered reliable to code observation sessions, they needed to reach a minimum of 80% agreement criterion on each target behavior on each coding standard video.

**Treatment Integrity and Social Validity**

Despite the importance of treatment integrity and social validity, seldom has been collected in peer-mediated intervention research (Chan et al., 2009; Zhang & Wheeler, 2011). This section describes how treatment integrity and social validity were collected for this study.

**Treatment Integrity**

Procedural integrity data on the PI’s implementation of the experimental procedures were collected on 30% observation sessions across experimental phases (i.e., Phases 2 and 3). Randomization across phases and participants was done by assigning a number to each observation session video and then using the random number function in Excel to create a randomized list of the videos of the observation sessions. To collect procedural integrity data during Phase 2, a data collector observed videos of preference assessment sessions and completed, for each session observed, the Preference Assessment Treatment Integrity Form (see Appendix J). Using this form, the data collector recorded the extent to which the PI followed the procedures described in the preference assessment protocol (i.e., Appendix F) while conducting the observed preference assessment session (i.e., data collector used hardcopies of the Preference Assessment Procedural Integrity Form and a pen or pencil to collect treatment integrity data).

Data on each session were collected on: a) whether or not the PI allowed the child to sample each stimulus in the array prior to conducting the session; b) the extent to which the PI set up the stimulus array correctly during the session; c) the extent to which the PI provided the correct consequences to the child during the session (i.e., provided child access to the selected stimulus); d) the extent to which the PI removed each selected stimulus from the array during the session;
e) the extent to which the PI sequentially rotated the sequencing of the stimuli during the session; and f) whether or not the PI ended the session correctly (i.e., once all of the stimuli were selected or after the child did not make a selection within 30 seconds of being instructed to select a stimulus from the array).

To collect treatment integrity data during Phase 3, a data collector observed videos of training sessions as well as videos of baseline, intervention, maintenance, and generalization sessions. For the children’s training sessions (i.e., focal children and peers), the data collector observed videos of all of the training sessions and completed, for each session observed, the Training Procedural Integrity Form (see Appendix J). Using this form, the data collector recorded whether or not the PI followed the procedures described in the focal child and peer training protocol (i.e., Appendix G) while conducting the observed training session (i.e., data collector used hardcopies of the Training Treatment Integrity Form and a pen or pencil to collect treatment integrity data). Data on each session was collected on whether or not the PI: a) explained the purpose of the intervention to the child receiving training; b) described or reviewed the social skills that the child receiving the training had to use during the peer-mediated interventions; c) assessed the child’s understanding of the social skills being taught to him or her by asking him or her questions; d) role-played scenarios with the child for the child to practice the social skills being taught to him or her; e) ended the role-play scenario correctly (e.g., after the child independently initiated social interactions with the PI three times); f) explained the prompting procedure to the child; and g) provided performance feedback and praise to the child at the end of the training session.

For assessing treatment integrity during the baseline, intervention, maintenance, and generalization phases of the study, a data collector observed videos of these sessions and
completed, for each session observed, the Intervention Treatment Integrity Form (see Appendix J). Using this form, the data collector recorded the extent to which the PI followed the procedures described in the intervention implementation protocol (i.e., Appendix G) while conducting the observed session (i.e., data collector used hardcopies of the Intervention Treatment Integrity Form and a pen or pencil to collect treatment integrity data). Data on each session was collected on: a) whether or not the PI told the children to play with the stimuli present in the play area; b) whether or not the PI told the children to socially interact with one another using the social skills previously taught to them; c) the extent to which the PI provided prompts to the children throughout the session; d) the extent to which the PI provided prompts to the focal child using the visual aids throughout the session; e) whether or not the focal child’s preferred stimulus was included in the session; and f) whether or not the PI provided performance feedback and praise to the children at the end of the session.

The extent to which the peers followed the intervention procedures was captured on the data collected during Phase 3 of the study using the direct observation system. Specifically, the extent to which a peer responded to a focal child’s initiations on a given intervention session was captured in the peer’s proportion of responses to the focal child’s initiations in that session. Similarly, the peers’ rate of initiations during intervention sessions was used to determine if the peers gave opportunities to the focal children to initiate toward them.

Social Validity

To assess the social validity of the outcomes of the intervention, the focal children’s teacher was asked to assess the changes in the social interactions exhibited by the focal children by completing a Likert-type rating scale at the conclusion of the study (see Appendix K). Moreover, segments of the baseline, intervention, and generalization sessions were shown to a special education graduate student who was unfamiliar with the purpose of the study (i.e., naïve
observer) via videotapes. The naïve observer was asked to complete a Likert-type rating scale to indicate the degree of appropriate social behaviors exhibited by the focal children on the video clips (see Appendix L). The PI indicated to the naïve observer which children were the focal children in each video, but did not indicate to her to which condition of the intervention (e.g., baseline or intervention) each video belonged to. The videos shown to the naïve observer were randomly sequenced (i.e., the video segments did not necessarily follow the order in which the intervention was implemented). The comparison of the peer-related social behaviors exhibited by the focal children and peers during the direct observations conducted in Phases 1 and 4 of the study served as evidence of social validity of the outcome of the intervention. Specifically, the comparison of the data collected on the focal children and peers’ peer-related social behaviors during these observations allowed the PI to determine whether or not the intervention produced levels of peer-related social behaviors in the focal children that were similar to the levels of peer-related social behaviors exhibited by their same-aged socially competent peers.
Table 3-1. Characteristics of the focal children.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Sex</th>
<th>Race</th>
<th>Age</th>
<th>CARS-2 T-score</th>
<th>SRS-2 T-score</th>
<th>BDI-2 T-score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luke</td>
<td>M</td>
<td>MR</td>
<td>3-5</td>
<td>47</td>
<td>65</td>
<td>35</td>
</tr>
<tr>
<td>Zane</td>
<td>M</td>
<td>AA</td>
<td>3-7</td>
<td>40</td>
<td>67</td>
<td>27</td>
</tr>
<tr>
<td>Zach</td>
<td>M</td>
<td>AA</td>
<td>3-3</td>
<td>54</td>
<td>75</td>
<td>33</td>
</tr>
<tr>
<td>Mike</td>
<td>M</td>
<td>C</td>
<td>3-6</td>
<td>59</td>
<td>70</td>
<td>31</td>
</tr>
</tbody>
</table>

Note: Age in years-months; M = male; AA = African American; C = Caucasian; MR = Multiracial.
Table 3-2. Characteristics of the peers.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Sex</th>
<th>Race</th>
<th>Age</th>
<th>Peer Condition</th>
<th>SSIS-RS Social Skills SS (Percentile Rank)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Judy</td>
<td>F</td>
<td>AA</td>
<td>4-6</td>
<td>Intervention</td>
<td>123 (95)</td>
</tr>
<tr>
<td>Shaw</td>
<td>M</td>
<td>AA</td>
<td>4-9</td>
<td>Generalization</td>
<td>96 (39)</td>
</tr>
<tr>
<td>Drake</td>
<td>M</td>
<td>AA</td>
<td>5-2</td>
<td>Intervention</td>
<td>101 (52)</td>
</tr>
<tr>
<td>Jamie</td>
<td>F</td>
<td>AA</td>
<td>5-0</td>
<td>Generalization</td>
<td>77 (8)</td>
</tr>
<tr>
<td>Chris</td>
<td>M</td>
<td>C</td>
<td>4-11</td>
<td>Intervention</td>
<td>77 (8)</td>
</tr>
<tr>
<td>Joni</td>
<td>F</td>
<td>AA</td>
<td>4-7</td>
<td>Generalization</td>
<td>127 (99)</td>
</tr>
<tr>
<td>Jon</td>
<td>M</td>
<td>C</td>
<td>5-3</td>
<td>Intervention</td>
<td>111 (75)</td>
</tr>
<tr>
<td>Alicia</td>
<td>F</td>
<td>AA</td>
<td>4-6</td>
<td>Generalization</td>
<td>123 (95)</td>
</tr>
<tr>
<td>Carl</td>
<td>M</td>
<td>AA</td>
<td>4-9</td>
<td>Generalization</td>
<td>93 (33)</td>
</tr>
</tbody>
</table>

Note: Age in years-months; M = male; F = female; AA= African American; C = Caucasian; SS= standard score. a Denotes that these peers were paired with Zach. b Denotes that these peers were paired with Mike. c Denotes that these peers were paired with Luke. d Denotes that these peers were paired with Zane.
Figure 3-1. Lily Collector setup to collect data
CHAPTER 4
RESULTS

The purpose of this study was to examine the effects of a peer-mediated intervention on the peer-related social behaviors of young children with ASD, with the primary focus on the initiations made by children with ASD to their peers. In this chapter, the results will be described by each specific research question addressed in the study. Then, the results of the interobserver agreement, treatment integrity, and social validity data will be described.

Effects of the Intervention on Peer-Related Social Behaviors

The study’s first research question was: What are the effects of a peer-mediated intervention on the initiations, responses, and interactions of young children with ASD and their peers? In order to answer this research question, data are reported on independent initiations (i.e., for focal children and peers), prompted initiations (i.e., for focal children), independent responses (i.e., for focal children and peers), prompted responses (i.e., for peers), and social interactions between the focal children and their peers across baseline, training, and intervention sessions. Before the intervention was implemented, preference assessments were conducted to identify and embed the preferred toys of the focal children in the intervention sessions.

Preference Assessments

Luke

Based on the teacher interview, Luke’s preference assessment included the following six items: 1) plastic toy cars; 2) a wooden puzzle; 3) play-dough (i.e., a play-dough container with two accessories used to play with the play-dough); 4) barn toys (i.e., a plastic horse with a cowboy action figure); 5) plastic toy trains; and 6) Legos (i.e., 10 Lego blocks of various colors and shapes). Luke chose to play with the play-dough on the first trial of all of the preference assessment sessions (i.e., a total of five preference assessment sessions were conducted with each
child) and thus, play-dough received the highest total score (i.e., a total of 30 points out of 30 possible points across preference assessment sessions; see Figure 4-1). Based on the results of the preference assessment, play-dough was used in Luke’s peer-mediated intervention sessions.

Zane

Based on the teacher interview, Zane’s preference assessment included the following six items: 1) plastic toy cars; 2) a wooden puzzle; 3) barn toys; 4) kitchen toys (i.e., a plastic pot with two plastic food items); 5) Mr. Potato Head (i.e., a potato head with two accessories used to play with it); and 6) Legos. Kitchen toys received the highest total score across preference assessment sessions (i.e., a total of 26 points out of 30 possible points across preference assessment sessions; see Figure 4-2). Based on the results of the preference assessment, kitchen toys were used in Zane’s peer-mediated intervention sessions.

Mike

Based on the teacher interview, Mike’s preference assessment included the following five items: 1) plastic toy cars; 2) a wooden puzzle; 3) barn toys; 4) plastic toy trains; and 5) Legos. Mike chose to play with the wooden puzzle on the first trial of all preference assessment sessions and thus, the wooden puzzle received the highest total score (i.e., a total of 25 points out of 25 possible points across preference assessment sessions; see Figure 4-3). Based on the results of the preference assessment, wooden puzzles were used during Mike’s peer-mediated intervention sessions.

Zach

Based on the teacher interview, Zach’s preference assessment included the following six items: 1) plastic toy cars; 2) a wooden puzzle; 3) play-dough; 4) barn toys; 5) an ABC Caterpillar (i.e., an interactive plastic caterpillar that has a letter of the alphabet on each of its foot); and 6) Legos. Zach chose to play with the toy cars on the first trial of four preference assessment
sessions and thus, toy cars received the highest total score (i.e., a total of 28 points out of 30 possible points across preference assessment sessions; see Figure 4-4). Based on the results of the preference assessment, toy cars were used in Zach’s peer-mediated intervention sessions.

**Peer-Mediated Intervention**

**Luke and Chris**

**Initiations.** Luke demonstrated low rates of independent initiations toward Chris (i.e., peer that received social skills training) across baseline sessions (see Figure 4-5). Specifically, Luke’s average rate of independent initiations toward Chris across baseline sessions was 0.1/min (range = 0.0–0.4/min). Chris’ average rate of independent initiations toward Luke across baseline sessions was 0.7/min (range = 0.3-1.5/min). During the three sessions in which Luke and Chris received social skills training, both children’s rate of independent initiations increased. Specifically, Luke’s average rate of independent initiations toward Chris was 0.4/min (range = 0.1-0.9/min) while Chris’ average rate of independent initiations was 1.1/min (range = 0.7-1.9/min) across these sessions. Once the peer-mediated intervention was implemented, there was an immediate change in the level of Luke’s rate of independent initiations toward Chris in the expected direction. Across intervention sessions, Luke’s average rate of independent initiations toward Chris was 2.0/min (range = 0.9-2.5/min) compared to 0.1/min (range = 0.0–0.4/min) across baseline sessions. Luke’s rate of independent initiations during the intervention sessions consistently exceeded his rate of independent initiations during baseline sessions and there were no overlapping data points between baseline and intervention sessions. Even though Luke’s rate of independent initiations toward Chris was variable across intervention sessions, there was an increasing trend in his rate of independent initiations across these sessions. Luke required low rates of prompts from the PI across intervention sessions in order for him to initiate toward Chris. Specifically, Luke’s average rate of prompted initiations toward Chris across intervention
sessions was 0.1/min (range = 0.0-0.4/min). Chris’ average rate of independent initiations toward Luke across intervention sessions remained the same as his rate of independent initiations during baseline sessions. Specifically, Chris’ average rate of independent initiations toward Luke across intervention sessions was 0.7/min (range = 0.1-1.3/min) while it was 0.7/min (range = 0.3-1.5/min) across baseline sessions.

**Responses.** Luke’s average proportion of independent responses to Chris’ initiations across baseline sessions was 0.5 (range = 0.3-1.0) while Chris’ average proportion of independent responses across these sessions was 0.3 (range = 0.0-1.0; see Figure 4-6). Luke’s average proportion of independent responses across training sessions was 0.5 (range = 0.4-0.6) while Chris’ average proportion of independent responses, as expected, began to increase during these sessions (i.e., 0.6; range = 0.0-1.0). Across intervention sessions, Luke’s average proportion of independent responses to Chris’ initiations increased to 0.7 (range = 0.4-1.0) and Chris’ average proportion of independent responses to Luke’s initiations remained the same as during training sessions (i.e., 0.6; range = 0.4-0.8). Following the social skills training, there was an increasing trend in Chris’ proportion of independent responses to Luke’s initiations across intervention sessions. Moreover, Chris required low rates of prompts from the PI across intervention sessions in order for him to respond Luke’s initiations. Specifically, Chris’ average proportion of prompted responses to Luke’s initiations across intervention sessions was 0.03 (range = 0.0-0.1). There was, however, overlap in Chris’ proportion of independent responses between baseline and intervention sessions.

**Social interactions.** The average percent duration of the social interactions between Luke and Chris across baseline sessions was 4.7% (range = 0.0-12.0%; see Figure 4-7). During the training sessions, the average percent duration of the social interactions between Luke and Chris
increased to 13.4% (range = 0.3-25.0%). Once the peer-mediated intervention was implemented, the social interactions between Luke and Chris increased compared to baseline sessions. Specifically, the average percent duration of their social interactions across intervention sessions was 21.6% (range = 10.0-41.0%) in comparison to 4.7% (range = 0.0-12.0%) during baseline sessions. The percent duration of the social interactions between Luke and Chris during the intervention sessions consistently exceeded the percent duration of their social interactions during the baseline sessions and there were no overlapping data points between baseline sessions and intervention sessions.

Zane and Jon

Initiations. Zane’s average rate of independent initiations toward Jon (i.e., peer that received social skills training) across baseline sessions was 0.2/min (range = 0.1–0.5/min) while Jon’s average rate of independent initiations toward Zane across these sessions was 0.3/min (range = 0.1-0.6/min; see Figure 4-5). During the training sessions, Zane did not initiate toward Jon while Jon’s average rate of independent initiations toward Zane was 0.2/min (range = 0.0-0.5/min). Once the peer-mediated intervention was implemented, there was an immediate change in the level of Zane’s rate of independent initiations toward Jon in the expected direction. Specifically, Zane’s average rate of independent initiations toward Jon across intervention sessions was 1.8/min (range = 1.2- 2.2/min) compared to 0.2/min (range = 0.1–0.5/min) in baseline sessions. Zane’s rate of independent initiations during the intervention sessions consistently exceeded his rate of independent initiations during baseline sessions and there were no overlapping data points between baseline and intervention sessions. Zane required low rates of prompts from the PI across intervention sessions in order for him to initiate toward Jon. Specifically, Zane’s average rate of prompted initiations toward Jon across intervention sessions was 0.5/min (range = 0.2-0.8/min). Nonetheless, Zane’s rate of independent initiations toward
Jon was variable across intervention sessions. Jon’s average rate of independent initiations toward Zane across intervention sessions increased compared to his rate of independent initiations during baseline sessions. Specifically, Jon’s average rate of independent initiations toward Zane across these sessions was 0.7/min (range = 0.4-0.9/min) while it was 0.3/min (range = 0.1-0.6/min) during baseline sessions.

Responses. Zane’s average proportion of independent responses to Jon’s initiations across baseline sessions was 0.5 (range = 0.0-1.0) while Jon’s average proportion of independent responses to Zane’s initiations across these sessions was 0.3 (range = 0.0-0.7; see Figure 4-6). Zane’s average proportion of independent responses across training sessions was 0.4 (range = 0.0-1.0). Zane did not initiate toward Jon in any of the training sessions, therefore, Jon had no opportunities to exhibit responses during the training sessions. Across intervention sessions, Zane’s average proportion of independent responses to Jon’s initiations remained the same as baseline sessions (i.e., 0.5; range = 0.2-0.8). Jon’s average proportion of independent responses to Zane’s initiations, as expected, increased across the intervention sessions (i.e., 0.6; range = 0.5-0.8) compared to baseline sessions (i.e., 0.3; range = 0.0-0.7). Moreover, Jon required low rates of prompts from the PI across intervention sessions in order for him to respond Zane’s initiations. Specifically, Jon’s average proportion of prompted responses to Zane’s initiations across intervention sessions was 0.01 (range = 0.0-0.1). There was, however, overlap in Jon’s proportion of independent responses between baseline and intervention sessions and there was a decreasing trend in Jon’s proportion of independent responses to Zane’s initiations across intervention sessions.

Social interactions. The average percent duration of the social interactions between Zane and Jon across baseline sessions was 1.9% (range = 0.0-9.5%; see Figure 4-7). During the
training sessions, the average percent duration of their social interactions was 0.8% (range = 0.0-2.5%). Once the peer-mediated intervention was implemented, the social interactions between Zane and Jon increased compared to baseline sessions. Specifically, the average percent duration of their social interactions across intervention sessions was 15.0% (range = 4.0-24.0%) in comparison to 1.9% (range = 0.0-9.5%) during baseline. However, the percent duration of their social interactions was variable and there were overlapping data points between baseline sessions and intervention sessions. Moreover, there was a decreasing trend in the percent duration of the social interactions between Zane and Jon across intervention sessions.

**Mike and Drake**

*Initiations.* Mike did not initiate toward Drake (i.e., peer that received social skills training) across baseline sessions while Drake demonstrated, on average, low rates of independent initiations toward Mike across these sessions (i.e., 0.1/min; range = 0.0-0.3/min). Both children’s rate of independent initiations increased during the training sessions, though this was more noticeable for Drake. Specifically, Mike’s average rate of independent initiations toward Drake during these sessions was 0.3/min (range = 0.2-0.3/min) while Drake’s average rate of independent initiations was 0.4/min (range = 0.3-0.6/min). Once the peer-mediated intervention was implemented, there was an immediate change in the level of Mike’s rate of independent initiations toward Drake in the expected direction. Across intervention sessions, Mike’s average rate of independent initiations toward Drake was 1.7/min (range = 1.0-2.3/min). Mike’s rate of independent initiations during the intervention sessions exceeded his rate of independent initiations during baseline sessions and there were no overlapping data points between baseline and intervention sessions (see Figure 4-5). Moreover, there was an increasing trend in Mike’s rate of independent initiations toward Drake during intervention sessions. Mike required low rates of prompts from the PI across intervention sessions in order for him to initiate
toward Drake. Specifically, Mike’s average rate of prompted initiations toward Drake across intervention sessions was 0.2/min (range = 0.0-0.4/min). Drake’s average rate of independent initiations toward Mike across intervention sessions was 0.9/min (range = 0.4-1.4/min).

**Responses.** Mike’s average proportion of independent responses to Drake’s initiations was 0.1 (range = 0.0-1.0) across baseline sessions. Moreover, Mike did not initiate toward Drake during these sessions, therefore, Drake had no opportunities to exhibit responses during baseline sessions (see Figure 4-6). Mike’s average proportion of independent responses across training sessions was 0.6 (range = 0.3-0.8) while Drake’s average proportion of independent responses across these sessions was 0.8 (range = 0.7-1.0). Once the peer-mediated intervention was implemented, Mike’s average proportion of independent responses to Drake’s initiations increased (i.e., 0.9; range = 0.5-1.0). Drake’s average proportion of independent responses to Mike’s initiations across intervention sessions was 0.5 (range = 0.3-0.7). There was no overlap in Drake’s proportion of independent responses between baseline and intervention sessions. Moreover, Drake required low rates of prompts from the PI across intervention sessions in order for him to respond Mike’s initiations. Specifically, Drake’s average proportion of prompted responses to Mike’s initiations across intervention sessions was 0.1 (range = 0.0-0.2). There was, however, a decreasing trend in Drake’s proportion of independent responses to Mike’s initiations across intervention sessions.

**Social interactions.** Mike and Drake did not engage in social interactions across baseline sessions. The average percent duration of the social interactions between Mike and Drake during the training sessions was 2.4% (range = 0.0-7.3%). Moreover, the average percent duration of their social interactions across the intervention sessions was 6.5% (range = 1.0-36.0%). Since no social interactions occurred between Mike and Drake during baseline sessions, the percent
duration of their social interactions across intervention sessions exceeded the percent duration of their social interactions across baseline sessions. The percent duration of the social interactions between Mike and Drake across intervention sessions was fairly stable with the exception of the first data point (see Figure 4-7).

**Zach and Judy**

**Initiations.** Zach demonstrated low rates of independent initiations toward Judy (i.e., peer that received social skills training) across baseline sessions (see Figure 4-5). Specifically, Zach’s average rate of independent initiations toward Judy across baseline sessions was 0.04/min (range = 0.0-0.3/min). Judy’s average rate of independent initiations toward Zach across baseline sessions was 0.02/min (range = 0.0-0.2/min). Both children’s rate of independent initiations increased during the training sessions, though this was more noticeable for Zach. Specifically, Zach’s average rate of independent initiations toward Judy across these sessions was 0.6/min (range = 0.4-0.8/min) and Judy’s average rate of independent initiations was 0.1/min (range = 0.0-0.3/min). Once the peer-mediated intervention was implemented, there was an immediate change in the level of Zach’s rate of independent initiations toward Judy in the expected direction. Across intervention sessions, Zach’s average rate of independent initiations toward Judy was 1.2/min (range = 0.9-1.5/min) compared to 0.04/min (range = 0.0-0.3/min) across baseline sessions. Zach’s rate of independent initiations during the intervention sessions exceeded his rate of independent initiations during baseline sessions and there were no overlapping data points between baseline and intervention sessions. There was little variability in Zach’s rate of independent initiations across intervention sessions. Moreover, Zach required low rates of prompts from the PI across intervention sessions in order for him to initiate toward Judy. Specifically, Zach’s average rate of prompted initiations toward Judy across intervention sessions was 0.2/min (range = 0.0-0.3/min). Judy’s average rate of independent initiations toward
Zach across intervention sessions slightly increased (i.e., 0.2/min; range = 0.0-0.6/min) compared to her average rate of independent initiations during the baseline sessions (i.e., 0.02/min; range = 0.0-0.2/min).

**Responses.** Zach’s average proportion of independent responses to Judy’s initiations across baseline sessions was 0.04 (range = 0.0-0.5) while Judy’s average proportion of independent responses to Zach’s initiations across these sessions was 0.1 (range = 0.0-1.0; see Figure 4-6). Zach did not respond to any of Judy’s initiations across training sessions while Judy’s average proportion of independent responses, as expected, increased during these sessions (i.e., 0.4; range = 0.1-0.7). Across intervention sessions, Zach’s average proportion of independent responses to Judy’s initiations was 0.06 (range = 0.0-0.2). Moreover, Judy’s average proportion of independent responses to Zach’s initiations increased across intervention sessions (i.e., 0.6; range = 0.5-0.8) compared to baseline sessions (i.e., 0.1; range = 0.0-1.0). Judy required no prompts from the PI across intervention sessions in order for her to respond Zach’s initiations. There was, however, overlap in Judy’s proportion of independent responses between baseline and intervention sessions. In addition, there was variability in Judy’s proportion of independent responses across the intervention sessions.

**Social interactions.** Zach and Judy did not engage in social interactions across baseline sessions. The average percent duration of the social interactions between Zach and Judy during the training sessions was 1.2% (range = 0.0-2.5%). Once the intervention was implemented, there was a slight change in the level of their social interactions in the expected direction. Specifically, the average percent duration of the social interactions between Zach and Judy across the intervention sessions was 5.2% (range = 4.0-6.5%). Since no social interactions occurred between Zach and Judy during baseline sessions, the percent duration of their social
interactions during the intervention sessions exceeded the percent duration of their social interactions during the baseline sessions and there were no overlapping data points between these sessions (see Figure 4-7).

