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**TEACHING SOCIAL SKILLS TO STUDENTS WITH AUTISM SPECTRUM
DISORDERS: EFFICACY OF A SOCIAL LEARNING APPROACH**

A Dissertation in

School Psychology

by

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ABSTRACT

As the number of children diagnosed with an autism spectrum disorder (ASD) is rising, there is increasing demand for evidence-based interventions that are efficient and easy to implement in school settings. The purpose of the current study was to evaluate the effectiveness of an intervention protocol featuring guided practice, coaching, modeling, role-play, and behavioral rehearsal on the promotion of social behaviors among students with ASD. A multiple-baseline design across intervention groups was used to determine the effects of this instructional model on students' social initiation, self-regulation, and assertion skills. Implementation of the intervention resulted in mean increases in each of the target skills across the six participating students. However, time series graphs indicated significant within-phase variability in the data, and a functional relationship across groups could not be established for any of the skills. Rating scale data suggested that each of the students acquired gains in related behaviors; however, these improvements generally were not maintained post-intervention. Nonetheless, the teacher, parents, and students reported positive views of the intervention and outcomes. Future directions and implications for researchers, practitioners, and parents are discussed.

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CHAPTER 1: INTRODUCTION

Autism spectrum disorders (ASD) are a group of developmental disabilities consisting of autistic disorder, Asperger's syndrome, pervasive developmental disorder - not otherwise specified (PDD-NOS), childhood disintegrative disorder, and Rett's syndrome. These disorders are characterized by deficits in up to three domains: (a) social interactions, (b) communication, and (c) restrictive, repetitive, or stereotyped behavior (American Psychiatric Association; APA, 2000). Each of these clinical features may vary from mild to severe and they often present differently among individuals. Consequently, the term "spectrum" refers to the continuum of developmental impairment among these disorders (Miller, 2006). Nonetheless, the deficits associated with each of these disorders are pervasive and typically persist throughout the individual's life (Nikopoulos & Keenan, 2007).

Prevalence

Over the past 20 years rates of ASD have dramatically increased, making this disorder one of the fastest growing developmental disabilities in the United States (Kabot, Masi, & Segal, 2003). ASD was once considered a low-incidence disability, occurring in approximately 5 per 10,000 births; however, the most current estimates from the Centers for Disease Control (CDC) indicate that ASD occurs in 1 of every 110 births (CDC, 2010). Further, between 1993 and 2008, there was a 1,779% increase in the number of students receiving services under the autism category of the Individuals with Disabilities Education Improvement Act (IDEIA; Fighting Autism, 2009). This increase has placed greater demands on educators to provide school-based services for these students. Moreover, in line with IDEIA there has been a push towards mainstreaming students with disabilities and educating them in the general education setting. From 1990 to 2007, the percentage of students spending more than 80% of their day in a general

education classroom increased by nearly 30% (Office of Special Education Programs, 2010).

This increase in classroom based services has highlighted the need to gain a better understanding of how to effectively disseminate and implement evidence-based practices within inclusive environments (Sansosti, 2010; Stahmer & Aarons, 2009).

Social Behaviors of Individuals with ASD

Difficulty with social interactions has been one of the hallmarks of autism since its first description by Kanner in 1943. Even individuals who have above-average intelligence and do not possess communication deficits experience significant challenges in processing social information and demonstrating appropriate social behavior (Miller, 2006). Therefore, while great differences exist among individuals with ASD, one of the few shared features is a pervasive deficit in socialization (Laushey & Heflin, 2000). Accordingly, social deficits have recently been suggested to be *the* defining feature of ASD (e.g., Cotugno, 2009; Laushey, Heflin, Shippen, Alberto, & Fredrick, 2009; Sansosti, 2010; Shulka-Mehta, Miller, & Callahan, 2010).

Early signs of ASD are usually not abnormal actions, but rather the absence of normal behavior. As infants, these individuals are less likely to respond to their name, make eye contact, or demonstrate spontaneous imitation (Anderson, Oti, Lord, & Welch, 2009). By approximately 18-months, children with ASD typically perform significantly lower on measures of eye gaze shift, gaze/point follow, rate of communicating, acts for joint attention, and use of conventional gestures. The First Words Project investigated early indicators of ASD by examining videotaped communication samples of children who were two years of age. Results indicated that four “red flags” distinguished children with ASD from developmentally delayed and typically developing children. These characteristics were a lack of pointing, not playing with a diverse range of toys,

lack of responding to contextual cues, and the absence of consonants in their vocalizations (Wetherby, Watt, Morgan, & Shumway, 2007).

As early as preschool, children with ASD can be reliably differentiated from typically developing peers as a result of their social communication deficits (Rao, Beidel, & Murray, 2008). These children are less likely to engage in symbolic play, communicate for social interactions, use toys appropriately, and imitate actions (Wetherby et al., 2007). They are also less likely to demonstrate shared enjoyment or direct facial and vocalizations toward others (Lincoln, Searcy, Jones, & Lord, 2007). Further, as these children fail to make initiations, they miss the learning opportunities that normally follow such displays such as “look” and “what’s that?” Thus, they become limited to the information that others explicitly provide, and they miss valuable learning opportunities that accompany the ability to seek out information (Loftin, Odom, & Lantz, 2008). In addition, their detachment from those around them discourages others from attempting to interact with them, further lessening their opportunities for learning (Liber, Frea, & Symon, 2008).

During elementary school, significant social relation problems typically exist and many children with ASD experience problems initiating and maintaining friendships (Rao et al., 2008). These children interact with peers for limited (if any) periods of time, are less likely to initiate/respond to social initiations from peers, and spend more time playing alone, in comparison to typically functioning peers (McConnell, 2002). As social demands increase, the limited social awareness of these individuals becomes more apparent through their difficulty in understanding and expressing emotions and nonverbal social cues, as well as their deficits in the social aspects of language and their skill in initiating and responding to social overtures (Anderson et al., 2009). These individuals often engage in behaviors that are commonly

described as awkward or inappropriate. By adolescence, their lack of social skills can result in rejection and bullying by their peer group (Rao et al., 2008). Persisting social impairments in adolescence and adulthood may increase their risk for psychiatric problems such as depression, anxiety, and loneliness (Anderson et al., 2009). Further, adolescence presents additional challenges for individuals with ASD as preparations must be made for their transition to adulthood. Thus, while specific social symptomatology varies widely across the spectrum, individuals with ASD are generally described as lacking the foundational skills for successful interpersonal relationships (Seltzer et al., 2003).

According to Elliott and Gresham (2008), social skill difficulties may result from acquisition or performance deficits. An acquisition deficit refers to the absence of a particular skill or behavior, while a performance deficit suggests that the individual possesses the skills necessary to perform the behavior, but does not use them consistently (Bellini, Peters, Benner, & Hopf, 2007b). Elliott and Gresham (2008) propose that acquisition deficits result from a lack of knowledge, practice, cues, reinforcement, or the presence of competing problem behaviors. Accordingly, these authors suggest that promoting social skills acquisition requires cognitive-behavioral and applied behavior analysis approaches (e.g., coaching, modeling, role-play, and feedback). Alternatively, increasing social skills performance involves antecedent-based strategies (e.g., peer-mediation, cuing and prompting, and precorrection) as well as consequence-based strategies (e.g., reinforcement, contingency systems, and behavioral contracts). Thus, when providing social skills instruction, it is important to differentiate between these deficiencies as the type of instruction required to remediate the specific deficit varies (e.g., Bellini et al., 2007b; Sansosti, 2010).

Need for Social Skills Interventions

To provide effective educational services to students with ASD, it is necessary to understand the social characteristics of this population. Individuals with ASD suffer direct and indirect consequences as a result of their social skills deficits. These individuals often express a desire for greater peer interactions and social support, and they typically report having poorer quality friendships. They are also more likely to endure increased feelings of loneliness, peer rejection, and social isolation as compared to typically developing peers (e.g., Laugeson, Frankel, Mogil, & Dillon, 2009; White, Keonig, & Scahill, 2007). Research also suggests that social skill deficits among individuals with ASD contribute to academic and occupational problems, as these individuals are more likely to be un- or under-employed and less likely to have satisfying social relationships (White et al., 2007).

Given that long-term social adjustment is directly related to the development of social competency, interventions addressing the social needs of these individuals are critical to help them overcome many of the negative effects of this disorder (Cotugno, 2009). However, while social skills deficits have been noted as the hallmark of this disorder, the majority of research in the field of ASD has focused on reducing behavior problems or increasing communication abilities (Webb, Miller, Pierce, Strawser, & Jones, 2004). Consequently, social deficits in this population remain a major treatment challenge (Webb et al., 2004; White et al., 2007). In addition, the manner of providing these services remains unclear (Kroeger, Schultz, & Newsom, 2007).

Overview of the SSIS Program

The Social Skills Improvement System (SSIS; Elliott & Gresham, 2008) is a new intervention resource for addressing social skills deficits. This comprehensive program was

recently developed by the authors of the Social Skills Rating Scale (SSRS; Gresham & Elliott, 1990), which is a commonly used assessment measure of social skills. The SSIS includes three components: rating scales, a classwide program, and an intervention guide. The focus of the current study is on the individualized/small group intervention guide (SSIS-IG). This instructional program incorporates an assessment component to determine whether students demonstrate social acquisition or performance deficits. While the SSIS-IG may be used with students who have either type of deficiency, the teaching methods vary depending on the individual student's learning objectives. The primary objectives of the SSIS-IG are to (a) promote skill attainment and facilitate generalization, (b) improve skill performance, and (c) reduce challenging problem behaviors (Elliott & Gresham, 2008).

Within the SSIS-IG, each of the skills are taught using a systematic procedure involving guided practice, coaching, modeling, role-play, behavioral rehearsal, progress monitoring, and generalization. Structured lesson plans are used to facilitate implementation and promote treatment integrity. In addition, this program incorporates video clips and skill step cue cards. The video clips depict realistic social situations using same aged peers in school settings, and the cue cards promote the rehearsal of the target skill. Finally, parent notes are provided to encourage home school collaboration and generalization of skills (Elliott & Gresham, 2008).

While the SSIS-IG addresses 20 core skills, the proposed study will target the following behaviors: asking others to do things with you, taking-turns in conversations, and asking for help. These skills were chosen as they are foundational behaviors for social competence (Elliott & Gresham, 2008). Among students with ASD social initiations, such as asking others to do things with you, is a pivotal skill as this behavior facilitates independence. In addition, improving students' social communication skills, such as taking-turns in conversations, has been

related to more positive peer interactions and relationships (Harper, Symon, & Frea, 2008).

Asking for help is an important adaptive skill that enables an individual to cope with problems and uncertainties. Further, the ability to use others as a resource promotes learning (Ryan, Gheen, & Midgley, 1998).

Project Significance and Specific Aims

Social skill difficulties among students with ASD continue to be a primary treatment challenge for practitioners. The use of controversial and unsupported intervention strategies result in inadequate treatment as well as wasted time, energy, and money (Hess, Morrier, Heflin, & Ivey, 2008). As the number of children diagnosed with ASD is rising, there is increasing demand for evidence-based interventions that are efficient, cost-effective, and easy to implement in school settings. The purpose of the current study was to evaluate the effectiveness of an intervention protocol featuring guided practice, coaching, modeling, role-play, and behavioral rehearsal on the promotion of social behaviors among students with ASD. Specifically, the following research questions were addressed:

1. Does the SSIS-IG intervention protocol (guided practice, coaching, modeling, role-play, and behavioral rehearsal) improve students' social initiation skills?
2. Does the SSIS-IG intervention protocol improve students' self-regulation skills?
3. Does the SSIS-IG intervention protocol improve students' assertion skills?
4. Do students demonstrate response generalization following the SSIS-IG intervention?
5. How do teachers, parents, and students view the social validity of the SSIS-IG intervention protocol?

CHAPTER 2: LITERATURE REVIEW

Given that social skill difficulties are perhaps the defining feature of ASD, interventions addressing this area are necessary. Fortunately, researchers are continually developing and examining techniques which may assist this population and produce beneficial and lasting social skill gains. Miller (2006) and Bellini et al. (2007b) completed meta-analyses regarding social skill interventions for students with ASD. These studies resulted in the identification of various correlates and techniques for the promotion of social skills among these students.

Social Skills Meta-Analyses

Miller (2006) conducted a meta-analysis of empirical literature (published between 1965 and 2003) to determine which interventions are most effective in promoting reciprocal social interactions among individuals with ASD. Common problems associated with a meta-analysis of single-case designs are autocorrelation (i.e. non-independent observations) and trend (i.e. the tendency of repeated observations to rise and fall regardless of treatment). Both of these issues may subsequently result in the over or underestimation of effect size calculations and an increased likelihood of Type I error rate. To control for these problems the author analyzed the results using Interrupted Time-Series Analysis for Autocorrelated Data (ITSACORR) and Hierarchical Linear Modeling (HLM), both of which remove the influence of autocorrelation and control for Type I error. While both analyses yielded similar results, the author noted that because HLM analyzes the influence of moderating variables it is thought to produce more precise effect sizes (Miller, 2006). As such, the HLM results are reported; however, caution should still be used when interpreting effect sizes.

Adhering to Cohen's (1977) criteria, a d of 0.2 represents a small effect, a d of 0.5 represents a medium effect, and a d of 0.8 represents a large effect. There was a large global

treatment effect size (2.71) of single-case design interventions for increasing reciprocal social interactions among individuals with ASD. In terms of specific intervention components, there was a large treatment effect for collateral skill (2.37), child-specific (2.19), and peer-mediated (3.27) treatments. Further, according to the fail-safe N calculations, an additional 1,054 studies would be needed to reduce these results to the level of a small effect (.20). This meta-analysis indicated that overall, social skills programs aimed at increasing reciprocal social interactions among individuals with ASD were effective. All three classes of social skill interventions that were investigated (collateral skills, child-specific, and peer-mediated) produced substantial overall gains in reciprocal social interaction skills (Miller, 2006).

Bellini et al. (2007b) completed a meta-analysis of existing single-case research studies on school-based social skills interventions for children with ASD. Fifty-five peer-reviewed studies published between 1986 and 2005 were included in this review, and the percentage of non-overlapping data (PND) was calculated for the intervention, maintenance, and generalization effects of each study (Bellini et al., 2007b). According to Scruggs and Mastropieri (1998), PND scores above 90 represent very effective intervention scores, scores from 70 to 90 represent effective interventions, scores from 50 to 70 represent interventions with low or questionable effectiveness, and scores below 50 indicate ineffective interventions.

Results indicated that social skills interventions produced questionable treatment ($M_{\text{PND}} = 70\%$) and generalization effects ($M_{\text{PND}} = 53\%$); however, moderate maintenance effects were calculated ($M_{\text{PND}} = 80\%$). When examining the type of social skills intervention, collateral skills had the highest effectiveness ($M_{\text{PND}} = 75\%$), followed by comprehensive ($M_{\text{PND}} = 72\%$), child-specific ($M_{\text{PND}} = 71\%$), and peer mediated ($M_{\text{PND}} = 62\%$). In addition, when comparing group and individual interventions individual formats produced slightly higher results ($M_{\text{PND}} = 72\%$)

than group-based interventions ($M_{\text{PND}} = 69\%$). Further, results of interventions targeting secondary students demonstrated effective results ($M_{\text{PND}} = 76\%$), while interventions with preschool ($M_{\text{PND}} = 70\%$) and elementary students ($M_{\text{PND}} = 69\%$) produced questionable results. There were no significant relationships between the number of intervention sessions, hours of intervention, length of intervention, and treatment outcomes ($p > .05$). Overall, this review suggested that school-based social skills interventions are minimally effective for children with ASD (Bellini et al., 2007b).

Systematic Review of the Literature

Potential studies for inclusion in the current literature review were identified through searches in PsychInfo and ProQuest. The descriptive terms used to conduct the literature searches included: *autism, autism spectrum disorder, ASD, pervasive developmental disability, PDD, pervasive developmental disability-not otherwise specified, PDD-NOS, social skills, social skills program, social skills intervention, social skills training, and individual, group, and group-based intervention*. Building upon the meta-analytic reviews conducted by Miller (2006) and Bellini et al. (2007b), the search was limited to studies published between 2005 and 2010. Studies located through the literature search procedure were included in the review if they met the following selection criteria:

1. The study was written in English
2. The study was published in a peer-reviewed journal
3. The target participants in the study had a diagnosis for one of the pervasive developmental disorders (i.e., autism, Aspergers, or PDD-NOS) excluding Rett's syndrome and childhood disintegrative disorder
4. Study assessed the effectiveness of a social skills intervention or technique

5. The outcome measure of the study targeted social functioning
6. Single-case design studies must have included a graph of raw baseline and treatment data

A total of 682 abstracts were reviewed. Adhering to the aforementioned inclusion criteria, 21 single-case and 11 group design studies were included in the literature review. Studies were organized based upon the class of the outcome behavior (i.e., social communication, social engagement, and social competency), the main intervention technique used (i.e., prompting, modeling, role-play, Social Stories, scripts, self-management, visual organizer, peer mediation, and cognitive-behavioral therapy), and research design (i.e., single-case or group). In addition, the principal author and a graduate research assistant independently calculated the PND effects for each single-case study. Once each study was coded, disagreements were discussed and a subsequent conclusion was reached regarding the calculated effect. The resulting percentage of agreement between raters was 100%. For group design studies, if an effect size was not provided for the outcome measure it was hand-calculated (if sufficient information was provided; Thalheimer & Cook, 2002).¹ It is important to note, though, that these effect sizes are likely an over-estimation due to the magnitude of correlation between the two scores (Dunlap, Cortina, Vaslow, & Burke, 1996). The results for social communication, social engagement, and social competency outcomes are presented in Tables 1 through 3 respectively. Specifically, each table includes participant characteristics, research design, targeted behaviors, intervention components, and findings for each study included in the current review.

¹ Cohen's d was calculated using the following equation: $d = (x_t - x_c) / s_{\text{pooled}}$ (Thalheimer & Cook, 2002).

