USING HIGH-PROBABILITY REQUEST SEQUENCES TO INCREASE SOCIAL
INTERACTIONS IN YOUNG CHILDREN WITH AUTISM

DISSERTATION

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By

Sunhwa Jung, M.A.

* * * * *

The Ohio State University
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Dissertation Committee:

Professor Diane Sainato, Advisor

Professor William Heward

Professor Ralph Gardner

Rebecca Morrison, Ph. D.

Approved by

Advisor
College of Education

ABSTRACT

The importance of children's development and learning in the early years has been strongly emphasized in practice and research. To date, a variety of empirically validated strategies in early childhood special education and applied behavior analysis have been developed. Among the variety of effective instructional strategies, the high-probability request sequence has been demonstrated as an antecedent and non-aversive procedure, which is well incorporated into classroom routines. Few studies on the use of the high-probability request sequence have addressed the social behaviors of young children with autism with peers in their natural environment.

The inclusion of young children with disabilities is increasing, and building meaningful social relationships between children with and without disabilities is one of the most important goals of inclusion. Due to the substantial social skill deficits of children with autism, facilitating social interactions has been a critical issue in educational research. Among a variety of social interaction interventions, peer-mediated strategies are the most frequently used and have shown the strongest empirical support for social outcomes. However, it is noted that these strategies focus on peer training to initiate with children with autism, and often yield prompt-dependent behavior and

limitations in generalization and maintenance. Few studies have been implemented to teach social behaviors children with autism as well as the typically developing peers.

The purpose of this study was to investigate an effective strategy to increase social interactions of children with autism in the children's typical classroom environment. The high-probability request sequence intervention was first delivered to the peers as a model and then delivered to the target children. The intervention was implemented using the children's favorite play materials during a center time in an inclusive classroom.

The specific dependent variables of interest were the percent correct responses to the low-probability requests, and number of intervals of social initiations and responses toward other children. The effects of the intervention on these variables were monitored using a single subject multiple baseline design across subjects. In addition, measures of procedural integrity, accuracy and social validity were collected.

The results of this study indicated that all three children's compliant responding to low-probability requests and social initiations and responses increased during the intervention condition. Furthermore, the target children's social initiations and responses generalized with their peers and in generality settings.

Dedicated to my parents

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VITA

March 1, 1964	Born-Choongbook, Korea
1986	B.A. Special Education, Ewha Womans University
1993	M.A. Special Education, Ewha Womans University
1986-1988	Special Education Teacher in Kodug middle school, Seoul, Korea
1992-1998	Early Childhood Special Education Teacher; Educational Diagnostician; Administrator, Seoul Community Rehabilitation Center, Seoul, Korea
1999-present	Graduate Administrative, Research, and Teaching Associate, The Ohio State University

PUBLICATIONS

- Jung, S., Kim, S., Kim, S., Hwang, S., Lee, S., Cho, H., & Lee, J. (1999). *The curriculum for small parent group education in Seoul Community Rehabilitation Center: Doongji Gyosil*. Seoul: Seoul Community Rehabilitation Center.
- Cho, Y., Jung, S., Kim, H., & Kang, O. (1994). *The curriculum for preschoolers with special needs I*. Seoul: Seoul Community Rehabilitation Center.
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FIELDS OF STUDY

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CHAPTER 1

INTRODUCTION

The importance of children's early development and learning has been strongly emphasized in practice and research (Sandall, McLean, Santos, & Smith, 2000).

Providing effective early intervention for children with disabilities results in positive outcomes for these children and their families (Sandall et al., 2000). To date, a variety of empirically validated strategies in early childhood special education and applied behavior analysis have been developed. Efforts to expand the repertoire of instructional techniques available to practitioners continue to be a focus of research in early intervention (Davis & Brady, 1993; Killu, 1999).

Inclusive educational placements have become more common for young children with disabilities. The increasing inclusion of young children with disabilities demands a broader variety of instructional strategies to accommodate the range of children's educational needs in early childhood settings. These instructional strategies need to be easily implemented, incorporated into instructional routines, use typical toys and

materials, and be delivered in the child's natural classroom environment. Such strategies may help children to generalize their learned behaviors as well as increase the implementation of interventions by classroom teachers.