**Maintenance of the Intervention Effects**

The study’s second research question was: Do the effects of a peer-mediated intervention on the initiations, responses, and interactions of young children with ASD and their peers maintain over time? In order to answer this research question, maintenance sessions were conducted 2 weeks after the peer-mediated intervention ended for Luke and Zane and a week after the intervention ended for Mike. Due to time constraints (i.e., the academic year ended), no maintenance sessions were conducted with Zach.

**Luke and Chris**

**Initiations**

Luke’s rate of independent initiations toward Chris remained the same during maintenance sessions as his rate of independent initiations during intervention sessions (see Figure 4-5). Specifically, Luke’s average rate of independent initiations toward Chris was 2.0/min (range = 1.5-2.3/min) across maintenance sessions while his average rate of independent initiations during intervention sessions was 2.0/min (range = 0.9-2.5/min). Moreover, Luke’s rate of independent initiations toward Chris during maintenance sessions was less variable than his rate of independent initiations during intervention sessions. Chris’ average rate of independent initiations toward Luke increased during maintenance sessions (i.e., 1.1/min; range = 0.8-1.7/min) compared to his rate of independent initiations across intervention sessions (i.e., 0.7/min; range = 0.1-1.3/min). However, there was a decreasing trend in Chris’ rate of independent initiations toward Luke across maintenance sessions.
Responses

Compared to intervention sessions, the proportion of independent responses exhibited by Luke and Chris increased across maintenance sessions (see Figure 4-6). Specifically, Luke’s average proportion of independent responses to Chris’ initiations across maintenance sessions was 0.8 (range = 0.4-1.0), while it was 0.7 (range = 0.4-1.0) across intervention sessions. Moreover, Chris’ average proportion of independent responses to Luke’s initiations was 0.8 (range = 0.6-0.9) across maintenance sessions, while it was 0.6 (range = 0.4-0.8) across intervention sessions.

Social interactions

The percent duration of the social interactions between Luke and Chris also increased during the maintenance sessions compared to intervention sessions (see Figure 4-7). Specifically, the average percent duration of the children’s social interactions across maintenance sessions was 34.7% (range = 19.0-47.0%) while it was 21.6% (range = 10.0-41.0%) across intervention sessions. There was an increasing trend in the percent duration of the social interactions between Luke and Chris across maintenance sessions, though there was variability in the percent duration of their social interactions.

Zane and Jon

Initiations

Even though maintenance sessions for Zane and Jon were conducted 2 weeks after the intervention sessions ended, only two maintenance sessions could be conducted with these children (i.e., due to the academic year ending). Across maintenance sessions, Zane’s rate of independent initiations toward Jon decreased compared to his rate of independent initiations across intervention sessions (see Figure 4-5). Specifically, Zane’s average rate of independent initiations across maintenance sessions was 1.1/min (range = 0.9-1.4/min) while his average rate
of independent initiations was 1.8/min (range = 1.2-2.2/min) across intervention sessions.

Zane’s rate of independent initiations increased during the second maintenance session.

However, more maintenance data points were needed to determine a trend in his rate of independent initiations. Jon’s rate of independent initiations toward Zane also decreased across maintenance sessions. Jon’s average rate of independent initiations across maintenance sessions was 0.4/min (range = 0.3-0.5/min) while it was 0.7/min (range = 0.4-0.9/min) across intervention sessions.

**Responses**

Zane’s proportion of independent responses to Jon’s initiations decreased across maintenance sessions when compared to intervention sessions (see Figure 4-6). Specifically, Zane’s average proportion of independent responses across maintenance sessions was 0.4 (range = 0.3-0.4) while it was 0.5 (range = 0.2-0.8) across intervention sessions. Jon’s average proportion of independent responses to Zane’s initiations across maintenance sessions (i.e., 0.6; range = 0.5-0.6) remained the same as his average proportion of independent responses across intervention sessions (i.e., 0.6; range = 0.5-0.8). Similarly to Zane’s rate of independent initiations during the second maintenance session, Jon’s proportion of independent responses to Zane’s initiations increased during this session. More maintenance data points, however, were needed to determine a trend in his proportion of independent responses.

**Social interactions**

The percent duration of the social interactions between Zane and Jon decreased across the maintenance sessions compared to the percent duration of their social interactions across intervention sessions (see Figure 4-7). Specifically, the average percent duration of the children’s social interactions across maintenance sessions was 3.6% (range = 0.0-7.3%) while the average
percent duration of their interactions across intervention sessions was 15.0% (range = 4.0-24.0%).

**Mike and Drake**

**Initiations**

Due to time constraints (i.e., the academic year ended), maintenance sessions were conducted a week after the peer-mediated intervention ended for Mike and Drake. In addition, only one maintenance session could be conducted with these children (see Figure 4-5). In the maintenance session, Mike’s rate of independent initiations toward Drake was 1.9/min, which was higher than his average rate of independent initiations across intervention sessions (i.e., 1.7/min; range = 1.0-2.3/min). Drake’s rate of independent initiations toward Mike was 1.3/min, which was also higher than his average rate of independent initiations across intervention sessions (i.e., 0.9/min; range = 0.4-1.4/min).

**Responses**

Mike’s proportion of independent responses to Drake’s initiations decreased during the maintenance session (i.e., 0.8; see Figure 4-6) compared to his average proportion of independent responses across intervention sessions (i.e., 0.9; range = 0.5-1.0). Moreover, Drake’s proportion of independent responses to Mike’s initiations during the maintenance session (i.e., 0.5) remained the same as his average proportion of independent responses across intervention sessions (i.e., 0.5; range = 0.3-0.7).

**Social interactions**

The percent duration of the social interactions between Mike and Drake increased during the maintenance session (i.e., 9.0%; see Figure 4-7) when compared to the average percent duration of their social interactions across intervention sessions (i.e., 6.5%; range = 1.0-36.0%).
Generalization of the Intervention Effects

The study’s third research question was: Do the effects of a peer-mediated intervention on the initiations, responses, and interactions of young children with ASD and their peers generalize across peers? In order to answer this research question, generalization probe sessions were conducted weekly throughout Phase 3 of the study. The purpose of these probes was to determine if, and when, changes in the focal children’s target behaviors generalized to peers that did not receive social skills training.

Luke and Joni

Initiations

No initiations were made by either Luke or Joni (i.e., peer that did not receive social skills training) during the generalization probe session conducted during the baseline condition (see Figure 4-5). No generalization probes were conducted during the training sessions. Luke’s rate of independent initiations toward Joni increased across the generalization probe sessions conducted during the intervention condition (i.e., a total of four generalization probe sessions were conducted across the intervention condition) and there was an increasing trend in his rate of independent initiations toward Joni during these generalization probes. Specifically, Luke’s average rate of independent initiations toward Joni in these generalization probe sessions was 0.32/min (range = 0.1-0.6/min). Joni’s average rate of independent initiations toward Luke across the generalization probe sessions conducted during the intervention condition was 0.02/min (range = 0.0-0.1/min). Luke’s average rate of independent initiations toward Joni increased across the generalization probe sessions (i.e., a total of two generalization probe sessions) conducted during the maintenance condition (i.e., 0.7/min; range = 0.7-0.7/min). Joni’s average rate of independent initiations toward Luke was 0.1/min (range = 0.1-0.1/min) across these generalization probes.
Responses

Neither Luke nor Joni initiated toward each other during the generalization probe session conducted during the baseline condition, therefore, no responses occurred either (see Figure 4-6). No generalization probe sessions were conducted during the training sessions. Luke’s average proportion of independent responses to Joni’s initiations across the generalization probe sessions conducted during the intervention condition was 0.2 (range = 0.0–1.0) and Joni’s average proportion of independent responses to Luke’s initiations was 0.4 (range = 0.0–1.0). Luke’s average proportion of independent responses to Joni’s initiations across the generalization probe sessions conducted during the maintenance condition was 0.5 (range = 0.0–1.0) while Joni did not respond to any of Luke’s initiations during these generalization probe sessions.

Social interactions

Neither Luke nor Joni initiated toward each other during the generalization probe session conducted during the baseline condition, therefore, no social interactions occurred between them either (see Figure 4-7). No generalization probes were conducted during the training sessions. Luke and Joni hardly engaged in social interactions across the generalization probe sessions conducted during the intervention condition. Specifically, the average percent duration of the social interactions between Luke and Joni across these generalization probe sessions was 0.2% (range = 0.0–0.7%). No social interactions occurred between these children across the generalization probe sessions conducted during the maintenance condition.

Zane, Alicia, and Carl

Initiations

During the generalization probe sessions conducted during the baseline condition (i.e., a total of two generalization probe sessions), Zane’s average rate of independent initiations toward Alicia (i.e., the peer that did not receive social skills training and was paired with Zane during
the baseline generalization probe sessions) was 0.05/min (range = 0.0-0.1/min; see Figure 4-5). Alicia did not initiate toward Zane during these generalization probe sessions. No generalization probes were conducted during the training sessions. Zane’s average rate of independent initiations toward Carl (i.e., the peer that did not receive social skills training and was paired with Zane during the intervention and maintenance generalization probes) increased across the generalization probe sessions conducted during the intervention condition (i.e., a total of two generalization probe sessions were conducted across the intervention condition) when compared to his average rate of independent initiations to Alicia during the baseline generalization probes (i.e., 0.3/min; range = 0.2-0.4/min). There was an increasing trend in Zane’s rate of independent initiations during the intervention generalization probes. Carl’s rate of independent initiations toward Zane across these sessions was 0.05/min (range = 0.0-0.1). Zane’s rate of independent initiations toward Carl across the generalization probe session conducted during the maintenance condition was 0.3/min while Carl did not initiate toward Zane during this generalization probe session.

**Responses**

Alicia did not initiate toward Zane during the generalization probe sessions conducted during the baseline condition, therefore, Zane did not have an opportunity to exhibit responses (see Figure 4-6) during these sessions. Alicia’s average proportion of independent responses to Zane’s initiations during these sessions was 0.5 (range = 0.0-1.0). As previously mentioned, no generalization probe sessions were conducted during the training sessions. Across the generalization probe sessions conducted during the intervention condition, Zane did not respond to Carl’s initiations while Carl’s average proportion of independent responses to Zane’s initiations was 0.1 (range = 0.0–0.2). Lastly, Carl did not initiate toward Zane during the generalization probe session conducted during the maintenance condition, therefore, Zane did
not have an opportunity to exhibit responses during this session. Carl’s proportion of independent responses to Zane’s initiations during this session was 0.3.

**Social interactions**

No social interactions occurred between Zane and either Alicia or Carl across generalization probe sessions (see Figure 4-7).

**Mike and Jamie**

**Initiations**

Across the generalization probe sessions conducted during the baseline condition (i.e., a total of three sessions), Mike did not initiate toward Jamie (i.e., peer that did not receive social skills training) while Jamie’s average rate of independent initiations was 0.03/min (range = 0.0-0.1/min; see Figure 4-5). No initiations were made by either Mike or Jamie during the generalization probe session conducted during the training sessions. Mike did not initiate toward Jamie during the generalization probe session conducted during the intervention condition while Jamie’s rate of independent initiations was 0.6/min. Mike did not initiate to Jamie during the generalization probe session conducted during the maintenance condition either while Jamie’s rate of independent initiations was 0.7/min.

**Responses**

Neither Mike nor Jamie initiated toward each other during the generalization probe sessions conducted during the baseline and training conditions, therefore, no responses occurred either during these generalization probe sessions (see Figure 4-6). Mike’s proportion of independent responses to Jamie’s initiations during the generalization probe sessions conducted during the intervention and maintenance conditions were 0.8 and 0.3, respectively. Since Mike did not initiate toward Jamie in any of the generalization probe sessions, Jamie could not exhibit any responses across these sessions.
Social interactions

Mike and Jamie did not engage in social interactions during the generalization probe sessions conducted during the baseline, training, and intervention conditions (see Figure 4-7). The percent duration of the social interactions between Mike and Jamie during the generalization probe session conducted during the maintenance condition was 6.0%.

Zach and Shaw

Initiations

Across the generalization probe sessions conducted during the baseline condition (i.e., a total of four generalization probe sessions), Zach’s average rate of independent initiations toward Shaw (i.e., peer that did not receive social skills training) was 0.15/min (range = 0.0-0.3/min) while Shaw’s rate of independent initiations toward Zach was 0.2/min (range = 0.0-0.7/min). Zach demonstrated higher rate of independent initiations toward Shaw during the generalization probe session conducted during the training sessions than during the generalization probes conducted during the baseline condition. Specifically, Zach’s rate of independent initiations during this generalization probe session was 0.6/min. Shaw did not initiate toward Zach during that generalization probe session. During the generalization probe session conducted during the intervention condition, Zach’s rate of independent initiations was 0.7/min while Shaw did not initiate toward Zach. Overall, there was an increasing trend in Zach’s rate of independent initiations toward Shaw across generalization probe sessions, with his rate of independent initiations steadily increasing in each subsequent generalization probe session (see Figure 4-5).

Responses

Zach’s average proportion of independent responses to Shaw’s initiations was 0.1 (range = 0.0-0.6) during the generalization probe sessions conducted during the baseline condition (see Figure 4-6). Shaw’s average proportion of independent responses during these sessions was 0.3
Shaw did not initiate toward Zach during the generalization probe session conducted during the training sessions and thus, Zach had no opportunities to exhibit responses during this session. Moreover, Shaw did not respond to Zach’s initiations during this generalization probe session. Since Shaw did not initiate toward Zach in the generalization probe session conducted during the intervention condition, Zach could not exhibit any responses in this session either. Shaw’s proportion of independent responses during this generalization probe session was 1.0.

**Social interactions**

The average percent duration of the social interactions between Zach and Shaw across the generalization probe sessions conducted during the baseline condition was 13.2% (range = 0.0-53.0%; see Figure 4-7). The percent duration of the social interactions between Zach and Shaw across the generalization probe session conducted during the training sessions was 0.8%. Lastly, the percent duration of these children’s social interactions increased in the generalization probe session conducted during the intervention condition (i.e., 6.0%).

**Comparison of Focal Children and Peers Social Behaviors**

The study’s fourth research question was: How do the initiations, responses, and interactions of young children with ASD compare to the initiations, responses, and interactions of same-aged peers prior to and after receiving a peer-mediated intervention? Pre and post-experimental direct observations during naturally occurring play activities were conducted to collect data on the peer-related social behaviors (i.e., initiations, responses, and social interactions) of the focal children and peers before and after implementing the intervention. The data collected during these observations were compared in order to answer this research question.
Pre and Post-Experimental Direct Observations

Luke, Chris, and Joni

Pre-experimental observations. Across the pre-experimental observation sessions, Luke did not initiate or engage in social interactions with his classmates during naturally occurring play activities (i.e., 0% of the intervals observed). Across observation sessions, Luke responded to his classmates’ initiations in 7% of the observed intervals (i.e., responses were observed in two intervals out of the 30 total observed intervals). Whereas, Chris initiated toward his classmates in 97% of the observed intervals (i.e., 29 intervals out of the 30 total observed intervals), responded to his classmates’ initiations in 73% of the observed intervals (i.e., 22 intervals out of the 30 total observed intervals), and engaged in social interactions with his classmates in 87% of the observed intervals (i.e., 26 intervals out of the 30 total observed intervals) across pre-experimental observation sessions. Joni initiated toward her classmates in 50% of the observed intervals (i.e., 15 intervals out of the 30 total observed intervals), responded to her classmates’ initiations in 67% of the observed intervals (i.e., 20 intervals out of the 30 total observed intervals), and engaged in social interactions with her classmates in 56% of the observed intervals (i.e., 17 intervals out of the 30 total observed intervals) across observation sessions. See Figure 4-8 for the percent of intervals that the aforementioned children engaged in each peer-related social behavior during each pre-experimental observation session.

Post-experimental observations. Across the post-experimental observation sessions, Luke initiated toward his classmates in 67% of the observed intervals (i.e., 20 intervals out of the 30 total observed intervals). Moreover, Luke responded to his classmates’ initiations and engaged in social interactions with them in 67% (i.e., 20 intervals out of the 30 total observed intervals) and 63% (i.e., 19 intervals out of the 30 total observed intervals) of the observed intervals, respectively, across observation sessions. Chris initiated toward his classmates in 70%
of the intervals across observation sessions (i.e., 21 intervals out of the 30 total observed intervals). In addition, Chris responded to his classmates’ initiations and engaged in social interactions with them in 43% of the intervals across observation sessions (i.e., 13 intervals out of the 30 total observed intervals). Lastly, Joni initiated toward her classmates in 27% of the intervals (i.e., 8 intervals out of the 30 total observed intervals), responded to her classmates’ initiations in 33% of the observed intervals (i.e., 10 intervals out of the 30 total observed intervals), and engaged in social interactions with her classmates in 33% of the observed intervals (i.e., 10 intervals out of the 30 total observed intervals). See Figure 4-9 for the percent of intervals that the aforementioned children engaged in each peer-related social behavior during each post-experimental observation session.

**Zane, Jon, Alicia, and Carl**

**Pre-experimental observations.** Zane initiated to his classmates in 3% of the observed intervals across pre-experimental observation sessions (i.e., 1 interval out of the 30 total observed intervals). Zane did not exhibit other peer-related social behaviors during the pre-experimental observations (i.e., 0% of the intervals observed). Jon initiated toward his classmates in 63% of the observed intervals (i.e., 19 intervals out of the 30 total observed intervals), responded to his classmates’ initiations in 43% of the observed intervals (i.e., 13 intervals out of the 30 total observed intervals), and engaged in social interactions with his classmates in 47% of the intervals across observation sessions (i.e., 14 intervals out of the 30 total observed intervals). Alicia initiated toward her classmates in 60% of the observed intervals (i.e., 18 intervals out of the 30 total observed intervals), responded to her classmates’ initiations in 67% of the observed intervals (i.e., 20 intervals out of the 30 total observed intervals), and engaged in social interactions with her classmates in 63% of the intervals across pre-experimental observation sessions (i.e., 19 intervals out of the 30 total observed intervals). Carl initiated toward his
classmates in 43% of the intervals across observations sessions (i.e., 13 intervals out of the 30 total observed intervals). Moreover, Carl responded to his classmates’ initiations and engaged in social interactions with them in 20% (i.e., 6 intervals out of the 30 total observed intervals) and 17% of the observed intervals, (i.e., 5 intervals out of the 30 total observed intervals), respectively, across observation sessions. See Figure 4-10 for the percent of intervals that each of the aforementioned children engaged in peer-related social behaviors during each pre-experimental observation session.

**Post-experimental observations.** Across observation sessions, Zane initiated toward his classmates in 40% of the observed intervals (i.e., 12 intervals out of the 30 total observed intervals), responded to his classmates’ initiations in 17% of the observed intervals (i.e., 5 intervals out of the 30 total observed intervals), and engaged in social interactions with his classmates in 20% of the observed intervals (i.e., 6 intervals out of the 30 total observed intervals). Jon initiated toward his classmates in 30% of the intervals across post-experimental observation sessions (i.e., 9 intervals out of the 30 total observed intervals). In addition, Jon responded to his classmates’ initiations in 40% of the observed intervals (i.e., 12 intervals out of the 30 total observed intervals) and engaged in social interactions with his classmates in 23% of the intervals across observation sessions (i.e., 7 intervals out of the 30 total observed intervals). Carl initiated toward his classmates in 57% of the intervals across observations sessions (i.e., 17 intervals out of the 30 total observed intervals). Moreover, Carl responded to his classmates’ initiations and engaged in social interactions with them in 57% of intervals across observation sessions (i.e., 17 intervals out of the 30 total observed intervals). See Figure 4-11 for the percent of intervals that each of the aforementioned children engaged in peer-related social behaviors during each post-experimental observation session.
Mike, Drake, and Jamie

**Pre-experimental observations.** Across the pre-experimental observation sessions, Mike did not engage in any peer-related social behavior with his classmates (i.e., 0% of the intervals observed). Drake initiated toward his classmates in 70% of the observed intervals across observation sessions (i.e., 21 intervals out of the 30 total observed intervals). Moreover, Drake responded to his classmates’ initiations in 53% of the observed intervals (i.e., 16 intervals out of the 30 total observed intervals) and engaged in social interactions with his classmates in 50% of the intervals across observation sessions (i.e., 15 intervals out of the 30 total observed intervals). Lastly, Jamie initiated toward her classmates in 53% of the observed intervals (i.e., 16 intervals out of the 30 total observed intervals), responded to her classmates’ initiations in 50% of the intervals (i.e., 15 intervals out of the 30 total observed intervals), and engaged in social interactions with her classmates in 37% of the intervals across observation sessions (i.e., 11 intervals out of the 30 total observed intervals). See Figure 4-12 for the percent of intervals that each of the aforementioned children engaged in peer-related social behaviors during each pre-experimental observation session.

**Post-experimental observations.** Mike initiated toward his peers in 33% of the observed intervals across post-experimental observation sessions (i.e., 10 intervals out of the 30 total observed intervals). In addition, Mike responded to his peers’ initiations and engaged in social interactions with them in 20% (i.e., 6 intervals out of the 30 total observed intervals) and 10% of the observed intervals (i.e., 3 intervals out of the 30 total observed intervals), respectively, across observation sessions. Drake initiated toward his classmates in 37% of the observed intervals (i.e., 11 intervals out of the 30 total observed intervals), responded to his classmates’ initiations in 50% of the intervals (i.e., 15 intervals out of the 30 total observed intervals), and engaged in social interactions with his classmates in 40% of the observed intervals across observation
sessions (i.e., 12 intervals out of the 30 total observed intervals). Jamie initiated toward her classmates in 63% of the observed intervals (i.e., 19 intervals out of the 30 total observed intervals), responded to her classmates’ initiations in 37% of the observed intervals (i.e., 11 intervals out of the 30 total observed intervals), and engaged in social interactions with her classmates in 40% of the intervals across observation sessions (i.e., 12 intervals out of the 30 total observed intervals). See Figure 4-13 for the percent of intervals that each of the aforementioned children engaged in peer-related social behaviors during each post-experimental observation session.

Zach, Judy, and Shaw

Pre-experimental observations. Across the pre-experimental observation sessions, Zach did not initiate or engage in social interactions with his classmates (i.e., 0% of the intervals observed). Zach responded to his classmates’ initiations in 17% of the observed intervals across pre-experimental observation sessions (i.e., 5 intervals out of the 30 total observed intervals). Judy initiated and engaged in social interactions with her classmates in 60% of the intervals (i.e., 18 intervals out of the 30 total observed intervals) and responded to her classmates’ initiations in 53% of the intervals across observation sessions (i.e., 16 intervals out of the 30 total observed intervals). Lastly, Shaw initiated toward his classmates in 70% of the observed intervals (i.e., 21 intervals out of the 30 total observed intervals), responded to his classmates’ initiations in 60% of the observed intervals (i.e., 18 intervals out of the 30 total observed intervals), and engaged in social interactions with his classmates in 50% of the observed intervals across observation sessions (i.e., 15 intervals out of the 30 total observed intervals). See Figure 4-14 for the percent of intervals that each of the aforementioned children engaged in peer-related social behaviors during each pre-experimental observation session.
**Post-experimental observations.** Zach initiated toward his peers in 27% of the observed intervals (i.e., 8 intervals out of the 30 total observed intervals) and responded to his peers’ initiations in 13% of the intervals across observation sessions (i.e., 4 intervals out of the 30 total observed intervals). Zach did not engage in social interactions with his classmates (i.e., 0% of the intervals observed). Judy initiated toward her classmates in 53% of the intervals across observation sessions (i.e., 16 intervals out of the 30 total observed intervals). Moreover, Judy responded to her classmates’ initiations in 57% of the observed intervals (i.e., 17 intervals out of the 30 total observed intervals) and engaged in social interactions with her classmates in 57% of the observed intervals across observation sessions (i.e., 17 intervals out of the 30 total observed intervals). Shaw initiated toward his classmates in 60% of the observed intervals across observation sessions (i.e., 18 intervals out of the 30 total observed intervals). Shaw responded to his classmates’ initiations and engaged in social interactions with them in 43% (i.e., 13 intervals out of the 30 total observed intervals) and 40% of the observed intervals across observation sessions (i.e., 12 intervals out of the 30 total observed intervals), respectively. See Figure 4-15 for the percent of intervals that each of the aforementioned children engaged in peer-related social behaviors during each post-experimental observation session.

**Summary of the Pre and Post-Experimental Direct Observations**

Data collected during the pre and post-experimental direct classroom observations are summarized in Table 4-1. These data were used to assess one aspect of the social validity of the outcome of the intervention. That is, to examine if the intervention resulted in socially meaningful changes for the focal children. The focal children engaged in low levels of peer-related social behaviors across the pre-experimental observation sessions. For example, Zane initiated to his classmates in 3% of the observed intervals across pre-experimental observation sessions and none of the focal children engaged in social interactions with their classmates.
during these observations. In comparison, all of the peers engaged in peer-related social behaviors during the pre-experimental observation sessions. For example, Chris initiated toward his classmates in 97% of the observed intervals across the pre-experimental observation sessions and all of the peers engaged in social interactions with their classmates during these observations. Consequently, the peer-related social behaviors exhibited by the focal children across the pre-experimental observations were not comparable to the peer-related social behaviors exhibited by their peers during these observations.