Table 1

Studies Targeting Social Communication Skills among Individuals with Autism Spectrum Disorders (ASD)

Study	Participants (<i>N</i> , sex, age, and race)	Research design	Targeted behaviors	Intervention components	Results
Single-Case Studies					
Apple, Billingsley, & Schwartz (2005)	<i>N</i> = 4; 3 boys; 4 to 5-years-old; race NR	Multiple-baseline across participants	Initiations and responses	Video modeling or self-management	Video modeling: initiations = 100%; responses = 100% Self-management: initiations = 100%
Maione & Mirenda (2006)	<i>N</i> = 1 boy; 5-years-old; Chinese	Multiple-baseline across play activities	Verbalizations, initiations, and responses	Video modeling	Verbalizations = 76%; initiations = 74%; responses = 50%
Nikopoulos & Keenan (2007)	<i>N</i> = 4; 3 boys; 6 to 7-years-old; race NR	Multiple-baseline across participants and AB design	Initiations, reciprocal play, imitative response, and object engagement	Video modeling	Initiations = 57%; engaged time = 91%
MacDonald, Sacramone, Mansfield, Wiltz, & Ahearn (2009)	<i>N</i> = 2 boys; 5 to 7-years-old; race NR	Multiple-probe across play sets	Verbalizations and play actions	Video modeling	Actions = 95%; verbalizations = 98%
Ingersoll & Schreibman (2006)	<i>N</i> = 5; 3 boys; 2 to 4-years-old; race NR	Multiple-baseline across participants	Object imitation, imitative language, spontaneous language, spontaneous pretend	In-vivo modeling	Object imitation = 74%; imitative language = 39%; spontaneous language = 31%;

			play, and total pretend play		spontaneous pretend play = 16%; total pretend play = 23%
Chan & O'Reilly (2008)	<i>N</i> = 2 boys; 5 to 7-years-old; Asian American and Caucasian	Multiple-probe across behaviors	Verbalizations, social interactions, and hand raising	Social Story	Appropriate social interactions = 100%; opportunities for hand raising = 86%; inappropriate social interactions = 100%; inappropriate verbalizations = 75%
Sawyer, Luiselli, Ricciardi, & Gower (2005)	<i>N</i> = 1 boy; 4-years-old; race NR	ABCB single-case	Physical and verbal sharing	Prompting	Priming, prompting, and praise: physical sharing = 100%; verbal sharing = 40% Prompting and praise: physical sharing = 100%; verbal sharing = 67%
Liber, Frea, & Symon (2008)	<i>N</i> = 3 boys; 5 to 9-years-old; race NR	Multiple-baseline across participants	Social play skills (i.e., saying peer's name, facing peer, making a statement)	Prompting	Unprompted social play skills = 82%
Licciardello, Harchik, & Luiselli (2008)	<i>N</i> = 4; 3 boys; 6 to 8-years-old; race NR	Multiple-baseline across participants	Initiations and responses	Prompting	Initiations = 64%; responses = 52%
Schrandt, Townsend, & Poulson (2009)	<i>N</i> = 4; 3 boys; 4 to 8-years-old; race NR	Multiple-baseline across participants	Empathetic responding (motor and vocal)	Prompting	Motor = 85%; vocal = 84%

Chung et al. (2007)	<i>N</i> = 4 boys; 6 to 7-years-old; race NR	Comparison group	Appropriate and inappropriate verbalizations	Peer-mediated	Appropriate talking = 51%; inappropriate talking = 46%
Loftin, Odom, & Lantz (2008)	<i>N</i> = 3 boys; 9 to 10-years-old; race NR	Multiple-baseline across participants	Repetitive behavior, social initiations, and interactions	Self-management	Initiations = 69%; interactions = 100%; repetitive = 93%
Laushey, Heflin, Shippen, Alberto, & Fredrick (2009)	<i>N</i> = 4 boys; Grades 1 through 4; race NR	Multiple-baseline across behaviors	Initiating, responding, and reading facial expressions	Visual organizer	Initiating = 92%; responding = 80%; reading expressions = 100%

Group Design Studies

Kroeger, Schultz, & Newsom (2007)	<i>N</i> = 25; 20 boys; 4 to 6-years-old; 84% Caucasian, 16% African American	Alternate treatments with pretest-posttest	Initiating, responding, and interacting	Video modeling or free play	η^2 ranged from .215 to .328
Owens, Granader, Humphrey, & Baron-Cohen (2008)	<i>N</i> = 31; 30 boys; 6 to 11-years-old; race NR	Alternate treatments with pretest-posttest	Frequency and duration of interactions	In-vivo modeling or collaborative play	*Cohen's <i>d</i> effect sizes ranged from .53 to .65
Quirnbach, Lincoln, Feinberg-Gizzo, Ingersoll, & Andrews (2009)	<i>N</i> = 45; sex NR; 7 to 14-years-old; race NR	Pretest-posttest repeated measures randomized control	Greeting, requesting, and accepting another's choice of game	Social Story	Mean η^2 = .30 across behaviors

Note. NR = Not reported. Percentages reported in Results refer to percentage of non-overlapping data (PND). * = Hand calculated

using $d = (x_t - x_c) / s_{\text{pooled}}$.

Table 2

Studies Targeting Social Engagement Skills among Individuals with Autism Spectrum Disorders (ASD)

Study	Participants (<i>N</i> , sex, age, and race)	Research design	Targeted behaviors	Intervention components	Results
Single-Case Studies					
Bellini, Akullian, & Hopf (2007a)	<i>N</i> = 2 boys; 4 to 5-years-old; race NR	Multiple-baseline across participants	Unprompted active participation in activity with a peer	Video modeling	Social engagement = 80%
Delano & Snell (2006)	<i>N</i> = 3 boys; 6-years-old; African American and Caucasian	Multiple-probe across participants	Seeking attention, initiating comments, initiating requests, making contingent responses	Social Story	Frequency = 82%; duration = 98%
Sansosti & Powell-Smith (2008)	<i>N</i> = 3 boys; 6 to 10-years-old; race NR	Multiple-baseline across participants	Joining-in and maintaining conversations	Social Story	Joining-in = 62%; maintaining = 88%
Kohler, Greteman, Raschke, & Highnam (2007)	<i>N</i> = 1 girl; 4-years-old; race NR	Multiple-baseline across participants	Frequency of social overtures	Peer-mediated	Frequency = 77%
Harper, Symon, & Frea (2008)	<i>N</i> = 2 boys; 8 to 9-years-old; Vietnamese and Caucasian	Multiple-baseline across participants	Gaining attention, initiations, turn-taking	Peer-mediated	Gaining attention = 92%; initiations = 13%; turn-taking = 100%

Bock (2007)	<i>N</i> = 4 boys; 9 to 10-years-old; race NR	Multiple-baseline across settings	Participating in cooperative learning activity, playing an organized game during recess, visiting a peer during lunch	Script	Cooperative learning = 100%; recess = 100%; lunch = 100%
Davis, Boon, Cihak, & Fore (2010)	<i>N</i> = 3 boys; 16 to 17-years-old; race NR	Multiple-probe across participants	Others-focused conversation	Script	Time engaged in others-focused conversation = 100%

Note. NR = Not reported. Percentages reported in Results refer to percentage of non-overlapping data (PND).

Table 3

Studies Targeting Social Competency Skills among Individuals with Autism Spectrum Disorders (ASD)

Study	Participants (<i>N</i> , sex, age, and race)	Research design	Targeted social behaviors	Intervention components	Results
Single-Case Study					
Feng, Lo, Tsai, & Cartledge (2008)	<i>N</i> = 1 boy; 11-years-old; race NR	Multiple-probe across behaviors and settings	Greetings, expressing needs, emotional expression and control	Role-play	93% across behaviors
Group Design Studies					
Golan & Baron-Cohen (2006)	<i>N</i> = 41; 31 boys; 21 to 43-years-old; race NR	Pretest-posttest with control group	Recognizing emotions	Video modeling	*Cohen's <i>d</i> ranged from .66 to .82
Laugeson, Frankel, Mogil, & Dillon (2009)	<i>N</i> = 33; 28 boys; 13 to 17-years-old; 42% Caucasian; 18% Hispanic; 12% Asian; 9% African American; 9% Middle-Eastern; 9% mixed ethnicity	Pretest-posttest mixed MANOVA	Conversational skills, friendship networks, sportsmanship, host behaviors, social reputations, and handling teasing, bullying, and arguments	In-vivo modeling	*Cohen's <i>d</i> effect sizes ranged from .11 to 3.3
Tse, Strulovitch, Tagalakis, Meng, & Fombonne (2007)	<i>N</i> = 46; 28 boys; 13 to 18-years-old; race NR	Pretest-posttest	Social cognition, social communication,	Role-play	Cohen's <i>d</i> effect sizes ranged from .34 to .72

			social motivation, and autistic mannerisms		
Herbrecht et al. (2009)	<i>N</i> = 17; 15 boys; 9 to 20-years-old; race NR	One group one treatment plan	Conversation and interaction skills, social relations, personal issues, self-awareness, and problem solving issues	Role-play	Partial η^2 ranged from .02 to .69
Bauminger (2007)	<i>N</i> = 19; 18 boys; 7 to 11-years-old; race NR	Pretest-posttest	Social interactions, social problem solving, and social and emotional understanding	CBT	Partial η^2 effect sizes ranged from .21 to .51
Lopata, Thomeer, Volker, Nida, & Lee (2008)	<i>N</i> = 54; 50 boys; 6 to 13-years-old; 89% Caucasian, 2% African American, 2% Latino, 7% Other	Alternate treatments with pretest-posttest	Social interactions, expressing emotions, sportsmanship, self-control, problem solving, offering help, following instructions	CBT with response-cost or non-categorical feedback	Cohen's <i>d</i> effect sizes ranged from .24 to .54
Epp (2008)	<i>N</i> = 44; 38 boys; 11 to 18-years-old; Hispanic, Biracial and White	Pretest-posttest	Compromise, sportsmanship, conversational skills, eye contact, voice modulation, friendship skills, nonverbal cues, awareness of the environment, and understanding and	CBT	*Cohen's <i>d</i> effect sizes ranged from .31 to .49

				recognizing emotions		
Cotugno (2009)	<i>N</i> = 18; sex NR; 7 to 11-years-old; race NR	Pretest-posttest	Stress, anxiety, joint attention, flexibility, and transitions	CBT	Overall gains	Group 1 = $t = 2.53, p < .05$; Group 2 = $t = 3.11, p < .01$

Note. NR = Not reported; CBT = Cognitive-behavioral therapy. Percentages reported in Results refer to percentage of non-overlapping

data (PND). * = Hand calculated using $d = (x_t - x_c) / s_{pooled}$.

Social Communication

Social communication is composed of both verbal and nonverbal behaviors. Verbal behaviors involve vocalizations such as pragmatics, verbal initiations and responses, and voice modulation. Alternatively, nonverbal behaviors include actions such as gestures, pointing, and personal space (Ingersoll, 2010). Within the communication domain individual deficits can range from a total lack of verbal communication to fluent speech with pragmatic deficits. However, initiating, responding, and nonverbal communication have emerged as areas in which children with ASD are likely to demonstrate difficulties (Murdock, Cost, & Tieso, 2007).

Modeling. Modeling, which is based on the principles of observational learning, was identified by Albert Bandura nearly 50 years ago. Bandura demonstrated that children can attain a wide range of skills simply by watching other people perform them (Bellini & Akullian, 2007). Peers, adults, or individuals themselves may be used as the video model; however, researchers have found the most effective models tend to have characteristics (e.g., age, gender, personality, and/or race) similar to the observer (Buggey, 2005). Through video modeling, irrelevant information may be removed from the video so that the child may focus on the critical components of the target behavior (Bellini & Akullian, 2007).

In the current review, mixed results were reported for interventions that utilized in-vivo modeling to increase students' social communication. Ingersoll and Schreibman (2006) obtained questionable to effective results for each of the targeted behaviors ($M_{SPND} \leq 74\%$) in their single-case design study. However, Owens, Granader, Humphrey, and Baron-Cohen (2008) used a group design to compare the use of in-vivo modeling (in conjunction with direct teaching) to collaborative group play (constructing Legos). Results indicated that individuals in the collaborative play group had significantly less maladaptive behavior (Cohen's $d = .59$), while

those who received in-vivo modeling did not obtain significant gains in this area. Alternatively, the in-vivo group obtained significant improvements in communication ($d = .53$), and socialization ($d = .65$), while the collaborative play group did not. Overall, these studies suggest that in-vivo modeling may yield moderate social communication gains in students with ASD (Ingersoll & Schreibman, 2006; Owens et al., 2008).

All of the studies that used video modeling (i.e., Apple, Billingsley, & Schwartz, 2005; MacDonald, Sacramone, Mansfield, Wiltz, & Ahearn, 2009; Maione & Mirenda, 2006; Nikopoulos & Keenan, 2007) produced effective to highly effective outcomes for at least one of the targeted behaviors ($M_{SPND} \geq 76\%$). Video modeling and tangible reinforcement led to highly effective results for increasing students' response to, and initiation of compliments ($M_{SPND} = 100\%$; Apple et al., 2005). In addition, video modeling has been found to produce effective to highly effective results for promoting verbalizations (M_{PND} range = 76 – 98%), initiations ($M_{PND} = 74\%$), and physical actions ($M_{PND} = 95\%$; MacDonald et al., 2009; Maione & Mirenda, 2006). However, other researchers (i.e., Maione & Mirenda, 2006; Nikopoulos & Keenan, 2007) obtained questionable results on students' initiations ($M_{PND} = 57\%$) and responses ($M_{PND} = 50\%$).

Similarly, a group design study (i.e., Kroeger et al., 2007) examined the effectiveness of video modeling on students' social communication. Results indicated that the video modeling and free play groups both demonstrated statistically significant increases in initiating, responding, and interacting behaviors. Specifically, all of the effects ($\eta^2 = .22 - .33$) were greater than .14, the level deemed a large effect size (Cohen, 1988). However, the video modeling group made significantly more gains in each of these areas than the free play group (Kroeger et al., 2007).

Social Stories. Social Stories are a relatively new approach for promoting social skills among students with ASD. A Social Story is a short individualized story designed to teach a child with ASD a certain skill, event, concept, or interaction. The stories attempt to facilitate a child's accurate understanding of social information for a given setting by describing where the activity will take place, when it will occur, who will be participating, and what will happen (Ali & Frederickson, 2006).

A combination of Social Stories and role-play has been found to be highly effective at increasing students' appropriate social interactions ($M_{PND} = 100\%$) and hand-raising ($M_{PND} = 86\%$), while decreasing their inappropriate interactions ($M_{SPND} = 100\%$) and vocalizations ($M_{PND} = 75\%$; Chan & O'Reilly, 2008). In addition, Quirnbach, Lincoln, Feinberg-Gizzo, Ingersoll, and Andrews (2009) examined the effectiveness of a Social Story intervention for a large cohort of children. Results suggested that children who received the Social Story showed significantly higher game play skills ($\eta^2 = .18$), with a large effect (using Cohen's 1988 criteria), than children who received the control story. Further, participants with verbal comprehension index (VCI) standard scores (as measured by the Wechsler Intelligence Scale for Children; WISC) above 68, obtained a much larger effect size (η^2) of .30. This study indicated that a single Social Story may be used across groups of children. However, individuals who have Extremely Low VCI scores may not benefit to the same degree (Quirnbach et al., 2009).

Prompting. Prompting is another approach that has been used to increase students' social communication skills. Prompting involves giving a verbal or physical directive to engage in the designated target behavior (Licciardello, Harchik, & Luiselli, 2008). In the current review, studies utilizing manual and/or auditory prompts (i.e., Liber et al., 2008; Licciardello et al., 2008; Sawyer, Luiselli, Ricciardi, & Gower, 2005; Schrandt, Townsend, & Poulson, 2009) produced

effective to highly effective outcomes for at least one of the target behaviors (PND range = 82 – 100%), not including Licciardello et al. (2008). In general, students' physical communication behaviors increased more (PND range 85 – 100%) than their verbal communication behaviors (PND range 40 – 84%; Sawyer et al., 2005; Schrandt et al., 2009).

Peer-mediated. Peer-mediated interventions involve training typical peers to increase their social initiations towards the individual with ASD. These interventions are in turn, designed to influence the social behaviors of the target children (Miller, 2006). In the current review, questionable effects were found for appropriate and inappropriate talking (PND range 46 – 51%; Chung et al., 2007). However, as only one study investigated the use of a peer-mediated intervention the utility of this approach is difficult to determine.

Self-management. Self-management techniques require individuals to monitor and reinforce their own behavior. Typically, students record their behaviors on a checklist and reinforcement is provided for acceptable performance (Scattone, 2007). Self-management procedures often focus on decreasing an undesirable target behavior or increasing a behavior that is incompatible with an undesired behavior (Kern, Ringdahl, Hilt, & Sterling-Turner, 2001). Self-management interventions have led to highly effective results for increasing interactions ($M_{\text{PND}} = 100\%$) and decreasing repetitive behaviors ($M_{\text{PND}} = 93\%$); however, questionable results were obtained for increasing initiations ($M_{\text{PND}} = 69\%$; Loftin et al., 2008).

Visual organizer. Concept mastery routines (CMR) provide a visual framework for understanding social skills. Typically, a diagram is created which includes the necessary elements (e.g., definitions, characteristics, and examples) of the target concept to facilitate students' understanding. Research has indicated that an intervention utilizing a CMR technique was highly effective for increasing students' skill at reading expressions ($M_{\text{PND}} = 100\%$), and

was effective at increasing their responding ($M_{\text{PND}} = 80\%$), and initiating behaviors ($M_{\text{PND}} = 92\%$; Laushey et al., 2009).

Summary of evidence regarding social communication. Interventions that targeted social communication skills generally produced positive outcomes for students with ASD. Excluding the peer-mediated approach, each of the intervention techniques led to moderate to large effects for at least one of the targeted communication behaviors. Video modeling ($N = 6$), Social Stories ($N = 2$), and visual organizers ($N = 1$) appeared to produce the most beneficial gains; however, there were a small number of studies conducted using these methods. Thus, it is difficult to interpret the meaningfulness and generalizability of the outcomes. In addition, while prompting produced a slightly smaller effect compared to the aforementioned approaches, this technique did lead to moderate gains across the various communication outcomes. Therefore, prompting may also be a promising technique for teaching social communication skills.

Social Engagement

Social engagement reflects an individual's active participation, with at least one other individual, in an activity (Bellini et al., 2007b). For example, joining-in behaviors, sustaining conversations, and involvement in other focused conversations are instances of engagement. Socially, individuals with ASD may demonstrate behaviors ranging from complete withdrawal to active social engagement with the occurrence of minor behavioral and/or communication difficulties (Murdock et al., 2007).

Modeling. One study (i.e., Bellini, Akullian, & Hopf, 2007a) examined the use of a video self-modeling (VSM) intervention to increase students' social engagement. Results indicated that this technique was effective at increasing their social participation ($M_{\text{PND}} = 80\%$).

Further, teacher ratings of social validity indicated that the intervention was believed to be beneficial and that it was easy to implement (Bellini et al., 2007a).