Among the variety of effective instructional strategies, the high-probability request sequence has received attention as an antecedent and non-aversive procedure (Davis & Brady, 1993). The high-probability request sequence procedure has been demonstrated to be an effective instructional tactic to increase not only compliance but also specific skills such as language and social skills (Davis & Brady, 1993; Davis, Brady, Hamilton, McEvoy, & Williams, 1994; Davis, Brady, Williams, & Hamilton, 1992; Davis & Reichle, 1996; Davis, Reichle, & Southard, 2000). The current Division for Early Childhood Recommended Practice Guidelines suggests the high-probability request procedure is one of the strategies that teachers can use to increase the complexity and duration of children's play, engagement, appropriate behavior, and learning (Wolery, 2000). In addition, researchers suggest that the high-probability procedure can be easily incorporated into classroom routines or existing intervention programs in preschools while at the same time accommodating a child's individual needs (Davis, 1995; Davis & Brady, 1993; Davis & Reichle, 1996; Davis et al., 1992, 1994; Davis et al., 2000; Killu 1999; Killu et al., 1998; Sanchez-Fort, Brady, & Davis, 1995; Santos & Lignugaris/Kraft, 1999). The high-probability request sequence does not require extra materials and can be used in a variety of contexts. Much of the research on the use of the high-probability request sequence intervention has focused on increasing compliance of school age-

children and adults with disabilities (Santos, 2001). Few high-probability request sequence studies have addressed the social behaviors of young children with autism with peers in their natural environment (Davis et al., 1994).

Social relationships with peers are critical for child development. These relationships are formed when children have positive interactions with peers in the classroom and in the community (Frea, Craig-Unkefer, Odom, & Johnson, 1999). Building meaningful social relationships between children with and without special needs is one of the most important goals of inclusion (Guralnick, 1999). However, young children with disabilities often do not have the prerequisite social skills to develop relationships.

Children with autism have substantial social interaction deficits. They rarely initiate interactions and are unlikely to exhibit spontaneous language, gestures, or eye contact before speaking (Zanolli, Daggett, & Adams, 1996). Numerous researchers note that social interactions between children with autism and typically developing peers are unlikely to occur without systematic and planned social interventions even when they are placed together in inclusive settings (Brown & Odom, 1995; Guralnick, 1999; Hundert & Houghton, 1992; Kohler & Strain, 1999).

Facilitating social interactions in young children with autism has been a critical issue in educational research. Researchers have developed a wide variety of interventions to increase social interactions of young children with autism (Kohler, Anthony, Steighner, & Hoyson, 2001; Odom & Strain, 1986; Odom & Watts, 1991; Sainato, Goldstein, & Strain, 1992; Zanolli et al., 1996). Among a wide variety of social skill interventions, peer-mediated strategies are the most frequently used and have shown the strongest

empirical support for social outcomes (Rogers, 2000; Sasso, Peck, & Garrison-Harrell, 1998; Zanolli et al., 1996). Peer modeling, as well as training peers to initiate to children with autism, can produce positive effects on children's generalized imitation of social behaviors (Kohler & Strain, 1990; Kohler and Strain, 1999). In studies using peer-mediated strategies, children with autism typically responded to their peers, acting as confederates rather than initiating social behaviors toward the typically developing peers. Additionally, it is noted that these interventions often yield prompt-dependent behavior; limitations in generalization and durability of responding; and require extensive teacher involvement (Chandler, Lubeck, & Fowler, 1992; Hundert & Houghton, 1992; Odom, Chandler, Ostrosky, McConnell, & Reaney, 1992; Sainato, Goldstein, & Strain, 1992; Sasso, Peck, & Garrison-Harrell, 1998). Children with autism need to learn to initiate to typical peers as well as respond to their initiations. Few studies have been implemented to improve the social initiations as well as the social responses of children with autism. A combination of the high-probability request sequence intervention and a peer-mediated intervention for both children with autism and typically developing children may help to facilitate children's social responses as well as social initiations while also helping children to maintain and generalize social interactions. Furthermore, facilitating social interactions embedded in the context of the classroom while encouraging engagement in appropriate play activities may help children extend spontaneous social interactions. Thus, children's social interactions may reap the benefits of the natural contingencies of ongoing reciprocal interactions in natural settings.

Purpose of the study

The purpose of this study was to investigate a strategy to increase social interactions for children with autism in an inclusive setting. This study combined the strategies of high-probability requests intervention and peer-mediated interventions in order to build an effective strategy for increasing social interactions in the children's typical classroom environment. It was anticipated that by facilitating social initiations as well as responses with encouraging play within a given context, children would be more likely to maintain and expand ongoing social interactions within the classroom.