Following the implementation of the intervention, all of the focal children exhibited peer-related social behaviors. However, not all of the peer-related social behaviors exhibited by the focal children during the post-experimental observations were comparable to those exhibited by their peers during these observations. Only the initiations made by Luke and Zane to their classmates during the post-experimental observations were comparable to the initiations made by their peers during these observation sessions. Specifically, Luke and Zane initiated toward their classmates in 67% and 40% of the observed intervals across the post-experimental observation sessions, respectively. On average, Chris and Joni (i.e., Luke’s peers) initiated toward their classmates in 48% of the observed intervals across post-experimental observation sessions while Jon and Carl (i.e., Zane’s peers), on average, initiated toward their classmates in 40% of the observed intervals across these observation sessions. The responses and social interactions exhibited by Luke during the post-experimental observations were the only other peer-related social behaviors exhibited by the focal children that were comparable to those exhibited by their peers during the post-experimental observations. Specifically, Luke responded to his classmates’ initiations and engaged in social interactions with them in 67% and 63% of the observed intervals, respectively, across post-experimental observation sessions. On average, Chris and
Joni responded to their classmates’ initiations and engaged in social interactions with them in 38% of the observed intervals across post-experimental observation sessions.

**Interobserver Agreement**

Interobserver agreement (IOA) data were collected on 30% randomly selected observation sessions during each experimental phase of the study (i.e., Phases 2 and 3).

**Phase 2: Preference Assessment Phase**

During Phase 2, data collectors recorded the order in which the focal children selected the stimuli presented to them during each preference assessment session. An agreement was defined as data collectors recording the same stimulus selection or no selection for each trial of a preference assessment session. IOA was calculated by dividing agreements by agreements plus disagreements and multiplying by 100. The IOA across focal children preference assessment sessions was 100%. A total of seven preference assessment sessions were used to collect IOA data during this phase of the study.

**Phase 3: Intervention Phase**

For Phase 3, IOA was calculated using a point-by-point time window agreement check (Bakeman & Quera, 2011) for both the duration and event codes. Specifically, IOA was calculated by dividing the number of agreements on the occurrence and nonoccurrence of a given behavior by the number of agreements plus disagreements and multiplying by 100. An agreement, for duration and event codes, was defined as two observers independently recording the occurrence or nonoccurrence of the same behavior code within a plus/minus three-second window of time. Average IOA across codes for baseline, intervention, maintenance, and generalization sessions was 99.93% (range = 99.55-100%), 98.90% (range 98.27-99.45%), 99.27% (range = 98.55-99.55%), and 99.93% (range = 99.73-100%), respectively. Overall IOA across codes was 99.50% (range 98.90-99.93%). A total of 33 sessions were used to collect IOA.
data (i.e., nine baseline sessions, 11 intervention sessions, four maintenance sessions, and nine
generalization probe sessions). See Table 4-2 for a summary of the average IOA for each code
across Phase 3 of the study.

**Treatment Integrity**

Procedural integrity data on the PI’s implementation of the experimental procedures were
collected on 30% randomly selected observation sessions across the experimental phases of the
study (i.e., Phases 2 and 3).

**Phase 2: Preference Assessment Phase**

During Phase 2, a data collector recorded the extent to which the PI followed the
procedures described in the preference assessment protocol while conducting the preference
assessment sessions. The data collector indicated that, across preference assessment sessions, the
PI correctly completed all of the steps included in the preference assessment protocol. That is,
across preference assessment sessions, the PI allowed the children to sample each stimulus
included in the stimuli array prior to conducting the preference assessment sessions, correctly set
up the stimuli array, provided the correct consequences to the children, removed each selected
stimulus from the array, sequentially rotated the sequencing of the stimuli, and ended the
sessions correctly. See Table 4-3 for a summary of the preference assessment procedural
integrity data.

**Phase 3: Intervention Phase**

During this phase of the study, a data collector recorded the extent to which the PI
followed the appropriate experimental procedures during the training sessions for the focal
children and their peers. The data collector indicated that, across training sessions, the PI
correctly completed all of the steps included in the focal child and peer training protocol. That is,
across training sessions, the PI correctly explained the purpose of the intervention to the children,
described or reviewed the social skills that the children had to use during the peer-mediated interventions, assessed the children’s understanding of the social skills taught to them, role-played scenarios with the children for them to practice the social skills taught to them, role-play scenarios ended correctly, explained the prompting procedure to the children, and provided performance feedback and praise to the children at the end of the training sessions (see Table 4-4 for a summary of the training procedural integrity data).

Moreover, during this phase of the study a data collector recorded the extent to which the PI followed the appropriate experimental procedures during baseline, intervention, maintenance, and generalization sessions. The data collector indicated that, across these sessions, the PI correctly completed all of the steps included in the intervention implementation protocol. That is, across these sessions, the PI provided the children with the correct instructions at the beginning of the sessions (e.g., the PI told the children to socially interact with one another using the social skills previously taught to them before intervention sessions), provided prompts to the children solely throughout intervention sessions, the focal children’s preferred toys were not included during baseline sessions and generalization probe sessions conducted during baseline, provided performance feedback to the children solely at the end of intervention sessions, and praised the children at the end of all sessions. See Table 4-5 for a summary of the intervention procedural integrity data.

**Social Validity**

The focal children’s teacher was asked to assess the acceptability and social validity of the outcomes of the intervention by completing a Likert-type rating scale at the conclusion of the study. On a 5-point scale (1 = Not at all to 5 = Very), the teacher indicated that the intervention was not disruptive to the classroom (i.e., the answer to this question was Not at all) and that she was willing to let other children in her classroom participate in the intervention (i.e., the answer
to this question was Very). Moreover, on a 5-point scale (1 = Disagree to 5 = Agree), the teacher indicated that she noticed that all of the focal children interacted more with the other children in her classroom (i.e., the average rating for this question was 4.75) as well as with children in other classrooms (i.e., the average rating for this question was 4.75) by the end of the study. The teacher indicated that all of the focal children exhibited more social behaviors in settings other than her classroom (e.g., playground) at the conclusion of the study (i.e., the average rating for this question was 4.75). See Table 4-6 for a summary of the teacher social validity questionnaire.

Segments of baseline and intervention sessions were shown to a naïve observer and she was asked to complete a Likert-type rating scale to indicate the degree of appropriate social behaviors exhibited by the focal children on the video clips. On a 4-point scale (1 = Did not occur to 4 = Continuously occurred), the naïve observer indicated that the focal children engaged in more social initiations during the intervention sessions (i.e., average rating of 3.75) than during the baseline sessions (i.e., average rating of 1.0). The naïve observer also indicated that the peers responded to the focal children’s initiations with more frequency during the intervention sessions (i.e., average rating of 3.25) than during the baseline sessions (i.e., average rating of 1.0). On a 4-point scale (1 = Did not occur to 4 = Appropriate), the naïve observer indicated that the social behaviors of the focal children were more appropriate during the intervention sessions (i.e., average rating of 3.5) than during the baseline sessions (i.e., average rating of 1.0). Lastly, the naïve observer indicated that the social interactions between the focal children and their peers were more appropriate during the intervention sessions (i.e., average rating of 3.25) than during the baseline sessions (i.e., average rating of 1.0). See Table 4-7 for a summary of the social validity assessment forms.
Similarly, segments of generalization probes conducted during baseline as well as during intervention were shown to the naïve observer (see Table 4-7). On a 4-point scale (1 = Did not occur to 4 = Continuously occurred), the naïve observer indicated that the focal children engaged in more social initiations during the generalization probe sessions conducted during the intervention condition (i.e., average rating of 2.5) than during the generalization probe sessions conducted during the baseline condition (i.e., average rating of 1.0). The naïve observer also indicated that the peers responded to the focal children’s initiations with more frequency during the generalization probe sessions conducted during the intervention condition (i.e., average rating of 2.25) than during the generalization probe sessions conducted during the baseline condition (i.e., average rating of 1.0). On a 4-point scale (1 = Did not occur to 4 = Appropriate), the naïve observer indicated that the social behaviors of the focal children were more appropriate during the generalization probe sessions conducted during the intervention condition (i.e., average rating of 3.75) than during the generalization probe sessions conducted during the baseline condition (i.e., average rating of 1.0). Finally, the naïve observer indicated that the social interactions between the focal children and their peers were more appropriate during the generalization probe sessions conducted during the intervention condition (i.e., average rating of 3.25) than during the generalization probe sessions conducted during the baseline condition (i.e., average rating of 1.0).
Table 4-1. Percent of intervals children engaged in social behaviors across observations.

<table>
<thead>
<tr>
<th>Child</th>
<th>Pre-Experimental Observations</th>
<th>Post-Experimental Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Initiations</td>
<td>Responses</td>
</tr>
<tr>
<td>Luke</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Chris</td>
<td>97</td>
<td>73</td>
</tr>
<tr>
<td>Joni</td>
<td>50</td>
<td>67</td>
</tr>
<tr>
<td>Zane</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Jon</td>
<td>63</td>
<td>43</td>
</tr>
<tr>
<td>Carl</td>
<td>43</td>
<td>20</td>
</tr>
<tr>
<td>Zach</td>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td>Judy</td>
<td>60</td>
<td>53</td>
</tr>
<tr>
<td>Shaw</td>
<td>70</td>
<td>60</td>
</tr>
<tr>
<td>Mike</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Drake</td>
<td>73</td>
<td>53</td>
</tr>
<tr>
<td>Jamie</td>
<td>53</td>
<td>50</td>
</tr>
</tbody>
</table>
Table 4-2. Summary of interobserver agreement across Phase 3.

<table>
<thead>
<tr>
<th>Code</th>
<th>Average IOA for Baseline (9 sessions)</th>
<th>Average IOA for Intervention (11 sessions)</th>
<th>Average IOA for Generalization (9 sessions)</th>
<th>Average IOA for Maintenance (4 sessions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peer initiations</td>
<td>99.89</td>
<td>99.00</td>
<td>99.78</td>
<td>99.25</td>
</tr>
<tr>
<td>FC initiations</td>
<td>99.89</td>
<td>98.36</td>
<td>99.89</td>
<td>99.00</td>
</tr>
<tr>
<td>FC prompted initiations</td>
<td>100.00</td>
<td>99.73</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>FC responses</td>
<td>100.00</td>
<td>99.00</td>
<td>99.89</td>
<td>99.25</td>
</tr>
<tr>
<td>FC prompted responses</td>
<td>100.00</td>
<td>99.82</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Peer responses</td>
<td>100.00</td>
<td>98.45</td>
<td>99.89</td>
<td>98.75</td>
</tr>
<tr>
<td>Peer Prompted responses</td>
<td>100.00</td>
<td>99.73</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Peer no responses</td>
<td>99.89</td>
<td>98.82</td>
<td>99.89</td>
<td>99.00</td>
</tr>
<tr>
<td>FC no responses</td>
<td>99.89</td>
<td>99.09</td>
<td>99.89</td>
<td>99.25</td>
</tr>
<tr>
<td>Interactions</td>
<td>99.67</td>
<td>96.00</td>
<td>100.00</td>
<td>97.50</td>
</tr>
<tr>
<td>Wait prompt</td>
<td>100.00</td>
<td>99.91</td>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Note: IOA = interobserver agreement; FC = focal child.
Table 4-3. Summary of the preference assessment procedural integrity forms.

<table>
<thead>
<tr>
<th>Item</th>
<th>Percent of Steps Completed Correctly/Average Rating (Across Sessions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The investigator allowed the child to sample each stimulus in the array.</td>
<td>100</td>
</tr>
<tr>
<td>2. Child was allowed to choose one stimulus from the stimuli array (i.e., 1 = <em>Not adhered to on any trials</em>, 4 = <em>Adhered to on all trials</em>).</td>
<td>4</td>
</tr>
<tr>
<td>3. Child was allowed to play with the chosen stimulus (i.e., 1 = <em>Not adhered to on any trials</em>, 4 = <em>Adhered to on all trials</em>).</td>
<td>4</td>
</tr>
<tr>
<td>4. After each trial, the chosen stimulus was removed from the array (i.e., 1 = <em>Not adhered to on any trials</em>, 4 = <em>Adhered to on all trials</em>).</td>
<td>4</td>
</tr>
<tr>
<td>5. The sequencing of the stimuli was sequentially rotated&lt;sup&gt;a&lt;/sup&gt; (i.e., 1 = <em>Not adhered to on any trials</em>, 4 = <em>Adhered to on all trials</em>).</td>
<td>4</td>
</tr>
<tr>
<td>6. Preference assessment session ended appropriately (i.e., 1 = <em>Not adhered to on any trials</em>, 4 = <em>Adhered to on all trials</em>).</td>
<td>100</td>
</tr>
</tbody>
</table>

Note: <sup>a</sup> Denotes that this item was not applicable to the first trial of a preference assessment session.
Table 4-4. Summary of the training procedural integrity forms.

<table>
<thead>
<tr>
<th>Item</th>
<th>Percent of Steps Completed Correctly (Across Sessions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The purpose of the investigation was explained to the child.</td>
<td>100</td>
</tr>
<tr>
<td>2. <em>Franklin’s New Friend</em> was read to the child and child was asked questions regarding the book*.</td>
<td>100</td>
</tr>
<tr>
<td>3. The social skills were either described or reviewed with the child.</td>
<td>100</td>
</tr>
<tr>
<td>4. The child was allowed to ask questions during the session.</td>
<td>100</td>
</tr>
<tr>
<td>5. Scenarios were role-played with the child*.</td>
<td>100</td>
</tr>
<tr>
<td>6. Role-play ended appropriately (e.g., after the child independently initiated social interactions three times)*.</td>
<td>100</td>
</tr>
<tr>
<td>7. Performance feedback was provided to the child*.</td>
<td>100</td>
</tr>
<tr>
<td>8. The child was explained that he or she will be provided with prompts throughout intervention sessions*.</td>
<td>100</td>
</tr>
<tr>
<td>9. Praise was provided to the child at the end of the session.</td>
<td>100</td>
</tr>
</tbody>
</table>

Note: FC = focal child. * Denotes that this item was only applicable to the peers’ first training session. ** Denotes that this item was only applicable to the second and third training sessions of both peers and focal children. *** Denotes that this item was only applicable to the third training sessions of both peers and focal children.
Table 4-5. Summary of the intervention procedural integrity data.

<table>
<thead>
<tr>
<th>Item</th>
<th>Baseline</th>
<th>Intervention</th>
<th>Maintenance</th>
<th>Generalization (BSL)</th>
<th>Generalization (INT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Children were told by the investigator to play with the stimuli present in the play area.</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>2. Children were told at the beginning of the session to interact using the social skills previously taught to them.</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>3. Prompts were provided to the FC for him to engage in the social skills (i.e., 1 = Not at all, 4 = Frequently/As Needed).</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4. Visual cards were used when providing prompts to the FC (i.e., 1 = Not at all, 4 = Frequently/ As Needed).</td>
<td>1</td>
<td>3.9</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5. Prompts were provided to peer for him/her to engage in the social skills (i.e., 1 = Not at all, 4 = Frequently/ As Needed).</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>6. The FC preferred stimulus was included/not included in the session.</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>7. Performance feedback was provided/not provided to the children at the end of the session.</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>8. Praise was provided to the children at the end of the session.</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Note: BSL = baseline; INT = intervention; FC = focal child.
Table 4-6. Summary of the teacher social validity questionnaire.

<table>
<thead>
<tr>
<th>Item</th>
<th>FC’s Teacher Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How disruptive was the intervention to your classroom (i.e., 1 = Not at all, 5 = Very)?</td>
<td>1</td>
</tr>
<tr>
<td>2. How willing are you to let another child participate in this intervention (i.e., 1 = Not at all, 5 = Very)?</td>
<td>5</td>
</tr>
<tr>
<td>3. I have noticed that the focal child interacts more with his peers in my classroom (i.e., 1 = Disagree, 5 = Agree).</td>
<td>Luke 5, Zane 5, Mike 5, Zach 4</td>
</tr>
<tr>
<td>4. I have noticed that the focal child interacts more with peers from others classrooms (i.e., 1 = Disagree, 5 = Agree).</td>
<td>Luke 5, Zane 5, Mike 5, Zach 4</td>
</tr>
<tr>
<td>5. I have noticed an increase in the social behaviors of the focal child in other settings (i.e., 1 = Disagree, 5 = Agree).</td>
<td>Luke 5, Zane 5, Mike 5, Zach 4</td>
</tr>
</tbody>
</table>

Note: FC’s = focal children’s.
Table 4-7. Summary of the social validity assessment forms.

<table>
<thead>
<tr>
<th>Item</th>
<th>Baseline</th>
<th>Intervention</th>
<th>Social Validity</th>
<th>Generalization (BSL)</th>
<th>Generalization (INT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How frequent were the social initiations made by the FC (i.e., 1 = Did not occur, 4 = Continuously occurred)?</td>
<td>Luke 1</td>
<td>Luke 4</td>
<td>Luke 1</td>
<td>Luke 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Zane 1</td>
<td>Zane 4</td>
<td>Zane 1</td>
<td>Zane 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mike 1</td>
<td>Mike 4</td>
<td>Mike 1</td>
<td>Mike 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Zach 1</td>
<td>Zach 3</td>
<td>Zach 1</td>
<td>Zach 3</td>
<td></td>
</tr>
<tr>
<td>2. How frequent were the responses of the peer to the FC’s initiations (i.e., 1 = Did not occur, 4 = Continuously occurred)?</td>
<td>Luke 1</td>
<td>Luke 4</td>
<td>Luke 1</td>
<td>Luke 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Zane 1</td>
<td>Zane 4</td>
<td>Zane 1</td>
<td>Zane 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mike 1</td>
<td>Mike 4</td>
<td>Mike 1</td>
<td>Mike 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Zach 1</td>
<td>Zach 1</td>
<td>Zach 1</td>
<td>Zach 3</td>
<td></td>
</tr>
<tr>
<td>3. How appropriate were the social behaviors of the focal child (i.e., 1 = Did not occur, 4 = Appropriate)?</td>
<td>Luke 1</td>
<td>Luke 4</td>
<td>Luke 1</td>
<td>Luke 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Zane 1</td>
<td>Zane 4</td>
<td>Zane 1</td>
<td>Zane 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mike 1</td>
<td>Mike 4</td>
<td>Mike 1</td>
<td>Mike 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Zach 1</td>
<td>Zach 2</td>
<td>Zach 1</td>
<td>Zach 4</td>
<td></td>
</tr>
<tr>
<td>4. How appropriate were the social interactions between the participants (i.e., 1 = Did not occur, 4 = Appropriate)?</td>
<td>Luke 1</td>
<td>Luke 4</td>
<td>Luke 1</td>
<td>Luke 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Zane 1</td>
<td>Zane 4</td>
<td>Zane 1</td>
<td>Zane 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mike 1</td>
<td>Mike 4</td>
<td>Mike 1</td>
<td>Mike 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Zach 1</td>
<td>Zach 1</td>
<td>Zach 1</td>
<td>Zach 4</td>
<td></td>
</tr>
</tbody>
</table>

Note: BSL = baseline; INT = intervention; FC = focal child.
Figure 4-1. Luke’s preference assessment results.

Figure 4-2. Zane’s preference assessment results.
Figure 4-3. Mike’s preference assessment results.

Figure 4-4. Zach’s preference assessment results.
Figure 4-5. Participants’ rate of initiations.
Figure 4-6. Participants’ proportion of responses.
Figure 4-7. Percent duration of the participants’ social interactions.
Figure 4-8. Luke, Chris, and Joni’s pre-experimental observations.

Figure 4-9. Luke, Chris, and Joni’s post-experimental observations.
Figure 4-10. Zane, Jon, Alicia, and Carl’s pre-experimental observations.

Figure 4-11. Zane, Jon, and Carl’s post-experimental observations.
Figure 4-12. Mike, Drake, and Jamie’s pre-experimental observations.

Figure 4-13. Mike, Drake, and Jamie’s post-experimental observations.
Figure 4-14. Zach, Judy, and Shaw’s pre-experimental observations.

Figure 4-15. Zach, Judy, and Shaw’s post-experimental observations.
CHAPTER 5
DISCUSSION

The purpose of this chapter is to provide an overview and explanation of the study’s findings. In addition, this chapter will provide a discussion of the implications of the findings for future research and practice. Finally, this chapter will conclude with a discussion of the study’s limitations.

Overview and Explanation of Findings

Peer-Related Social Behaviors

The purpose of this study was to examine the effects of a peer-mediated intervention on the peer-related social behaviors of young children with ASD, with the primary focus on the initiations made by these children to their peers. A functional relationship between the peer-mediated intervention and the initiations made by the children with ASD toward their peers was established. Moreover, a functional relationship between the peer-mediated intervention and the other peer-related social behaviors of the children with ASD was established. The findings of this study provide further support to the efficacy of peer-mediated interventions in addressing the peer-related social competence needs of children with ASD (e.g., Garrison-Harrell et al., 1997; Katz & Girolametto, 2013, 2015; Thiemann & Goldstein, 2001, 2004). Few studies have implemented peer-mediated interventions with the aim of increasing the initiations made by children with ASD toward their peers. Moreover, the studies that have focused on increasing these children’s initiations have reported mixed findings (e.g., Barber et al., 2016; Kamps et al., 2014). Consequently, this study contributes to the literature by demonstrating that providing systematic instruction to young children with ASD on how to initiate appropriate social interactions and embedding these children’s preferred toys, as identified by preference
assessments, in peer-mediated interventions may be an effective way to increase the initiations made by these children to their peers.

The findings of this study indicate that conducting preference assessments to identify and embed the preferred toys of young children with ASD in peer-mediated interventions may be an effective approach to increase the social initiations made by these children to their peers. Specifically, when the focal children were taught how to initiate appropriate social interactions with their peers, the rate of independent initiations made by three of them toward their peers began to increase. However, it was not until the intervention sessions began and the children’s preferred toys were included in these sessions that there was an immediate increase in the rate of independent initiations made by all of the focal children toward their peers (i.e., all of the focal children’s rate of independent initiations across intervention sessions consistently exceeded their rate of independent initiations across baseline sessions, with no overlapping data points). Given the immediate increase in the rate of independent initiations made by all of the focal children toward their peers once the intervention sessions began, it could be argued that peer-mediated interventions may be more effective in increasing the frequency of social initiations made by children with ASD to their peers, as well as in increasing these children’s overall peer-related social behaviors, when they include the preferred stimuli of the children with ASD in them (i.e., baseline or training sessions did not include the focal children’s preferred toys) than when they include stimuli selected a priori by intervention agents.

The peer-mediated intervention implemented in this study increased, across intervention sessions, the percent duration of the social interactions between all of the focal children and their peers. However, this increase was more noticeable for Luke and Zane, and their peers, than for Mike and Zach, and their peers. One plausible explanation might be the difference in the peers’
interest in the preferred toys identified for the focal children. For example, the peers of Luke and Zane enjoyed playing with the stimuli used during their intervention sessions (i.e., play-dough and kitchen toys, respectively) and actively engaged with those stimuli across intervention sessions. In contrast, Mike’s peer expressed many times throughout the intervention that he wanted to play with something other than puzzles (i.e., Mike’s preferred stimulus) while Zach’s peer expressed at the beginning of the intervention that she did not like playing with toy cars (i.e., Zach’s preferred stimulus). Therefore, it might be that Luke and Zane shared similar toy preferences with their peers and thus, they were more likely to engage in reciprocal social interactions with their peers across intervention sessions than Mike and Zach with their peers. It is important to note that there was a decreasing trend in the percent duration of the social interactions between Zane and his peer across intervention sessions. One possible explanation for this decreasing trend could be a change in Zane’s toy preferences during the intervention. Specifically, the preference assessments for all of the focal children were conducted at the same time (i.e., during Phase 2 of the study), which was approximately 2 months before Zane’s intervention sessions began. It is possible that Zane’s toy preferences began to change during that 2 month period and thus, the reinforcing value of the toys used in his intervention sessions decreased over time. However, no data were collected in any phase of this study to systematically determine if the preferences of the focal children changed during the course of the study.

**Maintenance of the Intervention Effects**

The results of this study suggest that the effects of the intervention maintained over time (i.e., 2 weeks after the intervention ended for Luke and Zane and one week after the intervention ended for Mike). Specifically, the rate of independent initiations made by these three children (i.e., maintenance sessions could not be conducted with Zach) toward their peers during
maintenance sessions consistently exceeded their rate of independent initiations toward their peers across baseline sessions. Additionally, the proportion of responses made by these children to their peers’ initiations and the percent duration of the social interactions between these children and their peers during maintenance sessions were comparable to those during intervention sessions. Nevertheless, the results of this study regarding the maintenance of the effects of the intervention should be considered preliminary as limited maintenance data were collected due to time constraints (i.e., end of the academic year).

An interesting finding was that Zane’s rate of independent initiations toward his peer during the maintenance sessions was lower than his rate of independent initiations toward his peer in any of the intervention sessions. There is evidence in the peer-mediated intervention literature that suggest that children with ASD engage in more peer-related social behaviors in settings in which they are provided with prompts from change agents than in settings in which they are not provided with any prompts (e.g., Fox, Shores, Linderman, & Strain, 1986; Odom, Hoyson, Jamieson, & Strain, 1985; Odom & Watts, 1991; Thiemann & Goldstein, 2001, 2004). This could be one possible explanation for Zane’s lower rate of independent initiations toward Jon during maintenance sessions than during intervention sessions. For example, Thiemann and Goldstein (2001) conducted a study to examine the effects of adult prompts and video feedback on the peer-related social behaviors of children with ASD. The authors found that the peer-related social behaviors of three out of five participants returned to baseline levels once the prompts were removed from the intervention. In the present study, the children were not provided with any prompts during maintenance sessions. Therefore, it could be that prompts were necessary for Zane to maintain similar rate of initiations toward Jon during maintenance sessions than during intervention sessions. Slowly fading the prompts provided to the children
with ASD during the peer-mediated intervention sessions may be a more effective way to ensure that the effects of the intervention maintain over time across participants (e.g., initially removing the PI’s verbal prompts while leaving the visual representations of the social skills taught to the children with ASD visible to them as a means for the children to self-prompt; Thiemann & Goldstein, 2004).