Social Stories. Social Stories have also been used to increase students' social engagement behaviors (i.e., Delano & Snell, 2006; Sansosti & Powell-Smith, 2008). Results of both studies suggested that Social Stories were highly effective at increasing the duration of students' social engagement ($M_{\text{PND}} = 98\%$), and effective at increasing their frequency ($M_{\text{PND}} = 82\%$), and maintenance ($M_{\text{PND}} = 88\%$) of engagement. However, questionable effects were obtained for joining-in behaviors ($M_{\text{PND}} = 62\%$). It is important to note that each of the studies implemented the Social Story in conjunction with additional instructional strategies (e.g., video modeling, prompts, and/or peer-mediation). Thus, it is impossible to delineate whether certain components were more or less effective than others (Delano & Snell, 2006; Sansosti & Powell-Smith, 2008).

Peer-mediated. Effective to highly effective results (PND range 77 – 100%) were obtained for frequency of social overtures, gaining another's attention, and turn-taking behaviors following a peer-mediated approach (Harper, et al., 2008; Kohler, Greteman, Raschke, & Highnam, 2007). However, as generalization was not assessed it is not clear whether the target child was able to demonstrate these behaviors with untrained individuals in differing settings.

Scripts. Student's social engagement skills also have been targeted through the use of scripts. Both of the studies utilizing scripts (i.e., Bock, 2007; Davis, Boon, Cihak, & Fore, 2010) obtained highly effective results ($M_{\text{SPND}} = 100\%$) across behaviors following the intervention implementation. However, Davis et al. (2010) did not assess students' skills without the use of their scripts. Therefore, it is impossible to determine whether students could produce these behaviors independently.

Summary of evidence regarding social engagement. An examination of the literature on social engagement interventions indicates that each of the interventions produced some beneficial results. Scripts appeared to be the most effective as both of the studies which used this method led to highly effective results across all of the targeted behaviors. In addition, video modeling and Social Stories also led to moderate to high gains across engagement behaviors. However, as only a small number of studies ($N = 7$) focused on social engagement behaviors, it is difficult to draw definitive conclusions.

Social Competence

Social competence is a cumulative evaluation of an individual's ability to interact with others, and it represents the social and emotional skills required for positive developmental outcomes (Miller, 2006; Wang, 2009). This construct has been defined by two types of abilities. The first involves the self-control and monitoring of negative emotions, while the second includes social problem-solving skills. Socially competent students are more likely to develop positive attitudes about school, successfully adjust to new experiences, and experience less behavioral problems than students with lower levels of social competence (Wang, 2009).

Modeling. Both in-vivo and video modeling were used to improve students' social competence. Previous research has yielded large effects on self-report ratings of the Test of Adolescent Social Skills Knowledge (TASSK; Cohen's $d = 3.3$), the Quality of Play Questionnaire (QPA; $d = 1.2$), and parent ratings on the SSRS ($d = .95$; Laugeson et al., 2009). In addition, medium to large effects have been found on participants' ability to recognize emotions from voice recordings (Cohen's $d = .82$) and faces ($d = .77$), as well as emotional concepts recognized ($d = .76$; Golan & Baron-Cohen, 2006).

Role-play. Role-play enables students to perform a skill and experiment with different ways of responding while receiving feedback from the educator (Elliott & Gresham, 2008). Studies which used role-play as the main intervention component (i.e., Feng, Lo, Tsai, & Cartledge, 2008; Herbrecht et al., 2009; Tse, Strulovitch, Tagalakis, Meng, & Fombonne, 2007) obtained small to large effects. A single-case study consisting of role-play, dyadic instruction, and corrective feedback, led to highly effective results ($M_{PND} = 93\%$) in social competency (Feng et al., 2008). Further, a group design study indicated significant increases on participants' Social Responsiveness Scale (SRS; $d = .39$), and Nisonger Child Behavior Rating Form Positive Social composites (N-CBRF; $d = .42$), suggesting benefits to students' overall social competence. In addition, ratings on the total Aberrant Behavior Checklist (ABC; $d = .72$) and the N-CBRF Problem Behavior composite ($d = .57$) suggested improvements in students' problem behaviors (Tse et al., 2007). Similarly, large effects on the Global Assessment of Functioning Scale (GAS; partial $\eta^2 = 0.42$), and the Social Competence Scale (SKS; partial $\eta^2 = 0.25$) were found (Herbrecht et al., 2009).

Cognitive-behavioral therapy. The final intervention strategy that was used to improve students' social competence was cognitive-behavioral therapy (CBT). Interventions which utilized CBT combined social cognitive learning approaches and skill instruction within a cognitive-developmental framework. Following a CBT-based intervention, statistically significant improvements in teacher ratings were obtained on the Walker-McConnell Scale of Social Competence and Social Adjustment (WMS). The younger age group demonstrated the greatest improvements on the teacher preferred and peer-preferred behavior subtests of the WMS, while the older age group showed the greatest improvement in school adjustment behavior (Cotugno, 2009). In addition, small effects on staff ratings ($d = .24$) and medium

effects on parent ratings ($d = .42$) of the BASC Social Skills scale were obtained. Similarly, pre-post ratings on the Skillstreaming Survey indicated medium effects for both parents ($d = .54$) and staff ($d = .51$; Lopata, Thomeer, Volker, Nida, & Lee, 2008). Further, small to medium effects in students' assertion ($d = .31$), internalizing ($d = .35$), and hyperactivity scores ($d = .49$), as well as their overall problem behavior composite scores ($d = .22$) were reported (Epp, 2008). Lastly, Bauminger (2007) obtained large effects (η^2) on student's cooperation (.21), assertion (.45), and self-control skills (.51). Students also demonstrated significantly fewer non-social problem solving solutions ($\eta^2 = .21$), and significantly more social solutions ($\eta^2 = .21$; Bauminger, 2007).

Summary of evidence regarding social competence. Overall, the results of the literature examining students' social competency were positive, and across the various approaches moderate to large effects were observed. Role-play and CBT were the most frequently reported techniques, and the majority of studies used a group design. In addition, while video modeling and in-vivo modeling were each examined in only one study, these approaches produced large effects as well.

Conclusions

Several conclusions can be drawn from the reviewed empirical literature to date. In terms of participant characteristics, the majority of the studies included preschool or elementary students (73%), while few studies conducted interventions with participants in middle school or beyond (12%; 15% of the studies included a combination of the aforementioned age ranges). This may be a result of preschool and elementary populations being more available for social skill interventions than students in secondary school or older (due to increased academic demands). In addition, a large percentage of the participants were male (83%); however, this is to be expected given that the prevalence rate of ASD is higher for males. Last, only a small

percentage of the studies (24%) included information regarding the participant's race. This is problematic as cultural factors should always be assessed, and intervention effectiveness and generalizability may vary based upon this characteristic.

There also were limitations regarding the design and implementation of some of the aforementioned studies. First, less than half of the studies examined the fidelity of treatment implementation (45%), or assessed the social validity of the results (42%). Second, maintenance and generalization effects were only examined in a small percentage of interventions, 55% and 39% respectively. Third, none of the studies examined whether the participants demonstrated an acquisition or performance deficit. Consequently the strategy used was not matched to the student's particular skill deficit, as recommended by Elliott and Gresham (2008). Finally, nearly all of the group design studies (92%) used a pretest-posttest design, yet only 18% of those studies contained a control condition. Failing to include a control group introduces a number of confounding variables (e.g., maturation, testing effects, and regression to the mean) and subsequently limits the validity of the results.

Rationale, Purpose, and Hypotheses

Social difficulties among students with ASD remain a major treatment challenge (e.g., Ashburner, Ziviani, & Rodger, 2010; Webb et al., 2004). As noted by Bellini et al. (2007b) and Miller (2006), studies that are conducted with a high level of treatment fidelity, and which also examine the maintenance, generalization, and social validity of outcomes are needed. The current review of the literature highlights many intervention techniques that have been successfully used to improve students' social skills. The SSIS-IG intervention protocol (i.e., guided practice, coaching, modeling, role-play, and behavioral rehearsal) incorporates several of the aforementioned instructional approaches into a concise, yet comprehensive model. However,

there is a lack of research regarding the effectiveness of the complete protocol among individuals with ASD.

The purpose of the current study was to examine the effectiveness of a comprehensive instructional model (e.g., guided practice, coaching, modeling, role-play, and behavioral rehearsal) for students with ASD. Specifically, five hypotheses were tested.

Hypothesis 1. The SSIS-IG intervention protocol will increase students' social initiation skills. Specifically, the skill that was targeted in this study was asking others to do things with you. Research has suggested that social initiation skills may be increased through the use of instructional strategies involving video modeling (e.g., Apple et al., 2005), in-vivo modeling (e.g., Owens et al., 2008), role-play (e.g., Herbrecht et al., 2009), and visual organizers (e.g., Laushey et al., 2009).

Hypothesis 2. The SSIS-IG intervention protocol will increase students' self-regulation skills. Specifically, the skill that was targeted in this study was taking-turns in conversations. Previous research (e.g., Bellini et al., 2007a; Laugeson et al., 2009; Tse et al., 2007) supports this prediction.

Hypothesis 3. The SSIS-IG intervention protocol will increase students' assertion skills. Specifically, the skill that was targeted in this study is asking for help. This hypothesis is based on the work of Bauminger (2007), Feng et al. (2008), and Lopata et al. (2008).

Hypothesis 4. Students will demonstrate response generalization following the SSIS-IG intervention. Research suggests interventions that incorporate role-play (Feng et al., 2008), video modeling (Apple et al., 2005), and peer mediation (Harper et al., 2008) produce generalized gains across behaviors and stimuli.

Hypothesis 5. Teachers, parents, and students will indicate moderate to high social validity of this instructional model. Previous research has indicated that individuals report high acceptability of interventions involving video modeling (e.g., Kroeger et al., 2007), role-play (e.g., Chan & O'Reilly, 2008), and corrective feedback (e.g., Feng et al., 2008).

CHAPTER 3: METHOD

Participants and Setting

Six students who were participating in an afterschool program for students with autism participated in this study. The program offers a range of behavioral, educational, and social supports. To attend, students must have a primary diagnosis of an autism spectrum disorder as determined via a comprehensive diagnostic evaluation, and based on the criteria from the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition Text Revision (DSM-IV TR; APA, 2000). The agency serves approximately 12 school-age children per session (age range: 8 – 13 years) and operates 4 days a week for 2 hours a day.² English was the only language spoken by each of the students.

In addition to the student participants, two female teachers who worked in the students' classroom participated in this study.³ Throughout the study, these individuals completed ratings of participating students' behaviors. Further, each of the student's parents was given the opportunity to complete questionnaires on their child's behaviors. Aiden's, Colin's, and Felicity's parents chose to do so. The majority of students (5 out of 6) had parents who had attained college or graduate level degrees. Intervention sessions were conducted in a private room at the agency, and direct observations took place within the students' classroom. All participants were treated in accord with the Ethical Principles of the American Psychological Association (2002).

Students were divided into three pairs based on their intellectual functioning, age, and gender. Specifically, Group A consisted of Aiden and Bryce, Group B consisted of Colin and

² During Weeks 8 and 9 the agency was only open for 3 days a week.

³ One of the teachers left the agency during the fifth week of the study.

Derek, and Group C consisted of Emma and Felicity. Aiden, Bryce, Derek, and Felicity attended the agency 4 days a week, while Colin and Emma attended 3 days a week. Demographic data (i.e., age, gender, and ethnicity) and participant characteristics (i.e., severity of autism symptoms and intellectual functioning) are presented in Tables 4 and 5 respectively. In addition, descriptive labels of students' behavior on the Social Skills Improvement System (SSIS) Rating Scale, completed by teachers at Week 1, are presented in Table A1.

Group A (Aiden & Bryce). Teacher ratings on the CARS2-HF indicated that Aiden demonstrates Mild-to-Moderate symptoms of ASD. His social and communication skills were reported on the SSIS Rating Scale as falling within the Below Average range. His full scale IQ score, as determined by the KBIT-2, fell within the Borderline to Low Average range. He demonstrated a relative strength in nonverbal processing, which fell within the Low Average to Average range. His verbal processing, however, fell within the Deficient to Borderline range. Teacher ratings indicated that Bryce displays Minimal-to-No symptoms of ASD. His social skills were reported as Below Average while his communication skills were within the Average range. His full scale IQ and nonverbal processing both fell within the Deficient range, while his verbal processing was within the Deficient to Borderline range.

Group B (Colin & Derek). Results suggested that Colin portrays Minimal-to-No symptoms of ASD. Ratings of his social and communication skills were both within the Below Average range. His full scale IQ fell within the Borderline to Low Average range. Colin demonstrated a strength in nonverbal processing, he performed in the Low Average to Average range. Alternatively, his verbal IQ was within the Deficient to Borderline range. Teacher ratings

Table 4

Students' Age, Gender, and Ethnicity

Student	Age	Gender	Ethnicity
Group A			
Aiden	8yr 10m	Male	Caucasian
Bryce	9yr 0m	Male	Caucasian
Group B			
Colin	11yr 0m	Male	NR
Derek	12yr 8m	Male	Caucasian
Group C			
Emma	11yr 0m	Female	African American
Felicity	9yr 6m	Female	African American

Note. yr = years; m = months; NR = Not reported.

Table 5

Severity of Autism Symptoms and Intellectual Functioning

Student	CARS2-HF	KBIT-2		
	Composite (<i>T</i> -score, PR)	Full Scale IQ (SS, PR)	Verbal IQ (SS, PR)	Nonverbal IQ (SS, PR)
Group A				
Aiden	46 (35%)	75 (5%)	64 (1%)	92 (30%)
Bryce	37 (10%)	55 (.10%)	66 (1%)	55 (.10%)
Group B				
Colin	40 (16%)	77 (6%)	70 (2%)	91 (27%)
Derek	49 (46%)	56 (.20%)	65 (1%)	57 (.20%)
Group C				
Emma	34 (6%)	88 (21%)	91 (27%)	88 (21%)
Felicity	67 (96%)	56 (.20%)	58 (.30%)	65 (1%)

Note. CARS2-HF = Childhood Autism Rating Scale, Second Edition High Functioning Version; PR = Percentile rank. *T* scores have a mean of 50 and a standard deviation of 10. Higher scores indicate more persistent and severe symptoms of autism. KBIT-2 = Kaufman Brief Intelligence Test, Second Edition; SS = Standard scores. KBIT-2 standard scores have a mean of 100 and a standard deviation of 15. Scores were interpreted using the following ranges: $\leq 69 = \textit{Deficient}$, 70-80 = *Borderline*, 80-89 = *Low Average*, 90-109 = *Average*.

indicated that Derek demonstrates Mild-to-Moderate symptoms of ASD. His social and communication skills were both reported to be within the Below Average range. His full scale IQ and nonverbal processing both fell within the Deficient range, while his verbal processing was within the Deficient to Borderline range.

Group C (Emma & Felicity). Teacher ratings indicated that Emma exhibits Minimal-to-No symptoms of ASD. In addition, her social and communication skills fell within the Average range. Her full scale IQ and verbal processing scores were in the Low Average to Average range, while she performed in the Borderline to Average range on the nonverbal processing index. Felicity portrayed symptoms of ASD within the Severe range. Her social skill performance was rated within the Well Below Average range, while her communication skills were rated as Below Average. Her full scale and verbal IQ both fell within the Deficient range and her nonverbal IQ fell within the Deficient to Borderline range.

Measures

Student characteristics. Three measures were used to gain information about students' cognitive skills, severity of autism, and demographic characteristics.

Intellectual functioning. The Kaufman Brief Intelligence Test, Second Edition (KBIT-2; Kaufman & Kaufman, 2004) was used to assess the cognitive skills of each participating student prior to baseline data collection. The KBIT-2 provides a quick (approximately 15 minutes) measure of verbal and nonverbal intelligence for individuals from 4 to 90 years of age. This individually administered test is composed of verbal and nonverbal subscales, which yield an overall intelligence quotient (IQ) composite. The verbal subscale assesses an individual's receptive vocabulary, vocabulary knowledge, comprehension, and reasoning skills. The nonverbal subscale assesses an individual's ability to solve new problems by detecting

relationships and completing visual analogies. The KBIT-2 IQ composite score demonstrates high internal consistency (.93) and test-retest reliability (.90). There is a moderate correlation between the KBIT-2 IQ composite and the Wechsler Intelligence Scales for Children, Fourth Edition (WISC-IV) Full Scale IQ (.77) and the Wechsler Abbreviated Scale of Intelligence (WASI) Full Scale IQ (.81 to .90; Bain & Jaspers, 2010).

Severity of autism symptoms. The Childhood Autism Rating Scale, Second Edition High Functioning Version (CARS2-HF; Schopler, Van Bourgondien, Wellman, & Love, 2010) is a screening instrument used for the assessment of autism among individuals with meaningful communication skills who are above the age of 6. The CARS2-HF provides clinicians with information regarding an individual's social and communication deficits, behavioral patterns, and cognitive and sensory differences. This norm-referenced scale is composed of 15 items and respondents rate an individual's behavior on a scale from 1 to 4. Ratings are based on the frequency, intensity, idiosyncrasy, and duration of behaviors, with higher scores indicating more persistent and severe symptoms. The CARS2-HF Total scores have high interrater reliability (.96) and internal consistency (.96). There is a moderate relationship between clinician ratings on the CARS2-HF and the Autism Diagnostic Observation Scale (ADOS) Total score (.77). In addition, sensitivity (.81), specificity (.87), and positive predictive value (.89) for the CARS2-HF Total score is high (Schopler et al., 2010). The CARS2-HF was completed by the students' teacher prior to the start of baseline data collection to provide information regarding the functioning of participating students.

Demographic questionnaire. Parents completed a brief demographic questionnaire. The questionnaire is composed of 5 items: student's age, sex, racial/ethnic status, and primary language as well as the highest level of education obtained by each of the student's parents (see

Appendix B). This questionnaire was completed prior to the start of the baseline collection phase.

Outcome measures. Direct observations and standardized ratings of behavior were used to examine the outcome variables of this study.