This study sought to extend previous research by exploring the effectiveness of the high-probability request sequence intervention through application of the procedure to the social interaction skills of young children with autism. Although numerous studies have demonstrated the effectiveness of the high-probability request sequence intervention on compliant behaviors, few studies using the high-probability request sequence have been conducted to increase the social interactions of young children with autism (Davis et al., 1994).

In addition, this study extended the literature in the area of high-probability requests and peer mediated interventions to increase social interactions through combining two strategies. Peer-mediated interventions have demonstrated the effectiveness of training peers to initiate toward children with disabilities. In addition to training peers to interact with children with autism, facilitating the social initiations of children with autism toward typically developing peers may encourage ongoing interactions between the children. Furthermore, using peer modeling could provide children with autism the opportunity to observe and imitate their peers' social behaviors.

Previous studies have demonstrated that friendship activities using songs and games increase social interactions among children by prompting greetings, complimenting, and affection behaviors (Brown, McEvoy, & Bishop, 1991; Brown, Raglan, & Bishop, 1989; Brown & Odom, 1995; Cooper & McEvoy, 1996; McEvoy, Twardosz, & Bishop, 1990; Twardosz, Nordquist, Simon, & Botkin, 1984). The intervention in this study included requests to prompt children to share greetings, compliment their friends, and display affectionate behavior and play interactions within a given context. Researchers note that friendship activities are more likely to obtain generalized social responding since the activities serve as multiple exemplars and include social behaviors that are more likely to evoke positive social interactions (McEvoy, Twardosz, & Bishop, 1990). Thus, the intervention would increase generalized social interactions by including prompts adapted from friendship activities.

Finally, the social validity of the goals, procedures, and outcomes were assessed. Since developing effective instructions in inclusive settings for use in the classroom or other natural environments is an important goal, assessment of relevant consumers' opinions regarding the intervention was necessary. Surveys and questionnaires were used to obtain the opinions of parents and teachers regarding the validity of the intervention goals, the acceptability and usability of the procedures, and the outcomes.

As young children with autism are increasingly placed in inclusive environments, it becomes more important to develop strategies that can be used in these environments to increase their social relationships with their typically developing peers. The investigation

of strategies such as the high-probability request sequence combined with a peer-mediated social interaction intervention may lead to the development of more effective strategies for use in classroom environments.

Research Questions

1. What are the effects of the use of high-probability request sequences with embedded peer modeling on complaint responding to low-probability requests to initiate social behaviors for young children with autism?
2. What are the effects of the use of high-probability request sequences with embedded peer modeling on the social interactions of young children with autism toward their typically developing peers?
3. What are the effects of the use of high-probability request sequences with embedded peer modeling on the social interactions of young children with autism toward their typically developing peers during generality sessions?
4. To what extent do parents and early childhood special education teachers find the intervention goals, procedures, and outcomes to be relevant, useful and effective for children with autism?

Glossary of Key Terms

The following is a glossary of terminology used in this study.

behavioral momentum: persistence of behavior and its resistance to change following a change in reinforcement condition (Nevin, Mandell, & Atak, 1983)

high-probability request sequence: a sequence of easy and favorite requests (i.e., high-probability requests) delivered immediately prior to a request that is not typically performed (i.e., low-probability request) (Davis & Brady, 1993; Davis, 1995).

high-probability requests: requests that a child consistently performs (Davis, 1995; Santos, 2001).

low-probability requests: requests that the child does not typically perform; thus, the probability of the child performing them is low (Davis, 1995; Santos, 2001).

Inter-prompt time (IPT): the interval of time between the reinforcement delivered for the previous request and commencing delivery of the next request

CHAPTER 2

REVIEW OF LITERATURE

Research in early childhood special education and applied behavior analysis seeks to develop and extend effective instructional strategies for children with autism. Among the variety of effective instructional strategies, the high-probability request sequence has been demonstrated to be an effective instructional tactic to increase not only compliance but also specific skills such as language and social skills. Due to the substantial social skill deficits of children with autism, facilitating social interactions has been a focus of research for these children. This chapter reviews the literature on the high-probability request sequence intervention, including the theoretical explanation, behavioral momentum, and the application of the high-probability request sequence intervention to improve a variety of skills. A review of the literature on increasing social interactions of young children with autism using peer-mediated strategies is presented.