**Generalization of the Intervention Effects**

The effects of the intervention on the focal children’s peer-related social behaviors did not generalize to untrained peers (i.e., peers that did not receive social skills training and were paired with the focal children during the generalization probe sessions). Although lack of generalization in social skills interventions targeting children with ASD is not uncommon (McConnell, 2002; Rogers, 2000), there may some possible explanations as to why generalization of the intervention effects did not occur in this study. It has been reported in the literature that the level of social interactions between children with ASD and peers may be higher when the children with ASD are familiar with their peers (Kamps et al., 2014; Pierce & Schreibman, 1995). This could be one possible explanation as to why the focal children exhibited more peer-related social behaviors with the peers that received social skills training, and they were increasingly familiar with, than with the peers that did not receive social skills training (i.e., the focal children spent significantly less time with these peers over the course of the study).

With the exception of Mike, there was an increasing trend in the focal children’s rate of initiations toward their peers across generalization probe sessions, which may provide support to the concept of children with ASD exhibiting more social behaviors with peers as they become more familiar with them.

Another possible explanation for the lack of generalization found in this study could be that only one peer, per focal child, received social skills training and was part of the peer-
mediated intervention. According to Stokes and Baer (1977), generalization may be achieved by providing individuals with practice of a target response or behavior with a variety of exemplars to promote generalization of the target response or behavior across settings or individuals. Specific to this study, more than one peer (i.e., exemplar), per focal child, needed to receive social skills training and form part of the intervention sessions (i.e., either as dyads or as triads) in order to increase the number of opportunities that the focal children had to practice the newly acquired peer-related social behaviors. This increased number of opportunities to practice peer-related social competence skills with a variety of social partners, in turn, might have increased the likelihood of those social behaviors generalizing across peers. For example, Fox and colleagues (1984) conducted a study to examine the effects of multiple peer exemplar training on the generalization of peer-related social behaviors exhibited by a child with ASD. The authors found that when the child with ASD was taught how to initiate toward one peer, her level of initiations toward that peer during intervention sessions increased compared to her level of initiations to the peer during baseline sessions. However, her initiations did not generalize toward the other three peers that participated in the study (i.e., the initiations made by the child with ASD toward the other three peers remained within baseline levels). Similar results occurred when the child with ASD was taught to initiate toward the second peer. However, once social initiation training was implemented with the third peer, the initiations made by the child with ASD generalized to the fourth peer (i.e., the child with ASD began to initiate toward the fourth peer without receiving social skills training with that specific peer). Therefore, the authors concluded that multiple exemplar training was needed to facilitate generalization of social skills in children with ASD. These findings are similar to the findings of other peer-mediated intervention studies that have achieved generalization of peer-related social behaviors across
peers by using multiple peers during the intervention sessions (e.g., Brady, Shores, McEvoy, Ellis, & Fox, 1987; Pierce & Schreibman, 1997; Rogers, 2000).

**Social Validity**

The focal children’s teacher indicated that she did not think that the intervention was disruptive to the classroom’s daily activities and that she would allow other children in her classroom participate in the intervention. This could be attributable to the fact that the intervention was incorporated into the natural context of the daily activities of the focal children’s classroom (i.e., the intervention was implemented while all of the children in the classroom were participating in morning centers within an area of the classroom in which a center would normally occur). This finding provides further support that peer-mediated interventions are well suited to be implemented in classrooms with minimal disruptions (Chan et al., 2009; Zhang and Wheeler, 2011). Moreover, the focal children’s teacher indicated that, following the implementation of the intervention, the peer-related social behaviors exhibited by all of the focal children increased in settings other than their classroom. Overall, the focal children’s teacher social validity data suggest that the intervention implemented in this study resulted in meaningful changes in the focal children’s peer-related social behaviors and thus, provided complementary data regarding the social importance of the effects of the intervention on the focal children’s social behaviors.

According to the social validity data collected from the naïve observer, all of the focal children engaged in more peer-related social behaviors during the intervention sessions (i.e., including the generalization probes conducted during the intervention condition) than during the baseline sessions (i.e., including the generalization probes conducted during the baseline condition). Moreover, the naïve observer indicated that the focal children’s initiations to their peers were less frequent during the generalization probe sessions conducted during the
intervention condition than during the intervention sessions. However, the naïve observer indicated that the quality of the focal children’s initiations toward their peers were comparable during these generalization probe sessions and the intervention sessions. This finding provides further evidence that the social skills training provided to the focal children was effective in terms of teaching them how to appropriately initiate social interactions with their peers (e.g., Garrison-Harrell et al., 1997; Katz & Girolametto, 2013; Thiemann & Goldstein, 2004). As discussed above, it could be that the focal children were initiating toward their peers during the generalization probe sessions with less frequency because they were less familiar with these peers (Kamps et al., 2014; Pierce & Schreibman, 1995), but the initiations that they were making toward these peers during the generalization probe sessions, once the intervention was implemented, were appropriate and of comparable quality to the social initiations they made toward their peers during the intervention sessions.

Peer comparison data collected at the end of the study revealed that not all of the focal children exhibited levels of peer-related social behaviors comparable to the levels of peer-related social behaviors exhibited by their peers. The post-experimental observations were conducted in the respective classrooms of the focal children and peers, which may explain this finding. Specifically, there were 19 typically developing children in the peers’ classroom, including the peers, while there were 11 children with developmental delays in the focal children’s classroom, including the focal children. Therefore, the peers had social partners with higher social competence skills and more opportunities to engage in social interactions within their classroom than the focal children. Conducting direct classroom observations of the focal children and peers while they are engaged in the same play activities, along with other social partners, may be a better way to compare the peer-related social behaviors of the focal children and peers prior to
and after receiving the intervention. For example, Robertson and colleagues (2003) conducted a study to examine the impact of a peer-mediated intervention on the engagement of children with disabilities in daily activities within an integrated preschool classroom. Moreover, in order to evaluate the social validity of the peer-mediated intervention, Robertson et al. (2003) conducted observations of children who were enrolled in the same classroom as the children with disabilities (i.e., typically developing) who usually exhibited the target behaviors appropriately. The results of that study suggested that the intervention was effective in increasing the target behaviors (e.g., on-task behavior) of the children with disabilities. The authors also concluded that the peer-comparison observations effectively allowed them to compare the target behaviors in the children with disabilities to their peers’ behaviors before and after the intervention was implemented (i.e., the target behaviors exhibited by the children with disabilities were comparable to their peers’ behaviors following the implementation of the intervention).

Similarly, other studies that have implemented school-based social competence interventions for young children with developmental disabilities and have conducted peer-comparison observations have used peers who were enrolled in the same classroom as the children with disabilities (Hurley, 2012). As previously mentioned, the peer-comparison findings of the present study may have been different had the peer-comparison observations been conducted while the focal children and their peers were engaged in the same activities within the same classroom, as it has traditionally been done in social competence interventions.

**Implications for Future Research**

Based on the findings of this study, there are several implications for future research in this area. First, this study should be replicated with a sample of children with ASD who exhibit various levels of social competence skills and functional language. This would allow researchers to identify the characteristics of children with ASD for whom this intervention may be most
effective. For example, it could be that children who exhibit mild social competence skills difficulties may respond better to this intervention than children who exhibit severe social competence skills difficulties. Children who have significant delays in social competence may lack some of the social behaviors or skills already present in the behavioral repertoire of children with mild delays and thus, a more intensive social competence intervention may be needed to address these children’s social competence needs (Loftin et al., 2008). Similarly, it could be that children with ASD who have functional language may respond better to this intervention than children who have not yet acquired functional language. Teaching young children with ASD to initiate toward peers solely through non-verbal means may require more explicit and longer social skills training and thus, they also may require a more intensive social competence intervention (Loftin et al., 2008).

Second, future peer-mediated intervention studies should examine if using multiple exemplar training (Cooper et al., 2007; Stokes & Baer, 1977) is an effective manner to increase the likelihood of the effects of the intervention on the peer-related social behaviors of children with ASD generalizing across peers. Specifically, children with ASD should be given the opportunity to practice the social skills taught to them during the intervention with a variety of social partners in order to promote the generalization of those newly acquired skills across peers. According to Stokes and Baer (1977), the number of exemplars required to achieve a desirable level and durability of generalization is variable (i.e., determined primarily by the nature of the target response or behavior). Therefore, future studies should examine how many peers need to be paired with children with ASD during peer-mediated interventions in order for the children with ASD to generalize the peer-related social behaviors taught to them across peers.
Third, if future studies use systematic assessments to determine toy preferences in children with ASD, these assessments should be conducted immediately before implementing the intervention with each child. This would ensure that appropriate modifications could be done to the intervention if children’s toy preference changes are identified before the intervention is implemented. In addition, future studies should pair children with ASD with socially competent peers who have equal/similar toy preferences or incorporate the toy preferences of both the children with ASD and their peers in the intervention sessions. This might increase the likelihood of children with ASD and peers engaging in mutually reinforcing stimuli and thus, increase the likelihood of both children engaging in appropriate peer-related social behaviors (e.g., appropriate reciprocal social interactions). For example, once the preferred toys of the children with ASD are identified, teachers could be asked to identify socially competent peers who have similar toy preferences as a means to pair them with the children with ASD during the intervention sessions. Moreover, future studies should conduct systematic assessments repeatedly across the duration of the study (e.g., before the intervention is implemented and once again before maintenance sessions begin) as a means to examine if the toy preferences of the children with ASD change during the course of the study. If toy preference changes occur, this would allow researchers to examine the influence of those preference changes on the effects of the intervention.

Fourth, future studies should conduct a component analysis in order to determine which component or combination of components included in the intervention are strictly needed in order for the intervention to effectively address the social competence needs of children with ASD. For example, Odom and colleagues (1985) conducted a study to examine the effects of a peer-mediated intervention on the social interactions between children with developmental
disabilities and their peers and to analyze the effectiveness of each component included in the intervention. To that end, peers were trained to initiate social interactions with the children with developmental disabilities, change agents prompted the peers to initiate toward the children with developmental disabilities when it was needed, and peers were rewarded with tokens for initiating toward the other children. The authors concluded that the frequency of positive social interactions between the children increased when the peers began initiating toward the children with developmental disabilities. Moreover, the authors concluded that the frequency of the social interactions between the children was not affected when the token reinforcement system was withdrawn and subsequently reinstated again. However, the social interactions between the children decreased when the prompts to the peers were withdrawn and it was not until the prompts were reintroduced that the social interactions between the children increased once again. Therefore, Odom and colleagues (1985) concluded that the prompts provided to the peers by the change agents were necessary for the intervention to be effective. As previously mentioned, future studies could conduct a component analysis with the intervention implemented in this study as a means to determine the ideal combination of components or the minimal combination of components needed in order for the intervention to be effective. This would help researchers with the translation of the intervention into a practical resource that teachers and other school personnel can implement in school settings.

Fifth, future studies should include teachers and other school personnel as intervention agents. This would allow researchers to determine the ability and feasibility of teachers as well as other school personnel implementing peer-mediated interventions within school settings. Finally, future studies should collect data on the quality of the peer-related social behaviors exhibited by the children with ASD as a means to evaluate the efficacy of peer-mediated
interventions in promoting changes in the quality of these behaviors. For example, future studies could use a mixed-methods research design (i.e., research design in which quantitative and qualitative methods are combined into a single study; Greene, Caracelli, & Graham, 1989; Johnson & Onwuegbuzie, 2004) to collect data on the frequency or duration of the peer-related social behaviors exhibited by children with ASD (i.e., using quantitative methods) and on the quality of those peer-related social behaviors (i.e., using qualitative methods), such as the variety of topics discussed between children with ASD and their peers during intervention sessions (Kamps et al., 2014).

Implications for Practice

According to Owen-DeSchryver and colleagues (2008), social skills instruction for children with ASD should focus on implementing interventions that can increase social opportunities between these children and a broad base of peers, given that only a small percentage of time in schools is devoted to social skills instruction. The results of this study suggest that teaching young children with ASD how to appropriately initiate social interactions with peers increases these children’s overall peer-related social behaviors, with some evidence suggesting that these gains may generalize across settings. Therefore, the current study has practical implications as it provides evidence that implementing peer-mediated interventions in classroom settings is an efficient manner to address the peer-related social competence needs of young children with ASD.

The teacher of the children with ASD that participated in this study indicated that the intervention was not disruptive to her classroom. This provides further evidence that peer-mediated interventions can be easily incorporated by teachers or other school personnel in the context of the daily activities and routines of the classrooms of children with ASD (Chan et al., 2009; Zhang & Wheeler, 2011). Being able to easily incorporate peer-mediated interventions
into classroom routines increases the likelihood of teachers implementing these interventions within their classrooms. Schools are a primary place in which some children with ASD receive social competence or behavioral interventions (Martinez, Werch, & Conroy, 2016). Therefore, it is important for teachers to be able to implement feasible and effective interventions within their classroom to address the social competence needs of the students with ASD that they serve.

**Limitations**

Although the peer-mediated intervention implemented in this study was functionally related to an increase in the peer-related social behaviors of all of the focal children, the findings should be viewed with consideration for the study’s limitations. The small sample size of this study, which is a characteristic of single case research design studies, may limit its external validity (Kazdin, 2011). All of the preschool-aged children with ASD included in this study were able to functionally communicate to others using a minimum of two-word utterances as well as able to follow two to three words commands or requests. Furthermore, none of the children with ASD included in this study exhibited severe social competence skills difficulties, as determined by the SRS-2 (Constantino & Gruber, 2011). Consequently, it is unknown if the findings of this study would extend to a larger sample of children with ASD who may exhibit different characteristics than the children with ASD included in this study, such as children who do not have functional language or exhibit severe social competence skills difficulties. It is also important to note that this study only included young children with ASD (i.e., all of the children were 3 years old at the beginning of the study) and thus, it cannot be determined if the findings of this study would extend to older children with ASD.

The peer-mediated intervention implemented in this study consisted of various components (e.g., social skills training for the focal children and peers, focal children’s preferred toys were embedded in the intervention sessions, and performance feedback was provided to the
focal children and peers). However, the effectiveness of each component or combination of components included in the intervention cannot be determined since a component analysis was not conducted. Another limitation is that data were not collected on the quality of the social behaviors exhibited by the children with ASD and their peers. For example, the intervention was effective in increasing the rate of independent initiations made by the children with ASD to their peers as well as effective in increasing the percent duration the social interactions between these children and their peers. However, it cannot be determined with the collected data if the intervention was effective in improving the quality of those social behaviors or social interactions.

Another limitation is that the intervention in this study was not implemented by teachers or other school personnel. Consequently, conclusions cannot be drawn regarding the ability of teachers or other school personnel implementing this intervention in school settings. Although generalization probes were conducted in this study to determine if the effects of the intervention on the focal children’s peer-related social behaviors generalized across peers, no data were collected to determine if the effects of the intervention generalized across settings. Finally, due to time constraints (i.e., the academic year ending), limited data were collected on the maintenance of the effects of the intervention on the peer-related social behaviors of the children (e.g., no maintenance data were collected on one child with ASD).
To identify relevant peer-mediated intervention studies conducted with young children with ASD, the PsycINFO, Educational Resources Information Center (ERIC), and PubMed electronic databases will be searched for peer-reviewed studies published in English containing the following search terms: 1) “autis*” or “aspirer*” or “asperger*” or “pdd*”; 2) “social skill*” or “social interaction*” or “social initiation*” or “social engagement”; and 3) “peer mediated intervention” or “peer mediated instruction” or “peer mediated social skills training” or “peer*”.

The timeframe chosen for this literature review (i.e., 2008 to 2016) was chosen to identify studies not included in past reviews (i.e., Chan et al., 2009; Zhang & Wheeler, 2011) and to highlight the contributions of recent research to this literature base. To identify relevant studies potentially missed by the electronic databases search, ancestry searches of the reference lists of past peer-mediated interventions literature reviews (i.e., Chan et al., 2009; Zhang & Wheeler, 2011) and studies that meet the inclusion criteria will be conducted. A search of authors who typically conduct peer-mediated intervention research will be conducted (i.e., Goldstein, Kamps, Katz, Koegel, Kohler, Odom, Peck, Schreibman, Stitcher, Strain, & Thiemann).

**Phase 1: Screening of Titles and Abstracts**

The initial search will be exported from the electronic databases mentioned above to Refworks. The title and abstract of each article will be reviewed in Refworks and sorted into a possible inclusion folder within a shared Dropbox folder (i.e., PMI Review) if they meet the initial inclusion criteria outlined below. The possible inclusion folder on Dropbox is labeled “PMI Review: Possible Articles”.
Screening Inclusion/Exclusion Criteria Items

- Does the study include at least one participant with an ASD (i.e., autism, Asperger syndrome, or pervasive developmental disorder-not otherwise specified [PDD-NOS]) that is eight years of age or younger?
  - Yes = Include.
  - Unclear = Include.
  - No = Exclude.

- Was a peer-mediated intervention implemented in the study with the goal of increasing the peer-related social competence skills (e.g., initiations, responses, or social interactions) of the children with ASD?
  - Yes = Include.
  - Unclear = Include.
  - No = Exclude.

- Was the study published in a peer-reviewed journal or book in English?
  - Yes = Include.
  - Unclear = Include.
  - No = Exclude.
  - Note: Do not include dissertations.

- Was the study published between 2008 (i.e., included) and 2016?
  - Yes = Include.
  - Unclear = Include.
  - No = Exclude.

Phase 2: Full Text Coding

Studies that are included during Phase 1 will move to Phase 2 (i.e., full text coding). On the “PMI Review Inclusion-Exclusion” worksheet of the Excel workbook provided (i.e., “PMI Review”) record answers (i.e., Yes or No) to the following inclusion criteria items. These criteria
are to be used as a hierarchy and the questions should be answered until a “No” is recorded. That reason will be recorded as the “Reason for Exclusion” on the review (i.e., PRISMA diagram). Studies during this phase will be included if the answer is “Yes” to all of the following questions:

**Experimental Design**

- Did the study use a single case experimental research design that allowed for direct analysis of the effects of the peer-mediated intervention on the participants’ target behaviors?
  
  o **Definitions:**
    
    - Single case experimental research designs use participants (i.e., individuals or groups) as their own control and collect repeated measures of dependent variables over time to test the effects of a practice or intervention manipulated by the researcher (e.g., reversal designs, multiple-baseline designs, changing-criterion designs, and alternating-treatment designs; Kazdin, 2011).
  
  o **Exclusion:** Group design studies or studies that do not use experimental designs to evaluate the effects of the intervention on the participants’ target behaviors, which include:
    
    - Qualitative designs:
      
      - Designs in which observations are conducted in the field with no manipulations of causal variables (Dooley, 2001).
    
    - AB designs:
      
Participants

- Does the study include at least one participant diagnosed with an ASD (i.e., autism, Asperger syndrome, or PDD-NOS) that is eight years of age or younger?
  
  **Definitions:**
  
  - Autism is a neurodevelopmental disorder that includes social competence difficulties as well as restricted and repetitive patterns of behaviors and interests (American Psychiatric Association, 2013).
  
  - Asperger Syndrome is an ASD considered to be on the “high functioning” end of the spectrum. These individuals have difficulty with social interactions and exhibit a restricted range of interests and or repetitive behaviors. Compared with individuals with other forms of ASD, individuals with Asperger Syndrome do not have significant delays or difficulties in language or cognitive development (Autism Speaks, 2016a).
  
  - Individuals with PDD-NOS are on the autism spectrum, but do not fully meet the criteria for another ASD. PDD-NOS can occur in conjunction with a wide spectrum of intellectual abilities. However, its defining features are significant challenges in social and language development (Autism Speaks, 2016b).
  
  **Exclusion:** Studies that do not explicitly state the diagnoses of the participants.

Intervention

- Did the study implement a peer-mediated intervention?

  **Definition:**
  
  - Peer-mediated interventions are those in which peers are taught to engage children with ASD in positive social interactions through the use of effective instructional strategies (e.g., gaining attention, joining in and/or
maintaining play, initiating talk, and assisting/offering help; Katz & Girolametto, 2013; Odom & Strain, 1984).

- **Exclusion:** Studies in which peers do not implement the intervention, which include:
  - Studies in which peers are only recipients of social initiations.
  - Studies in which children with ASD observe peers perform particular behaviors without any interactions occurring between the two.

**Outcome**

- Was the goal of the peer-mediated intervention to increase the peer-related social competence skills of the children with ASD (i.e., at least one dependent variable included a direct measure of peer-related social competence skills involving an initiation and/or a response between a child with ASD and at least one peer)?

- **Definitions:**
  - Peer-related social competence is defined as the ability to select and use appropriate social/communicative behaviors that are effective in achieving interpersonal social goals within complex social contexts involving peers (Guralnick, 1992, 2010).
  - Initiations are verbal or nonverbal behaviors produced by a child and directed toward a peer for the purpose of beginning or maintaining a conversation, beginning a joint activity or, conversing during an ongoing joint activity (Hughes et al., 2000).
  - Responses are verbal or nonverbal behaviors produced by a child for the purpose of answering an initiation made by a peer, maintaining a joint activity with a peer, or demonstrating understanding of an initiation made by a peer (Hughes et al., 2000).
Exclusion: Studies that implement peer-mediated interventions with the goal of increasing the academic (e.g., mathematics) or functional/self-help skills of children with ASD.

Articles that do not meet all of the inclusion criteria above (i.e., “No” is answered for any one of the inclusion criteria) will be excluded from the review. Included articles will be transferred to the Dropbox folder labeled “PMI Review: Included Articles”.

Phase 3: Data Extraction

Data from each study included in this literature review will be extracted and recorded on the “PMI Review Data” worksheet of the Excel workbook (i.e., “PMI Review”). Each article will be coded according to five broad categories: a) characteristics of the study; b) characteristics of the children with ASD; c) characteristics of the peers; d) characteristics of the peer-mediated intervention; and e) methodological quality of the study. Below are the operational definitions and coding procedures for each of those categories. If multiple studies are presented in one article, code each separately on the appropriate coding spreadsheet, using Study 1, Study 2, and so forth following the citation of the article in order to differentiate each study.

Characteristics of the Study

- First Author:
  - Write the last name of the study’s first author.

- Year:
  - Write the year (i.e., a four digit numerical response) that the study was published (e.g., 2010).
- **APA Citation:**
  - Write the study’s citation as per the guidelines in the *Publication Manual of the American Psychological Association* (6th Edition; American Psychological Association, 2010).
- **Research Question/Purpose:**
  - Write the research question(s) or purpose of the study.
    - **Note:** Within the introduction of the study (usually right before the method section), the authors will state the specific research question(s) to be addressed in the study. This can be written directly from the studies or summarized. Multiple research questions are possible. Write the purpose of the study if no research question(s) is offered in the study.
- **Research Design:**
  - Select from the drop down menu the type of research design used in the study:
    - **Multiple baseline:**
      - Intervention is implemented to different baselines (e.g., persons, settings, or behavior) at different time points. Once an intervention is implemented, it does not need to be withdrawn and effects are demonstrated by evaluating changes in behavior when the intervention was applied (Kazdin, 2011).
    - **Withdrawal/Reversal:**
      - A design in which the experimental effect of the intervention is evaluated by alternating the baseline condition with the intervention condition and these phases are repeated (e.g., ABAB design; Kazdin, 2011).
• Multielement:
  • Implementation of two or more interventions within the same
    phase with each intervention associated with distinct stimulus
    conditions to show that the behavior varies systematic as a function
    of that particular stimulus (Kazdin, 2011).

• Alternating treatments:
  • Different treatment conditions are alternated across different
    stimulus conditions. This differs from a multielement design as the
    interventions are purposely balanced and not connected from a
    specific stimulus (Kazdin, 2011).

• Changing criterion:
  • Experimental effects are shown by demonstrating that the behavior
    changes gradually over time and improves in increments to match
    a specified criterion (Kazdin, 2011).

• Two or more single case designs:
  • Two or more of the above designs were used in the intervention.

Characteristics of the Children with ASD

• Number:
  • Write the total number of children with ASD in the study.
  • Note: Children with ASD are the children in the studies with peer-related
    social competence difficulties and are the target or focal children of the
    interventions (Goldstein, Schneider, & Thiemann, 2007). If studies have
    children with and without ASD as the focal children, record data relevant
    only to the children with ASD (i.e., this applies to the remaining coding
    categories and subcategories of the review).
• **Gender:**
  - Select from the drop down menu the gender of each child with ASD in the study (i.e., information for each child is recorded on a separate line of the Excel workbook):
    - Male.
    - Female.
    - NR (i.e., not reported):
      - The gender of the children with ASD was not reported in the study.

• **Age:**
  - Write the numerical age of each child with ASD in the study (i.e., information for each child is recorded on a separate line of the Excel workbook).
    - If individual ages are not provided, write the age range of the children with ASD.
    - Write “NR” if the age of the children with ASD was not reported in the study.

• **Diagnosis:**
  - Select from the drop down menu the diagnosis of each child with ASD in the study (i.e., information for each child is recorded on a separate line of the Excel workbook):
    - Autism.
    - Asperger syndrome.
    - PDD-NOS.

