Young children make significant gains in the development of their social skills during their early years of life through a variety of experiences with different people including family members, relatives, teachers, and peers (Brown, Odom, & Conroy, 2001; Odom, McConnell, & Brown, 2008). Thus, children’s early learning and development of social skills play a foundational role for their life-long social adjustment and socialization (Brown, Odom, & Conroy, 2001; Guralnick & Neville, 1997; Janney & Snell, 2006; Odom, McConnell, & McEvoy, 1992; Odom, McConnell, & Brown, 2008).

Young children spend large amount of time with their siblings in the ongoing routines and contexts of their family (Azmitia & Hesser, 1993; Downey & Condon, 2004; El-Ghoroury & Romanczyk, 1999; Kim & Horn, 2010; Stoneman, 2005; Tsao & Odom, 2006). Interactions and relationships with siblings are a potentially powerful influence on children’s social development even more than parents because siblings have the longest and the most intimate peer relationships (Azmitia & Hesser, 1993; Stoneman, Brody, Davis, & Crapps, 1989). Social experiences with siblings, such as problem solving to address conflicts and negotiating relationships, support the development of children’s social skills (Downey & Condon, 2004).

Children with disabilities, however, may experience less benefit from these natural learning opportunities because of specific developmental skill delays, behavioral problems, and lack of social competence that may act as barriers to accessing peer play experience and other natural learning and practice opportunities (Guralnick, Hammond, Conor, & Neville, 2006; Kim & Horn, 2010; Knott, Lewis, & Williams, 2007; Strain & Danko, 1995; Tsao & Odom, 2006). In fact, children with disabilities regardless of type of disability commonly have been reported to have limited opportunities for social interactions with peers in their educational settings because of their lack of social competence and basic social interaction skills (Freeman & Kasari, 1998; Guralnick, et al., 2006; Janney & Snell, 2006; McConnell, 2002; McConnell & Ostrosky, 2008; Odom et al., 1999).

These social skill issues can also be a serious impairment for the child’s with disabilities relationships and interactions with their siblings (Downey & Condon, 2004; Kim & Horn, 2010; Knott, Lewis, & Williams, 2007; Stoneman, 2005). However, given the importance of sibling relationships and interactions as an essential foundation for developing positive peer relationships, the potential for siblings serving in the role of intervention agents for improving social skills of their siblings with disabilities makes logical sense (Lobato & Tiaker, 1985; Powell, Salzberg, Rule, Levy, & Itzkowitz, 1983).

Siblings’ roles as intervention agents are, in fact, supported by the findings of a recent research synthesis (Kim & Horn, 2010). Kim and Horn in their recently completed research synthesis reviewed the empirical research addressing sibling-implemented interventions to address the question as to whether siblings can serve as effective intervention agents.
for improving age appropriate skills of their siblings with disabilities. The conclusion of the synthesis was that siblings can serve as effective intervention agents for their siblings with disabilities’ learning and improving a variety of age appropriate skills including communication, social, and adaptive skills. While only two studies in this review specifically focused on enhancing social interaction skills, the results do provide strong support for our assumption that siblings could also play a critical role as intervention agents for specifically improving the social interaction skills of their siblings who have difficulties with socialization.

A large body of research is available in which peers have been demonstrated to be powerful intervention agents for enhancing social skills of children with disabilities, particularly, children with autism (e.g., DiSalvo & Oswald, 2002; Goldstein, Kaczmarek, Pennington, & Shafer, 1992; Gonzalez-Lopez & Kamps, 1997; Kamps et al., 1992; Kamps, Potucek, Lopez, Kravits, & Kemmerer, 1997; Kohler, Strain, Maretsky, & DeCesare, 1990; Laushey & Heflin, 2000; Lefebvre & Strain, 1989; Odom, Hoyson, Jamieson, & Strain 1985; Odom & Strain, 1986; Odom & Watts, 1991; Zanolli, Daggett, & Adams, 1996). All of these studies provide a strong empirical base for the conclusion that peer-implemented interventions are an evidence-based practice in that they have demonstrated that substantial improvements in social interaction skills of children with disabilities were achieved (Odom, Brown, Frey, Karasu, Smith-Canter, & Strain, 2003).