Systematic direct observation of behavior. Systematic direct observation was used to measure students' social behaviors (see Appendix C). Specifically, the following behavior categories were coded: Asking Others to Play (AO), Taking-Turns in Conversations (TT), Asking for Help (AH), and Positive Social (PS). While AO, TT, and AH were the target skills of this study, PS was also coded to assess the generalization of behavior change during each phase of the study. All behaviors were coded using the partial interval method (i.e., behaviors were coded if they occurred at any time during the interval). Each of these behaviors was operationally defined and the observations were conducted using a standardized procedure. A minimum of three 15-minute systematic direct observations per child were conducted during each week of the study.⁴

Systematic direct observations are currently the gold standard for measuring behavior as this is an objective assessment with high levels of specificity and sensitivity (Riley-Tillman, Chafouleas, Briesch, & Eckert, 2008). However, the representativeness of this data has been questioned by researchers (e.g., Hintze & Matthews, 2004; Riley-Tillman et al., 2008). Hintze and Matthews (2004) examined the reliability and validity of systematic direct observations across time and settings. Results suggested that to obtain adequate levels of reliability (> .90) students had to be observed four times per day for a minimum of four weeks. Collecting this

⁴ There were slight variations in the number of direct observations conducted for each child due to differences in program attendance and student absences. In addition, Emma was absent during the eighth week of the study.

amount of observational data is generally beyond the available resources for most practitioners. Therefore, the potential lack of generalizability of observational data should be recognized (Hintze & Matthews, 2004).

Standardized ratings of social and problem behavior. In addition to observations of student's prosocial behavior, the Social Skills Improvement System (SSIS; Gresham & Elliot, 2008) Rating Scale was used to evaluate student's response generalization across two domains: social skills and problem behaviors. Autism spectrum behaviors were also evaluated via a subscale within the problem behaviors domain. Teacher and parent forms were used to provide a comprehensive picture of student's skill levels across the school, home, and community environments (Gresham & Elliott, 2008). Internal consistency coefficients for the Social Skills ($r = .97$) and Problem Behaviors ($r = .96$) domains are high (Kettler, Elliott, Davies, & Griffin, 2009). Teachers and participating parents completed the SSIS Rating Scale during the baseline period (Week 1), at the midpoint of the study (Week 5), and post intervention (Week 9).⁵

Intervention fidelity. Intervention fidelity assesses the extent to which essential intervention components are delivered in a comprehensive and consistent manner by a trained interventionist (Sanetti & Kratochwill, 2009). A research assistant completed a systematic checklist of intervention implementation for each fidelity observation (see Appendix D). Treatment fidelity was calculated by dividing the total number of tallied steps by the total number of steps possible (Salvia, Ysseldyke, & Bolt, 2007).

Social validity. Modified versions of the Intervention Rating Profile (IRP-15; Martens, Witt, Elliott, & Darveaux, 1985) and the Children's Intervention Rating Profile (CIRP; Witt & Elliott, 1983) were used to measure the social importance, perceived outcomes, and acceptability

⁵ Colin and Felicity's parents only completed the questionnaire at Week 9.

of the intervention. Specifically, these questionnaires were adapted from their original form to include questions pertaining to the current intervention (see Appendix E). Teachers and parents completed the modified IRP-15 and students completed the modified CIRP. Raters responded to the items by indicating their level of agreement or disagreement on a 5-point Likert scale, ranging from *strongly disagree* (1) to *strongly agree* (5) with higher scores being associated with more acceptable interventions. Internal consistency of the IRP-15 total scores is high (coefficient alpha = .98), and results of factor analysis have supported the unidimensional structure of the measure (Harris, Preller, & Graham, 1990). Teachers, students, and participating parents completed their respective social validity questionnaire at the completion of the study.

Goal attainment scaling (GAS) also was used to gain insight regarding teachers' perceptions of intervention effectiveness (see Appendix F). GAS is a systematic, criterion referenced approach for describing changes in children's performance. This technique has been used in educational settings as well as single-case research studies to provide an indirect measure of social behavior. It may also be used in conjunction with direct observations to provide a comprehensive view of the child's functioning and progress (Roach & Elliott, 2005). While GAS ratings are typically completed on a 5-point Likert scale, the current study utilized a 7-point scale, where -3 = *large negative change in the target behavior*, 0 = *no change in the target behavior*, and +3 = *large positive change in the target behavior*. A 7-point Likert scale was chosen to allow for greater sensitivity to changes in the target behaviors. Interrater reliability of the 5-point GAS form is high (Phi Coefficient = .87; Kaplan & Smith, 1977). Teachers provided ratings of each student's target behaviors (via GAS) at the end of each week. These ratings started at Week 1 and continued through the duration of the study (Week 9).

Procedure

Consent. The principal investigator provided an overview of the study to the teachers at the agency. The terms of their involvement in the project (i.e., the completion of CARS2-HF, GAS, SSIS Rating Scale, and social validity questionnaire) were clearly described and they were provided a consent form to sign if they agreed to participate in the study. All parents who had a child at the agency received a letter describing the project, a brief demographic questionnaire, and a consent form to sign and return if they wanted their child to participate. The terms of participation were verbally described to each student by the principal investigator and students could choose to verbally assent to their participation, or decline their involvement in the study. Parents who agreed to complete ratings of their child's behavior received monetary compensation for their time spent completing these forms. Students received school supplies (e.g., pencils, erasers, notebooks) as a thank you for their participation. In addition, books and school supplies were provided to the agency as a thank you for their involvement in the study.

Intervention implementation. The SSIS-IG intervention protocol incorporates instructional strategies to increase students' social skill acquisition and performance, while also reducing their competing problem behaviors. Each unit within the SSIS-IG intervention protocol is composed of the following six phases: (a) tell, (b) show, (c) do, (d) practice, (e) monitor progress, and (f) generalize (Elliott & Gresham, 2008).

The tell phase utilizes a coaching strategy and is founded on the social learning theory (Elliott & Gresham, 2008). The process begins with the teacher providing an explicit description of the target skill and when the skill should and should not be used. Next, the student practices the skill through behavioral rehearsal, and the teacher provides detailed verbal feedback (DiPerna, 2006). The second phase, show, involves modeling positive and negative social

behaviors using pictures, video clips, and role-play. During the third step, the students engage in role-play and problem solving activities. The educator presents students with a mock scenario and students are then directed to use role-play to act out the social situation featuring the target skill. During the practice phase, students rehearse the skills presented in the lesson and may experiment with different ways of responding as they receive feedback from the educator. Following these steps, the students reflect on their own progress using a progress chart. In addition, the group leader monitors and documents student progress and provides feedback to the students. Finally, the students are encouraged to apply their skills in a variety of settings (Elliott & Gresham, 2008).

The principal investigator facilitated each intervention lesson as described in the SSIS-IG manual. During the intervention phase each group participated in three 30-minute lessons a week. As each of the lessons target independent skills, the administration of the units was randomized across groups to control for order effects. Randomization of the units increases the likelihood that the observed effects are a result of the treatment rather than an extraneous variable (Kennedy, 2005). Therefore, while each group received all of the units, the order in which they received them varied. To facilitate skill acquisition and performance, a brief (5-minute) review of the previous units was conducted at the start of each session. For example, during the third week of the intervention phase, the material from the first 2 weeks of the intervention was reviewed. During the review, the students were quizzed on each of the skill steps required to complete the target behavior.

Interobserver agreement. Systematic direct observations were conducted by three female graduate research assistants. Prior to the start of the study, data collectors completed a 2-hour training session facilitated by the principal investigator. The research assistants were

trained in the behavioral observation techniques that were used in the present study; however, they were not provided with information regarding the research questions or hypotheses being evaluated. During the training session each assistant completed two observations of a videotaped classroom session. Percent agreement was used to calculate interrater reliability (Araujo & Born, 1985).⁶ Each research assistant obtained 100% interrater reliability with the principal investigator on the training videos. Throughout the study 25% of all direct observations (75 of 306) were co-observed by the principal investigator. Reliability for each of the domains (i.e., asking others to play, taking-turns in conversation, asking for help, and prosocial behavior) was high ($r \geq .92$).

Intervention fidelity. A fourth female graduate research assistant was responsible for assessing the fidelity of the intervention implementation. This research assistant attended a 1-hour training session on the SSIS-IG program and the protocol for conducting fidelity observations. Throughout the study, approximately 22% of the intervention sessions (6 of 27) were observed. During each fidelity observation a systematic checklist of intervention implementation was completed. Fidelity of implementation was perfect (100%) for each observation.

To minimize threats to validity, teachers were not informed of the order in which each target skill was taught. In addition, all research assistants who were conducting direct observations were not told which phase the students were in (i.e., baseline, intervention, follow-up), or the order of the unit implementation. Only the principal investigator and the research

⁶ Percent of agreement is calculated using the following equation: $(\text{agreements} / (\text{agreements} + \text{disagreements})) \times 100\%$.

assistant involved in collecting treatment fidelity data had specific knowledge of the unit administration.

Design and Data Analysis

Research design. A multiple-baseline design across intervention groups was used to determine the effects of the SSIS-IG intervention protocol on student's level of skill attainment. Using this design, evidence of internal validity can be supported by a functional relationship between the dependent and independent variables (Kennedy, 2005). Each group (A, B, and C) received the units in a randomized order and the intervention start dates were staggered (see Figure 1). Therefore, Group A was in baseline for approximately 1-week, Group B was in baseline for 2-weeks, and Group C was in baseline for 3-weeks. No less than eight baseline data points were collected for any individual.

The length of time for each phase of the study (baseline, intervention, follow-up) varied by skill and group. Participants were considered to be in the baseline phase for a particular skill until the unit for that skill was taught (e.g., the baseline phase for asking for help for Group A was 2 weeks). The intervention phase for each skill was the time between when the first and last lesson was taught (e.g., the intervention phase for asking for help for Group A was Week 3). All data collected following the last lesson of a particular unit was considered to be in the follow-up phase for that particular skill (e.g., Week 4 started the follow-up phase for asking for help for Group A). Changes in student behavior were expected to occur in the intervention or follow-up phases.

Figure 1. *Multiple-Baseline Design across Intervention Groups: SSIS Unit Intervention Implementation Schedule*

Weeks of Study									
Group	1	2	3	4	5	6	7	8	9
A	Baseline	Unit 1	Unit 2	Unit 3	Follow-up				
B	Baseline		Unit 3	Unit 1	Unit 2	Follow-up			
C	Baseline			Unit 2	Unit 1	Unit 3	Follow-up		

Note. Unit 1: Asking Others to Play; Unit 2: Asking for Help; Unit 3: Taking-Turns in Conversations.

Data analysis. Direct observation data were graphed and analyzed during each phase of the study (i.e., baseline, intervention, and follow-up). Changes in level, mean, and variability between the phases were reported and data trends (i.e., slope) in each phase were inspected. Data were analyzed regularly throughout the baseline, intervention, and follow-up phase. Percentage of non-overlapping data (PND) was used to determine intervention effectiveness for each of the outcome variables. PND is calculated by dividing the number of intervention data points that exceed the highest baseline data point by the total number of intervention data points, and multiplying the result by 100. Scruggs and Mastropieri's (1998) guidelines were used to determine intervention effectiveness: Very effective ($\geq 90\%$); effective (70 – 90%); questionable (50 – 70%); and ineffective ($\leq 50\%$). Reliable change index (RCI) was used to determine if there was a significant change in teacher and parents ratings on the SSIS Rating Scale following the intervention (Ferguson, Robinson, & Splaine, 2002).⁷ RCI adjusts for both population

⁷ Reliable change index (RCI) is calculated using the following equation: $(T2 - T1) / [2 (SE)^2]^{1/2}$ where

$SE = SD (1 - r_{xx})^{1/2}$ (Ferguson, Robinson, & Splaine, 2002).

(standard deviation) and individual (Cronbach's alpha) variation and estimates the expected spread of the distribution of change scores if no actual change had occurred (Hawley, 1995).

Criteria for Testing Hypotheses

Hypothesis 1. The SSIS-IG intervention protocol will improve students' social initiation behavior. Evidence to support this prediction was expected in the form of mean increases in the demonstration of this skill, as well as a positive trend line, with PND values in the effective (70 – 90%) to very effective ($\geq 90\%$) ranges, based on Scruggs and Mastropieri's (1998) criteria.

Hypothesis 2. The SSIS-IG intervention protocol will improve students' self-regulation behavior. Evidence to support this prediction was expected in the form of mean increases in the demonstration of this skill, as well as a positive trend line, with PND values in the effective to very effective ranges, based on Scruggs and Mastropieri's (1998) criteria.

Hypothesis 3. The SSIS-IG intervention protocol will improve students' assertion behavior. Evidence to support this prediction was expected in the form of mean increases in the demonstration of this skill, as well as a positive trend line, with PND values in the effective to very effective ranges, based on Scruggs and Mastropieri's (1998) criteria.

Hypothesis 4. Students will demonstrate generalization of behavior changes in the form of prosocial behaviors and increases in related skills (e.g., communication, self-control, assertion) as measured by the SSIS Rating Scale. Evidence to support this prediction was expected in the form of mean increases in the demonstration of prosocial behaviors, as well as a positive trend line, with PND values in the effective to very effective ranges, based on Scruggs and Mastropieri's (1998) criteria. Teacher and parent ratings on the SSIS Rating Scale, completed pre-, mid-, and post-intervention, will provide evidence for generalization of behavior

changes. If the calculated RCI score is greater than 1.96 ($p < .05$) the change is considered reliable (Hawley, 1995).

Hypothesis 5. Following the completion of the intervention, teachers, parents, and students will indicate moderate to high levels of social validity for the SSIS-IG intervention protocol. Ratings between 4 (*agree*) and 5 (*strongly agree*) on the modified IRP-15 and the CIRP will provide evidence for high levels of social validity. In addition, individual improvements in GAS ratings from Week 1 to Week 9 will provide insight regarding the teachers' perception of behavior change.

CHAPTER 4: RESULTS

Asking Others to Play (Hypothesis 1)

This intervention unit was taught to Group A, then Group B, and finally Group C. Descriptive statistics and percent non-overlapping data (PND) values for social initiation behaviors are presented in Table 6. Figure 2 depicts the number of social initiations made across each phase of the study (baseline, intervention, and follow-up). Based on the aforementioned guidelines established by Scruggs et al. (1987), PND values may be categorized as *very effective* ($\geq 90\%$); *effective* (70 – 90%); *questionable* (50 – 70%); and *ineffective* ($< 50\%$).

Group A. Throughout the baseline period Aiden did not ask any of his peers to play. After the second intervention session, Aiden exhibited a level change and his mean number of initiations increased. PND graphing results for the intervention period fell within the *effective* range. Following the intervention phase, his frequency of asking others to play continued to increase and he exhibited a positive trend line. His post-intervention PND results remained within the *effective* range.

During the baseline phase, Bryce made few initiations to play and displayed a relatively flat trend line. Within the intervention phase, he exhibited an immediate level change and his frequency of asking others to play increased. His trend line however, remained flat. After the completion of the intervention, Bryce displayed a positive trend line and his initiations to play remained stable. His PND value for the intervention and follow-up phases fell within the *ineffective* range.

Group B. Colin made no initiations to play throughout the baseline period. At the start of intervention phase, he exhibited an abrupt level change. However, his demonstration of this skill quickly decreased and he displayed a descending trend line. Following the intervention

phase, Colin's skill of asking others to play was varied. His mean number of initiations to play decreased slightly and his trend line leveled. His PND results for both the intervention and follow-up phases fell within the *ineffective* range.

During the baseline period, Derek made few initiations to play. At the intervention phase change, he exhibited an immediate level change. Similar to Colin, Derek did not maintain his performance and his initiations to play quickly decreased. Derek also displayed a descending trend line during the intervention. After the completion of the intervention, Derek displayed this skill inconsistently. His mean number of initiations to play decreased slightly and his trend line leveled. PND graphing results fell within the *ineffective* range for both the intervention and follow-up phases.

Group C. Emma and Felicity both made no initiations to play during the baseline and intervention phases. As such, both of their trend lines were flat and their calculated PND values fell within the *ineffective range*. Following the completion of the unit, both girls made gains in their demonstration of this skill. Specifically, Emma displayed an immediate level change after the last lesson for this unit. Her mean number of initiations increased and she exhibited a positive trend line. Her PND value fell within the *questionable* range. Felicity's progress was less consistent. Although her mean number of initiations gradually increased during the follow-up phase, she continued to display this skill inconsistently. Her trend line was positive, however, it was relatively flat and her PND value fell within the *ineffective* range.

Summary of evidence for hypothesis 1. Inspection of time series graphs indicated that Groups A and B exhibited the predicted increases in social initiation skills at the Week 2 and Week 4 phase changes, respectively. Group C, however, did not exhibit any increases in this skill until the follow-up phase. Across all groups there was a lack of consistency in the

demonstration of this skill and a functional relationship could not be established across groups. As such, results for asking others to play provide partial support for the effectiveness of the SSIS-IG intervention protocol.