• **Diagnostic Information:**
  - Select from the drop down menu if the study used/provided a standardized criterion or criteria such as the one provided in the *Diagnostic and Statistical Manual of Mental Disorders* (5th Edition; American Psychiatric Association, 2013) to determine/confirm the diagnoses of at least one child with ASD:
- Yes.
- No.

- **Standardized Diagnostic Information:**
  - If standardized diagnostic information is provided in the study, write the criterion or criteria used to determine/confirm the diagnosis of each child with ASD (i.e., information for each child is recorded on a separate line of the Excel workbook).
    - Write “NR” if the study used a standardized criterion or criteria, but does not report which one was used.
    - Write “N/A (i.e., not applicable)” if no standardized diagnostic information was used in the study.

- **Functioning Level:**
  - Select from the drop down menu the functioning level of each child with ASD in the study (i.e., based on the schema provided by Reichow and Volkmar, 2010).
  - **Note:** Only record the functioning level of the children with ASD if information reported by authors or specified by IQ scores are available in the study:
    - **Lower functioning:**
      - Children with limited or no verbal language skills and/or an IQ score less than 55.
    - **Moderate functioning:**
      - Children with basic verbal communication skills and/or an IQ score between 55 and 85.
    - **High functioning:**
      - Children with well-developed verbal communication and/or an IQ score higher than 85.
    - **NR:**
      - The functioning level of the children with ASD was not reported in the study.
• **Assessment of Peer-Related Social Competence:**
  
  o Select from the drop down menu if the study formally assessed the peer-related social competence of the children with ASD:
    - Yes.
    - No.

• **Peer-Related Social Competence Assessment Method:**
  
  o Select from the drop down menu the method used to determine the peer-related social competence ability (i.e., the ability to engage in meaningful and reciprocal social interactions with peers; Stichter & Conroy, 2006) of the children with ASD in the study (i.e., if multiple methods are used, record each method on a separate line of the Excel workbook):
    - Teacher interview.
    - Parent interview.
    - Direct observation.
    - Experimental analysis (e.g., functional analysis [FA] or structural analysis [SA]).
    - Standardized assessment.
    - N/A:
      - Study does not formally assess social competence.

• **Peer-Related Social Competence Standardized Assessment:**
  
  o Write the standardized assessment(s) used to determine the peer-related social competence abilities of the children with ASD, if one was used (i.e., information for each child is recorded on a separate line of the Excel workbook).
    - Write “NR” if the study used a standardized assessment, but does not report which one was used.
    - Write “N/A” if no standardized assessment was used in the study.
• Peer-Related Social Competence Deficit:
  o Select from the drop down menu the deficit(s) in peer-related social competence exhibited by each child with ASD as reported by authors in the study (i.e., information for each child is recorded on a separate line of the Excel workbook):
    ▪ Initiations deficit:
      • Children that do not or rarely exhibit spontaneous attempts (i.e., verbal or nonverbal) to gain attention or responses from peers (e.g., giving compliments; making comments, sharing, requesting, touching, approaching peers to play; Whalon, Conroy, Martinez, & Werch, 2015).
    ▪ Responses deficit:
      • Children that do not or rarely respond (i.e., verbally or nonverbally) to peers’ initiations (Whalon et al., 2015).
    ▪ Social engagement/interactions difficulties:
      • Children that do not or rarely appropriately and actively participate and/or interact with peers during play or other social activities. This includes children that do not or rarely maintain conversations with peers (Whalon et al., 2015).
    ▪ Initiations and responses difficulties.
    ▪ Initiations and engagement/interactions difficulties.
    ▪ Responses and engagement/interactions difficulties.
    ▪ Initiations and engagement/interactions difficulties.
    ▪ Responses and engagement/interactions difficulties.
    ▪ Initiations, responses, and engagement/interactions difficulties.

• Restricted and Repetitive Behaviors (RRBs):
  o Select from the drop down menu if the study targeted RRBs in the children with ASD:
- Yes.
- No.

**Note:** RRBs consist of a broad range of behaviors that have been conceptually and empirically grouped into lower order motor behaviors and higher order cognitive behaviors. Lower order motor behaviors (i.e., stereotyped movements, repetitive manipulation of objects, and repetitive forms of self-injurious behaviors) are characterized by repetition of movement while higher order cognitive behaviors (i.e., compulsions, rituals and routines, insistence on sameness, and circumscribed interests) are characterized by a rigid adherence to certain rules or mental sets (Boyd, McDonough, & Bodfish, 2012).

- **RRB Topography:**
  - Select from the drop down menu the topography of the RRB exhibited by each child with ASD in the study (i.e., information for each child is recorded on a separate line of the Excel workbook):
  - **Motor stereotypy:**
    - Repetitive movements or postures of any body part (e.g., fingers, arms or head) that serve no functional purpose (e.g., hand flapping, head nodding and rocking back and forth; Rapp & Vollmer, 2005).
  - **Vocal stereotypy:**
    - Repetitive non-contextual or non-functional utterances/speech that serve no functional purpose (Ahearn, Clark, MacDonald, & Chung, 2007).
  - **Self-injurious behavior:**
    - Forceful movements made by the children with ASD in order to injure themselves either using their own bodies or hard surfaces such as walls, furniture or floors (e.g., head banging, face slapping,
hair pulling, eye poking, fist-to-head movements, beating and scratching their bodies; Boyd et al., 2012).

- Circumscribed interest:
  - Preoccupation with topics/objects/patterns of interests that are abnormal either in intensity or focus (Boyd et al., 2012).

- Ritualistic behavior:
  - Behaviors that are repeated beyond what is necessary for goal completion and have a fixed sequence (e.g., lining up/stacking/dumping of toys for non-functional or non-goal directed purposes; Boyd et al., 2012).

- Motor and vocal stereotypy.

- N/A:
  - RRBs were not targeted in the study.

Characteristics of the Peers

- Number:
  - Write the total number of peers in the study.
    - **Note:** These are the children in the studies who are taught a number of strategies to facilitate social interactions with the children with ASD (Goldstein, Schneider, & Thiemann, 2007).

- Gender:
  - Select from the drop down menu the gender of each peer in the study (i.e., information for each child is recorded on a separate line of the Excel workbook):
    - Male.
    - Female.
    - NR:
      - The gender of the peers was not reported in the study.
• **Age:**
  - Write the numerical age of each peer in the study (i.e., information for each child is recorded on a separate line of the Excel workbook).
    - If individual ages are not provided, write the age range of the peers.
    - Write “NR” if the age of the peers was not provided in the study.

• **Disability:**
  - Select from the drop down menu if any of the peers had a disability or a diagnosis (e.g., a learning disability):
    - Yes.
    - No.
    - NR.

• **Disability Information:**
  - Write the disability or diagnosis of the peers if they had one (i.e., information for each child is recorded on a separate line of the Excel workbook).
    - Write “N/A” if the peers in the study did not have a disability or diagnosis.

• **Selection Criteria:**
  - Select from the drop down menu if the study used a criterion or criteria to select the peers:
    - Yes.
    - No.

• **Selection Criteria Used:**
  - Select from the drop down menu the criterion or criteria by which peers were chosen to participate in the study (i.e., if more than one criterion was used, information for each criterion is recorded on a separate line of the Excel workbook):
    - Teacher recommendation/nomination.
    - Regular or good school attendance.
- Age-appropriate social and language skills.
- Frequent interactions with the children with ASD prior to the intervention.
- Good compliance with directions and/or following rules.
- Willingness to participate in the study and interact with the children with ASD.
- Participated previously in a study with peer training.
- Convenience:
  - Only peer[s] available in the classroom of the children with ASD.
  - Eager/enthusiastic to work and/or help others.
  - Flexible in his or her play.
- N/A:
  - Study did not use a criterion or criteria to select peers.

- **Assessment of Peer-Related Social Competence:**
  - Select from the drop down menu if the study formally assessed the peer-related social competence of the peers:
    - Yes.
    - No.

- **Peer-Related Social Competence Assessment Method:**
  - Select from the drop down menu the method used to determine the peer-related social competence ability of the peers in the study (i.e., if multiple methods are used, record each method on a separate line of the Excel workbook):
    - Teacher interview.
    - Parent interview.
    - Direct observation.
    - Experimental analysis.
    - Standardized assessment.
• N/A:
  • Social competence was not formally assessed in the study.

• Peer-Related Social Competence Standardized Assessment:
  o Write the standardized assessment(s) used to determine the peer-related social competence abilities of the peers, if one was used (i.e., information for each child is recorded on a separate line of the Excel workbook).
    • Write “N/A” if no standardized assessment was used in the study.

• Matching:
  o Select from the drop down menu if the study matched the children with ASD with the peers:
    • Yes.
    • No.

• Matching Method:
  o Select from the drop down menu the characteristic(s)/variable(s) used to match the children with ASD with the peers, if it they were matched (i.e., if multiple characteristic(s)/variable(s) are used, record each on a separate line of the Excel workbook):
    • Age.
    • Gender.
    • Grade level.
    • Social or cognitive ability.
    • Interests.
    • N/A:
      • Study did not match children with ASD and peers.
• **Grouping:**
  o Select from the drop down menu how the children with ASD and the peers were grouped for the intervention (i.e., if the groupings differed for each child with ASD, record each on a separate line of the Excel workbook):
    ▪ One peer for each child with ASD.
    ▪ Two peers for each child with ASD.
    ▪ Three peers for each child with ASD.
    ▪ Four peers for each child with ASD.
    ▪ Five peers for each child with ASD.
    ▪ More than five peers for each child with ASD.
    ▪ NR:
      * Study did not report how children with ASD were grouped with the peers.

**Characteristics of the Intervention**

• **Assessment-Based:**
  o Select from the drop down menu if the peer-mediated intervention implemented in the study was assessment-based:
    ▪ Yes.
    ▪ No.
    ▪ **Note:** Assessment-based interventions are those in which systematic assessments are conducted prior to the intervention to identify antecedent variables (e.g., type of activities or materials used, number of peers used for each child with ASD, or familiarity of the peers) in which appropriate social interactions and social behaviors of the children with ASD are most likely to occur. The conditions or variables identified in the assessments to
affect the children’s social behaviors are then incorporated in the interventions (Peck, Sasso, & Jolivette, 1997).

- **Assessment Method:**
  - Select from the drop down menu the method(s) used to determine which antecedent variables to incorporate in the intervention (i.e., if multiple methods are used, record each method on a separate line of the Excel workbook):
    - Teacher interview.
    - Parent interview.
    - Direct observation.
    - Structural analysis:
      - Structural analyses assess various antecedent variables to identify what occasions appropriate social interactions (i.e., identify antecedent stimuli or variables in which appropriate social behaviors are more likely to occur; Peck et al., 1997).
    - Functional analysis:
      - Functional analyses involve the direct manipulation, using an experimental design (e.g., multielement design), of various antecedent and consequent events and measurement of their effects on the behavior of interest (Iwata, Dorsey, Slifer, Bauman, & Richman, 1982/1994).
    - N/A:
      - Intervention implemented in the study was not assessment-based.

- **Antecedent Variables:**
  - Select from the drop down menu the variables or stimuli incorporated in the intervention (i.e., if multiple stimuli/variables were incorporated in the intervention, record each on a separate line of the Excel workbook):
Materials:
- The preferred materials (e.g., preferred toys or books) of the children with ASD are incorporated in the intervention sessions as a means to increase the likelihood of them engaging in appropriate social behaviors.

Activities:
- The preferred activities of the children with ASD are incorporated in the intervention as a mean to increase the likelihood of them engaging in appropriate social behaviors. Activities can be selected based on their structure (e.g., activities with a lot of rules or with only one acceptable way of being performed [i.e., highly structured activities] or activities with few rules [i.e., low structured activities]), or level of social interaction involved in them (e.g., activities that require a lot of turn taking or sharing objects [i.e., highly interactive activities] or activities that involve a few interactions such as working on individual puzzles [i.e., low interactive activities]).

Gender of peers:
- Peers of the gender most likely to occasion appropriate social behaviors in the children with ASD are selected to deliver the intervention.

Number of peers:
- Children with ASD are paired or grouped with the number of peers most likely to occasion appropriate social behaviors in them.

Settings:
- The preferred settings (e.g., settings with a lot of dialogues and noises [i.e., high noise level settings] or settings in which there is...
not a lot of dialogues and are quiet in general [i.e., low noise level settings] of the children with ASD are incorporated in the intervention in order to increase the likelihood of them engaging in appropriate social behaviors.

- N/A:
  - Intervention implemented in the study was not assessment-based.

- **Method of Training Peers:**
  
  - Select from the drop down menu the method(s) used to train the peers on the intervention procedures (i.e., if multiple methods are used, record each method on a separate line of the Excel workbook):

    - **Modeling:**
      - The trainer says or acts to the peers what they are expected to do during the intervention sessions.

    - **Practice:**
      - Peers rehearse by saying or acting what they are expected to do (i.e., practice) during the intervention sessions in the presence of the trainer.

    - **Role play:**
      - Peers practice what they are expected to do during the intervention sessions with the trainer whose social behaviors become increasingly more like those of the children with ASD. Trainers and peers may switch roles during role play sessions.

    - **Visual aids:**
      - Peers are told what they are expected to do during the intervention sessions though the use of visual aids (e.g., a hand drawn picture of two children interacting with topic bubbles [as seen in cartoons]
above their heads depicting appropriate social interactions between them).

- **Direct instruction:**
  
  - Peers are taught what they are expected to do during the intervention sessions (e.g., initiate social interactions with the children with ASD by suggesting play ideas) and are asked questions to determine their understanding regarding the intervention procedures. Direct instruction sessions usually include a discussion of the importance of playing with children with ASD. The use of manuals (e.g., manual readings) may be part of direct instruction.

- **Feedback:**
  
  - Trainer provides feedback (e.g., corrective or instructive feedback) to the peers on the intervention procedures based on their performance during training sessions.

- **Reinforcement:**
  
  - Trainer provides reinforcement to the peers for practicing the intervention procedures during training sessions or contingent upon correct responding during training sessions.

- **NR:**
  
  - Study does not report the method used to train peers.

- **Training:**
  
  - Select from the drop down menu if the training of the peers lasted the whole duration of the intervention (i.e., includes all phases of the intervention):
    
    - Yes.
    - No.
• **Duration of Training:**
  o If training was not in place during all phases of the intervention, select from the drop down menu the phases of the study in which peer training was in place (i.e., if training took place in multiple phases of the intervention, record each phase on a separate line of the Excel workbook):
    ▪ Before baseline.
    ▪ Baseline.
    ▪ After baseline, but before intervention.
    ▪ Intervention.
    ▪ Maintenance.
    ▪ Generalization.
    ▪ N/A:
      • Training lasted the whole duration of the intervention.

• **Training Mastery:**
  o Select from the drop down menu if there was a criterion or criteria in the study that peers needed to achieve before they were allowed to implement the intervention:
    ▪ Yes.
    ▪ No.

• **Training Mastery Criteria:**
  o Write the criterion or criteria that the peers had to meet before implementing the intervention.
    ▪ Write “N/A” if a mastery criterion or criteria was not used in the study.

• **Trainer:**
  o Select from the drop down menu the individual(s) who trained the peers on the intervention procedures (i.e., if more than one individual trained the peers, record each individual on a separate line of the Excel workbook):
• Researchers/Research staff (e.g., graduate students).
• Teachers/School staff (e.g., paraprofessionals).
• Parents.
• NR:
  • Study does not report who trained peers.

• **Trainer Role:**
  o Select from the drop down menu the role(s) of the trainer during the intervention sessions (i.e., if trainers had more than one role, record each role on a separate line of the Excel workbook):
    • **Prompting:**
      • Trainers cue peers on things they could do (i.e., strategies taught to them previously) in order to elicit social behaviors from the children with ASD or maintain social interactions. Prompting can be done verbally with explicit (e.g., “Try talking about Jose’s airplanes”) or subtle (e.g., “Respond to Jose’s question”) instructions, using gestures (e.g., signaling the peer to move closer to the child with ASD), or using visual cues/prompts (e.g., showing peers a drawing of two children talking).
    • **Reinforcing:**
      • Trainers provide reinforcement to the peers and children with ASD contingent on correct responding or appropriate social interactions.
    • **Feedback:**
      • Trainers provide feedback to the peers and regarding their performance on the intervention strategies.
    • **Monitoring:**
      • Trainer solely monitors the children during the intervention sessions (i.e., observes the children to collect data, but does not
interact [i.e., prompts children] with the children) and makes sure they stay in the designated area (i.e., intervention setting).

- NR:
  - Study does not report the role of the trainer during intervention sessions.

**Intervention Strategy:**

- Select from the drop down menu the strategy or strategies used by the peers to socially interact with the children with ASD (i.e., if more than one strategy was used by the peers, record each strategy on a separate line of the Excel workbook; adapted from Odom and Strain, 1984):
  - Initiations:
    - Interventions in which peers are taught to initiate social interactions with the children with ASD (e.g., “Come play with me”).
  - Responses:
    - Interventions in which peers are taught to respond to the social initiations made by the children with ASD.
  - Prompting:
    - Interventions in which peers are taught to prompt specific social behaviors from the children with ASD.
  - Reinforcing:
    - Interventions in which peers are taught to reinforce specific social behaviors exhibited by the children with ASD.
  - Proximity:
    - Interventions in which peers are taught to stay in close proximity from the children with ASD.
• Persistence:
  • Interventions in which peers are taught to persist in their attempts to initiate and maintain social interactions with the children with ASD.

• NR:
  • The study does not report the intervention strategy used.

• Intervention Setting:
  o Select from the drop down menu the settings in which peers implemented the intervention:
    • Contrived settings:
      • Settings/situations created by researchers in order to assess the effects of the interventions on the participants’ target behaviors that would not normally occur for the participants if it not were for the study (e.g., research conducted in a behavior therapy clinic or in an empty room in a school during an activity that a participant would not normally encounter in his/her day).
    • Natural settings:
      • Real-life/normally occurring settings/situations (i.e., settings in which participants behaved as they routinely would) in which the effects of the interventions on the participants’ target behaviors were assessed (e.g., research conducted in classrooms during normally occurring activities).
    • Combined settings:
      • The intervention was implemented in contrived and natural settings for all of the participants or the intervention was implemented in natural settings for some participants and in contrived settings for the remainder.
• NR:
  • The setting in which the intervention was implemented was not reported in the study.

• Peer-Related Social Competence Dependent Variable:
  o Select from the drop down menu the dependent variable(s) measured in the study for each child with ASD regarding his or her social competence skills (i.e., information for each child is recorded on a separate line of the Excel workbook; if multiple dependent variables were measured for each child, record each on a separate line of the Excel workbook):
    ▪ Increase in frequency (or percent) of the initiations made by children with ASD to the peers.
    ▪ Increase in frequency (or percent) of the responses made by children with ASD to the peers.
    ▪ Increase the duration (or percent duration) of social interactions/engagement between the children with ASD and peers.
    ▪ Increase in frequency (or percent) of social interactions between the children with ASD and peers.
    ▪ Increase in frequency (or percent) of joint attention episodes between the children with ASD and peers.
    ▪ Increase in frequency (or percent) of turn taking/sharing between the children with ASD and peers.

• Peer-Related Social Competence Dependent Variable Outcome:
  o Select from the drop down menu the findings of the study for each child with ASD regarding his or her social competence skills (i.e., information for each child is recorded on a separate line of the Excel workbook; if multiple dependent variables were measured for each child, record each outcome on a separate line of the Excel workbook):
• Positive:
  • It is clear from the data presented in the study or reported by the authors that there was a functional relationship established between the intervention and the dependent variable, resulting in a meaningful, therapeutic change in the targeted social competence skill for the child with ASD.

• Negative:
  • It is clear from the data presented in the study or reported by the authors that there was a functional relationship established between the intervention and the dependent variable, resulting in a nontherapeutic change (i.e., data intended to increase actually decrease or vice versa) in the targeted social competence skill for the child with ASD.

• No Changes:
  • It is clear from the data presented in the study or reported by the authors that a functional relationship cannot be established between the independent and dependent variable (i.e., there were no differences between the baseline and intervention levels of the social competence skills of the child with ASD).

• Other Dependent Variables:
  o Select from the drop down menu if there was at least another dependent measure in the study for at least one child with ASD:
    • Yes.
    • No.
• **RRBs Measurement:**
  o If there was more than one dependent measure in the study for at least one child with ASD, select from the drop down menu if one of those dependent measures was decreases in the RRBs exhibited by the children with ASD:
    ▪ Yes.
    ▪ No.
    ▪ N/A:
    - Study does not have more than a primary dependent measure.

• **Other Dependent Variables Measured:**
  o Select from the drop down menu the other dependent variables measured in the study for each child with ASD (i.e., information for each child is recorded on a separate line of the Excel workbook; each additional dependent variable is recorded each on a separate line of the Excel workbook):
    ▪ Decreases in the frequency or duration of the RRBs exhibited by the children with ASD.
    ▪ Decreases in the frequency or duration of other problem behaviors (e.g., aggression) exhibited by the children with ASD.
    ▪ Decreases in the frequency of prompts given to the peers to implement the intervention as intended.
    ▪ Increases in academic skills (e.g., math skills).
    ▪ Increases in functional/self-help skills of the children with ASD.
    ▪ Other.
    ▪ N/A:
    - Study does not have more than a primary dependent measure.

• **Other Dependent Variables Outcome:**
  o Select from the drop down menu the findings of the study for each child with ASD regarding other dependent measures (i.e., information for each child is
recorded on a separate line of the Excel workbook; outcome for each additional dependent variable is recorded each on a separate line of the Excel workbook):

- **Positive:**
  - It is clear from the data presented in the study or reported by the authors that there was a functional relationship established between the intervention and the dependent variable, resulting in a meaningful, therapeutic change in the targeted behavior for the child with ASD.

- **Negative:**
  - It is clear from the data presented in the study or reported by the authors that there was a functional relationship established between the intervention and the dependent variable, resulting in a nontherapeutic change (i.e., data intended to increase actually decrease or vice versa) in the targeted behavior for the child with ASD.

- **No Changes:**
  - It is clear from the data presented in the study or reported by the authors that a functional relationship cannot be established between the independent and dependent variable (i.e., there were no differences between the baseline and intervention levels of the targeted behaviors of the child with ASD).

- **N/A:**
  - Study does not have more than a primary dependent measure.

**Methodological Quality of the Study**

- The methodological quality of each study will be coded according to the evidence-based criteria for single-case research developed by Horner and colleagues (2005).
• **Participants Description:**
  o Select from the drop down menu if the study used/provided a standardized criterion or criteria to determine/confirm the diagnoses of the children with ASD (Horner et al., 2005):
    ▪ Yes.
    ▪ No.

• **Dependent Variable:**
  o Select from the drop down menu if: a) the dependent variables in the study are described with operational precision; b) each dependent variable is measured with a procedure that generates a quantifiable index; c) measurement of the dependent variable is valid and described with replicable precision; d) dependent variables are measured repeatedly over time; and e) data are collected on the reliability or interobserver agreement associated with each dependent variable (Horner et al., 2005):
    ▪ Yes.
    ▪ No.

• **Treatment Integrity:**
  o Select from the drop down menu if treatment integrity was measured in the study:
    ▪ Yes.
    ▪ No.

• **Treatment Integrity Data:**
  o Select from the drop down menu the individual(s) for whom treatment integrity data were collected on:
    ▪ Peers.
    ▪ Trainers.
    ▪ Both peers and trainers.
• N/A:
  • Treatment integrity data was not collected in the study.

• **Treatment Integrity Outcome:**
  o Select from the drop down menu if the intervention was implemented as intended (i.e., treatment fidelity in the study was above 80% across phases and individual[s]):
    • Yes.
    • No.
    • N/A:
      • Treatment integrity was not measured in the study.

• **Baseline:**
  o Select from the drop down menu if baseline conditions are described with replicable precision in the study (Horner et al., 2005):
    • Yes.
    • No.

• **Internal Validity:**
  o Select from the drop down menu if: a) the design provides at least three demonstrations of experimental effect at three different points in time; b) the design controls for common threats to internal validity (e.g., permits elimination of rival hypotheses); and c) the results document a pattern that demonstrates experimental control (Horner et al., 2005):
    • Yes.
    • No.

• **External Validity:**
  o Select from the drop down menu if experimental effects are replicated across participants, settings, or materials to establish external validity (Horner et al., 2005):
- Yes.
- No.

- **Generalization:**
  - Select from the drop down menu if generalization was measured in the study:
    - Yes.
    - No.

- **Generalization Outcome:**
  - Select from the drop down menu the findings of the study regarding generalization:
    - Positive:
      - The effects of the intervention on the children’s target behaviors generalized to settings other than those in which the intervention was implemented.
    - Negative:
      - The effects of the intervention on the children’s target behaviors did not generalize to settings other than those in which the intervention was implemented.
    - N/A:
      - Generalization was not measured in the study.

- **Maintenance:**
  - Select from the drop down menu if maintenance was measured in the study:
    - Yes.
    - No.

- **Maintenance Outcome:**
  - Select from the drop down menu the findings of the study regarding maintenance:
Positive:
- The effects of the intervention on the children’s target behaviors were maintained over time.

Negative:
- The effects of the intervention on the children’s target behaviors were not maintained over time.

N/A:
- Maintenance was not measured in the study.

Social Validity:
- Select from the drop down menu if social validity was measured in the study:
  - Yes.
  - No.