High-Probability Request Sequence

The high-probability request sequence has received attention as an effective instructional strategy to increase compliant behavior (e.g., Davis, Brady, Williams, &

Hamilton, 1992; Ducharme & Wolering, 1994; Mace et al., 1988, etc.). Recently, the high-probability intervention has been expanded to improve other functional skills such as language and social skills for young children with disabilities (e.g., Davis, Brady, Hamilton, McEvoy, & Williams, 1994; Davis & Reichle, 1996; Sanchez-Fort, Brady, & Davis, 1995; Santos & Lignugaris/Kraft, 1999).

The high-probability request sequence intervention includes a sequence of easy and favorite requests (i.e., the high-probability requests) delivered immediately before a request that is not typically performed (i.e., the low-probability request) (Davis & Brady, 1993; Davis, 1995). This strategy has been also referred to as “pre-task requests,” or “interspersed requests.” High-probability requests are those that a child consistently performs (Davis, 1995; Santos, 2001). Low-probability requests are requests that the child does not typically perform (Davis, 1995; Santos, 2001). The high-probability request procedure is performed as follows (Davis, 1995): (a) deliver a sequence of three to five high-probability requests at a rapid pace, (b) deliver praise for each performance of the high-probability requests, (c) deliver a low-probability request, and (d) deliver praise for the performance of the low-probability request.

Researchers note that the high-probability request sequence is a proactive, antecedent strategy that teachers, parents, and peers can effectively implement to promote a variety of appropriate behaviors in children with disabilities (Davis 1995; Davis & Brady, 1993; Davis & Reichle, 1996; Davis et al., 1992, 1994, 2000; Santos, 2001). Investigators who have implemented the high-probability request sequence note that it has many advantages as an instructional strategy in applied settings. For example, the

high-probability request sequence does not require extra materials and can be easily incorporated into classroom routines, the home, or a variety of other contexts (Davis, 1995; Davis & Brady, 1993; Davis & Reichle, 1996; Davis et al., 1992, 1994, 2000; Ducharme & Worling, 1994; Killu, Sainato, Davis, Ospelt, & Paul, 1998; Sanchez-Fort, Brady, & Davis, 1995; Santos, 2001; Santos & Lignugaris/Kraft, 1999).

The Theoretical Explanations of the Effects of the High-Probability Request Sequence

Although numerous studies have demonstrated the substantial effects of the high-probability request sequence procedure to promote appropriate behaviors, the effectiveness of the high-probability request sequence intervention has not been clearly explained. According to Singer, Singer, and Horner (1987) the reinforcement of compliance to pretask requests changes the valence of the target requests. That is, when movement from a positive valence condition (i.e. recess) to negative valence condition (i.e., work) is preceded by series of reinforced requests, the negative valence becomes weak or less discriminative. Horner, Day, Sprague, O'Brien, and Heathfield (1991) explained that the experience of compliance to preferred instructions following reinforcement may produce more opportunities to promote a generalized class (i.e., the same stimulus class) of compliance to instruction that includes less preferred activities.

As another interpretation of the effectiveness of the high-probability request sequence that has been used by most researchers who implemented the high-probability request sequence procedure, Mace and his colleagues (1988) suggested that the effectiveness of the high-probability request procedure can be explained by the behavioral momentum paradigm proposed by Nevin, Mandell, and Atak (1983). Mace et al. (1988) proposed that by delivering the high-probability request sequence immediately

prior to issuing a low-probability request, the rates of response and reinforcement increased. Thus, compliance with instructions following the high-probability request sequence persisted when the low-probability request was delivered by establishing a momentum of compliant behavior. Most applied literature on the use of the high-probability request sequence has used the behavioral momentum model to interpret the effects of the high-probability request sequence procedures (e.g., Ardoin, Martens, & Wolfe, 1999; Belfiore, Lee, Vargas, & Skinner, 1997; Davis & Reichle, 1996; Davis et al., 1992, 1994, 2000; Ducharme & Worling, 1994; Harchick & Putzier, 1990; Houlihan, Jacobson, & Brandon, 1994; Killu et al., 1998; Mace & Belfiore, 1990; Mace, Mauro, Boyajian, & Eckert, 1997; McComas, Wacker, & Cooper, 1998; Rortvedt & Miltenberger, 1994; Sanchez-Fort et al., 1995; Santos & Ligungaris/Kraft, 1999; Wehby & Hollahan, 2000).