Table 6

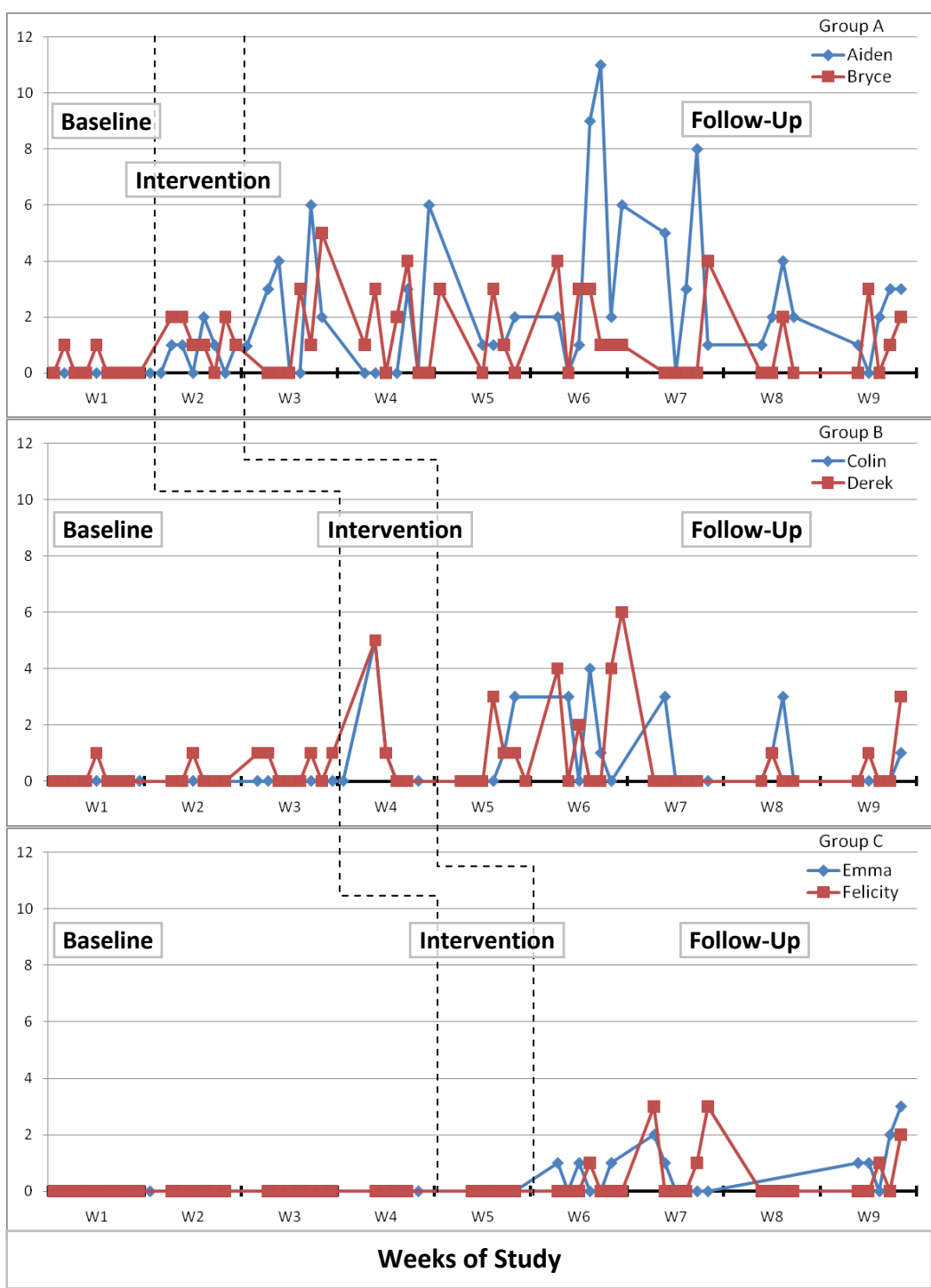
Mean, Standard Deviation, and Percent Non-Overlapping Data (PND) for Social Initiation Behaviors by Phase

	<i>M (SD)</i>			PND	
	Baseline	Intervention	Follow-Up	Intervention	Follow-Up
Group A					
Aiden	0.00 (0.00)	0.86 (0.69)	2.50 (2.72)	71%	74%
Bryce	0.25 (0.46)	1.29 (0.76)	1.31 (1.52)	43%	39%
Group B					
Colin	0.00 (0.00)	1.20 (2.17)	0.83 (1.31)	40%	36%
Derek	0.29 (0.46)	1.50 (2.38)	0.93 (1.61)	25%	21%
Group C					
Emma	0.00 (0.00)	0.00 (0.00)	0.76 (0.90)	0%	53%
Felicity	0.00 (0.00)	0.00 (0.00)	0.50 (0.96)	0%	27%

Note. PND values were calculated between the baseline and intervention phase and the baseline and follow-up phase for each child. Based on the guidelines established by Scruggs et al. (1987), PND values may be categorized as *very effective* (> 90%); *effective* (70 – 90%); *questionable* (50 – 70%); and *ineffective* (< 50%).

Figure 2

Observations of Asking Others to Play (Social Initiation Skills)



Note. Asking Others to Play intervention unit began at Week 2 (Group A), Week 4 (Group B), and Week 5 (Group C).

Taking-Turns in Conversations (Hypothesis 2)

This intervention unit was taught to Group B, then Group A, and Group C. Descriptive statistics and PND values for self-regulation behaviors are presented in Table 7. Figure 3 depicts the number of self-regulation behaviors observed across each phase of the study (baseline, intervention, and follow-up).

Group B. Colin demonstrated a low frequency of turn-taking within a conversation throughout the baseline phase and a relatively flat trend line. During the intervention phase, he exhibited this skill inconsistently. Although his average turn-taking increased, a change in level was not observed and his trend line was positive, but fairly flat. Within the follow-up phase, Colin's demonstration of this skill increased; however, he exhibited a descending trend line. Colin's PND graphing results for both the intervention and follow-up phases fell within the *ineffective* range.

During the baseline period Derek's demonstration of the target skill was variable and he exhibited a relatively flat trend line. He displayed a level change after the second intervention lesson and his average frequency of turn-taking increased during this phase. In addition, he exhibited a steep positive trend line. Following the intervention period, Derek's mean number of demonstrations remained relatively constant and his trend line leveled. Derek's PND results for both the intervention and follow-up phases fell within the *ineffective* range.

Group A. Throughout the baseline and intervention phases Aiden's frequency of turn-taking within a conversation remained relatively constant. He displayed a small level change at the start of the intervention; however, he exhibited a decelerating trend line. His intervention PND value fell within the *ineffective* range. Following the intervention period, Aiden's

frequency of turn-taking within a conversation increased and he displayed a steep positive trend line. Aiden's PND graphing results fell within the *questionable* range.

During the baseline period, Bryce demonstrated the target skill infrequently and displayed a relatively flat trend line. He exhibited an immediate level change at the start of the intervention and his frequency of turn-taking increased. Bryce's intervention PND results for the intervention phase fell within the *questionable* range. After the completion of the intervention, Bryce's turn-taking continued to increase and he displayed a steep positive trend line. Bryce's PND results, however, remained within the *questionable* range.

Group C. Emma displayed a low frequency of turn-taking within a conversation during the baseline period and a relatively flat trend line. During the intervention phase, she demonstrated an increase in turn-taking and exhibited a steep positive trend line. However, she did not exhibit a level change until the last intervention lesson for this unit had been taught. Following the intervention, Emma's average instances of turn-taking was fairly stable and her trend line leveled. Her PND graphing results for both the intervention and follow-up phases fell within the *ineffective* range.

Felicity demonstrated few instances of turn-taking within a conversation during the baseline phase and her trend line was relatively flat. At the start of the intervention, she exhibited a small change in level. Her mean demonstrations of this skill increased and she displayed a positive trend line. Following the intervention, Felicity continued to demonstrate increases in this skill; however, her trend line leveled. Her PND value for the intervention and follow-up phases fell within the *ineffective* range.

Summary of evidence for hypothesis 2. All groups exhibited lack of stability in turn-taking within a conversation throughout the course of the study. While immediate changes in

level were not consistently observed at the intervention phase change, gradual increases in this skill were noted across each of the groups. A functional relationship, however, could not be established. Therefore, results for taking-turns within a conversation provide limited support for the effectiveness of the SSIS-IG intervention.

Table 7

Mean, Standard Deviation, and Percent Non-Overlapping Data (PND) for Self-Regulation

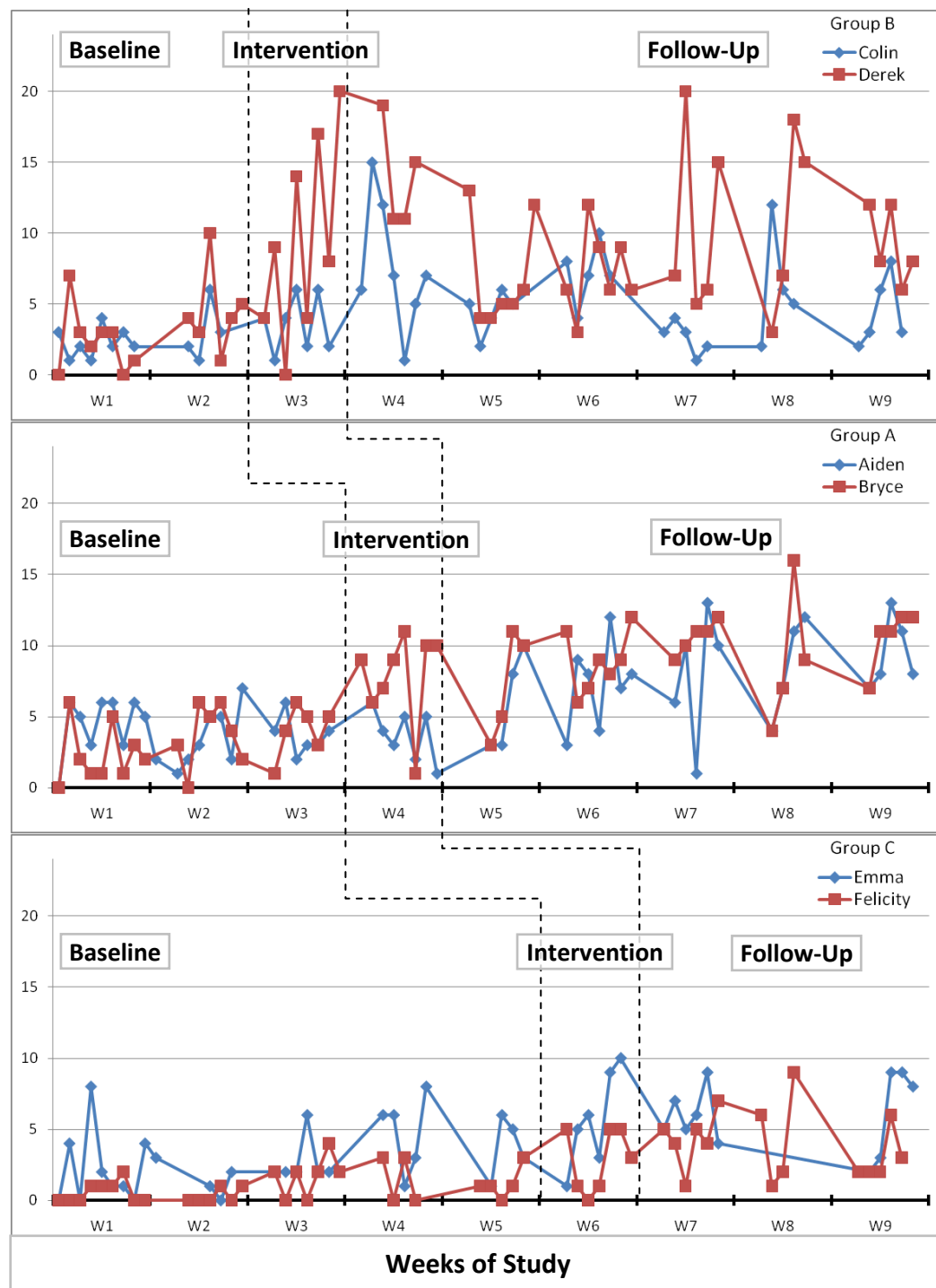
Behaviors by Phase

	<i>M (SD)</i>			PND	
	Baseline	Intervention	Follow-Up	Intervention	Follow-Up
Group B					
Colin	2.50 (1.45)	3.57 (1.99)	5.52 (3.37)	0%	32%
Derek	3.54 (2.67)	9.50 (6.52)	9.31 (4.75)	38%	33%
Group A					
Aiden	4.05 (1.73)	3.71 (1.80)	7.84 (3.39)	0%	60%
Bryce	3.38 (1.99)	7.88 (3.23)	9.32 (2.94)	75%	84%
Group C					
Emma	3.04 (2.41)	5.67 (3.44)	6.09 (2.51)	33%	27%
Felicity	1.03 (1.16)	2.86 (2.19)	3.93 (2.37)	43%	40%

Note. PND values were calculated between the baseline and intervention phase and the baseline and follow-up phase for each child. Based on the guidelines established by Scruggs et al. (1987), PND values may be categorized as *very effective* (> 90%); *effective* (70 – 90%); *questionable* (50 – 70%); and *ineffective* (< 50%).

Figure 3

Observations of Taking-Turns in Conversations (Self-Regulation Skills)



Note. Taking-Turns in Conversations intervention unit began at Week 3 (Group B), Week 4 (Group A), and Week 6 (Group C).

Asking for Help (Hypothesis 3)

This intervention unit was taught to Group A, then Group C, and finally Group B. Descriptive statistics and PND values for assertion behaviors are presented in Table 8. Figure 4 depicts the number of self-regulations made across each phase of the study (baseline, intervention, and follow-up).

Group A. During the baseline and intervention phases, Aiden demonstrated a low frequency of asking for help and a flat trend line. Following the intervention period, Aiden's frequency of asking for help was variable. His mean number of requests increased slightly, and he demonstrated a positive, but relatively flat trend line. PND values for both the intervention and follow-up phases fell within the *ineffective* range.

Bryce exhibited no instances of asking for help during the baseline period. After the second intervention lesson, he displayed a positive level change. His demonstration of this skill increased, and he exhibited a steep positive trend line. Bryce's PND graphing results for the intervention period fell within the *questionable* range. Following the intervention phase, his frequency of asking for help was inconsistent. His average demonstrations of this skill decreased slightly and his trend line leveled. Bryce's PND graphing results post-intervention fell within the *ineffective* range.

Group C. Within the baseline and intervention phases Emma did not demonstrate the target skill (i.e., asking for help). After the completion of the intervention, her demonstration of this skill increased; however, her trend line was relatively flat. PND graphing results for Emma fell within the *ineffective* range for both the intervention and follow-up phases.

Felicity demonstrated a low frequency of asking for help during the baseline and intervention phases, and her trend lines were relatively flat. Following the intervention, her

average demonstration of this skill increased slightly, as did her trend line. PND graphing results for the intervention and follow-up phases fell within the *ineffective* range.

Group B. During the baseline and intervention phases, Colin made few requests for help and exhibited a flat trend line. Results during the follow-up phase showed a lack of improvement and his trend line remained relatively flat. Colin's PND results for both the intervention and follow-up phases fell within the *ineffective* range.

Derek exhibited a low frequency of asking for help during the baseline phase and his trend line was relatively flat. He exhibited a positive level change after the second intervention lesson; however, his performance quickly decreased and he displayed a decelerating trend line. Following the intervention period his average frequency of asking for help decreased slightly, but he displayed a positive trend line. PND graphing results fell within the *ineffective* range for both the intervention and follow-up phases.

Summary of evidence for hypothesis 3. Examination of the time series graphs indicated that Groups A and B exhibited increases in asking for help during their respective intervention phase changes, Weeks 3 and 5. Group C did not demonstrate gains in this skill until the post-intervention period, Week 5. During the follow-up phase Group B did not maintain the gains demonstrated during the intervention period and exhibited decreases in this skill immediately after the intervention phase (Week 6). Students in Group B then began increasing gradually during Weeks 8 and 9 of the follow-up period. Groups A and C exhibited variable gains throughout the post-intervention phase. Overall, the demonstration of this skill was variable across participants and improvements did not consistently align with phase changes. Therefore results suggest minimal support for this hypothesis.

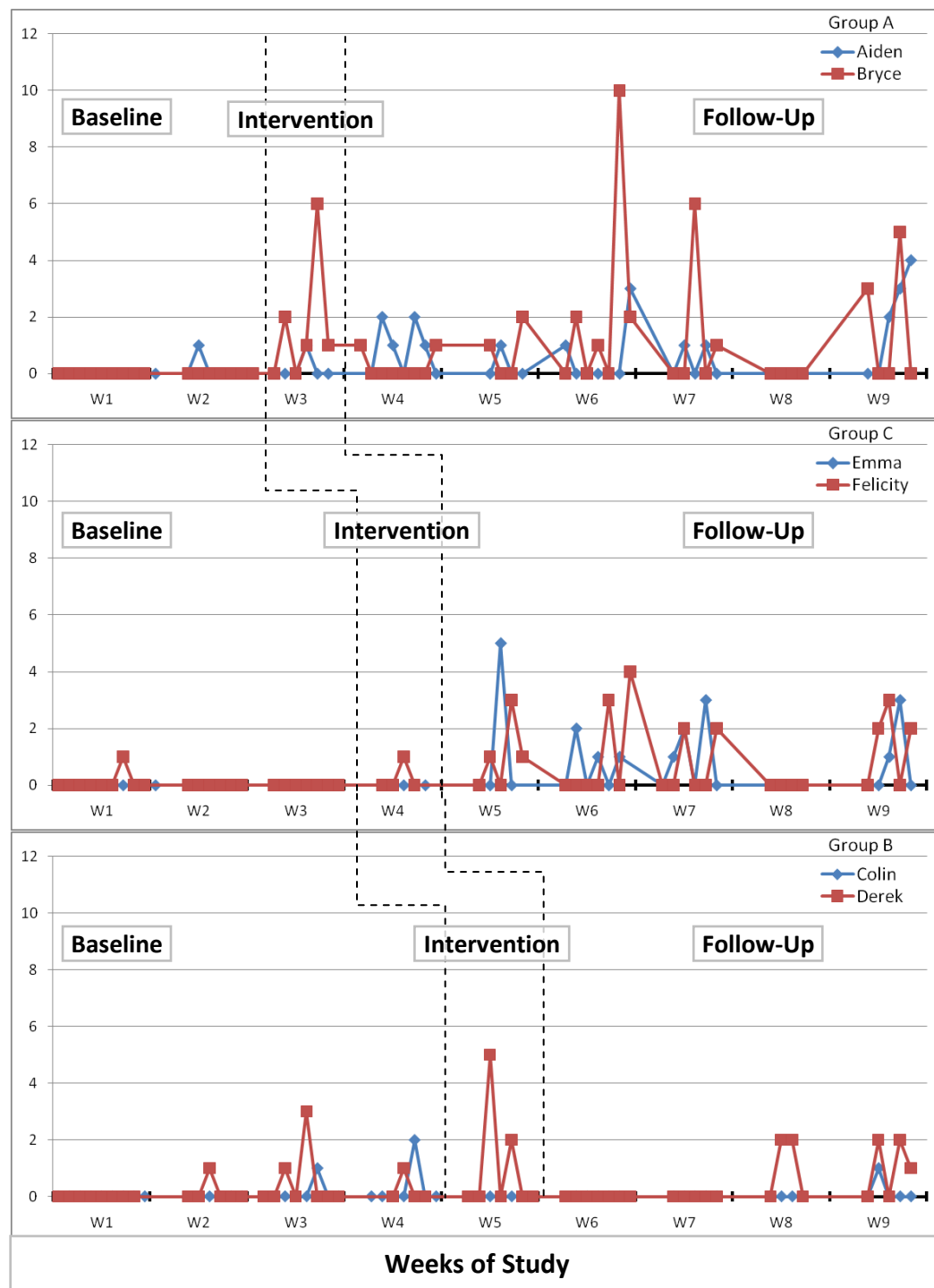
Table 8

Mean, Standard Deviation, and Percent Non-Overlapping Data (PND) for Assertion Behaviors by Phase

	<i>M (SD)</i>			PND	
	Baseline	Intervention	Follow-Up	Intervention	Follow-Up
Group A					
Aiden	0.06 (0.24)	0.17 (0.41)	0.69 (1.09)	0%	16%
Bryce	0.00 (0.00)	1.67 (2.25)	1.06 (2.16)	67%	36%
Group C					
Emma	0.00 (0.00)	0.00 (0.00)	0.86 (1.36)	0%	43%
Felicity	0.05 (0.22)	0.25 (0.50)	0.85 (1.26)	0%	29%
Group B					
Colin	0.12 (0.43)	0.00 (0.00)	0.05 (0.23)	0%	0%
Derek	0.24 (0.66)	1.00 (1.91)	0.43 (0.81)	14%	0%

Note. PND values were calculated between the baseline and intervention phase and the baseline and follow-up phase for each child. Based on the guidelines established by Scruggs et al. (1987), PND values may be categorized as *very effective* (> 90%); *effective* (70 – 90%); *questionable* (50 – 70%); and *ineffective* (< 50%).