Social Validity Data:
- Select from the drop down menu the individual(s) that completed the social validity assessments in the study (i.e., if more than one individual completed social validity assessments, record each individual on a separate line of the Excel workbook):
  - Peers.
  - Children with ASD.
  - Teachers/School personnel.
  - Parents/Other caregivers.
  - Independent observers.
  - N/A:
    - Social validity was not measured in the study.

Social Validity Outcome:
- Select from the drop down menu the findings of the study regarding social validity:
- **Positive:**
  - The intervention was found to be acceptable, feasible, and/or easy to implement; the behaviors targeted in the intervention were found to be meaningful and/or important to intervene on.

- **Negative:**
  - The intervention was found to be unacceptable, unfeasible, and/or hard to implement; the behaviors targeted in the intervention were not found to be meaningful and/or important to intervene on.

- **N/A:**
  - Social validity was not measured in the study.
APPENDIX B
FOCAL CHILD NOMINATION CHECKLIST

Child ID: ________________  Teacher: ________________________________
Date: ____________________

1. What is this child’s date of birth?

2. Does this child have been found eligible for special education services under the category of autism or developmentally delayed (i.e., based on the state board of education criteria for special education)?
   □ Yes  □ No

3. Does this child exhibit peer-related social competence difficulties (i.e., seldom initiates social interactions with peers, responds to peers’ initiations, and/or engages in social interactions with peers)?
   □ Yes  □ No

4. Does this child have the ability to functionally communicate to others using a minimum of two word utterances that are intelligible?
   □ Yes  □ No

5. Does this child have the ability to follow two-three words utterances commands or requests?
   □ Yes  □ No

---

2 Child must be between the ages of 3 and 5 years old. In addition, the answer to questions 2 through 5 must be “Yes” in order for the child to be nominated to participate in the study (i.e., informed consent sought from parents or caregivers).
PEER NOMINATION CHECKLIST

Child ID: _______________  Teacher: _______________________________________
Date: ______________________

1. What is this child’s date of birth?

2. Is this child able to frequently and appropriately initiate social interactions with peers, respond to peers’ initiations, and/or engage in social interactions with peers?
   □ Yes  □ No

3. Does this child work well with adults (e.g., able to follow directions/instructions from teachers)?
   □ Yes  □ No

4. Does this child have regular school attendance (i.e., no more than three absences per month) and opportunities to socially interact with the focal children during the school day?
   □ Yes  □ No

5. Has this child been identified with a developmental disability or is eligible for special education services under the category of autism or developmentally delayed, based on the state board of education criteria for special education?
   □ Yes  □ No

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3 Child must be between the ages of 3 and 5 years. In addition, the answer to questions 2 through 4 must be “Yes” and the answer to question 5 must be “No” in order for the child to be nominated to participate in the study (i.e., informed consent sought from parents or caregivers).
Appendix C
Consent Forms and Child Assent Script

University of Florida
Anita Zucker Center for Excellence in Early Childhood Studies
P.O. Box 117050, 1345 Norman Hall
Gainesville, FL 32611-7050

Parental Informed Consent (Focal Children)

Please read the following consent form carefully before deciding whether or not to give permission for your child to take part in this research study.

One of our research interests is working with children who have been diagnosed with autism spectrum disorder (ASD) and have difficulties playing and socially interacting with their peers at school or in their community. We are conducting a research study that examines ways in which we may help these children increase their peer-related social competence skills.

The purpose of this letter is to explain our study and ask if you would agree to allow your child to participate. If you agree to have your child participate in the study, the phases of the study described below will be conducted in your child’s school.

Phase 1: Teacher interview and classroom observations - The first phase of the study consists of conducting an interview with your child’s teacher to identify potential factors that may influence your child’s social behaviors at school. Direct observations of your child during naturally occurring classrooms social interactions with classmates will also be conducted in this phase of the study.

During the interview, your child’s teacher will be asked to complete the following assessments: 1) the Childhood Autism Rating Scale (2nd Edition; Schopler, Van Bourgondien, Wellman, & Love, 2010), which is used to determine the severity of the symptoms associated with ASD; and 2) the Social Responsiveness Scale (2nd Edition; Constantino & Gruber, 2011), which is used to identify the presence and severity of social competence difficulties in children diagnosed with ASD. The classroom observations will be conducted over a period of three days and each will last approximately 10 minutes. In addition to the teacher interview and classroom observations, we will review your child’s cumulative records to obtain additional descriptive information for research purposes, such as school attendance.

Phase 2: Systematic assessment – This phase of the study involves conducting an assessment called preference assessment with your child. The purpose of this assessment is to identify your child’s preferred toys to play with while he or she is at school, such as toy cars, building blocks, or play-dough. During the assessment, your child will be given the opportunity to choose toys from an assortment of up to ten toys. We will keep track of how often your child selects each toy. The most frequently selected toys will be identified as your child’s preferred ones. This assessment will be conducted in your child’s classroom over a period of five days and each session will last approximately 10 minutes.
Phase 3: Intervention implementation – In this phase of the study we will implement an intervention in your child’s classroom to assist him or her in the acquisition of peer-related social behaviors. The intervention will be focused on teaching your child how to initiate social interactions and will be developed using the findings of the study’s first two phases. During the intervention, your child will join a researcher and two peers in a play-based social activity selected for the intervention. Your child’s peers will learn how to use certain social skills, such as asking questions, to effectively maintain social interactions with your child. The researcher will observe your child’s social interactions with his or her peers during the activity in order to see if there are changes in those social interactions. This will help us determine strategies that may help your child to acquire peer-related social behaviors that can be used in the future. Intervention sessions will occur three times a week and each will last approximately 10 minutes. We expect the entire duration of the study (all three phases) to last approximately four months. Due to illness, holidays and absences, and rate of skill acquisition, the study may last longer.

All of the information collected on your child during the study (file reviews, teacher interviews, preference assessments, and intervention sessions) will be kept confidential to the extent provided by the law and will be kept for the foreseeable future in a locked room that only the research personnel has access to. These data will be used for training or as part of a publication, but your child's name will not be used for data publication or presentation. We will videotape the intervention sessions. This will be done to record the behaviors that occur during the sessions and to evaluate differences that may occur during the study. These videotapes will be shown only under our direction to people collecting and scoring the data, to students or other researchers at the University of Florida, and at professional presentations outside of the university (for research or training purposes only). The videos will contain no identifying information that could associate them with your child or with your child’s participation in this study. The Principal Investigator (PI) will strictly monitor the confidentiality of these videotapes. However, you should be aware that the showing of these videotapes might result in others being able to recognize your child. The videos will be stored for the foreseeable future at the University of Florida’s College of Education’s secure server.

Participation or nonparticipation in this study will not affect your child’s placement in any educational programs. Participation in this study is voluntary. You and your child have the right to withdraw consent at any time without any consequences.

There are no known risks for participation in this study. There is also no compensation for participation in this study. Possible benefits of participation include improvement in your child's peer-related social behaviors and your child’s teacher receiving behavioral assessment and intervention training to help your child learn new social skills.

The results of this study will be shared with you at the end of the study. No information will be shared with anyone other than you unless you authorize this to occur.
I have read the procedures described above for this study. I have received a copy of this statement and I agree to allow my child to participate. I am free to ask questions or to express any concerns that I have about the study. I am free to withdraw consent at any time, and this will have no effect on other services provided to my child.

________________________                                    _____________________________
Signature                                             Witness

________________________                                    _____________________________
Date                                             Date

_______________________________
Relationship to participant

I give my consent for my child, ___________________________ to be videotaped during interventions sessions to serve as a record of his or her responses and for the purposes stated in this consent.

________________________                                    _____________________________
Signature                                             Witness

________________________                                    _____________________________
Date                                             Date

_______________________________
Relationship to participant

For information regarding your rights as a research participant contact the University of Florida’s Institutional Review Board at 352-392-0433. Questions about this research project may be directed to Jose Martinez (PI), 305-989-3628/j.martinez36@ufl.edu, or Dr. Maureen Conroy, 352-273-4382/mconroy@coe.ufl.edu.

Rev. 9/22/16
One of our research interests is working with children who have been diagnosed with Autism Spectrum Disorder (ASD) and have difficulties playing and socially interacting with their peers at school or in their community. We are conducting a research study that examines ways in which we may help these children increase their peer-related social competence skills. We are writing to you because your child has been nominated by his or her teacher to serve as a “peer buddy” for a child with ASD participating in our study.

The purpose of this letter is to explain our study and ask if you would agree to allow your child to participate. If you agree to have your child participate in the study, the phases of the study described below will be conducted in your child’s school.

Phase 1: Teacher interview and classroom observations - The first phase of the study consists of conducting an interview with your child’s teacher to learn about your child’s social behaviors at school. During the interview, your child’s teacher will be asked to complete the Social Skills Improvement System Rating Scales (SSIS-RS; Gresham & Elliot, 2008), which is used to determine the social competence abilities of your child. Direct observations of your child during naturally occurring classrooms social interactions with classmates will also be conducted in this phase of the study. These observations will be conducted over a period of three days and each will last approximately 10 minutes. In addition to the teacher interview and classroom observations, we will be reviewing your child’s cumulative records to obtain additional descriptive information for research purposes, such as school attendance information.

Phase 2: Systematic assessment – This phase of the study involves conducting an assessment called preference assessment. The purpose of this assessment is to identify the preferred toys that the child with ASD likes to play with while he or she is at school, such as toy cars, building blocks, or play-dough. This assessment will be conducted over a period of five days and each session will last approximately 10 minutes. Your child will not participate in this phase of the study.

Phase 3: Intervention implementation - In this phase of the study we will implement an intervention to assist the child with ASD to acquire peer-related social behaviors. This intervention will target teaching the child with ASD how to initiate social interactions with your child and will be developed using the findings of the study’s first two phases. During the intervention, your child will join a researcher, the child with ASD, and another peer in a play-based social activity selected for the intervention. Your child will learn how to use certain social skills, such as asking questions, to effectively maintain social interactions with the child with
ASD. The researcher will observe your child’s social interactions with his or her peer and the child with ASD during the activity in order to see if there are changes in those social interactions. This will help us determine strategies that may help children with ASD to acquire peer-related social behaviors that can be used in the future. Intervention sessions will occur three times a week and each will last approximately 10 minutes. We expect the entire duration of the study (all three phases) to last approximately four months. Due to illness, holidays and absences, and rate of skill acquisition, the study may last longer.

All of the information collected on your child during the study (file reviews, teacher interviews, preference assessments, and intervention sessions) will be kept confidential to the extent provided by the law and will be kept for the foreseeable future in a locked room that only the research personnel has access to. These data will be used for training or as part of a publication, but your child's name will not be used for data publication or presentation. We will videotape the intervention sessions. This will be done to record the behaviors that occur during the sessions and to evaluate differences that may occur during the study. These videotapes will be shown only under our direction to people collecting and scoring the data, to students or other researchers at the University of Florida, and at professional presentations outside of the university (for research or training purposes only). The videos will contain no identifying information that could associate them with your child or with your child’s participation in this study. The Principal Investigator (PI) will strictly monitor the confidentiality of these videotapes. However, you should be aware that the showing of these videotapes might result in others being able to recognize your child. The videos will be stored for the foreseeable future at the University of Florida’s College of Education’s secure server.

Participation or nonparticipation in this study will not affect your child’s placement in any educational programs. Participation in this study is voluntary. You and your child have the right to withdraw consent at any time without any consequences.

There are no known risks for participation in this study. There is also no compensation for participation in this study. Possible benefits of participation include improvement in your child's peer-related social behaviors and your child’s teacher receiving behavioral assessment and intervention training to help children learn new social skills.

The results of this study will be shared with you at the end of the study. No information will be shared with anyone other than you unless you authorize this to occur.
I have read the procedures described above for this study. I have received a copy of this statement and I agree to allow my child to participate. I am free to ask questions or to express any concerns that I have about the study. I am free to withdraw consent at any time, and this will have no effect on other services provided to my child.

________________________                                    _____________________________
Signature                                    Witness

________________________
Date

___________________________
Relationship to participant

I give my consent for my child, ___________________________ to be videotaped during interventions sessions to serve as a record of his or her responses and for the purposes stated in this consent.

______________________
Signature

___________________________
Witness

________________________
Date

___________________________
Relationship to participant

For information regarding your rights as a research participant contact the University of Florida’s Institutional Review Board at 352-392-0433. Questions about this research project may be directed to Jose Martinez (PI), 305-989-3628/ j.martinez36@ufl.edu, or Dr. Maureen Conroy, 352-273-4382/mconroy@coe.ufl.edu.

Rev. 9/22/16
One of our research interests is working with children who have been diagnosed with autism spectrum disorder (ASD) and have difficulties playing and socially interacting with their peers at school or in their community. We are conducting a research study that examines ways in which we may help these children increase their peer-related social competence skills.

The purpose of this letter is to explain our study and ask if you would agree to participate. If you agree to participate in the study, the phases of the study described below will be conducted.

**Phase 1: Interview and direct classroom observations** - The first phase of the study will consist of the Principal Investigator (PI) asking you to identify a child with ASD in your classroom that exhibits peer-related social competence difficulties that may benefit from participating in the study. In addition, you will be asked to identify two socially competent peers with whom the child with ASD has opportunities to socially interact with during the school day in order to be included in the study as the social partners of the child with ASD. Consent forms will be sent to the parents or caregivers of these children for potential participation in the study. Once consent is obtained for each child, you will be interviewed in order to collect data on the children for research purposes.

During the interview, you will be asked to complete the following assessments: 1) the Childhood Autism Rating Scale (2nd Edition; Schopler, Van Bourgondien, Wellman, & Love, 2010), which is used to determine the severity of the symptoms associated with ASD; 2) the Social Responsiveness Scale (2nd Edition; Constantino & Gruber, 2011), which is used to identify the presence and severity of social competence difficulties in children diagnosed with ASD; and 3) the Social Skills Improvement System Rating Scales (SSIS-RS; Gresham & Elliot, 2008), which is used to determine the social competence abilities of children. In addition, the Social Skills Interview (Asmus, Conroy, Ladwig, Boyd, & Sellers, 2004) will be utilized during the interview, a structured interview questionnaire developed to identify factors that may influence children’s social behaviors at school. The interview will be conducted in your classroom or at an alternative location in the school at a time that is convenient to you (e.g., after the children are dismissed for the day) and will take approximately 60 minutes.

Direct observations of the children during naturally occurring classrooms social interactions will also be conducted in this phase of the study. These observations will be conducted over a period of three days and each will last approximately 10 minutes.
**Phase 2: Systematic assessment** – This phase of the study involves conducting an assessment called preference assessment with the child with ASD. The purpose of this assessment is to identify the child’s preferred toys to play with while he or she is at school, such as toy cars, building blocks, or play-dough. During the assessment, the child will be given the opportunity to choose toys from an assortment of up to ten toys. You will be asked to identify this assortment of toys during the interview. We will keep track of how often the child selects each toy. The most frequently selected toys will be identified as the child’s preferred ones. This assessment will be conducted in your classroom over a period of five days and each session will last approximately 10 minutes. Your only role in this phase of the study will be to identify toys to be included in the preference assessment.

**Phase 3: Intervention implementation** – In this phase of the study we will implement an intervention in a section of your classroom to assist the child with ASD in the acquisition of peer-related social behaviors. The intervention will be focused on teaching the child how to initiate social interactions and will be developed using the findings of the study’s first two phases. During the intervention, the child with ASD will join the PI and the two peers in a play-based social activity selected for the intervention. The peers will learn how to use certain social skills, such as asking questions, to effectively maintain social interactions with the child with ASD. The PI will observe the children’s social interactions during the activity in order to see if there are changes in those social interactions. This will help us determine strategies that may help children with ASD to acquire peer-related social behaviors that can be used in the future. Intervention sessions will occur three times a week and each will last approximately 10 minutes. You will not be asked to be a part of these intervention sessions. At the end of the study you will be asked to complete an intervention acceptability form and a social validity form. Each of these forms takes approximately five minutes to be completed. We expect the entire duration of the study (all three phases) to last approximately four months. Due to illness, holidays and absences, and rate of skill acquisition, the study may last longer.

All of the information collected on you and the children during the study will be kept confidential to the extent provided by the law and will be kept for the foreseeable future in a locked room that only the research personnel have access to. These data will be used for training or as part of a publication, but names will not be used for data publication or presentation. We will videotape the intervention sessions. This will be done to record the behaviors that occur during the sessions and to evaluate differences that may occur during the study. These videotapes will be shown only under our direction to people collecting and scoring the data, to students or other researchers at the University of Florida, and at professional presentations outside of the university (for research or training purposes only). The videos will contain no identifying information that could associate them with your or the children’s participation in this study. The PI will strictly monitor the confidentiality of these videotapes. The videos will be stored for the foreseeable future at the University of Florida’s College of Education’s secure server.

Participation or nonparticipation in this study will not affect you position in any way. Participation in this study is voluntary. You have the right to withdraw consent at any time without any consequences.
There are no known risks for participation in this study. There is also no compensation for participation in this study. Possible benefits of participation include improvement in the peer-related social behaviors of the child with ASD and increased appreciation and acceptance of individual differences as well as increased understanding and acceptance of diversity for the peers. The results of this study will be shared with you at the end of the study.

I have read the procedures described above for this study. I have received a copy of this statement and I agree to participate. I am free to ask questions or to express any concerns that I have about the study or to withdraw consent at any time.

________________________________________  __________________________________________
Signature                                                                 Witness

________________________________________  __________________________________________
Date                                                                                   Date

For information regarding your rights as a research participant contact the University of Florida’s Institutional Review Board at 352-392-0433. Questions about this research project may be directed to Jose Martinez (PI), 305-989-3628/j.martinez36@ufl.edu, or Dr. Maureen Conroy, 352-273-4382/mconroy@coe.ufl.edu.

Rev. 9/24/16
Hi [child’s name]. My name is Jose. I am a student at the University of Florida. I am trying to learn how you play and talk with your friends at school. I would like to ask you to help me by being in my research study. A research study is a way to learn information about something.

I will ask you to play and talk with your friends at school. By being in the study, you will help me understand how you and your friends play together and talk to each other.

When I tell other people about the study, I will not use your name. No one will be able to tell who I am talking about.

Your parents said it is okay for you to be in my study, but you do not have to be in the study if you do not want to. Participation in the study is voluntary. That means that I will not be upset, or anyone else, if you do not want to participate. It is okay if you want to be in the study now, but change your mind later. Just let me know when you want to stop. You can stop being part of the study at any time. If there is anything that you do not understand about the study, let me know so I can explain it to you better.

You can ask me any questions about my study at any time. If you have a question that you cannot think of while at school, you or your parents can call me or send me an email.

Do you have any questions for me now?

Would you like to be in my study and play with your friends?
APPENDIX D
SOCIAL SKILLS INTERVIEW

Child ID: ___________________________    Age: ______________

Gender: M    F

Date of Interview: _____________________    Interviewer: ___________

Part I: Social Behaviors

The purpose of this part of the interview is to identify appropriate social behaviors exhibited by this child and contexts in which he or she is more likely to exhibit those behaviors.

1. Please identify the topography (i.e., what the behaviors look like) and the frequency (i.e., how often the child engages in the behaviors) of the appropriate social behaviors (e.g., initiating toward peers or adults, sharing toys or responding to peers’ initiations) that you have seen this child engage in. Also indicate the times or activities in which this child is most likely to exhibit those behaviors.

<table>
<thead>
<tr>
<th>Behaviors and Frequency</th>
<th>Times or Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
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<tr>
<td>3.</td>
<td></td>
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<tr>
<td>4.</td>
<td></td>
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<tr>
<td>5.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td></td>
</tr>
</tbody>
</table>
2. Name three child-directed activities that this child enjoys engaging in and offer him or her opportunities to socially interact with his or her peers.

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

3. What are times during the school day when this child has access to play-based activities and opportunities to socially interact with his or her peers?

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

4. Are there any peer characteristics that make a difference in this child’s display of appropriate social behaviors?

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

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5. What things do you do (or could do) to encourage this child to appropriately socially interact with peers?

6. Rate on a scale of 1 (i.e., *not at all likely*) to 5 (i.e., *highly likely to occur*) the likelihood of this child engaging in appropriate social interactions due to one of the following:

<table>
<thead>
<tr>
<th>Event</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>A peer initiating an interaction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If a peer responds to his or her initiation</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>If an adult helps the child engage in play with a peer</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>If an adult tells the child and peers to play with one another</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The child is in a large group of peers playing</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The child is in a small group of peers playing</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>If an adult directs a social activity</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>If a peer directs a social activity</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>If an adult is present and participates in a play activity</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>If peers playing are the same gender as the child</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
7. Are there any particular situations or events not listed above that may increase or decrease this child’s occurrence of appropriate social interactions with others (e.g., types of directions given, transitions, or presence or absence of certain toys)?

Part II: Preferred Toys

The purpose of this part of the interview is to identify the preferred toys that this child likes to play with while he or she is at school (e.g., toy cars, building blocks, or play-dough).

8. List the top ten toys that this child enjoys playing with while he or she is at school (i.e., this child’s preferred toys at school).

   a.  
   b.  
   c.  
   d.  
   e.  
   f.  
   g.  
   h.  
   i.  
   j.  
APPENDIX E
SOCIAL SKILLS SCREENING INSTRUMENT

Child ID: ________________

**Directions:** For each day, circle the behavior(s) observed during each one-minute interval, write the activity in which the child was observed, and the date of the observation. Once each observation is completed, calculate the percent of intervals in which the child engaged in each behavior by dividing the number of times the child engaged in each behavior by 10 and multiplying by 100.

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

**Activity:**

**Date:**

<table>
<thead>
<tr>
<th>Behaviors</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>___% Initiations</td>
<td>___% Initiations</td>
<td>___% Initiations</td>
<td></td>
</tr>
<tr>
<td>___% Responses</td>
<td>___% Responses</td>
<td>___% Responses</td>
<td></td>
</tr>
<tr>
<td>___% Social Interactions</td>
<td>___% Social Interactions</td>
<td>___% Social Interactions</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* I = interaction; R = response, SI = social interaction.

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4 Adapted from Brown, Odom, and Buysee (2002).
APPENDIX F
PREFERENCE ASSESSMENT PROTOCOL

Materials: Ten stimuli (i.e., identified by the teacher) and the Preference Assessment Data Collection Form.

Location: Sessions will be conducted in an area of the child’s classroom with no other children present and no other stimuli nearby (other than those required for the assessment). Stimuli are presented to the child in an array on top of a table.

Pre-session Sampling: Prior to beginning the assessment, allow the child to sample each stimulus for approximately 10 seconds. Once the child samples all of the stimuli, begin the session.

Session Procedure:
- Place the stimuli in a straight line in a random order on a table in the child’s classroom (i.e., each stimulus approximately one inch apart).
- Bring child to the table and instruct him or her to select one stimulus (e.g., “pick one”). This marks the beginning of the trial.
- Allow the child access to the stimulus that he or she chose for 30 seconds.
  - Once the child makes a selection, block him or her from accessing additional stimuli during that trial.
  - If the child makes contact with more than one stimulus, give him or her the one touched first.
- At the end of the trial (i.e., at the end of the 30 seconds), take the stimulus away from the child and remove it from the array (i.e., place the stimulus under the table, away from the child).
  - Once a stimulus is removed from the array it will remain removed from the array during all subsequent trials of that session.
- Prior to beginning the next trial, rotate the sequencing of the remaining stimuli by taking the stimulus at the left end of the array and moving it to the right end, then shift the other stimuli so they will again be equally spaced on the table. The second trial will begin.
- Continue in this manner until all stimuli are selected or until the child makes no selection within 30 seconds of being instructed to select a stimulus from the array. This marks the end of the session.
  - In the latter case, the session will be terminated and the remaining stimuli will be recorded as “not selected.”
- Ignore all problem behaviors.

Data Collection and Analysis: Use the Preference Assessment Form to record the stimulus selected during each trial. Once all of the preference assessment sessions are conducted for the child, use the Preference Assessment Summary Form to add the scores assigned to each stimulus, across sessions, to obtain a total score for each stimulus. The child’s preferred stimulus is the stimulus with the highest total score.

5 Adapted from DeLeon & Iwata (1996).
PREFERENCE ASSESSMENT DATA COLLECTION FORM

Child ID: ___________________ Date: ________________

Data Collector: ___________________ Primary/Reliability (Circle one)

Session #: ___________

<table>
<thead>
<tr>
<th>Trial</th>
<th>Stimulus Selected</th>
<th>Score</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2</td>
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<td>10</td>
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</tbody>
</table>

Directions: Write the stimulus selected by the child on each trial on the “Stimulus Selected” column. Assign a score to each stimulus based on the order in which it is selected on the “Score” column: A stimulus selected on the 1<sup>st</sup> trial is assigned a score of 10, a stimulus selected on the 2<sup>nd</sup> trial is assigned a score of 9, a stimulus selected on the 3<sup>rd</sup> trial is assigned a score of 8, and so on. Assign a score of 0 to the stimuli not selected during the session.

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<sup>6</sup> Adapted from DeLeon & Iwata (1996).
PREFERENCE ASSESSMENT SUMMARY FORM

Child ID: ___________________ Date: ___________________ Data Collector: ___________________

<table>
<thead>
<tr>
<th>Stimulus</th>
<th>Session 1 Score</th>
<th>Session 2 Score</th>
<th>Session 3 Score</th>
<th>Session 4 Score</th>
<th>Session 5 Score</th>
<th>Total Score</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

Preferred Stimulus: ___________________

**Directions:** Write each of the stimuli used during the preference assessment sessions on the “Stimulus” column. Write the score assigned to each stimulus in every preference assessment session on the corresponding column. Add the score assigned to each stimulus in each session and write the obtained total score for each stimulus on the “Total Score” column. Write the stimulus with the highest total score on the “Preferred Stimulus” row.
APPENDIX G
FOCAL CHILD TRAINING PROTOCOL

Each focal child will receive training across three 15-minute sessions (i.e., one session per day). Teachers will select the location of the training (i.e., a play area in the classroom during a time that is minimally disruptive to the class). The principal investigator (PI) will conduct the training for each focal child following the procedures outlined in this protocol for each session.