In these studies, the peers were taught specific social skills and strategies to support their initiation and response to children with disabilities and for sustaining interactions once begun. It would appear that these same strategies could be used with siblings.

The purpose of this study, thus, is to assess the potential of siblings as an important intervention agent by systematically teaching them appropriate social skills and strategies in order to improve the social interaction skills of their siblings who have difficulties with socializations. Specifically, the study investigated the following three research questions: (a) Does the sibling-implemented intervention promote typically developing siblings’ play related social interactions with their siblings with disabilities? (b) Does the sibling-implemented intervention promote children with disabilities’ total social interactions with their siblings? and (c) Does the sibling-implemented intervention result in socially valid changes in the children’s play related social interactions?

**Method**

The following sections provide a complete description of the participants and setting, pilot study conducted for field testing the intervention and measurement procedures, experimental design and procedures, and measurement procedures.

**Participants Demographics**

Three siblings and their siblings with disabilities (referred to as the child) participated in this study. All three siblings were Caucasian females and two to three years older than the child with a disability. Peyton was diagnosed with ADHD but her social skills were much more advanced than her brother who was the child with a disability according to her parents. She met all of the inclusive criteria that were described in the previous section. Terry has a very good relationship with her brother, Sam, and has been an excellent play partner and model for Sam as reported by her parents. Terry’s parents also indicated that her cognitive abilities were age appropriate and that she was doing well in her first grade classroom. Libby, the final sibling, also was reported by her parents to have a relatively good relationship
with her sister, Penny. Libby has age appropriate social and cognitive skills and those was noted by her parents to be capable of participating in the training and implementing the procedures with Penny.

All three children with disabilities were in the preschool age range and were Caucasian. Gary, whose sibling is Peyton, was a 5-year-old boy at the beginning of the study. He was diagnosed with Autism and was receiving speech/language therapy and early childhood special education services through the local school district. He attended a special education class which included children with and without disabilities. Gary’s social skill was reported as poor by his parents. He uses simple word and typically single word utterances to communicate basic needs. Sam, a 5-year-old boy, whose sibling was Terry, attended a public school preschool program which included children with and without disabilities.

He was diagnosed with Autism and was receiving occupational therapy, speech/language therapy, and early childhood special education services. Sam’s parents reported that his social skills were relatively good but not age appropriate. Penny, the 44 month-old sister of Libby, was diagnosed with developmental delays as well as several significant health issues (e.g., polymicrogyria, epilepsy, auditory sensory disorder). She attended an early childhood special education class including children with and without disabilities. Penny has significant physical limitations with the result that she has only very limited independent movement abilities of her extremities.

Setting

The study took place in the homes of the participants (i.e., children with disabilities, siblings, and their parents). Toys, materials, or activities that had been noted through discussions with the parents and observations of the children as preferred for both the siblings and the children and facilitate children’s interactions (e.g., dramatic play materials, toy vehicles) were chosen for use in the play sessions.

Experimental Design and Procedures

A single-subject, multiple baseline design across the sibling/child dyads were implemented to evaluate the effects of sibling-implemented intervention for improving the social skills of children who have difficulties with socialization. The study was comprised of three phases: baseline, intervention, and maintenance. All sessions across two phases (i.e., baseline, intervention) took place twice a week in the children’s home.

Baseline phase. During the baseline phase, the sibling was asked to play with his or her sibling with a disability together in a typical manner for approximately 10 minutes. During this play time, the researcher videotaped and observed the sibling and the child’s interactions. No coaching such as prompts, praises, or instructions by any adult (i.e., a researcher, a parent) was provided during the baseline phase.

Intervention phase. The intervention consisted of multiple tasks. The following two primary activities were conducted and explained in detail below: (a) the researcher and sibling working through the training materials together followed by the sibling practicing the strategies with the child while receiving coaching from their parent and the researcher (i.e., intervention training) and (b) play time with videotaped recording for the purpose of conducting an assessment of skill acquisition (i.e., intervention assessment).