Figure 4
Observations of Asking for Help (Assertion Skills)



Note. Asking for Help intervention unit began at Week 3 (Group A), Week 4 (Group C), and Week 5 (Group B).

Generalization of Behavior Change (Hypothesis 4)

It was hypothesized that students would demonstrate generalization of behavior changes following the SSIS-IG intervention. Generalizability was evaluated through observations of prosocial behaviors and ratings on the Social Skills Improvement System (SSIS) Rating Scale (Teacher and Parent Form).

Prosocial behaviors. Table 9 includes the descriptive statistics and PND values for prosocial behaviors. Figure 5 shows the number of prosocial behaviors exhibited during each phase of the study (baseline, intervention, follow-up). Although prosocial behaviors were not directly taught to the participants, the intervention phase was the period between when the first unit was taught to when the last unit was completed.

Group A. Aiden demonstrated no prosocial behaviors during the baseline period. Within the intervention phase, his prosocial interactions increased slightly and he exhibited a relatively flat trend line. Aiden's PND value for the intervention period fell within the *ineffective* range. Post-intervention, Aiden continued to make gains in his prosocial behaviors and his trend line remained constant. Aiden's PND graphing results for the follow-up phase fell within the *effective* range.

Bryce displayed a low frequency of prosocial interactions during the baseline phase and exhibited a decreasing trend line. Within the intervention period, his average frequency of prosocial behaviors increased and he displayed a steep positive trend line. Bryce's mean number of prosocial behaviors remained relatively constant during the follow-up phase, and he continued to exhibit a positive trend line. PND graphing results for both the intervention and follow-up phases fell within the *ineffective* range.

Group B. Colin exhibited few prosocial interactions during the baseline, intervention, and follow-up periods. In addition he demonstrated a relatively flat trend line during each of these phases. As such, Colin's PND values for the intervention and follow-up phases fell within the *ineffective* range.

Derek's frequency of prosocial behaviors was low during the baseline and intervention phases and he exhibited relatively flat trend lines. His frequency of prosocial interactions increased slightly following the intervention, but his trend line was relatively flat. Derek's PND graphing results for both the intervention and follow-up phases fell within the *ineffective* range.

Group C. Emma and Felicity both demonstrated few prosocial behaviors during the baseline, intervention, and follow-up periods. Their trend lines during each of these phases were relatively flat as well. As such, Emma and Felicity obtained PND values within the *ineffective* range for both the intervention and follow-up phases.

Standardized rating scale. Please refer to Table 10 for pre-, mid-, and post-intervention standard scores and percentiles on the SSIS Rating Scale. Mid- and post-intervention reliable change index (RCI) values for Groups A, B, and C are presented in Tables 11 through 13, respectively.

Group A. Teacher ratings on the SSIS Rating Scale completed at Weeks 1 and 5, indicated that Aiden demonstrated improvements in social skills, particularly in the areas of communication, cooperation, assertion, engagement, and self-control. He also exhibited a decrease in externalizing and autism spectrum behaviors. Post-intervention (Week 9) ratings indicated that Aiden continued to demonstrate fewer symptoms of autism spectrum disorder.

Standardized teacher ratings completed at pre- and mid-intervention indicated that Bryce made gains on the Social Skills domain, specifically in the areas of assertion, engagement, and

self-control. Bryce did not exhibit improvements within the Problem Behaviors composite; however, he did demonstrate a decrease in autism spectrum behaviors. Post-intervention ratings suggested that Bryce obtained improvements in the areas of empathy, engagement, hyperactivity/inattention, and autism spectrum behaviors.

Group B. Teacher ratings completed at Weeks 1 and 5 indicated that Colin demonstrated improvements on the Social Skills domain and each of the subscales except for Cooperation. Further, a decrease was noted on the Problem Behaviors composite and each of the corresponding subscales, as well as the index of autism spectrum behaviors. Post-intervention (Week 9) ratings indicated that Colin maintained his gains in self-control and each of the areas assessed by the Problem Behaviors domain except for internalizing behaviors.

Teacher ratings completed pre- and mid-intervention indicated that Derek made gains on the Social Skills composite, particularly in the areas of empathy and self-control. Derek also exhibited a decrease in symptoms of hyperactivity/inattention as well as autism spectrum behaviors. Post-intervention ratings indicated that Derek maintained gains in the area self-control.

Group C. Teacher report suggested that Emma improved on the Social Skills composite between Weeks 1 and 5, with her greatest improvements noted in the areas of communication and engagement. Changes in problem behaviors were not indicated; however, Emma exhibited a decrease in autism symptoms. Post-intervention ratings indicated improvements in the areas of self-control and internalizing behaviors.

Teacher ratings completed pre- and mid-intervention indicated that Felicity attained improvements in empathy skills and externalizing behaviors. Gains were not noted between pre- and post-intervention.

Summary of evidence for hypothesis 4. All groups exhibited mean increases in prosocial behaviors from the baseline to follow-up phase; however, the gains exhibited by Group C were quite small. Each of the groups exhibited lack of stability throughout the course of the study and predicted increases were not observed at the intervention phase change. Therefore, a functional relationship across groups was not established. Scores from the standardized rating scale indicated that overall, students exhibited the greatest gains in generalized behavior change between pre- and mid-intervention. Unfortunately, these gains generally were not maintained post-intervention.

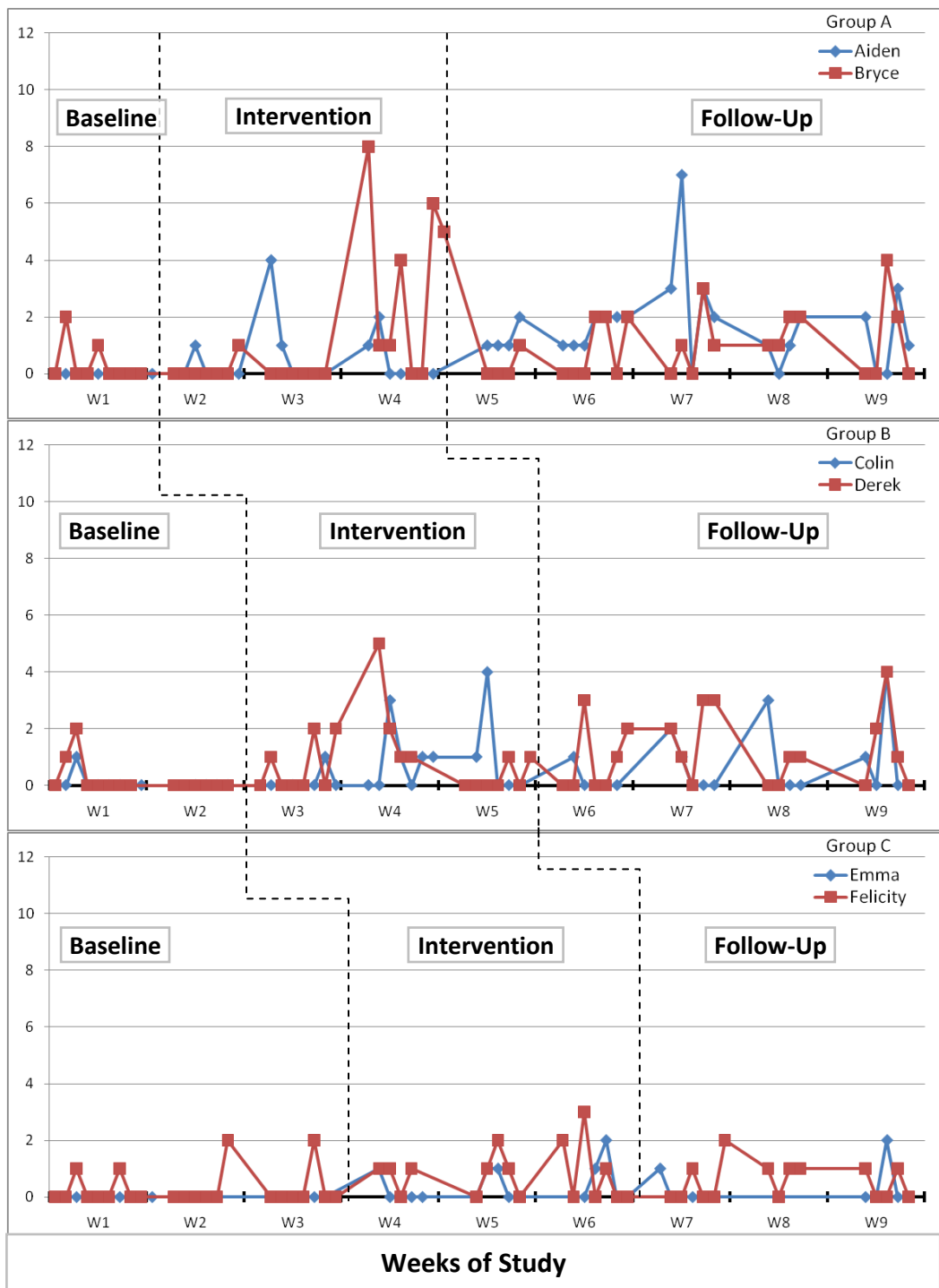
Table 9

Mean, Standard Deviation, and Percent Non-Overlapping Data (PND) for Prosocial Behaviors by Phase

	<i>M (SD)</i>			PND	
	Baseline	Intervention	Follow-Up	Intervention	Follow-Up
Group A					
Aiden	0.00 (0.00)	0.45 (1.00)	1.64 (1.44)	25%	84%
Bryce	0.38 (0.74)	1.24 (2.36)	0.96 (1.14)	19%	8%
Group B					
Colin	0.08 (0.29)	0.63 (1.12)	0.63 (1.16)	11%	16%
Derek	0.23 (0.60)	0.84 (1.26)	1.14 (1.28)	5%	19%
Group C					
Emma	0.00 (0.00)	0.40 (0.63)	0.25 (0.62)	33%	18%
Felicity	0.29 (0.64)	0.81 (0.91)	0.53 (0.64)	6%	0%

Note. PND values were calculated between the baseline and intervention phase and the baseline and follow-up phase for each child. Based on the guidelines established by Scruggs et al. (1987), PND values may be categorized as *very effective* (> 90%); *effective* (70 – 90%); *questionable* (50 – 70%); and *ineffective* (< 50%).

Figure 5
Observations of Prosocial Behaviors



Note. Group A began the intervention at Week 2, Group B at Week 3, and Group C at Week 4.

Table 10

Standard Scores and Percentiles on the Social Skills Improvement System Rating Scale

Student	Social Skills			Problem Behaviors			Autism Spectrum		
	Week 1	Week 5	Week 9	Week 1	Week 5	Week 9	Week 1	Week 5	Week 9
Group A									
Aiden (TRS)	84 (15%)	106 (66%)	80 (10%)	121 (89%)	118 (86%)	115 (83%)	17	12	10
Aiden (PRS)	71 (3%)	72 (4%)	--	123 (91%)	121 (91%)	121 (91%)	18	15	--
Bryce (TRS)	81 (11%)	91 (26%)	90 (25%)	117 (85%)	123 (91%)	106 (70%)	19	15	7
Group B									
Colin (TRS)	80 (10%)	107 (67%)	92 (29%)	126 (93%)	101 (60%)	98 (52%)	26	8	16
Colin (PRS)	--	--	81 (9%)	--	--	129 (95%)	--	--	20
Derek (TRS)	74 (5%)	92 (29%)	78 (7%)	125 (93%)	116 (84%)	118 (86%)	21	15	18

(Table continues)

Group C

Emma (TRS)	89 (22%)	106 (66%)	90 (25%)	100 (57%)	102 (63%)	106 (70%)	15	4	16
Felicity (TRS)	65 (1%)	71 (3%)	65 (2%)	114 (82%)	123 (91%)	117 (85%)	29	30	28
Felicity (PRS)	--	--	59 (1%)	--	--	126 (94%)	--	--	29

Note. TRS = Teacher rating scale; PRS = Parent rating scale. Standard scores $M = 100$ and $SD = 15$. Combined norms were used for percentiles. Standard error of measurement for the Social Skills composite is 2.6 and 3.3 on the TRS and PRS, respectively. Standard error of measurement for the Problem Behaviors composite is 3.3 and 3.6 on the TRS and PRS, respectively. Autism Spectrum scores > 15 are in the *Above Average* range.

Table 11

Reliable Change Index (RCI) Values on the Social Skills Improvement System Rating Scale for Group A

Domain	Aiden		Bryce	
	Mid-Intervention	Post-Intervention	Mid-Intervention	Post-Intervention
Social Skills	2.59*	-0.47	2.28*	1.06
Communication	3.37*	0.48	-0.48	1.92
Cooperation	2.52*	-0.63	-0.63	-0.63
Assertion	2.77*	0.92	2.31*	0.46
Responsibility	1.11	-2.22*	0.56	-0.56
Empathy	0.00	0.50	0.50	2.01*
Engagement	2.29*	-1.14	2.86*	2.86*
Self-Control	5.67*	-1.89	2.52*	0.63
Problem Behaviors	-0.32	-0.65	0.65	-1.19
Externalizing	-2.36*	1.77	4.12	-0.59
Bullying	-1.41	-1.41	1.41	0.00
Hyperactivity/ Inattention	-0.56	1.11	-0.56	-2.22*
Internalizing	0.54	0.00	-0.54	-0.54
Autism Spectrum	-3.04*	-4.26*	-2.43*	-7.30*

Note. * = $p < .05$; RCI > 1.96 indicates reliable change. For the Problem Behaviors and Autism Spectrum subscales a negative RCI value indicates positive change.

Table 12

Reliable Change Index (RCI) Values on the Social Skills Improvement System Rating Scale for Group B

Domain	Colin		Derek	
	Mid-Intervention	Post-Intervention	Mid-Intervention	Post-Intervention
Social Skills	3.18*	1.41	2.12*	0.47
Communication	3.85*	0.96	1.92	-0.96
Cooperation	1.26	0.63	0.00	0.63
Assertion	3.24*	0.92	1.85	0.46
Responsibility	2.78*	1.67	1.11	0.56
Empathy	2.01*	1.01	2.51*	1.01
Engagement	5.14*	1.71	1.71	-0.57
Self-Control	2.52*	2.52*	5.67*	2.52*
Problem Behaviors	-2.70*	-3.03*	-0.97	-0.76
Externalizing	-2.36*	-5.89*	-1.77	-1.77
Bullying	-2.36*	-2.36*	-0.47	-0.94
Hyperactivity/ Inattention	-2.22*	-3.33*	-2.22*	-1.11
Internalizing	-4.33*	-1.62	-1.08	1.08
Autism Spectrum	-10.95*	-6.09*	-3.65*	-1.83

Note. * = $p < .05$; RCI > 1.96 indicates reliable change. For the Problem Behaviors and Autism Spectrum subscales a negative RCI value indicates positive change.

Table 13

Reliable Change Index (RCI) Values on the Social Skills Improvement System Rating Scale for Group C

Domain	Emma		Felicity	
	Mid-Intervention	Post-Intervention	Mid-Intervention	Post-Intervention
Social Skills	2.00*	0.12	0.71	0.00
Communication	2.89*	0.48	0.00	0.96
Cooperation	1.89	-1.26	-1.89	-1.26
Assertion	1.39	0.00	0.46	0.46
Responsibility	1.67	0.00	1.11	0.00
Empathy	1.01	-0.50	2.51*	-0.50
Engagement	4.57*	0.00	0.57	0.57
Self-Control	0.63	2.52*	1.89	0.00
Problem Behaviors	0.22	0.65	0.97	0.32
Externalizing	0.00	-1.18	2.36*	1.18
Bullying	0.00	0.00	0.47	0.47
Hyperactivity/ Inattention	-0.56	0.00	1.11	0.56
Internalizing	0.54	3.24*	1.08	0.54
Autism Spectrum	-6.69*	0.61	-0.61	-0.61

Note. * = $p < .05$; RCI > 1.96 indicates reliable change. For the Problem Behaviors and Autism Spectrum subscales a negative RCI value indicates positive change.

Social Validity (Hypothesis 5)

At the completion of the study, participating teachers, parents, and students completed a brief rating scale to assess the perceived effectiveness and social importance of the SSIS-IG instructional model. Raters responded to the items by indicating their level of agreement or disagreement on a 5-point Likert scale, ranging from *strongly agree* (5) to *strongly disagree* (1), with higher scores being associated with more acceptable interventions.

Parent and teacher form. One teacher and two parents completed the social validity questionnaire. All respondents indicated that they *agreed* the program was effective at promoting the target behaviors and that the children demonstrated the outcome behaviors in more than one setting. While both parents stated that they *agreed* their children had maintained the target behaviors following the completion of the program, the teacher responded *equally agree/disagree*. All respondents marked *agree* to the item, “Overall the intervention was beneficial for the student.” The teacher reported *agree* when asked whether this intervention would be appropriate for a variety of students; while both parents responded *equally agree/disagree*. One parent indicated *strongly agree* when asked if they would be willing to use this intervention in a home/classroom setting and if they would suggest the use of this intervention. The teacher responded *agree* to both of these items; while the other parent responded *equally agree/disagree*.

Student form. Half of the students responded *strongly agree* and half responded *agree* when asked if they enjoyed participating in the activities. Five out of the six students reported that they *strongly agreed* that the activities were useful, while one rated *agree*. Half of the students rated *strongly agree* that the activities were fun while two students rated *agree* and one student rated *equally agree/disagree*. When asked if they would like to take part in the activities

again, four of the six students said *strongly agree*, while two students said *agree*. Four of the six students also responded *strongly agree* to the question “would you recommend these activities to a friend,” the remaining two students answered *agree*. Overall, the students reported that their favorite part of the lessons were the videos, prizes, and stickers. When asked what they didn’t like about the lessons, five of the students reported that “there was nothing I didn’t like” or “I liked everything,” while one student indicated that he/she didn’t like one of the instructional videos.