Session One

Purpose of session one:

1. Introduce the child to the purpose of the intervention.
2. Discuss the importance of friendships and of making new friends.
3. Teach the child how to initiate social interactions using the four initiation strategies (i.e., hello, question, comment, and help).

Steps to be followed in session one:

1. Explain of the purpose of the intervention to the child.
   a. “I want to help you learn new ways to make new friends at school. I will teach you while playing fun games and doing fun activities with me and [name of peer]. It will be super fun!”
2. Discuss of the importance of friendships and ways in which children are alike and different.
   a. “Having friends is fantastic! You can share toys with your friends, you can also play many fun games and activities with them, and you can talk to them about many cool things, like your favorite cartoon character. My favorite one is SpongeBob! What is your favorite? Oh! I also like [repeat cartoon character

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7 Adapted from the training procedures used by Garrison-Harrell et al., 1997, Katz & Girolametto, 2013, and Thiemann & Goldstein, 2004.
mentioned by child]. See? You can talk to your friends about [cartoon character mentioned by child] and other cool things.”

b. “Making new friends is also great! We can learn a lot from making new friends, even if they are a bit different from you. For example, some new friends may like to talk a lot and other new friends may like to talk very little. But even if new friends are a bit different than you, it is fun to be friends with them! You can learn new games or cartoon characters from them. One of the best ways to make new friends is to play games with them; I will help you do that!”

c. “Do you have any questions for me?”
   i. Answer question(s), if any.

3. Define and model examples of each social initiation strategy to the child.
   a. “A great way to make new friends is by talking to them while playing games. There are many ways you can start talking to others while playing a game: you can say hello to them, you can ask them questions about the game, you can make comments to them about the game, or you can ask them to help you play the game.”
      i. Hello:
         1. “You can to start talking to other children by saying hello to them and then saying their names. For example, if I was saying hello to you I would say: Hello [name of focal child]! When you say hello to others, remember to always look at them in the eyes. It lets them know that you are talking to them.”
         2. Show the “Hello” visual aid to the child while talking about the strategy.
      ii. Question:
         1. “When you are playing games with others you can ask them question about the games. This is another great way to talk to other
children and make new friends! For example, I could ask you:

*What is your favorite car?* While playing toy cars with you.”

2. Show the “Question” visual aid to the child while talking about the strategy.

iii. Comment:

1. “Another way to talk to other children and make new friends is to make comments about the games that you are playing together. For example, I could say to you: *I love the Lego tower that you are building!* While playing with Lego blocks with you.”

2. Show the “Comment” visual aid to the child while talking about the strategy.

iv. Help:

1. “While playing games with other children, it is okay to ask them for help if you do not understand something about the game, like the rules of a game, or if you need help with something else, like someone passing you a toy. For example, I could say to you: *Can you please pass me the green Lego block?* While playing with Lego blocks with you.”

2. Show the “Help” visual aid to the child while talking about the strategy.

4. Ask child if he or she has questions regarding the session.

   a. “Do you have any questions for me?”

      i. Answer child’s question(s), if any.

5. Praise child for his or her participation in the training session.

   a. “You did great today! I had fun talking to you today. Next time we will talk more about making new friends while playing games, it will be fun too!”
Session Two

Purpose of this session:

1. Review with the child how to initiate social interactions using the four initiation strategies (i.e., hello, question, comment, and help).

Steps to be followed in session two:

1. Review the purpose of the intervention with the child.
   a. “Remember that when we meet, I will help you learn how to make new friends at school while playing fun games and doing fun activities.”

2. Review the social initiation strategies with the child.
   a. “Remember that a great way to make new friends is by talking to them while playing games. There are many ways you can start talking to others while playing a game: you can say hello to them, you can ask them questions about the game, you can make comments to them about the game, or you can ask them to help you play the game.”
      i. Show the visual aids to the child while talking about each strategy.
   b. “For example, you could say to me: I love the Lego tower that you are building! While playing with Lego blocks with me. You can also say hello to me by saying Hello Jose! Or you can ask me for help while playing a game with me. For example, you can say: Jose, can you please pass me the green Lego block?”
   c. “Do you have any questions for me?”
      i. Answer question(s), if any.

3. Role-play with the child during a play activity in order for the child to practice initiating social interactions.
   a. “We will practice now how you can start talking to me while we are playing together. Choose something from this area that we both can play with [have child select toys already present in the play area where the training is taking place].
While we are playing, remember the ways I told you that you can start talking to others while playing a game.”

b. Role-playing will continue until the child independently initiates social interactions with the PI using any of the social strategies at least three times.

4. Provide performance feedback to the child.
   a. Provide the child with behavior specific praise for the steps that he or she followed correctly during the role-play (e.g., “I really liked how you said hello to me as soon as we started playing together and you looked at me in the eyes when you said hello. That is how you say hello to your friends! Keep it up!”).
   b. If needed, provide child with corrective feedback for the steps that he or she did not follow correctly during the role-play (e.g., “You said hello to me, but you did not look at me in the eyes when you said hello. Remember to look at others in the eyes when you say hello to them so they know that you are talking to them.”).

5. Ask child if he or she has questions regarding the session.
   a. “Do you have any questions for me about anything we talked about today?”
      i. Answer child’s question(s), if any.

6. Praise child for his or her participation in the training session.
   a. “You did great today! I had fun playing with you today. You deserve a high five!”

**Session Three**

**Purpose of this session:**

1. Review with the child how to initiate social interactions using the four initiation strategies (i.e., hello, question, comment, and help).
2. Discuss with the child how he or she will be prompted to initiate social interactions with the peer.
Steps to be followed in session three:

1. Review the social initiation strategies with the child.
   a. “Remember that a great way to make new friends is by talking to them while playing games. There are many ways you can start talking to others while playing a game: you can say hello to them, you can ask them questions about the game, you can make comments to them about the game, or you can ask them to help you play the game.”
      i. Show the visual aids to the child while talking about each strategy.
   b. “For example, you could say to me: *I love the Lego tower that you are building!*
      While playing with Lego blocks with me. You can also say hello to me by saying *Hello Jose! Or* you can ask me for help while playing a game with me. For example, you can say: *Jose, can you please pass me the green Lego block?*”
   c. “Do you have any questions for me?”
      i. Answer question(s), if any.

2. Review the prompt procedure with the child.
   a. “I will help you remember to start talking to your friends while playing games.
      For example, if you are playing with [name of peer] and you forget to say something to him or her, I will say to you: *[name of focal child] you can ask [name of the peer] to help you build the Lego tower. I will remind you also by showing you these cards [show the child the visual aids of the strategies].”
   b. Do you have any questions for me?”
      i. Answer child’s question(s), if any.

3. Role-play with the child during a play activity in order for the child to practice initiating social interactions and receiving prompts.
   a. “We will practice now how you can start talking to me while we are playing together. Choose something from this area that we both can play with [have child select toys already present in the play area where the training is taking place].
While we are playing, remember the ways I told you that you can start talking to others while playing a game.”

b. Role-playing will continue until the child independently initiates social interactions with the PI using any of the social strategies at least three times.

c. Provide prompts, as needed, to the child while role-playing.
   i. Use the application Interval Timer (Deltaworks, 2013) on an iPhone to keep track of 30-second intervals. If the child does not initiate within a 30-second interval, prompt him or her to do so.

4. Provide performance feedback to the child.
   a. Provide the child with behavior specific praise for the steps that he or she followed correctly during the role-play (e.g., “I really liked how you said hello to me as soon as we started playing together and you looked at me in the eyes when you said hello. That is how you say hello to your friends! Keep it up!”).
   b. If needed, provide child with corrective feedback for the steps that he or she did not follow correctly during the role-play (e.g., “You said hello to me, but you did not look at me in the eyes when you said hello. Remember to look at others in the eyes when you say hello to them so they know that you are talking to them.”).

5. Ask child if he or she has questions regarding the session.
   a. “Do you have any questions for me about anything we talked about today?”
      i. Answer child’s question(s), if any.

6. Praise child for his or her participation in the training session.
   a. “You did great today! I had fun playing with you today. You deserve a high five!”
Each peer will receive training across three 15-minute sessions (i.e., one session per day). Teachers will select the location of the training (i.e., a play area in the classroom during a time that is minimally disruptive to the class). Each peer will receive his or her training the same days that the focal child that he or she is paired with will receive his or her training (i.e., peer training will take place after the focal child’s training). The PI will conduct the training for each peer following the procedures outlined in this protocol for each session.

**Session One**

**Purpose of this session:**

1. Introduce the child to the purpose of the intervention.
2. Discuss the importance of friendships and of making new friends with various children in school.

**Steps to be followed in session one:**

1. Explain of the purpose of the intervention to the child.
   a. “As you have seen, [name of focal child], can be quiet/shy and needs to learn how to make new friends, so we are going to help [name of focal child] learn ways to make friends. We will do that by playing fun games each time that [name of focal child] joins us."

2. Discuss the importance of friendships and ways in which children are alike and different.
   a. “Having friends is fantastic! You can share toys with your friends, you can also play many fun games and activities with them, and you can talk to them about many cool things, like your favorite cartoon character. My favorite one is SpongeBob! What is your favorite? Oh! I also like [repeat cartoon character

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8 Adapted from the training procedures used by Garrison-Harrell et al., 1997, Katz & Girolametto, 2013, and Thiemann & Goldstein, 2004.
mentioned by child]. See? You can talk to your friends about [cartoon character mentioned by child] and other cool things!”

b. “Making new friends is also great! We can learn a lot from new friends, even if they are a bit different from you. For example, some children like to talk a lot and others like to talk very little. But even if other children are a bit different than you, it is fun to be friends with them! You can learn new games or cartoon characters from them. One of the best ways to make new friends is to play games with them; that is how we will help [name of focal child] make new friends!”

c. “Do you have any questions for me?”

i. Answer child’s question(s), if any.


a. “We will read this book now [show the book to the child], it is called *Franklin’s New Friend* and it talks about a turtle named Franklin who becomes friends with a Moose. See? It is fun to be friends with others that are a bit different from you. I really like this book!”

b. On page 2, ask: “Who do you think is moving to this house [point to the house on the book]?”

c. On page 3, include the following cloze statement: “Franklin was scared because Moose was so ____”.

d. On page 6, ask: “What did Franklin do? He tried to___”.

e. On page 7, ask: “Why do you think Moose said no?”

f. On page 9, include the following cloze statement: “Moose was scared because he was new and ___”.

g. On page 11, ask: “What did Franklin and Moose like to do? They both liked___”.

h. On page 13, ask: “Why was Franklin happy?”

i. On page 14, ask: “Why do you think Franklin was glad Moose was his buddy?”
4. Ask child if he or she has questions regarding the session.
   a. “Do you have any questions for me about making new friends or the book?”
      i. Answer child’s question(s), if any.

5. Praise child for his or her participation in the training session.
   a. “You did great today! I had fun reading the book with you today. Next time we
      will talk more about making new friends while playing games, it will be fun too!”

Session Two

Purpose of this session:

1. Teach the child how to wait for an initiation from the focal child and how to effectively
   respond to that initiation (i.e., respond to the initiation within three seconds).

Steps to be followed in session two:

1. Review the purpose of the intervention with the child.
   a. “Like I mentioned to you last time, we will help [name of focal child] make new
      friends while playing games.”

2. Define the steps involved in responding to the focal child’s initiations.
   a. “Your job while playing games with [name of focal child] will be to wait for him
      or her time to say something or ask something to you and then respond to what he
      or she tells you or asks you. Remember, responses are when you answer your
      friends’ questions or make comments about something that your friends have said
      to you first.”
   b. “When playing with [name of focal child], it is important that you give him or her
      time to say something or ask something to you. It is okay for you to play with the
      same toys as [name of focal child], I just want you to wait for him or her to talk to
      you first. After [name of focal child] says something to you or asks you a
      question, make sure to respond to him or her fast so he or she does not lose
interest in playing with you. I always make sure to respond to my friends before three seconds are over (i.e., One Mississippi, two Mississippi, three Mississippi)”.

c. “Remember to be friendly when talking to [name of focal child]. Our job is to teach [name of focal child] how to make new friends!”

3. Model examples and non-examples of responses to the child.
   a. “An example of answering a question fast is if someone asks me: What is your favorite color? And I answer right away [answer within three seconds]: Blue! See how fast I answered that question? A not so good example of answering a question fast is if someone asks me: What is your favorite TV show? And I answer [wait five seconds before answering]: Red. See how slow was that? Someone can lose interest in the answer if you take too long”.
   
b. “Do you have any questions for me?”
      i. Answer child’s question(s), if any.

4. Role-play with the child during a play activity in order for the child to practice waiting for and responding to initiations.
   a. “We will practice now how you can respond to my comments and questions while we are playing together. Choose something from this area that we both can play with [have child select toys already present in the play area where the training is taking place]. Before we get started, remember two things: 1) you have to wait until I say something or ask a question to you, and 2) you have to respond fast to my comments or questions.”
   
b. Role-playing will continue until the child waits for and responds to the PI’s initiations within three seconds at least five times independently.

5. Provide performance feedback to the child.
   a. Provide the child with behavior specific praise for the steps that he or she followed correctly during the role-play (e.g., “I really liked how fast you passed
me the green Lego block when I asked you for it. That is how fast you have to respond to [name of focal child] when you play with him or her. Keep it up!”).

b. If needed, provide child with corrective feedback for the steps that he or she did not follow correctly during the role-play (e.g., “You took too long to pass me the green Lego block when I asked you for it. Remember that you need to respond quickly to your friends when they ask you questions or they make comments to you.”).

6. Ask child if he or she has questions regarding the session.
   a. “Do you have any questions for me about anything we talked about today?”
      i. Answer child’s question(s), if any.

7. Praise child for his or her participation in the training session.
   a. “You did great today! I like playing games with you!”

Session Three

Purpose of this session:

1. Review with the child how to wait for an initiation from the focal child and how to effectively respond to that initiation (i.e., respond to the initiation within three seconds).

2. Discuss with the child how he or she will be prompted to wait and effectively respond to initiations from the focal child.

Steps to be followed in session three:

1. Review the steps involved in responding to the focal child’s initiations.
   a. “Remember that your job while playing games with [name of focal child] will be to wait for him or her time to say something or ask something to you and then respond to what he or she tells you or asks you. Responses are when you answer your friends’ questions or make comments about something that your friends have said to you first. Remember that when playing with [name of focal child], it is
important that you give him or her time to say something or ask something to you, okay?”

b. “Also remember to be friendly when talking to [name of focal child]. Our job is to teach [name of focal child] how to make new friends!”

c. “Do you have any questions for me?”

i. Answer child’s question(s), if any.

2. Review prompt procedure with the child.

a. “If you forget to wait for [name of focal child] to ask you a question or say something to you when you are playing with him or her or if you forget to respond to his or her questions/comments, I will help you remember to do it.”

b. “For example, if [name of focal child] asks you to pass him or her a green Lego block and you do not do it quickly, I will say to you: [name of peer] remember to pass [name of focal child] the green Lego block. If you forget to wait for [name of focal child] to ask you questions or make comments to you, I will say this to you: [name of peer] remember to give [name of focal child] an opportunity to talk to you and ask you questions. I will remind you each time that you forget to respond to [name of focal child] questions/comments or each time that you do not wait for him or her to say something to you first.”

c. Do you have any questions for me?”

i. Answer child’s question(s), if any.

3. Role-play with the child during a play activity in order for the child to practice waiting for and responding to initiations as well as receiving prompts.

a. “We will practice now how you can respond to my comments and questions while we are playing together. Choose something from this area that we both can play with [have child select toys already present in the play area where the training is taking place]. Before we get started, remember two things: 1) you have to wait until I say something or ask a question to you, and 2) you have to respond fast to
my comments or questions. If you forget to do those things, I will help you remember.”

b. Role-playing will continue until the child waits for and responds to the PI’s initiations within three seconds at least five times independently.

c. Provide prompts, as needed, to the child while role-playing.

4. Provide performance feedback to the child.

a. Provide the child with behavior specific praise for the steps that he or she followed correctly during the role-play (e.g., “I really liked how fast you passed me the green Lego block when I asked you for it. That is how fast you have to respond to [name of focal child] when you play with him or her. Keep it up!”).

b. If needed, provide child with corrective feedback for the steps that he or she did not follow correctly during the role-play (e.g., “You took too long to pass me the green Lego block when I asked you for it. Remember that you need to respond quickly to your friends when they ask you questions or they make comments to you.”).

5. Ask child if he or she has questions regarding the session.

a. “Do you have any questions for me about anything we talked about today?”

i. Answer child’s question(s), if any.

6. Praise child for his or her participation in the training session.

a. “Great job today! I really like playing these games with you!”
INTERVENTION IMPLEMENTATION PROTOCOL

This protocol describes the steps that should be followed when conducting each of the experimental sessions in Phase 3 of the study.

**Baseline Sessions**

1. Bring focal child and peer to the play area where baseline sessions will take place.
   a. Start recording the session on the video camera.
   b. The PI will introduce himself and the children at the beginning of the first session.
      i. “Hi guys! My name is Jose! I am here because I am trying to learn how you and your friends talk to each other while playing games here at school. [Introduce children by name to each other]. Every time that we meet, we will play fun games and activities. I am so happy to be here with you guys! It will be super fun!”

2. Instruct children to play with the stimuli (e.g., toys) already present in the play area.
   a. “You guys can play with these toys [point/gesture to the toys already present in the play area] in any way that you want. Just make sure that you stay in this area when playing [point/gesture to the limits of the play area]. I have work to do so I will do it while you guys play.”
   b. Signal the beginning of the session to data collectors (i.e., “3, 2, 1 begin”).
   c. Set timer on Interval Timer (Deltaworks, 2013) to 10 minutes and start the timer.
   d. Focal child preferred stimulus should **not** be available during baseline sessions.

3. Allow children to play with the stimuli present in the play area.
   a. Do not facilitate social interactions between the children (i.e., do not provide prompts for the children to do so).

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9 These steps should be followed during the sessions in which the children are receiving their training, but have not yet started the intervention sessions.
4. Signal the end of the session to data collectors (i.e., “3, 2, 1 stop”) at the end of the 10 minutes.

5. Instruct the children to stop playing and give praise to them.
   a. “Time is up! You guys did a great job today playing with these toys! It is time now for you guys to go back to your class. Can I get a high five?”
   b. Stop recording the session on the video camera.

**Intervention Sessions**

1. Bring focal child and peer to the play area where intervention sessions will take place.
   a. Start recording the session on the video camera.

2. Instruct children to play with the focal child’s preferred stimulus and to interact with one another using the skills previously taught to them.
   a. “You guys will play with this [point/gesture to the focal child’s preferred stimulus]. While playing make sure to talk and play together. [Name of focal child], remember the ways I told you that you can talk to friends while playing games with them. [Name of peer], remember what we talked about responding to friends’ comments or questions while playing games with them.”
   b. Signal the beginning of the session to data collectors (i.e., “3, 2, 1 begin”).
   c. Set timer on Interval Timer (Deltaworks, 2013) to 10 minutes and start the timer.

3. Allow children to play with focal child’s preferred stimulus.
   a. Provide a prompt to the focal child to initiate socially toward the peer every 30 seconds that he or she does not do so (e.g., “[name of focal child] you can ask [name of the peer] to help you build the Lego tower.”).
      i. Keep track of 30-second intervals on Interval Timer (Deltaworks, 2013).
      ii. When providing a prompt to the focal child, show him or her the visual aid of the strategy being prompted.
b. Provide a prompt to the peer to wait for a focal child’s initiation or to respond to a focal child’s initiation each time that he or she does not do so (e.g., “[name of peer] remember to give [name of focal child] an opportunity to talk to you and ask you questions.”).

4. Signal the end of the session to data collectors (i.e., “3, 2, 1 stop”) at the end of the 10 minutes.

5. Instruct the children to stop playing and give performance feedback to the children.
   a. Provide the children with behavior specific praise for the steps that they performed well during the intervention session (e.g., “[name of peer], I liked how fast you answered all of the questions that [name of focal child] asked you while you guys were playing!”).
   b. If needed, provide child with corrective feedback for the steps that they did not perform as well during the session (e.g., “[name of peer], you took too long to answer some of [name of focal child] questions. Make sure to answer his or her questions as soon as he or she asks them to you.”).

6. Give praise to the children for participating in the session and allow them to choose an item from the treasure chest.
   a. “You guys did a great job today playing with these toys! You guys can choose one item each from my amazing treasure chest!”
   b. Stop recording the session on the video camera.

**Generalization Sessions**

1. Bring focal child and peer (i.e., peer that has not received social skills training) to the play area where generalization sessions will take place (i.e., same play area as intervention sessions).
   a. Start recording the session on the video camera.
   b. The PI will introduce the children at the beginning of the first session.
2. Instruct children to play with the focal child’s preferred stimulus.
   a. “You guys will play with this [point/gesture to the focal child’s preferred stimulus]. Just make sure that you stay in this area when playing [point/gesture to the limits of the play area]. I have work to do so I will do it while you guys play.”
   b. Signal the beginning of the session to data collectors (i.e., “3, 2, 1 begin”).
   c. Set timer on Interval Timer (Deltaworks, 2013) to 10 minutes and start the timer.

3. Allow children to play with the stimulus.
   a. Do not facilitate social interactions between the children (i.e., do not provide prompts for the children to do so).

4. Signal the end of the session to data collectors (i.e., “3, 2, 1 stop”) at the end of the 10 minutes.

5. Instruct the children to stop playing and give praise to them.
   a. “Time is up! You guys did a great job today playing with these toys! It is time now for you guys to go back to your class. Can I get a high five?”
   b. Stop recording the session on the video camera.

Maintenance Sessions

1. Bring focal child and peer (i.e., peer that has received social skills training) to the play area where maintenance sessions will take place (i.e., same play area as intervention sessions).
   a. Start recording the session on the video camera.

2. Instruct children to play with the focal child’s preferred stimulus.
   a. “You guys will play with this [point/gesture to the focal child’s preferred stimulus]. Just make sure that you stay in this area when playing [point/gesture to the limits of the play area]. I have work to do so I will do it while you guys play.”
   b. Signal the beginning of the session to data collectors (i.e., “3, 2, 1 begin”).
   c. Set timer on Interval Timer (Deltaworks, 2013) to 10 minutes and start the timer.
3. Allow children to play with the stimulus.
   a. Do not facilitate social interactions between the children (i.e., do not provide prompts for the children to do so).

4. Signal the end of the session to data collectors (i.e., “3, 2, 1 stop”) at the end of the 10 minutes.

5. Instruct the children to stop and give praise to them.
   a. “Time is up! You guys did a great job today playing with these toys! It is time now for you guys to go back to your class. Can I get a high five?”
   b. Stop recording the session on the video camera.
APPENDIX H
CODING DEFINITIONS AND DATA COLLECTION GUIDELINES

The following operational definitions will be used to code the children’s social behaviors during the study. The coding definitions to be used in this study were adapted from the Generalized Assessment Tools for Observing and Remediating Social Skills coding manual (Conroy & Asmus, 2006).

**Focal Child and Peer Independent Initiations**

Independent verbal or gestural behaviors (i.e., exhibited by a focal child or peer without a prompt from the PI for him or her to do so) that are not preceded in the previous three seconds by another social behavior and are directed toward a focal child or peer in an attempt to obtain the other child’s attention, engage the other child in a mutual activity, to elicit a social response from the other child, or to request help or a desired object from the other child. If multiple initiations occur in a period less than three seconds (e.g., if a peer says “Tom, Tom, Tom” with no gap), only the first occurrence of the behavior will be coded as an initiation. This is an event code.

- Examples of focal child and peer independent initiations:
  - Focal child independently says the peer’s name while saying hello to him (e.g., “Hi Jason!”).
  - Focal child independently gives the peer a hug as a means to say hello to her.
  - Focal child independently asks the peer to play with him (e.g., “Do you want to play toy cars with me?”).
  - Focal child independently makes a comment to the peer while playing to obtain the peer’s attention (e.g., “Look at my Lego tower!”).
  - Focal child independently points to a toy that she wants but cannot reach and asks the peer to give the toy to her.

10 Use this definition when coding the focal children and peers’ initiations during the direct classroom observations (i.e., pre-experimental classroom observations and post-experimental classroom observations).
Peer independently points to a picture in a book while making a comment about it to obtain the focal child’s attention (e.g., “Look at the cat! He is wearing shoes!).

- Non-examples of focal child and peer independent initiations:
  - Focal child accidentally brushes up against the peer.
  - Focal child independently hands the peer a toy within three seconds of the peer asking her for the toy (i.e., focal child independent response).
  - Focal child gives the peer a hug as a means to say hello to her within three seconds of the PI prompting the focal child to say hello to the peer (i.e., focal child prompted initiation).
  - Focal child is spinning in circles with his arms out. While spinning, his arms accidentally run into the peer’s face.
  - Focal child tells the peer “play with me” within three seconds of the PI prompting the focal child to do so (i.e., focal child prompted initiation).
  - Focal child independently responds “red” to the peer within three seconds of being asked by the peer “what is your favorite color?” (i.e., focal child independent response).
  - Peer is playing with toy cars while the focal child is playing with another set of toy cars on his own.