Intervention training. The intervention training session lasted approximately 10-to-40 minutes depending on the amount and difficulty of skills and strategies being taught. The intervention training sessions, as with sessions of other phases, were conducted approximately twice a week for each sibling and child dyad.
The intervention training used a three step process that has been adapted from the “Stay-Play-Talk” procedure developed by English and colleagues (English, Shafer, Goldstein, & Kaczmarek, 1997) for peer training. Furthermore, specific strategies modified from the Social Skills Curriculum developed by Strain and colleagues (Strain, Danko, & Lawry, 1998) were added to the training content.

Step 1- “Stay.” The first part of the intervention training (i.e., researcher/sibling training session) for Stay included the following components: (1) researcher provides a definition of the skill to the sibling, (2) sibling completes verbal rehearsal of the definition, (3) sibling applies the skill to an example provided by the researcher, (4) researcher provides instruction on the use of a “cue card,” (5) researcher models the skill for the sibling, and (6) researcher and sibling role play the use of the skill. The sibling/child practice component with coaching from the adults was not conducted for this step given that the training content is relatively simple and straightforward. Rather, the skill that the sibling learned for Step one-Stay was practiced in combination with the skill and strategies for Step two-Stay and Play during the sibling/child practice session for Stay and Play.

Step 2-Stay and Play. The first part of the intervention training session (i.e., researcher/sibling training session) for Stay and Play included nine components: (1) Sibling reviews the skills that she or he learned in the previous step, (2) researcher provides a definition of the skill for Step 2 to the sibling, (3) sibling completes verbal rehearsal of the definition, (4) sibling applies the skill to an example provided by the researcher, (5) researcher provides instruction on the use of social strategies (i.e., sharing, requesting to share, see Table 5) that help the sibling to use the skill, (7) researcher models the skill and strategies for the sibling, (8) researcher and sibling role play the use of the skill and strategies, and (9) sibling practices the skill and strategies with the researcher. Then, sibling/child practice session for the combined steps, Stay and Stay and Play, followed. In the second part of the intervention training session (i.e., sibling/child practice session) for Stay and Play, the sibling and the child received coaching from their parent and the researcher.

Step 3- Stay, Play, and Talk. The intervention training (i.e., researcher/sibling training session) for Stay, Play, and Talk included the following nine components that is very similar to the components of Step 2. In the second part of the intervention training session (i.e., sibling/child practice session) for Stay, Play, and Talk, the sibling and the child received coaching from their parent and the researcher.

**Intervention assessment.** Following the intervention training sessions, the intervention assessment (i.e., video-taped play session) was conducted in order to assess the effects of the training. The intervention assessment sessions were conducted in two sequential parts: (a) the sibling practices with the child receiving coaching from the researcher and their parent (i.e., practice and coaching sessions) and (b) sibling and child’s play time without coaching from adults (i.e., play sessions).

**Practice and coaching.** The sibling practiced the combined skills and strategies that had been taught for all three steps (i.e., Step 1-Stay, Step 2-Stay and Play, Step 3-Stay, Play, and Talk) with the child while receiving coaching from the researcher and parent. As the sibling began to show that they could successfully use the skills and strategies and rarely needed prompts or cues from adults (i.e., the researcher, the parent), the adults began to withdraw their coaching. Play (without coaching). The sibling played with the child using the combined skills and strategies for all three steps (i.e., Step 1-Stay, Step 2-Stay and Play, Step 3-Stay, Play, and Talk) without coaching from adults. Play sessions were continued until the sibling’s use of the combined skills and strategies for Step 1, 2, and 3 in interacting with the child had substantially increased over the baseline phase and the increase was at a stable level for several sessions (i.e., a minimum of four sessions).
**Maintenance phase.** The researcher conducted sessions and collected the data once one week and three weeks following the completion of the final intervention assessment phase session. Therefore, a total of two sessions was collected to assess maintenance of outcomes for each of the sibling and child dyads except one dyad who were not available for the second maintenance session due to their limited timeline. The same procedures as used during the play sessions of the intervention assessment phase were used.