Goal attainment scaling. Goal attainment scaling (GAS) also was used to assess the teachers’ perspectives of behavior change. Teachers responded on a 7-point Likert scale, where $-3 = \text{large negative change in the target behavior}$, $0 = \text{no change in the target behavior}$, and $+3 = \text{large positive change in the target behavior}$. Teachers completed this form starting at Week 1 and continuing through the duration of the study. Table 12 includes the means and standard deviations for teacher ratings of GAS during each phase of the study.

Group A. Teacher ratings indicated that Aiden obtained gains in social initiation and self-regulation behaviors during the intervention phase. Post-intervention, his social initiations decreased slightly and his assertion skills returned to the level reported during the baseline phase. Improvements in assertion skills were not reported between the baseline and intervention phases; however, increases in this skill were noted between the baseline and follow-up phase.

Ratings suggested that Bryce’s self-regulation and assertion skills remained constant between the baseline and intervention periods. Post-intervention, Bryce’s social initiation and

assertion skills remained stable; however, increases in self-regulation behaviors were reported. Data was not available regarding Bryce's social initiation skills prior to the intervention.⁸

Group B. Teachers reported improvements in Colin's and Derek's social initiation and self-regulation skills between the baseline and intervention phases. After the intervention period, teachers' perceptions of their behavior change were not maintained. Information was not reported for Colin and Derek's assertion skills during the intervention period. However, post-intervention data indicated that both students displayed decreased levels of these skills compared to the baseline period.

Group C. Information regarding Emma's social initiation skills was not reported during the intervention phase; however, post-intervention ratings indicated a decline in performance between the baseline and follow-up phases. Teacher ratings indicated that Emma's self-regulation skills decreased between the baseline and intervention periods. Post-intervention ratings returned to that of the baseline period. Increases were reported for Emma's assertion skills from the baseline to intervention period; however, these gains were not maintained during the follow-up period.

Data were not available for Felicity's social initiation skills during the intervention phase. Post-intervention ratings indicated an increase in social initiation skills relative to the baseline period. In addition, Felicity demonstrated improvements in self-regulation and assertion skills from the baseline to intervention period, and gains in these target skills were maintained during the follow-up period.

⁸ Although every effort was made to acquire GAS ratings on a weekly basis, participating teachers were unavailable to complete the ratings during certain weeks due to their busy schedules, which resulted in missing data.

Table 14

*Pre-, Mid-, and Post-Intervention Means and Standard Deviations for Teacher-Rated Goal**Attainment Scaling Data*

	Social Initiation (AO)			Self-Regulation (TT)			Assertion (AH)		
	Pre	Int	Post	Pre	Int	Post	Pre	Int	Post
Group A									
Aiden	2.00 (0.00)	3.00 (0.00)	2.50 (0.58)	2.00 (0.82)	3.00 (0.00)	2.00 (1.41)	2.33 (0.58)	2.00 (0.00)	2.67 (0.58)
Bryce	--	1.00 (0.00)	1.00 (0.82)	2.00 (0.00)	2.00 (0.00)	2.50 (0.71)	2.00 (0.00)	2.00 (0.00)	2.00 (0.00)
Group B									
Colin	1.50 (0.58)	2.00 (0.00)	1.50 (0.71)	2.00 (1.00)	3.00 (0.00)	2.00 (0.00)	1.80 (0.45)	--	1.50 (0.71)
Derek	1.00 (0.00)	2.00 (0.00)	0.50 (0.71)	1.00 (0.00)	2.00 (0.00)	1.33 (0.58)	1.67 (0.58)	--	1.00 (0.00)
Group C									
Emma	2.00 (1.00)	--	1.50 (0.71)	3.00 (0.00)	2.00 (0.00)	3.00 (0.00)	2.25 (0.96)	3.00 (0.00)	1.00 (1.41)
Felicity	0.00 (0.71)	--	1.50 (2.12)	-0.20 (1.10)	1.00 (0.00)	1.00 (0.00)	0.50 (1.00)	1.00 (0.00)	2.00 (0.00)

Note. AO = Asking others to play; TT = Taking-turns in conversations; AH = Asking for help;

Pre = Baseline phase; Int = Intervention phase; Post = Follow-up phase. Standard deviations are in parentheses.

CHAPTER 5: DISCUSSION

The purpose of the current study was to evaluate the effectiveness of an intervention protocol featuring guided practice, coaching, modeling, role-play, and behavioral rehearsal on the promotion of social behaviors among students with ASD. Implementation of the intervention primarily resulted in mean increases in each of the target skills across the six participating students. However, inspection of time series graphs indicated significant within-phase variability in the data, and a functional relationship across groups could not be established for any of the skills. Further, PND graphing results indicated that the majority of the gains made by the students fell within the *ineffective* range, although some students obtained gains in the *questionable* and *effective* ranges. Rating scale data suggested that each of the students obtained improvements in related behaviors, providing preliminary evidence of generalized behavior change. Finally, the teacher, parents, and students reported high levels of acceptability of the intervention.

Asking Others to Play (Hypothesis 1)

Following the implementation of the Asking Others to Play intervention unit, all students increased their frequency of social initiations. However, PND graphing results fell within the *ineffective* range for the majority of the participants (Bryce, Colin, Derek, and Felicity). Aiden and Emma were the only students to exhibit PND values within the *effective* and *questionable* ranges, respectively. Visual analysis of time series graphs indicated that Groups A and B demonstrated gains at the intervention phase change (Weeks 2 and 4, respectively), while Group C exhibited increases in this skill at the completion of the intervention unit (Week 6). Given the functioning level of the students, gradual increases in performance were expected. However, due to the lack of consistency in the demonstration of this skill, a functional relationship could not be

established across groups. As such, results for asking others to play provide partial support for the effectiveness of the SSIS-IG instructional model for this target skill.

Previous research has reported positive findings for the use of video modeling interventions on students' social initiation and play skills (Maione & Mirenda, 2006; Nikopoulos & Keenan, 2007). Peer-mediation and modeling also have been shown to increase the frequency of students' social overtures (Harper et al., 2008; Kohler et al., 2007). However, Harper et al. (2008) found that peer-mediation strategies were more effective at increasing students' skill of gaining another's attention versus initiating a social interaction. Moderate effects on students' social initiation and interaction skills also have been obtained for interventions composed of prompting, modeling and behavioral rehearsal (Licciardello et al., 2008), as well as self-management, modeling, and direct instruction (Loftin et al., 2008).

Although similar instructional strategies were utilized in the present study (e.g., video modeling, behavioral rehearsal, and direct instruction), there were several methodological differences relative to the intervention format and experimental design. First, in all of the aforementioned studies, the target students were interacting with typically functioning peers (Harper et al., 2008; Kohler et al., 2007; Licciardello et al., 2008; Maione & Mirenda, 2006), the examiner (Nikopoulos & Keenan, 2007) or a trained peer (Loftin et al., 2008). As noted by Loftin et al. (2008), teaching non-disabled peers to be more responsive likely created an environment that promoted and reinforced the social initiation skills of the individuals with ASD. Within the context of the present study, students were interacting with other peers on the autism spectrum, the majority of whom were not participating in this study. When social initiations were made, students' peers would often ignore or reject their request. This lack of positive reinforcement may have diminished the participants' motivation to engage in the target behavior.

In addition, unlike the studies conducted by Kohler et al. (2007), Maione and Mirenda (2006), and Nikopoulos and Keenan (2007), students were not prompted to exhibit any of the target skills within their classroom. As noted by Weiss (2001) the use of prompting alters the social context, and brings into question whether the child is really initiating an interaction. Therefore, differences in outcomes may have been related to this factor. Last, there were also dissimilarities in participant characteristics. Students involved in the current intervention were of school-age, while participants in several of the aforementioned studies (Kohler et al., 2007; Maione & Mirenda, 2006; Nikopoulos & Keenan, 2007) were of preschool age. Further, Average to Above Average IQ scores were reported for the participants in Loftin et al. (2008), whereas all but one of the participants in the current study demonstrated cognitive skills significantly below this level. Loftin et al. (2008) suggested that individuals with lower communication and cognitive skills may need longer, more intensive instruction to obtain behavioral change. As each intervention unit was composed of only three lessons, it is possible that students were not given adequate instruction and opportunity for behavioral rehearsal.

Taking-Turns in Conversations (Hypothesis 2)

Data related to the second hypothesis, whether an instructional model could improve the self-regulation skills of students with ASD, also demonstrated mixed results. All students increased their frequency of turn-taking within a conversation from the baseline to post-intervention phase. However, observational data indicated that students' performance of this target skill was inconsistent, and improvements did not consistently align with phase changes. Therefore, whether such outcomes could be attributed to the intervention is unclear given that a functional relationship was not established. Further, the PND values for four of the students fell within the *ineffective* range (Colin, Derek, Emma, and Felicity), while the remaining students

obtained PND values within the *questionable* (Aiden) and *effective* (Bryce) ranges. Thus, data provide limited support for the effectiveness of the SSIS-IG intervention protocol in promoting conversation turn-taking among students with ASD.

Group design and single-case studies have been used to investigate the conversational skills of students with ASD. Group designs have utilized interventions composed of in-vivo modeling and didactic instruction (Laugeson et al., 2009), role-play (Herbrecht et al., 2009; Tse et al., 2007) and cognitive-behavioral therapy (Epp, 2008). These studies have produced mixed results, with most effect sizes falling within the small to moderate range. However, it is important to note that outcomes in these previous studies were based on rating scale data, and none of these studies included a control condition, which may bring into question the validity of the results. Among single-case design studies, Social Stories (Delano & Snell, 2006) and video modeling combined with such stories (Sansosti & Powell-Smith, 2008) have produced improvements in students' maintaining reciprocal conversations and making contingent responses. In addition, a peer-mediated intervention conducted by Harper et al. (2008) yielded positive changes in students' turn-taking skills.

Several plausible reasons may explain why the results from the present study were less consistent than those noted in the current empirical literature. Similar to the research on social initiations, students in the aforementioned studies were usually engaging in interactions with typically functioning peers and were often prompted and rewarded for positive displays of the target behavior during observational periods (Delano & Snell, 2006; Harper et al., 2008; Sansosti & Powell-Smith, 2008). Because participants in the current study were having conversations with other students on the autism spectrum, interfering behaviors (e.g., stereotypic and impulsive actions) and a lack of positive reinforcement (e.g., being ignored, interrupted) may have hindered

students demonstration of this skill. The addition of prompting, child confederates, and positive reinforcement may have led to more consistent gains in the present study. Last, because students were observed during both structured and unstructured activities, the opportunity to demonstrate this skill varied across observations, which may account for some of the inconsistency in the observational data.

Asking for Help (Hypothesis 3)

Following the instructional unit of asking for help, all of the students except for Colin increased in their use of this skill. Each of the groups (A, B, and C) demonstrated the predicted increases in asking for helping at their respective intervention phase change, Weeks 3, 5, and 4, respectively. However, during the intervention and follow-up periods results were variable across groups. The students in Group A demonstrated this skill most frequently during the intervention (Week 3) as well as Weeks 6 and 7 of the follow-up period. Group C demonstrated the greatest gains following the intervention (Week 5) and then portrayed this skill inconsistently for the remainder of the study. Alternatively, while one student in Group B exhibited gains within the intervention period (Week 5), his demonstration of this skill returned to baseline post-intervention (Week 6).

Within the intervention period, PND graphing results fell within the *questionable* range for Bryce and the *ineffective* range for the remaining students. Post-intervention PND scores fell within the *ineffective* range for all of the students. Therefore, results of the present study indicate minimal support for the effectiveness of the SSIS-IG instructional protocol on students' assertion behaviors.

It should be noted that it is difficult to determine the effectiveness of this intervention on students' assertion behaviors, as most students do not require help during each observational

period. As students were observed during a variety of activities (e.g., circle, snack, craft, play), and situations were not created in which students were required to ask for help, it is difficult to observe when and if a student needed assistance. It is likely that during some, if not the majority, of the observational periods the students did not require help and as such did not request it. However, it is impossible to determine if a student did not request help because he or she did not need it or because he or she lacked the necessary skills to do so.

Previous research has suggested that interventions involving role-play produce moderate increases in students' skill at expressing their needs (Feng et al., 2008) and resolving difficulties (Herbrecht et al., 2009). Similarly, didactic instruction, modeling, role-play, and reinforcement have yielded moderate to large effects on students' offering of help, problem solving skills, and social and emotional understanding (Bauminger, 2007; Lopata et al., 2008).

The present study utilized similar intervention techniques as Bauminger (2007) and Lopata et al. (2008) with the addition of a video modeling component. However, significant differences exist in experimental design and participant characteristics. Each of these group design studies utilized a pretest-posttest design and outcomes were measured through rating scales, not direct observations. Further, participants in each of these studies were reported as having Low Average to Above Average intellectual functioning and communication skills. As noted by Lopata et al. (2008), cognitive ability and verbal skills may have a significant impact on the appropriateness of intervention techniques such as explicit instruction, modeling, and role-play. Bauminger (2007) stated that such methods are best suited for individuals with high functioning ASD as they require higher order thinking skills such as cognitive reconstruction and problem solving. As the participants in the current study displayed limited cognitive and

verbal skills, intensive and extended instruction may have produced greater gains in students' assertion skills.

Generalization of Behavior Change (Hypothesis 4)

Generalizability was evaluated through observations of prosocial behaviors and responses on the standardized rating scale. Although prosocial behaviors were not directly taught to the participants, the intervention phase was the period between when the first unit was taught and when the last unit was completed. Therefore, the intervention phase for prosocial behaviors occurred over a 3-week span.

After the implementation of the instructional protocol, all students increased their frequency of prosocial interactions; however, these increases were generally small. Further, results were variable across each phase of the study (baseline, intervention, and follow-up), and none of the groups demonstrated the predicted increases in prosocial behaviors at the follow-up phase change. Post-intervention PND graphing results fell within the *effective* range for Aiden and the *ineffective* range for the remaining students. Due to the lack of positive findings and the absence of a functional relationship, support is not provided for the generalization of behavior change to prosocial behaviors following this intervention.

Scores from the standardized rating scale of social, problem (i.e., challenging), and autism spectrum behaviors suggested that overall students exhibited the greatest gains between pre- and mid-intervention; however, these improvements generally were not maintained during the follow-up period. Specifically, ratings completed mid-intervention indicated that the majority of students made significant gains on the Social Skills composite, Engagement, and Self-Control subscales. Decreases in challenging behaviors consistently were not reported; however, half of the students obtained gains in at least one area within the Problem Behaviors

domain. Interestingly, improvements on the Autism Spectrum index were reported for all students, with the exception of Felicity. Therefore, according to the raters' perspective, students exhibited progress in domains such as social initiations, social engagement, empathy, eye contact, gestures, and stereotypic behavior. Ratings completed post-intervention indicated that half of the students obtained gains in self-control and autism spectrum behaviors. However, for most of the students the improvements noted at mid-intervention were not maintained during the follow-up period. Thus, results for the generalization of behavior change provide partial support for the effectiveness of the SSIS-IG intervention.

As noted in the literature review, generalization of behavioral outcomes associated with social skills interventions is often not assessed within empirical research. However, the present findings are in line with the results of the meta-analytic review conducted by Bellini et al. (2007b), which indicated that social skill interventions produce questionable generalization effects. Limited generalization across settings and stimuli also has been reported for students' conversational skills (Davis et al., 2010), empathetic responding (Schrandt et al., 2009), and social engagement (Sansosti & Powell-Smith, 2008).

Research suggests that features of ASD may inhibit the generalization of behavior change. For example, poor flexibility, difficulty integrating experiences, lack of responsiveness to cues, and stimulus over-selectivity may hinder their demonstration of a skill across settings and stimuli (Hume, Loftin, & Lantz, 2009). Further, as this intervention took place outside of the students' classroom, it is possible that the contrived setting may have undermined the maintenance and generalization of outcomes. Bellini et al.'s (2007b) meta-analysis of social skills interventions indicated that maintenance, generalization, and treatment effects were significantly lower for interventions that were implemented in pullout settings. Therefore,

providing instruction within naturalistic environments may be particularly important for students on the autism spectrum. Further, training and educating the individuals who are present in the environments where generalization is desired may also lead to greater gains (Machalicek et al., 2007).

Social Validity (Hypothesis 5)

A brief social validity questionnaire was completed by the classroom teacher, two parents, and each of the participating students. This questionnaire was used to determine the perceived effectiveness, appropriateness, importance, and future use of the current intervention. All respondents favorably rated the SSIS-IG intervention protocol at the completion of the study, providing support for this hypothesis.

The teacher and both parents indicated positive perceptions of the intervention and agreed that the intervention was beneficial for the student(s). All raters reported that the instructional protocol was effective at increasing the target behaviors and that these outcomes generalized to more than one setting. While parents reported that students maintained the target skills following the intervention, the teacher's ratings were less favorable and provided moderate support for the maintenance of the outcome behaviors. Ratings were mixed when respondents were asked whether they would be willing to use this intervention within a home/classroom setting and if they would suggest the use of this intervention. One parent strongly agreed with both of these statements, while the teacher agreed, and the remaining parent equally agreed/disagreed.

All students reported a positive perception of their overall experience with the intervention. The students indicated that the activities were enjoyable and useful. Similar ratings were reported when students were asked if they would like to take part in the activities again and

if they would recommend these activities to a friend. Overall, students stated that their favorite part of the lessons was the video clips and rewards and that there was nothing they did not like.

In addition, teachers' perception of behavioral change also was assessed through the completion of weekly goal attainment scaling (GAS) ratings. Overall, teachers reported small improvements in students' social initiation, self-regulation, and assertion behaviors, with gains most frequently noted during the intervention phase for each of the skills. However, missing data and restriction of range made it difficult to draw meaningful conclusions.

Implications for Practice

In sum, results of this study provide limited support for the effectiveness of the SSIS-IG instructional protocol on the social initiation, self-regulation, and assertion behaviors of students with ASD. The most positive outcome was observed for students' social initiation skills, followed by self-regulation, and assertion behaviors. While some students exhibited small increases in prosocial behaviors, these gains generally were not maintained post-intervention. Interestingly, standardized ratings completed by teachers and parents indicated that each of the students made gains in at least one domain on the Social Skills and Problem Behaviors composites. Further, all but one of the students (Felicity) demonstrated fewer symptoms of autism spectrum behaviors. In line with these ratings, parents and the classroom teacher reported positive views of the program and outcomes. Therefore, it is possible that students may have exhibited improvements in the areas of social initiation, self-regulation, and assertion that were not observed consistently by examiners. Alternatively, raters may have been responding in a socially acceptable way to please the examiner.