**Focal Child Prompted Initiations**

A verbal or gestural behavior exhibited by a focal child as a means to obtain the peer’s attention, engage the peer in a mutual activity, to elicit a social response from the peer, or to request help or a desired object from the peer within three seconds of the PI prompting the focal child to engage in the behavior. This is an event code.
• Examples of focal child prompted initiations:
  o Focal child gives the peer a hug as a means to say hello to her within three seconds of the PI prompting the focal child to say hello to the peer.
  o Focal child tells the peer “play with me” within three seconds of the PI prompting the focal child to do so.
  o Focal child asks the peer to help him build a Lego tower within three seconds of the PI prompting the focal child to ask the peer to play with him.

• Non-examples of focal child prompted initiations:
  o Focal child independently says the peer’s name while saying hello to him (i.e., focal child independent initiation).
  o Focal child independently responds “red” to the peer within three seconds of being asked by the peer “what is your favorite color?” (i.e., focal child independent response).
  o Focal child independently points to a toy that she wants but cannot reach and asks the peer to give the toy to her (i.e., focal child independent initiation).
  o Focal child independently hands the peer a toy within three seconds of the peer asking her for the toy (i.e., focal child independent response).

**Focal Child and Peer Independent Responses**

Independent verbal or gestural behaviors (i.e., exhibited by a focal child or peer without a prompt from the PI for him or her to do so) directed to an initiating peer or focal child that overtly acknowledge the other child’s initiation within three seconds of the initiation. This includes a child verbally responding to a peer’s or focal child’s initiation, joining a play activity once asked to join, or helping to complete a task once asked to do so. Responses also include a focal child or peer clearly orienting himself or herself toward the initiating child after the

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11 Use this definition when coding the focal children and peers’ responses during the direct classroom observations (i.e., pre-experimental classroom observations and post-experimental classroom observations).
occurrence of the initiation. Responses include appropriately declining initiations. This is an event code.

- **Examples of focal child and peer independent responses:**
  - Focal child independently hands the peer a toy within three seconds of the peer asking him for the toy.
  - Peer independently responds “no, thank you” to the focal child within three seconds of being asked by the focal child to play cars with her.
  - Focal child independently responds “yes!” to the peer within three seconds of being asked by the peer “do you want to play magnet tiles with me?”
  - Peer independently waves hello to the focal child within three seconds of being greeted by the focal child.
  - Focal child independently looks to a picture in a book within three seconds of the peer making a comment about it.

- **Non-examples of focal child and peer independent responses:**
  - Peer independently asks the focal child for a toy out of her reach (i.e., peer independent initiation). The focal child ignores the peer for over three seconds (i.e., focal child no response).
  - Focal child independently gestures to the peer to come over and play with him (i.e., focal child independent initiation).
  - Focal child independently asks the peer to play cars with him (i.e., focal child independent initiation). The peer keeps playing with her own toys for over three seconds (i.e., peer no response).
  - Focal child hands the peer a toy within three seconds of the PI telling him to hand the toy to the peer (i.e., focal child prompted response).
Peer Prompted Responses

A verbal or gestural behavior directed to an initiating focal child that overtly acknowledges the other child’s initiation within three seconds of the PI prompting the peer to engage in the behavior. This is an event code.

- Examples of peer prompted responses:
  - Peer hands the focal child a toy within three seconds of the PI telling him to hand the toy to the focal child.
  - Peer waves hello to the focal child within three seconds of the PI telling the peer to say “hi” back to the focal child.
  - Peer responds “yes, I want to play cars” to the focal child within three seconds of the PI prompting the peer to respond to the focal child.

- Non-examples of focal child and peer prompted responses:
  - Peer independently asks the focal child for a toy out of her reach (i.e., peer independent initiation). The focal child ignores the peer for over three seconds (i.e., focal child no response).
  - Focal child independently responds “yes!” to the peer within three seconds of being asked by the peer “do you want to play magnet tiles with me?” (i.e., focal child independent response).
  - Focal child independently gestures to the peer to come over and play with him (i.e., focal child independent initiation).
  - Focal child independently asks the peer to play cars with him (i.e., focal child independent initiation). The peer independently responds to the focal child “yes, I want to play” within three seconds (i.e., peer independent response).
Focal Child and Peer No Responses

A peer or focal child either knowingly or unknowingly does not respond to the initiating child. Allow three seconds after an initiation before coding a no response. This is an event code.

- Examples of focal child and peer no responses:
  - Focal child ignores the peer for over three seconds after being greeted by the peer.
  - The peer keeps playing with her own toys for over three seconds after being asked by the focal child to play cars with him.

- Non-examples of focal child and peer no responses:
  - The focal child independently asks the peer to play Legos with him (i.e., focal child independent initiation) and the peer joins the activity within three seconds of being asked to do so (i.e., peer independent response).
  - Peer says the focal child’s name (i.e., peer independent initiation) and the focal child looks at the peer within three seconds of her name being called (i.e., focal child independent response).
  - Peer waves hello to the focal child within three seconds of the PI telling the peer to say “hi” back to the focal child (i.e., peer prompted response).

Social Interactions\textsuperscript{12}

A social interaction is coded when a sequence of three social event behaviors occur between a focal child and a peer within three seconds of each other. A social interaction begins (i.e., behavior’s onset) after an initiation-response sequence with the third behavior in the sequence (i.e., initiation-response-interaction). While the children are engaged in a social interaction, additional initiations and responses will not be coded (i.e., the duration of each interaction will take precedence). Social interactions will stop being coded (i.e., behavior’s offset) when a lapse of three seconds (i.e., one Mississippi, two Mississippi, three Mississippi) in

\textsuperscript{12} Use this definition when coding social interactions between focal children and peers during the direct classroom observations (i.e., pre-experimental classroom observations and post-experimental classroom observations).
the social exchanges between a peer and a focal child occur. The social interaction code is a duration code.

- Examples of social interactions:
  - Focal child independently says the peer’s name (i.e., focal child independent initiation), the peer turns around and looks at the focal child within three seconds of his name being called (i.e., peer independent response), focal child asks the peer for a red crayon (i.e., social interaction).
  - Focal child hands a truck to the peer after being prompted by the PI to do so (i.e., focal child prompted initiation), the peer takes the truck within three seconds (i.e., peer independent response), and the focal child says to the peer “let’s play cars” (i.e., social interaction).
  - Focal child independently asks the peer “what do you want to play?” (i.e., focal child independent initiation), the peer responds “play with Legos” within three seconds of being prompted by the PI to do so (i.e., peer prompted response), the focal child says “okay” (i.e., social interaction).

- Non-examples of social interactions:
  - Focal child independently asks peer to play with cars (i.e., focal child independent initiation) and the peer responds within three seconds “no, thank you” (i.e., peer independent response) and continues to play by himself.
  - Peer asks focal child to play with Legos (i.e., peer independent initiation) and the focal child ignores the peer for over three seconds (i.e., focal child no response).
  - Focal child independently hands a truck to the peer (i.e., focal child independent initiation). The peer independently takes the truck within three seconds (i.e., peer independent response) and walks away from the focal child.
  - Focal child independently asks peer to play with cars (i.e., focal child independent initiation) and the peer responds within three seconds “okay” (i.e., peer independent response) and both children begin playing with the cars. However,
the children do not engage in any further gestural or verbal behaviors with the goal of obtaining the other child’s attention while playing with the cars.

**Wait Prompts**

If the peer initiates to the focal child either at the beginning of an observation session or after a social interaction has ceased for at least three seconds, the PI will deliver a verbal prompt to the peer to remind him or her to wait for the focal child to initiate toward him or her. This is an event code.

- **Examples of wait prompts:**
  - The PI tells the peer “remember to give Jason the opportunity to say something to you first” right after the peer independently says the focal child’s name while saying hello to him at the beginning of the observation session.
  - The PI tells the peer “remember to wait for your friend to ask you a question or says something to you” right after the peer independently asks the focal child “which one is your favorite [toy] car?”

- **Non-examples of wait prompts:**
  - Focal child independently says the peer’s name while saying hello to him at the beginning of an observation session (i.e., focal child independent initiation).
  - Peer waves hello to the focal child within three seconds of the PI telling the peer to say “hi” back to the focal child (i.e., peer prompted response).
  - Focal child tells the peer “play with me” within three seconds of the PI prompting the focal child to do so (i.e., focal child prompted initiation).
  - Focal child hands the peer a toy within three seconds of the PI telling him to hand the toy to the peer (i.e., focal child prompted response).

**Notes**

- Social behaviors are coded in sequence beginning with an initiation, followed by a response, followed by an interaction (i.e., Initiation – Response – Interaction sequence). Therefore, initiations should be coded before responses and interactions.
• For independent initiations and responses, allow a three second wait time before coding another behavior (e.g., if a peer says “Tom, Tom, Tom” with a gap of less than three seconds, one peer independent initiation rather than three peer independent initiations should be coded).

• Event codes require observers to code each occurrence of the behavior (i.e., code key should be pressed each time that the behavior occurs at the moment that the behavior occurs).

• Duration codes require observers to code how long a behavior lasts (i.e., code key should be pressed at the behavior’s onset and at its offset).
DATA COLLECTION GUIDELINES

Lily Collector Guidelines

Opening Lily Collector (Tapp, 2010). Follow these steps to open Lily Collector:

- Open Lily Collector by double-clicking the shortcut labeled “Lily Collector” on the desktop of your computer. Maximize the “Lily Collector” window (i.e., orange background with white buttons) by clicking the middle box in the upper right-hand side of the window.

- If the “Lily Collector” window is not visible, follow these steps to make it visible:
  - Place the cursor over the Lily Collector icon on the task bar at the bottom of the screen.
  - Two small windows will pop up. One window will be labeled “Timer” and the other one will be labeled “Lily Collector.”
    - Right click on the “Lily Collector” window.
    - Select “Maximize” from the menu that appears once you right click on the “Lily Collector” window.

- Once the “Lily Collector” window is maximized, the “Timer” window (i.e., green background with grey buttons labeled “start” and “stop”) will also be visible. Click and drag the “Timer” window to the right-hand side of the screen, away from the buttons of the “Lily Collector” window (See Figure 1).
Figure 1. Example of the Lily Collector windows set up to collect data.

Setting up Lily Collector for coding. Follow these steps to set up Lily Collector to collect data:

- Click on the “Preferences” menu in the upper left-hand corner of the screen.
- Select “Change Preferences” from the drop-down menu that appears once you click on “Preferences”.
- A window labeled “Lily Preferences” will open.
- Click on the “Operation” tab of the “Lily Preferences” window.
  - Click on the “Event Mode” radio button.
    - In the “Session Duration box” enter 900.
  - Click on the “Screen Tab” of the “Lily Preferences” window.
    - In the “Button Width” box enter 150.
    - In the “Button Height” box enter 50.
    - Click on the “Button Font” button.
      - Select font size 10.
o Select the box labeled “Show Timer” at the bottom of the window.

- Close the “Lily Preferences” window by clicking on the “X” in the upper right-hand corner of the window.

- Close down Lily Collector by clicking the “X” on the upper right-hand corner of the window. This will ensure that the changes made to the preferences of the Lily Collector program are saved.

**Using Lily Collector to code videos.** Follow these steps to code videos using Lily Collector:

o Click on “File” on the upper left-hand corner of the “Lily Collector” window.

o Select “New File” from the drop-down menu that appears once you click on “File”.

o Select the location where the document created by Lily Collector will be saved (i.e., Lily output file).

  o Lily output files will be saved on a folder labeled “Lily Files”. The “Lily Files” folder will be housed in the “Documents” folder of your computer.

o Name the Lily output file using this naming convention: ChildID
   _Condition_SessionNumber_DataCollectorInitials_Date (e.g.,
   P01_BL_1_JM_11.15.16).

  o Name practice Lily output files using this naming convention:
   PracticeVideoNumber_DataCollectorInitials_Date (e.g., PV1_JM_11.15.16).

o Click on “Save” on the lower right-hand side of the window.

o A box saying “Header for this session …” will appear with the date and time, click on “OK” on the upper right-hand side of the window.

o Ensure that all of the buttons are white (i.e., turned off), by clicking on any buttons that are red.

o Press “Start” on the “Timer” window to start observation sessions (i.e., start coding videos).
Lily Collector will indicate the beginning of observation sessions by saying: “Begin observation session now”.

Record the target behaviors observed in each video by selecting the appropriate buttons from the “Lily Collector” window. Once a button is selected, it will turn red (i.e., turned on). Lily Collector will automatically save the target behaviors selected during observation sessions once their corresponding buttons are selected.

Once videos end, click on “Stop” on the “Timer” window.

Click on “File” on the upper left-hand of the “Lily Collector” window and select “Save and Close” from the drop-down menu that appears once you click on “File”.

Close down Lily Collector by clicking on the “X” on the upper right-hand side of the “Lily Collector” window. **Note:** It is important to close Lily Collector before coding another video. If Lily Collector is not closed between videos, errors will appear in the Lily output files and videos will need to be recoded.

**MOOSES Guidelines**

**Opening MOOSES (Tapp, Wehby, & Ellis, 1995).** Follow these steps to open MOOSES:

- Open MOOSES by double-clicking the shortcut labeled “MOOSES” on the desktop of your computer. Maximize the “MOOSES” window (i.e., yellow and olive background with a white space on the left-hand side) by clicking the middle box in the upper right-hand side of the window.

**Running frequency analysis.** Follow these steps to run a frequency analysis on MOOSES:

- Click on “Browse – Create/Append…” on the upper right-hand corner of the “MOOSES” window.
- Select the location where the document created by MOOSES will be saved (i.e., MOOSES output files).
  - MOOSES output files will be saved on a folder labeled “MOOSES Files”. The
“MOOSES Files” folder will be housed in the “Documents” folder of your computer.

- Name the MOOSES output file using this naming convention: MOOSES_ChildID_Condition_SessionNumber_DataCollectorInitials_Date (e.g., MOOSES_P01_BL_1_JM_11.15.16).
  - Name practice MOOSES output files using this naming convention: MOOSES_PracticeVideoNumber_DataCollectorInitials_Date (e.g., MOOSES_PV1_JM_11.15.16).

- Click on “Save” on the lower right-hand corner of the window.
- From the “Lily Files” folder, find the Lily output file that you want to analyze.
- Click and drag the Lily output file to the white space on the left-hand side of the “MOOSES” window.
- Select the “Event Frequencies and Durations” option from the drop-down menu of the lower right-hand side of the “MOOSES” window.
- Click on “Run selected analysis” on the lower right-hand side of the “MOOSES” window.
- The MOOSES output file will appear in a separate window with an analysis report for each target behavior (see Figure 2).
Figure 2. Example of a MOOSES output file.

Calculating IOA on MOOSES

- Click on “Browse – Create/Append…” in the upper right-hand corner of the “MOOSES” window.
- Select the location where the IOA output file will be saved.
  - IOA output files will be saved on a folder labeled “MOOSES Files”. The “MOOSES Files” folder will be housed in the “Documents” folder of your computer.
- Name the MOOSES output file using this naming convention: MOOSES_ChildID _Condition_SessionNumber_DataCollectorInitials_IOA_Date (e.g., MOOSES_P01_BL_1_JM_IOA_11.15.16).
- Click on “Save” on the lower right-hand corner of the window.
- Click and drag the Lily output files that you want to analyze to the white space in the left-hand side of the “MOOSES” window.
• Select the “Interobserver Agreement” option from the drop-down menu of the lower right-hand side of the “MOOSES” window.
• Click on “Run selected analysis” on the lower right-hand side of the “MOOSES” window.
• The MOOSES IOA output file will appear in a separate window with the IOA report.

Coding Procedures

Follow these steps when coding videos:
• Data collectors will read the operational definitions of the target behaviors before coding each video.
• Data collectors will start coding each as soon as the video begins and will stop coding at the end of each video (i.e., once the video stops playing).
• All of the target behaviors that occur during each observation session will be coded as specified in this manual.
• After coding each video, data collectors will immediately run the analysis on MOOSES.
• Data collectors will upload the appropriate output files to their appropriate folders within the server (see below).
• Note: Coding sessions should last no more than one hour. It is recommended that data collectors take at least a 10 minute break every hour.

Data Management and Storage

• All videos will be stored on the University of Florida’s secure server.
• Data collectors will be given permission to access the server.
• Each data collector will have a folder on the server with his or her name as the label. Data collectors’ folders will contain three additional folders: “Videos”, “Lily Files”, and “MOOSES Files”.
• The “Videos” folder will contain all of the videos that will be coded. Lily output files will be uploaded to the “Lily Files” folder, and the MOOSES output files will be uploaded to the “MOOSES Files” folder.
• Data collectors will access the videos via the server. Once they are done coding the videos, data collectors will upload the appropriate output files to their appropriate folders.
APPENDIX I
FOCAL CHILDREN SOCIAL SKILLS VISUALS

Hello

Question

Comment

Help
APPENDIX J
PREFERENCE ASSESSMENT TREATMENT INTEGRITY FORM

Date: ___________________                      Data Collector: _____________________________
Child ID: ________________

Directions: Complete each item by circling the answer that best describes your response to each item.

1. Prior to beginning the preference assessment session, the investigator allowed the child to sample each stimulus to be included in the assessment.

   No                                   Yes

   2. The investigator arranged the stimuli in an array in front of the child and instructed him or her to select one stimulus from the array (e.g., “pick one”).

   1 2 3 4
   Not adhered on any trials  Adhered on some trials  Adhered on most trials  Adhered to on all trials

   3. If the child selected a stimulus from the array, the investigator immediately allowed the child to play with the stimulus.

   1 2 3 4
   Not adhered on any trials  Adhered on some trials  Adhered on most trials  Adhered to on all trials

   4. After each trial, the investigator removed the selected stimulus from the array (i.e., investigator placed the stimulus under the table, away from the child).

   1 2 3 4
   Not adhered on any trials  Adhered on some trials  Adhered on most trials  Adhered to on all trials

   5. At the beginning of trials 2 through 10, the investigator sequentially rotated the sequencing of the remaining stimuli.

   1 2 3 4
   Not adhered on any trials  Adhered on some trials  Adhered on most trials  Adhered to on all trials

   6. The session ended once all of the stimuli were selected or after the child did not make a selection within 30 seconds of being instructed to select a stimulus from the array.

   No                                   Yes
### TRAINING PROCEDURAL INTEGRITY FORM

**Date:** ___________________                      **Data Collector:** _____________________________

**Child ID:** ________________

**Directions:** Complete each item by circling the answer that best describes your response to each item.

1. The investigator explained the purpose of the intervention to the child (e.g., “I will help you learn how to make new friends while playing games and doing fun activities”).
   - **No**
   - **Yes**
   - **Not Applicable**

2. The investigator read the book *Franklin's New Friend* (Bourgeois, 1997) to the child and asked him or her questions regarding the book while reading it (e.g., “What do you think Franklin will do next?”).
   - **No**
   - **Yes**
   - **Not Applicable**

3. The investigator described to the child the social skills to be learned or reviewed with the child the social skills that were taught previously (e.g., “Responses are when you answer your friends’ questions or make comments about something that your friends have said”).
   - **No**
   - **Yes**
   - **Not Applicable**

4. The investigator allowed the child to ask questions during the training session (e.g., “Do you have any questions about how to say hello to your friends?”).
   - **No**
   - **Yes**
   - **Not Applicable**

5. The investigator role-played scenarios with the child for the child to practice the social skills being taught to him or her?
   - **No**
   - **Yes**
   - **Not Applicable**

6. Role-play ended after the child independently initiated social interactions with the investigator three times or after the child responded to the investigator’s initiations five times?
   - **No**
   - **Yes**
   - **Not Applicable**

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7. The investigator provided performance feedback to the child while role-playing (e.g., “I really liked how you asked me to play Legos with you! You made sure I was paying attention to you and looked at me in the eyes when you asked me to play with you!”).

| No | Yes | Not Applicable |

8. The investigator explained to the child that he will provide him or her with prompts if he or she does not initiate social interactions with his or her peer frequently or if he or she does not respond to his or her peer’s initiations quickly (e.g., “I will help you talk to your friend if you forget to do it while playing with him”).

| No | Yes | Not Applicable |

9. The investigator provided praise to the child for participating in the training session (e.g., “You did a great job today learning how to play with your friends! You get two thumbs up!).

| No | Yes | Not Applicable |
INTERRUPTION PROCEDURAL INTEGRITY FORM

Date: ___________________  Data Collector: _____________________________

Child ID: _______________  Child’s Preferred Stimulus: ____________________

**Directions:** Complete each item by circling the answer that best describes your response to each item.

1. Children were told by the investigator to play with the stimuli present in the play area.
   - No
   - Yes

2. Children were told at the beginning of the session by the investigator to socially interact with one another using the social skills previously taught to them.
   - No
   - Yes

3. The investigator provided prompts to the focal child, as needed, throughout the session for him or her to engage in the social skills taught to him or her.
   - 1 Not at all
   - 2 Sometimes
   - 3 Considerably
   - 4 Very frequently/As needed

4. If focal child prompts were needed, the investigator used visual cards when providing the prompts to him or her.
   - 1 Not at all
   - 2 Sometimes
   - 3 Considerably
   - 4 Very frequently/As needed

5. The investigator provided prompts to the peer, as needed, throughout the session for him or her to engage in the social skills taught to him or her.
   - 1 Not at all
   - 2 Sometimes
   - 3 Considerably
   - 4 Very frequently/As needed

6. The focal child’s preferred stimulus was included in the session.
   - Stimulus not included
   - Stimulus included

7. The investigator provided performance feedback to the children at the end of the session.
   - No
   - Yes

8. The investigator provided praise to the children at the end of the session (e.g., “You guys are rock stars! I loved how you two played together today!”).
   - No
   - Yes
APPENDIX K
TEACHER SOCIAL VALIDITY QUESTIONNAIRE

Date: ____________________________  Child ID: ____________________________
Name of Teacher: __________________

**Directions:** Using the Likert scales below, please complete each item by circling the number that best describes how you feel about each question or statement. Thank you for your assistance.

1. How disruptive was the intervention to your classroom?
   | Not at all | Neutral | Very |
   | 1 | 2 | 3 | 4 | 5 |

2. How willing are you to let another child participate in this intervention?
   | Not at all | Neutral | Very |
   | 1 | 2 | 3 | 4 | 5 |

3. I have noticed that the focal child interacts more with his or her peers in my classroom.
   | Disagree | Neutral | Agree |
   | 1 | 2 | 3 | 4 | 5 |

4. I have noticed that the focal child interacts more with peers from others classrooms.
   | Disagree | Neutral | Agree |
   | 1 | 2 | 3 | 4 | 5 |

5. I have noticed an increase in the social behaviors of the focal child in other settings (e.g., lunch time, playground).
   | Disagree | Neutral | Agree |
   | 1 | 2 | 3 | 4 | 5 |
APPENDIX L
SOCIAL VALIDITY ASSESSMENT FORM

Date: ____________________________  Child ID: ____________________

Observer: ________________________

Directions: Using the Likert scales below, please complete each item by circling the number that best describes how you feel about each question. Thank you for your assistance.

1. How frequent were the social initiations made by the focal child to his or her peer?

   1  2  3  4
   Did not occur  Rarely occurred  Frequently occurred  Continuously occurred

2. How frequent were the responses of the peer to the focal child’s initiations?

   1  2  3  4
   Did not occur  Rarely occurred  Frequently occurred  Continuously occurred

3. How appropriate were the social behaviors of the focal child?

   1  2  3  4
   Did not occur  Not appropriate  Somewhat appropriate  Appropriate

4. How appropriate were the social interactions between the participants?

   1  2  3  4
   Did not occur  Not appropriate  Somewhat appropriate  Appropriate
LIST OF REFERENCES

References marked with an asterisk (*) were included in the literature review.


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BIOGRAPHICAL SKETCH

Jose Martinez graduated from the University of Miami with a Bachelor of Arts degree in 2007. As an undergraduate student, Jose volunteered as a Research Assistant at a lab in the Department of Psychology that focused on studying the social communication difficulties exhibited by children with autism spectrum disorder (ASD). Jose helped the graduate students working in that lab collect and analyze data. After two years of work in this lab, Jose wanted to further expand his knowledge on how to systematically collect, analyze, and summarize data. Therefore, he decided to write a senior thesis using data collected in the lab. That experience significantly contributed to Jose’s interest in pursuing a career in academia.

Upon graduating from the University of Miami, Jose wanted to gain more applied experience working with children with ASD, and their families, before pursuing a career in academia. To that end, Jose worked as a home-based behavior therapist for a child with ASD and as a teaching assistant at an elementary school for children with ASD. Those experiences were a guiding force in Jose’s desire to identify effective treatment and educational practices for children with ASD as a means to increase the likelihood of these children thriving socially, academically, and behaviorally. After working in those jobs for 4 years, Jose decided to pursue a doctoral degree in Special Education at the University of Florida.

After receiving his Ph.D. in the summer of 2017, Jose has continued a career in academia and carrying out research in the field of autism. Jose’s research focuses on the identification and evaluation of early intervention strategies designed to prevent and ameliorate social and behavioral challenges in children with ASD, the application of meta-analytic methods to systematic literature reviews to identify the most effective treatments for children with ASD, and the translation of effective practices for children with ASD into useful resources that teachers and families can use to improve the quality of lives of these children.