Behavioral Momentum

Behavioral momentum, proposed by Nevin et al. (1983), describes the persistence of behavior following a change in reinforcement conditions. Nevin and his colleagues applied Newton's laws of motion in physics to the study of changes in human behavior. Momentum in physics is the product of mass and velocity. That is, when a heavy body and a light body move at the same time, velocity differs in momentum. The velocity of the heavier body changes less than that of the lighter body when its movement is opposed by an external force.

Behavioral momentum is the product of response rate and resistance to change (Nevin et al., 1988). In the analogy by Nevin et al., behavioral velocity corresponds to response rate, and behavioral mass corresponds to resistance to change (i.e., response

strength). Responses occur at a steady rate under constant conditions until affected by a new variable. This is parallel to a body persisting in motion until being affected by an external force. When the response rate is changed by a given variable, the change depends on the rate of reinforcement, much like the change in motion of a body depends on its mass. Thus, responding maintained by a relatively higher rate of reinforcement has greater resistance to change than responding maintained by less frequent reinforcement. Nevin (1996) noted that the metaphor of behavioral momentum includes two independent dimensions of behavior important to applied behavior analysis: the rate of responding that is established and maintained by the contingencies of reinforcement, and its resistance to change when responding is challenged or disrupted in some way. The applied behavior analysis may concern establishment of desirable and adaptive behavior and persistence of that behavior when the intervention is removed (Nevin, 1996). Mace and his colleagues (1990) stated the practical implications of the behavioral momentum metaphor in terms that practitioners attempt to overcome persistent maladaptive behavior patterns and build new patterns that will persist after intervention ends.

Basic Research Findings in Behavioral Momentum

Nevin and his colleagues (1983) proposed the behavioral momentum paradigm extending Nevin's early research (1974) examining the relationship between response strength and schedules of reinforcement. Nevin (1974) noted that in his experiment with pigeons response strength is relative resistance to change, and more frequently reinforced responding was less influenced by extinction. Nevin (1974) arranged multiple variable-interval variable-interval (multiple VI VI) schedules with different rates of reinforcement in two successive schedule components signaled by distinctive stimuli. The pigeons were

trained to respond to one schedule of food reinforcement for pecking in the presence of one key color, and a different schedule in the presence of a second key color. After the pigeons responded to the schedules consistently, the response strength was examined by providing the procedures of response-independent food and extinction (the termination of food). The results indicated that the response rates were higher in the components with more frequent reinforcement, larger magnitude of reinforcement, shorter delay, and shorter ratio requirement of responding. In addition, the responding maintained by those components was less influenced by the procedure of response-independent food, and was more resistant to extinction than responding maintained by less frequent reinforcement, smaller magnitude of reinforcement, and high ratio requirements of responding. That is, greater relative resistance to change was established by more frequent reinforcement, larger, and less delayed reinforcers.

In the subsequent study, Nevin and his colleagues (1983) extended previous studies on the relationship between response strengths and schedules of reinforcement and examined behavioral momentum and response strength by training pigeons to peck a lighted key on two-component multiple variable-interval, variable-interval schedules of reinforcement. This study assessed resistance to change (i.e., response strength) based on behavioral momentum framework. When pigeons responded to different schedules, resistance to change was assessed by arranging a response-independent food procedure during periods between the two components on a variable time (VT) schedule and extinction. The results of the study indicated that resistance to change was greater under conditions with higher rates of reinforcement and relatively more rapid extinction was occurred in the component previously correlated with less frequent reinforcement. This

study demonstrated the similarities between the momentum paradigm in physics and resistance of behavior change by applying the paradigm to the experiment with pigeons. The authors paralleled the momentum paradigm to free operant behavior by proposing that response rate is analogous to velocity and resistance to change is analogous to mass. On the basis of this analogy, they suggested that when performance occurs at the same rate in two different schedule components and one is less influenced by an external variable than the other, the response showing greater resistance to change may have greater mass. Behavioral mass is related to the tendency for responding to persist when conditions are altered, and behavioral velocity is related to the ongoing response rate. Thus, the results of the study supported the analogy that resistance to change is greater under conditions with higher rates of reinforcement after conditions of reinforcement were changed. In addition, the authors stated that response rates depended on contingencies between responses and reinforcer, and resistance to change depended on overall rate of reinforcement. They suggested that the velocity component of the behavioral momentum may be determined by operant, response-reinforcer contingencies, and the mass component may be determined by Pavlovian, stimulus-reinforcer contingencies.