**Measurement Procedures**

A 10-minute observational sample was videotaped for each session and transferred to a laptop computer using GOM Player. To facilitate coding, the 10 minute samples were divided into 10-second observational intervals. The primary measures (i.e., dependent variables) were (a) social interaction behaviors of the sibling, (b) inappropriate social behaviors of the sibling, (c) social interaction behaviors of the child, and (d) inappropriate social behaviors of the child. Finally, procedures for assessing social validity, implementation fidelity and inter-observer reliability are presented.

**Sibling and child behaviors.** Social interaction behaviors for the sibling and the child include (a) total social interaction behaviors including non play-related social behaviors and (b) play-related social interaction behaviors (i.e., initiations for the sibling, responses for the child). In addition, inappropriate social behaviors of the sibling and the child during play were assessed. All negative behaviors of the children were considered as inappropriate social behaviors. Social behaviors rating scores were calculated by summing all 10-s intervals in which a social interaction behavior was recorded as occurring and dividing by the total number of 10-s intervals in the videotaped intervention assessment session, and then multiplying by 100 to obtain a percentage. Percent of intervals for inappropriate behaviors was calculated by summing all 10-s intervals in which an inappropriate behavior was recorded as occurring and dividing by the total number of 10-s intervals in the videotaped intervention assessment session and then multiplying by 100 to obtain a percentage.

**Social validity.** The researcher asked questions regarding importance, effectiveness, and appropriateness of the intervention training and procedures, and participants' satisfaction to the parents and the siblings following completion of the intervention assessment sessions. In addition to these questionnaires, segments of videotapes from the baseline phase and the intervention phase were randomly selected by the researcher for assessing social validity. The selected videotape segments were viewed by a group of knowledgeable early childhood professionals (e.g., doctoral students in special education) who were naïve to the phase of intervention they were viewing. After viewing each segment these individuals provided their feedback on the interaction between the two children.

**Implementation fidelity.** The researcher provided written notes of all of the information regarding the intervention training (i.e., definitions of the three steps, the training component and sequence for each of the three steps, descriptions of the social strategies that the sibling will learn, descriptions of each person’s role) to the parents. The parents were asked to check questionnaires for each step. For analysis of implementation fidelity ratings, percentages (i.e., number of ‘yes’ allotted divided by the total number of the questions, then multiplied by 100) were calculated for each of the three steps.

**Interobserver agreement.** The researcher was a primary data collector and coder and coded all sessions. A second trained observer who was naïve to the specific experimental procedures of the study conducted reliability coding on a subset of sessions in each phase of the study. Interobserver agreement was assessed for 25% of the sessions for each sibling and child dyad. Interobserver agreement was conducted interval by interval in which the total number of agreements was divided by the total number of agreements plus disagreements, and then multiplied by 100%.
Results

Peyton/Gary dyad’s Social Interaction Behaviors

Sessions

*Note: Training sessions without data collection between the baseline and the intervention
Terry/Sam dyad’s Social Interaction Behaviors

Sessions  *Note: Training sessions without data collection between the baseline and the intervention
Libby/Penny dyad's Social Interaction Behaviors

Sessions  *Note: Training sessions without data collection between the baseline and the intervention
Interobserver Agreement

For sibling behaviors, interobserver agreement across all dyads' sibling behaviors for all phases (i.e., the overall interobserver agreement for sibling behaviors) was 91% with a range of 70% to 100%. For child behaviors, interobserver agreement across all dyads' child behaviors for all phases (i.e., the overall interobserver agreement for child behaviors) was 86% with a range of 57% to 100%.

Implementation Fidelity

All of the listed behaviors except providing a 'cue card' for helping the siblings' understanding were rated as completed 100% of the time. The provision of the cue cards was rated as completed 86% of the time.

Social Validity

**Participant perspective of the intervention.** All three parents reported that they agreed or strongly agreed that overall the intervention was appropriate and important for their children and family (one parent strongly agreed and the other two parents agreed), the intervention training procedures were easy for their children and them to follow (one parent strongly agreed and the other two parents agreed), and they felt they would be able to teach the skills and strategies with the provided written notes in the future (one parent strongly agreed and the other two parents agreed).