In addition to contributing to the existing literature on social skills interventions for school-age children with ASD, the current study has several potential implications for

researchers, practitioners, and parents to consider. First, given the short term duration of the current intervention and limited number of participants, it is difficult to delineate the impact of participant characteristics and treatment interaction effects. However, researchers (e.g., Bauminger, 2007; Loftin et al., 2008; Lopata et al., 2008) have posited that social learning methods are most appropriate for individuals with high cognitive ability and verbal skills. Students who are lower functioning may require training in foundational social communication behaviors in order to benefit more fully from such methods. In addition, a longer, more intensive intervention period may be required to obtain behavioral change (Loftin et al., 2008). Similarly, students may benefit from practicing target skills with typically functioning children who can model appropriate behaviors and reinforce students' skill demonstration within natural environments. As noted by Bellini et al. (2007b), precedence should be given to selecting social skills interventions that can be implemented within classroom settings, as research suggests that naturalistic environments are related to more positive outcomes. Therefore implementing this intervention within students' classrooms may lead to greater improvements. Prompting and reinforcement may also be beneficial, particularly for the establishment of complex behaviors and generalization across multiple settings (Nikopoulos & Keenan, 2007).

Previous research has suggested that early intervention is critical in determining the future outcomes of children with autism. Therefore, it is imperative that children who are not responding to an intervention are identified so that additional or different treatments can be implemented (Lord et al., 2001). Practitioners must continuously monitor students' progress and open communication must be maintained between educators, parents, and clinicians (Reichow & Wolery, 2009).

Limitations

Several limitations to the current study exist. First, the systematic direct observations took place during different classroom activities (both structured and unstructured). It is to be expected that students were more likely to demonstrate particular skills during certain classroom settings. For instance, asking others to play was most likely to occur during periods of free play, whereas taking-turns in conversations most often occurred during snack. Asking for help was the least dependent upon a particular setting; however, it was often exhibited during craft time. It was not feasible to observe each student during each classroom setting due to the number of students in the study and the number of observers. Further, students were frequently transitioning between tasks and few activities lasted for the duration of an observational period.

Second, although all students received the same number of intervention sessions, there were an inconsistent number of direct observations conducted for each of the students due to differences in program attendance and absences. The inconsistent data collection was most problematic for Emma who was absent during the eighth week of the study. The variable rates of attendance may have influenced the students' opportunity to practice these skills within the classroom environment.

Third, each instructional unit was taught over a 1-week period. Due to the functioning level of the participating students, it is possible that a longer intervention period may have produced greater gains for the students. Similarly, as new units were introduced on a weekly basis during the intervention phase, participants may not have been given an appropriate amount of time to transition between skills. Felicity in particular, had a difficult time transitioning between the instructional units and would often provide responses and behaviors that applied to previously taught skills, as opposed to the current skill being targeted.

Fourth, although students received praise and tangible reinforcement during the intervention lessons, they were not reinforced for demonstrating these skills within their classroom. Students were not reinforced because it may have been distracting for the students not participating in the study and may have influenced the observers who were blind to the intervention goals and order of unit implementation. On several occasions, participating students would approach the researcher and ask if she had seen them demonstrating a particular behavior and/or if they were doing a good job working on their skills within the classroom. Although anecdotal, this suggests that students desired reinforcement and that they were cognitively aware of the target behaviors outside of the intervention setting. Therefore, it is possible that the lack of positive reinforcement within the students' classroom may have impacted their success.

Fifth, there were limitations regarding the videos used to model the target behaviors. Specifically, the children featured within the videos did not have autism and demonstrated verbal skills above the level of the participating students. Research suggests that observational learning is most effective when the observer shares characteristics with the model (e.g., gender, age, race; Grusec, 1994). Therefore, utilizing videos with students who are on the autism spectrum may be beneficial. In addition, providing multiple examples of each target behavior may promote skill generalization.

Sixth, to address the floor effects present in the data regression was used to calculate observational trend lines. Single-case designs violate many assumptions for parametric analysis, including normality and independent observations (Riley-Tillman & Burns, 2009). Therefore, the reported trend lines must be interpreted with caution.

Last, the use of PND as an effect size within single-case designs has limitations (Ma, 2006; Manolov, Solanas, & Leiva, 2010; Parker, Hagan-Burke, & Vannest, 2007). The

reliability of PND is unknown (Parker et al., 2007). In addition, as PND is calculated using the highest baseline data point, the presence of an outlier within the baseline phase may lead to an underestimation of the treatment effect (Manolov et al., 2010). Further, PND is insensitive to the magnitude of change above the highest baseline point (Parker et al., 2007). For instance, PND scores of 100% could be obtained whether treatment scores were barely above or considerably higher than that of the baseline score (Ma, 2006). As such, the limitations of this metric must be considered when examining the PND values reported in this study.

Directions for Future Research

Across each of the participating students, Aiden demonstrated the greatest level of improvement. He achieved mean increases in each of the target behaviors and with the exception of assertion skills, his PND values fell within the effective and questionable ranges. There are several possible reasons for this. First, Aiden responded well to the direct instruction, video modeling, and role play within the intervention sessions. He was also highly motivated and responded well to reinforcement. He frequently approached the examiner to ask how he was doing with each of the target skills and noted that he enjoyed working the students in his class. Aiden also exhibited an outgoing personality and did not demonstrate many of the interfering behaviors that were noted among the other participants (e.g., shyness, stereotyped interests, bullying).

Although Bryce's target skills increased, his PND results fell within the questionable or ineffective ranges. Bryce demonstrated poor cognitive skills and many interfering behaviors throughout the intervention. He exhibited stereotyped interests and hyperactivity that made it difficult for him to maintain his focus and engage in activities with other children. He was often

argumentative with students and staff, and he had difficulty following the rules and listening to instruction. These challenging behaviors may have impacted Bryce's progress.

Colin obtained mean increases in social initiation, self-regulation, and prosocial behaviors; however, he did not demonstrate an increase in assertion behaviors. His PND results fell within the ineffective range for each of the target skills. Colin was a very quiet and reserved child who demonstrated rigid behaviors. He typically preferred to engage in isolated activities (e.g., drawing or reading) and often denied the requests of other children to play. When Colin did play with other children, it frequently resulted in a verbal dispute over sharing toys or following the rules. These interfering behaviors may have impacted Colin's level of skill attainment.

Derek obtained mean increases in each of the target skills; however, each of his PND results fell within the ineffective range. Derek exhibited poor cognitive skills and stereotyped interests. His fixation on Transformers (toys) and impulsive behaviors often irritated his classmates. Consequently, when Derek tried to engage in an activity with another child (e.g., asking a child to play or engage in a conversation) his efforts were usually ignored or rejected. This lack of positive reinforcement quickly diminished Derek's motivation to engage in the target behaviors. Further, on several occasions Derek reported to the examiner that his peers did not like him and that no one wanted to play with him. Derek's peer difficulties and lack of reinforcement may have impacted his responsiveness to this intervention.

Emma demonstrated mean increases in each of the target skills; however, her improvements were relatively small. In addition, while Emma's PND value for social initiation behaviors fell within the questionable range, her PND for all other behaviors fell within the ineffective range. Although Emma exhibited strong cognitive and verbal skills, she was very quiet and reserved. Similar to Colin, Emma typically preferred to engage in isolated activities

and noted that she did not like playing with the other children. Emma reported that she enjoyed spending time with her peers from school; however, she indicated that she did not get along with the students at the agency. Therefore, Emma's peer relationships may have interfered with her target skills.

Felicity achieved small gains in each of the target behaviors and all of her PND values fell within the ineffective range. As Felicity demonstrated poor verbal skills and echolalia, the lessons appeared to be difficult for her to follow and comprehend. Felicity generally did not demonstrate any of the target behaviors until all three lessons had been taught. Even then, she exhibited the skills inconsistently. When Felicity would try to speak with peers, her limited communication skills often interfered with her ability to do so. She had difficulty forming sentences and for the most part was unable to carry on a conversation. These challenges subsequently impacted Felicity's responsiveness to the intervention.

Due to the inconsistent findings obtained in the present study, future research should continue to investigate the effect of comprehensive instructional programs on the social behaviors of students with ASD. Research investigating the use of this intervention protocol may benefit from targeting one specific skill and observing students during situations when behaviors are most likely to occur. In addition, creating situations in which students are required to demonstrate the outcome behavior may address the issue of demand opportunities, which were noted as a limitation in the current study.

Future directions should specifically examine how effects of this comprehensive instructional model vary across age, gender, functioning level, and symptom characteristics. It is also necessary to investigate whether certain prerequisite skills (e.g., verbal processing,

intellectual functioning) or interfering behaviors (e.g., shyness, echolalia, stereotypic interests) impact a student's progress.

Research investigating the effectiveness of a social cognitive intervention for students with ASD should examine whether certain social behaviors (e.g., initiation, self-regulation, assertion) are more or less likely to benefit from such an approach. Further, differences in the intervention format (individual and group) should be explored. Likewise, extending the length of the intervention period and the amount of time between units would provide students with increased repetition of the concepts and additional opportunities to practice the targeted skill. The use of reinforcement contingencies may also promote skill maintenance. Last, increased teacher involvement is another possible target for research, as classroom teachers may play a role in the design and implementation of the intervention.

Conclusions

Individuals on the autism spectrum suffer direct and indirect consequences as a result of their social and communication difficulties (White et al., 2007). These individuals often are rejected by their peers due to their inability to establish appropriate social interactions and relationships (Apple et al., 2005). In addition, they are more likely to experience increased feelings of loneliness, anxiety, and depression as compared to typically developing peers (White et al., 2007). As such, research regarding effective and efficient techniques to increase positive social behaviors among these individuals is critical in overcoming many of the debilitating effects of this disorder (Cotugno, 2009).

The purpose of the current study was to evaluate the effectiveness of a comprehensive instructional protocol on the promotion of social behaviors among students with ASD. Overall, results provide limited support for the effectiveness of this intervention on the social initiation,

self-regulation, and assertion behaviors of students on the autism spectrum. Students obtained mean increases in each of the target skills; however, time series graphs indicated significant within-phase variability in the data and a functional relationship could not be established between intervention implementation and any of the target skills. In addition, although rating scale data suggested that each of the students acquired gains in related behaviors, these gains generally were not maintained post-intervention. Nonetheless, the teacher, parents, and students reported positive perceptions of the intervention and deemed the instructional protocol acceptable and effective.

These findings present a building block for future studies examining the use of a social learning intervention on the social initiation, self-regulation, and assertion behaviors of students with ASD. Due to the mixed results obtained in the present study, future research should continue to investigate the outcomes of comprehensive instructional programs on individuals' social behaviors. Several future studies are needed to fully understand the effects of this educational intervention among students on the autism spectrum.

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APPENDIX A
SUPPLEMENTAL STATISTICAL TABLE

Descriptive Labels of Students' Behavior

Table 1

Descriptive Labels of Students' Behavior on the Social Skills Improvement System Rating Scale

Domain	Group A		Group B		Group C	
	Aiden	Bryce	Colin	Derek	Emma	Felicity
Social Skills	Below Average	Below Average	Below Average	Below Average	Average	Well Below Average
Communication	Below Average	Average	Below Average	Below Average	Average	Below Average
Cooperation	Below Average	Average	Average	Average	Average	Average
Assertion	Average	Average	Below Average	Average	Average	Below Average
Responsibility	Average	Average	Average	Average	Average	Below Average
Empathy	Average	Average	Below Average	Below Average	Average	Below Average
Engagement	Average	Below Average	Below Average	Below Average	Below Average	Below Average
Self-Control	Below Average	Below Average	Average	Below Average	Average	Average
Problem Behaviors	Above Average	Above Average	Above Average	Above Average	Average	Average
Externalizing	Above Average	Average	Average	Above Average	Average	Average
Bullying	Above Average	Average	Above Average	Above Average	Average	Average

(Table continues)

Hyperactivity/ Inattention	Above Average	Above Average	Average	Above Average	Average	Above Average
Internalizing	Average	Average	Above Average	Average	Average	Average
Autism Spectrum	Above Average	Above Average	Above Average	Above Average	Average	Above Average

Note. Descriptive labels of students' behavior reflect teacher ratings completed at Week 1.

APPENDIX B
DEMOGRAPHIC MEASURE

Demographic Questionnaire

Demographic Questionnaire

Please answer the following demographic questions and return with your child's consent form. (For questions 2-5, please place a \checkmark in the appropriate box.)

Child's Name: _____

Examiners use only - ID #: _____

1. **Child's birth date:** _____
2. **Child's sex:** Male Female
3. **Primary language spoken in the home:** English Spanish Other
4. **Racial status:** White Black or African American Spanish/Hispanic/Latino
 Mexican Chinese Japanese Korean Native Hawaiian
 American Indian or Alaska Native Other Prefer not to answer
5. **What best describes your level of education:**

	<i>Mother</i>	<i>Father</i>
No high school	<input type="checkbox"/>	<input type="checkbox"/>
Some high school	<input type="checkbox"/>	<input type="checkbox"/>
High school graduate or equivalent	<input type="checkbox"/>	<input type="checkbox"/>
Associate degree	<input type="checkbox"/>	<input type="checkbox"/>
Vocational or trade degree	<input type="checkbox"/>	<input type="checkbox"/>
College graduate	<input type="checkbox"/>	<input type="checkbox"/>
Graduate or professional degree	<input type="checkbox"/>	<input type="checkbox"/>
Prefer not to answer	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX C
DIRECT OBSERVATION MEASURE

Systematic Direct Observation Form

Systematic Direct Observation Form

- ***Asking Others to Play (AO)***: Coded when the student asks another individual (peer or teacher) to join them in an activity. Examples include asking a child to play or to work on a class related activity together.
- ***Taking-Turns in Conversations (TT)***: Listening to what others are saying and carrying on a discussion without interrupting others. This behavior also includes raising one's hand and waiting to be called on prior to speaking. Non-examples include repetitive talking, person-centered conversations, interrupting others, and not waiting to be called on.
- ***Asking for Help (AH)***: Asking an adult or peer for help. Exhibiting behaviors that facilitate getting a person's attention and then requesting his or her help in a positive way.
- ***Positive Social (PS)***: Coded when the child engages in any appropriate social behavior that is permitted at that time. Examples include sharing work materials, complimenting a peer, and helping a peer. Non-examples include criticizing a peer, working with a peer at the same table but not interacting, talking with a peer when not permitted to do so.

Observer: _____

Frequency count of behaviors over a 15-minute period

Student's Initials: _____ Date: _____ Setting: _____														
Bx														Sum
AO														
TT														
AH														
PS														
Notes:														
Student's Initials: _____ Date: _____ Setting: _____														
Bx														Sum
AO														
TT														
AH														
PS														
Notes:														
Student's Initials: _____ Date: _____ Setting: _____														
Bx														Sum
AO														
TT														
AH														
PS														
Notes:														

Note. AO = Asking others to play; TT = Taking-turns in conversations; AH = Asking for help;

PS = Positive social behavior.

APPENDIX D
FIDELITY MEASURE

Intervention Integrity Direct Observation Form

Intervention Integrity Direct Observation Form

Social Skills Unit _____
Date _____ Group _____

Directions: Please mark whether each component of the lesson was *implemented*, *partially implemented*, or *not implemented*.

Component	Implemented	Partially Implemented	Not Implemented
Reviewed Skill Steps from previous unit(s). (If applicable)			
Introduced the skill and asked questions about it.			
Defined the skill, and discussed the Key Words.			
Discussed why the skill is important.			
Identified the Skill Steps and had students repeat them.			
Modeled and role-played the skill.			
Reinforced occurrences of the skill through the session.			
Corrected inappropriate demonstrations of the skill.			
Sum			
%			

Comments about implementation _____

APPENDIX E
SOCIAL VALIDITY MEASURES

Modified Intervention Rating Profile – Parent and Teacher Form

Modified Children’s Intervention Rating Profile – Student Form

Social Validity Questionnaire

Parent/Teacher Form

Instructions: Please complete the following rating scale based on your attitudes and observations of the Social Skills Improvement System Intervention Guide throughout this project. Feel free to specify further information, comments, or areas of concern in the space provided below.



Attitudes or Observations	Strongly Agree	Agree	Equally Agree/ Disagree	Disagree	Strongly Disagree
1. This program was effective at promoting the target behaviors.	5	4	3	2	1
2. The outcome behaviors of the student(s) improved.	5	4	3	2	1
3. The student(s) demonstrated the outcome behaviors in more than one setting.	5	4	3	2	1
4. The student(s) maintained their target behaviors following the completion of the program.	5	4	3	2	1
5. Overall, this intervention was beneficial for the student.	5	4	3	2	1
6. This intervention would be appropriate for a variety of students.	5	4	3	2	1
7. I would be willing to use this intervention in a home/ classroom setting.	5	4	3	2	1
8. I would suggest the use of this intervention.	5	4	3	2	1

Comments:

Social Validity Questionnaire

Student Form

Directions: Your teacher will read the sentences below. Please answer each question based on what you thought about taking part in the social skills program. There are no right or wrong answers!

Questions					
1. I enjoyed participating in the activities.	Strongly Agree	Agree	Equally Agree/ Disagree	Disagree	Strongly Disagree
2. I found the activities useful.	Strongly Agree	Agree	Equally Agree/ Disagree	Disagree	Strongly Disagree
3. I found the activities fun.	Strongly Agree	Agree	Equally Agree/ Disagree	Disagree	Strongly Disagree
4. I would want to take part in these activities again.	Strongly Agree	Agree	Equally Agree/ Disagree	Disagree	Strongly Disagree
5. I would recommend these activities to a friend.	Strongly Agree	Agree	Equally Agree/ Disagree	Disagree	Strongly Disagree

6. My favorite part of the lessons was

_____.

because _____.

7. One thing I didn't like about the lessons was

_____.

because _____.

APPENDIX F
TEACHER-RATED OUTCOME MEASURE

Goal Attainment Scaling (GAS)

Goal Attainment Scaling

Student's Initials: _____

Week : _____

Directions: Please complete the following rating scale based on your observations of the student throughout the week. Circle the number that corresponds to your rating of the student's performance of the target behavior.

Asking Others to do Things	
Almost always	+3
Often	+2
Sometimes	+1
No change in performance	0
Sometimes fails despite periodic prompting	-1
Usually fails despite frequent prompting	-2
Never	-3
Taking-Turns in Conversations	
Almost always	+3
Often	+2
Sometimes	+1
No change in performance	0
Sometimes fails despite periodic prompting	-1
Usually fails despite frequent prompting	-2
Never	-3
Asking for Help	
Almost always	+3
Often	+2
Sometimes	+1
No change in performance	0
Sometimes fails despite periodic prompting	-1
Usually fails despite frequent prompting	-2
Never	-3

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