By extending Nevin et al.'s study (1983) which proposed that resistance to change may have resulted from differential stimulus-reinforcer contingencies rather than the difference in frequency of reinforcement for key pecking, Nevin (1984) examined the determiners which contribute to resistance to change (behavioral mass). He hypothesized that stimulus-reinforcer contingencies affect behavioral mass in the Newtonian metaphor. Three pigeons were trained to peck keys on a six-component multiple schedules of food

reinforcement arranged in successive pairs on three keys. The first component of all three keys with different colors (red-left, yellow-center, and green-right) had variable intervals of 120-s. As the second component, a variable time of 24-s was correlated to the left key (white key), a variable-time of 120-s to the center key (blue key), and extinction to the right key (orange). Thus, the red key in the first component would become associated with the highest reinforcement rates in the second component, and the green key in the first component would become associated with extinction (nonreinforcement) in the second component. Resistance to change was assessed by prefeeding, discontinuing food, and presenting free food after pigeons responded consistently to the baseline schedules. The results in baseline showed no consistent relations between response rates and Component 1 and Component 2. However, when resistance to change was assessed by prefeeding and extinction, Component 1 was related to reinforcement rate in Component 2. Thus, these findings indicated that stimulus-reinforcer contingencies affected resistance to change. According to results, the author suggested that response rate and resistance to change are influenced by reinforcement, however, their determiners may be separated.

On the basis of the study by Nevin et al. (1983), Mace and his colleagues (1990) attempted to apply basic research paradigms of behavioral momentum in a laboratory to adults with mental retardation in a naturalistic setting. They conducted two studies in a group home assessing resistance to change by providing edible reinforcers for sorting plastic dinnerware. In the first experiment, sorting responses were reinforced on a VI 60-s schedule and a VI 240-s schedule with a different color flatware for each schedule. Videotape was provided as the distracting stimulus to assess resistance to change.

Response rates in baseline without distracting stimulus were similar in both schedules. While presenting a distracting stimulus (i.e., videotape) with the sorting task, response rates in both schedules decreased, and were higher with the color associated with the higher reinforcement schedule (VI 60-s). In the second experiment, a VI 60-s schedule of reinforcement was used as the first experiment. Additionally, response-independent reinforcers were provided on a VT 30-s schedule (i.e., a conc VI VT schedule) with different colors of flatware. During baseline condition, response rates were higher with the color associated with the VI 60-s schedule than with the color associated with the VI 60-s VT 30-s. When a videotape was presented as a concurrent distracting stimulus, overall responses at both colors decreased relative to baseline. However, response rates were higher with the color associated with the concurrent VI VT schedule than with the color of VI reinforcement in this condition. Thus, the authors suggested that resistance to change is independent of both response rates during baseline and response-reinforcer contingencies. The results of the study indicated that response strength (i.e., behavior persistence) is dependent upon the presence of a stimulus associated with the higher reinforcements, supporting the basic literature on nonhuman performance. This study supported premise that the behavioral momentum model can be applied to human behavior.

Behavioral Momentum in Basic Research and High-Probability Request Sequence in

Applied Research

Mace and his colleagues (1988) first described the high-probability request sequence in relation to the behavioral momentum metaphor. They applied the high-probability request sequence which indirectly manipulated the rate of reinforcement to

establish momentum of compliance that may persist in compliance with a low-probability task. Mace et al. (1988) hypothesized that the velocity of a behavior was increased by delivering three requests that were likely to be performed and the mass was increased by delivering reinforcement for the performance of the high-probability requests (Davis, 1995). That is, when several high-probability requests were performed (i.e., increasing velocity), and subsequently reinforced for the performance of the requests (i.e., increasing mass), the momentum of behavior is established for low-probability requests. Although Mace et al. (1988) developed the high-probability request sequence intervention prompted by the behavioral momentum model, researchers have noted that there are some similarities and differences between basic research in behavioral momentum and applied research with the high-probability request sequence intervention.

Nevin (1996) stated that increased compliance with the low-probability request following the high probability procedure can be understood in relation to the procedures and findings of basic research. In terms of the momentum metaphor, the high-probability request sequences may be interpreted as establishing a high velocity of the response class of compliance. Reinforcers for compliance during the high-probability request sequence increase the mass-like aspect of compliance. The momentum effect results in making compliance to a low-probability request more likely.