**Independent assessment of socially valid changes**

<table>
<thead>
<tr>
<th>Questions</th>
<th>Mean Rating (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate the degree to which the sibling actively initiated the joint play activity.</td>
<td>Dyad 1 (Peyton &amp; Gary) Baseline: 1.33 (1-2) Intervention: 4.57 (4-5) Dyad 2 (Terry &amp; Sam) Baseline: 2.67 (1-3) Intervention: 4.43 (3-5) Dyad 3 (Libby &amp; Penny) Baseline: 2.67 (2-3) Intervention: 4 (2-5)</td>
</tr>
<tr>
<td>Rate the degree to which the sibling actively maintained the joint play activity.</td>
<td>Dyad 1 (Peyton &amp; Gary) Baseline: 1.33 (1-2) Intervention: 4.43 (3-5) Dyad 2 (Terry &amp; Sam) Baseline: 2.67 (2-3) Intervention: 4.86 (4-5) Dyad 3 (Libby &amp; Penny) Baseline: 2.17 (2-3) Intervention: 4 (2-5)</td>
</tr>
</tbody>
</table>
The purpose of this study was to assess the effectiveness of sibling-implemented intervention for improving social interaction skills of young children (i.e., 3 to 5 year olds) with disabilities. A three step training sequence (i.e., Step1-Stay, Step 2-Stay and Play, and Step 3-Stay, Play, and Talk) with additional social interaction and play engagement strategy training were included in the sibling-implemented intervention package. A multiple baseline across participants was replicated across three sibling and child dyads. Results of the study indicate that the sibling-implemented intervention training promoted the siblings’ play-related social interactions with their siblings with disabilities. That is, the siblings could learn and use some specific social skills and strategies in interacting with their siblings with disabilities during play. Furthermore, the sibling-implemented intervention training promoted the children with disabilities’ total social interactions with their siblings. The results presented support the statement that all three siblings used the social interaction initiation behaviors at higher levels after the intervention than during the baseline. Although the siblings’ uses of inappropriate behaviors were at relatively low levels even during the baseline, the results demonstrated that the siblings’ low levels maintained or in some cases were lower after the intervention than during the baseline. The increase in social interaction initiations by the siblings to the child with a disability and the slightly lower levels of already low levels of inappropriate behaviors on the part of the siblings provides support for the statement that the interactions between the children became more positive after the intervention. The social validity ratings by independent raters and the participants provides further verification that changes in sibling and child play related social interaction were meaningful and important changes.

Implications for Research

First, this study included children who have relatively diverse characteristics and types of disabilities. That is, the study included not only children with autism but also a child with physically severe disabilities. The majority of the previous studies have targeted children with autism for promoting their social skills because children with autism are typically known to be socially isolated or withdrawn. However, in fact, most of children with disabilities regardless of the type of disability have been reported as having issues with social isolation or withdrawn personalities due to their lack of social skills or physical limitations (Freeman & Kasari, 1998; Guralnick, et al., 2006; Janney & Snell, 2006; McConnell, 2002;
McConnell & Ostrosky, 2008; Odom et al., 1999). Thus, by including a child with a variety of disabilities other than children with autism, this study provided some useful information of the types of modifications that are needed in the intervention approach and content to appropriately meet the needs of the children with disabilities.

Another worthy aspect of the study is incorporating the assessment of social validity from the other raters who were naïve to the intervention as well as the participants. As noted earlier, Kennedy (2005) and Wolf (1978) suggested the need to report the social importance of intervention effects, appropriateness of the procedures, and/or satisfaction of the participants. Furthermore, Horner and colleagues (2005) emphasized the importance of the assessment of social validity as a critical feature of high-quality single-subject design studies.

**Implications for Practice**

Several of the parents reported having learned some specific tips and strategies that they could and had used at other times with their children. Thus, professionals working with young children with disabilities should consider using the intervention and training procedures as a tool for supporting families to implement in their homes with their children. This is particularly relevant given that parents spend large amounts of time with their children in their daily routines, have a very comprehensive knowledge of both of their children's learning characteristics and social skills and thus would likely have a higher probability for achieving positive outcomes from implementing the intervention.
References