On the other hand, Nevin (1996) noted that the high-probability request procedure differs in several ways from basic research on momentum, and some methods and findings of basic research may not be relevant to applied work on compliance.

Additionally, some researchers have pointed out several issues to consider when interpret effects of the high-probability request sequence using behavioral momentum metaphor (Houlihan & Brandon, 1996; Plaud & Gaither, 1996)

First, in Nevin's momentum paradigm, the high-probability request sequence is considered as a dependent variable (i.e., measurement for resistance), and the low-probability request as a disrupter (i.e., prefeeding or free feeding) while in applied research the low-probability request is considered as a dependent variable in common higher order response class (Houlihan & Brandon, 1996; Nevin, 1996).

There is a difference in the schedules of reinforcement used in basic research and the application of the high-probability request sequence (Nevin, 1996; Houlihan & Brandon, 1996; Plaud & Gaither, 1996). On the behavioral momentum model multiple schedule components were used to maintain steady state behaviors whereas the high-probability procedure used one continuous schedule of reinforcement for compliance with each request (i.e., high-probability or low-probability). Nevin (1996) stated that two or more different schedule components are necessary to demonstrate a positive relation between resistance to change and rate of reinforcement.

Additionally, Nevin (1996) pointed out that the high-probability request sequence procedure does not show steady-state baseline response rate against which to evaluate the effect of a disrupter, for two reasons: "(a) the compliance response class is not a free operant, but is prompted by a discrete request and indeed is defined by correspondence between the request and action, and (b) the high-probability sequence is too brief to establish a reliable baseline" (Nevin, 1996, p. 541).

The important contribution of the behavioral momentum paradigm is to separate the determiners of the velocity (i.e., response rate) and mass of the behavior (i.e., resistance to extinction) (Houlihan & Brandon, 1996; Nevin, 1996; Plaud & Gaither, 1996). However, Nevin (1996) has questioned whether compliance to the low-probability request after the high-probability request sequence is the result of the velocity of compliance, the mass of compliance, or both (i.e., momentum).

In terms of the behavioral momentum paradigm, an intervention to establish compliance with requests is successful when compliance occurs consistently during intervention (i.e., high velocity) and responding to requests persists in the appropriate situation when the intervention was withdrawn (Nevin, 1996). However, many studies have shown that responding to low-probability request was not maintained after the high-probability procedure ended (Nevin, 1996; Plaud & Gaither, 1996).

Nevin (1996) suggested that the effectiveness of the high-probability request procedure can be understood within the framework of the momentum metaphor; however, translating the terms of the momentum metaphor into the high-probability request procedure should be done cautiously, and alternative accounts are possible.

On the other hand, Mace (1996) who first described behavioral momentum as the effects of the high-probability request sequence suggested some points for the relation between the high-probability request sequence procedures and behavioral momentum model. He stated that the generality for behavioral momentum is considered, although there are many procedural differences between Nevin's multiple schedule work with pigeons and the high-probability request sequence intervention of noncompliance with humans: (a) species generality which resistance to change is a positive function of rate of

reinforcement with a variety of species, (b) procedure generality which the functional relationship between reinforcement and resistance to change has been shown across various reinforcement parameters such as different types of multiple schedules of reinforcement, different reinforcer amounts, and different reinforcer types; and (c) variations of the high-probability request sequence procedure have established effective procedures by examining the short inter-prompt intervals, and using higher quality reinforcers to enhance the effectiveness, and an experiment with a rat with a signaled fixed ratio (FR). Mace (1996) questioned if Nevin's findings were limited to pigeons using the multiple-schedule procedure or represent an example of a general functional relation between reinforcement and persistence that was included in the high-probability request sequence procedure. Moreover, he stated that the applications of behavioral momentum should be done in terms of a general behavioral relation. Mace (1996) suggested that studies on strengthening the persistence of desirable behavior and weakening the persistence of undesirable behavior will be more needed by coordinating basic and applied research.

Applied Research Findings Using the High-Probability Request Sequence

Numerous studies on the use of high-probability request sequences have demonstrated the effectiveness of promoting appropriate behaviors in a variety of contexts that include compliance with request routines, medication taking, transition activities, self-care routines, communications, and social interaction. Many of those studies have applied the high-probability request sequence to increase compliance, and

recently have been extended to increase other functional skills in a variety of settings.

Table 2.1 provides a brief overview of applied research on the high-probability request sequence.

Early applications of the high-probability request sequence

Early studies on the use of the high-probability request sequence or interspersed requests have been conducted by extending the strategies that previous researchers have suggested (Carr, Newsome, & Binkoff, 1976; Engleman & Colvin, 1983). Carr and his colleagues (1976) decreased the self-injury of a child with psychosis by embedding the requests to follow directions within descriptive statements. The child's self-destructive behavior decreased by delivering the story in an animated and cheerful manner prior to request mands. Similarly, Engleman and Colvin (1983) suggested an antecedent intervention by preceding a difficult request with a rapid series of short, simple requests and reinforcing compliance with the less demanding requests.

On the basis of Engleman and Colvin's suggestion (1983), Singer, Singer, and Horner (1987) examined the effects of using pretask requests to increase compliance during transitions from recess to work. Pretask request intervention was implemented with four elementary students with severe disabilities who had extensive histories of noncompliance to teacher requests after each of three recess periods (morning, noon, and afternoon). Pretask requesting consisted of delivering three to five requests that had a high probability of compliance (e.g., "Give me five") immediately prior to requests with a low probability of compliance (i.e., "Go to group now"). Compliance resulted in praise, and if compliance did not occur within 3-s, the request was repeated in a firm voice and

Study	Ardoin, Martens, & Wolfe(1999)	Belfiore, Lee, Vargas, & Skinner (1997)
Subjects/ Setting	3 children attending a second grade regular education classroom During transitions in regular elementary classroom	2 children ages of 14 and 15 years old in an alternative school
Dependent Variable & Measurement	Percentage of compliance to low-p instructions Latency to compliance	Latency to initiate low-probability problem
Independent Variable/	High-p 3 condition Fading conditions(HIP-2, HIP-1)	Interspersal of single-digit problems with multiple-digit problems
Trainer	Teacher	Experimenter
Experimental Design	A multielement design	A reversal(ABAB) design
Results	High-p request intervention and fading procedures were effective for two subjects, but was not effective for one subject. Two students' compliance maintained at follow-up.	High-p request intervention decreased latency to initiate.
Generality	No	No
Procedural Integrity	Yes	Yes
Social Validity	Yes. The Intervention Rating Profile-15	No

Continued

Table 2.1: Summary of studies on high-probability request sequence intervention

Table 2.1 (continued)

Study	Davis, Brady, Hamilton, McEvoy, & Williams (1994)	Davis, Brady, Williams, & Hamilton (1992)
Subjects/ setting	3 children with severe disabilities between ages of 5 and 6 years old 8 typical peers as training peers(4) and generalization peers(4) Regular integrated play settings Regular school campus	2 boys with behavior disorders and severe disabilities ages of 7 years old and 5 years old Special needs preschool classroom
Dependent Variable & Measurement	Responses to low-p requests (e.g., "Share the toy.") Peer interactions Duration, event recording	Percentage of responses to low-p requests (e.g., "Come here.") Event recording
Independent Variable/ Trainer	High-p intervention; prompt-removal procedure Experimenter & teacher	High-p intervention Special education teacher
Experimental Design	A multiple baseline design across subjects	A multiple baseline design across trainers
Results	Increased responses to low-p requests Generalized unprompted initiations and interaction to training peers and nontraining peers in the training and nontraining setting. Compliance was maintained after removing the intervention.	Increase in responding to the low-p requests Generalized compliance to the other adults Compliance was maintained at 4 weeks follow-up
Generality	Generalized compliance in nontraining settings and children	Generalized compliance across trainers
Procedural Integrity	Yes	Yes
Social Validity	No	No

Continued

Table 2.1(continued)

Study	Davis & Reichle (1996)	Davis, Reichle, & Southard (2000)
Subjects/ setting	4 children with emotional-behavioral disorders ages 4 and 5 years old), and 3 children as intervention peers Play groups in day; elementary classrooms	2 six year old boys with mental retardation and with severe challenging behavior during transition times During classroom transition times in regular ed. Kindergarten classroom and segregated classroom
Dependent Variable & Measurement	Percentage of compliance to low-p requests (e.g., "Hand (peer) Soda.") MOOSE computer based observation system	Percentage of successful transition (e.g., "Let's go to class.") Event recording
Independent Variable/ Trainer	Variant and invariant high-p request sequences Peers	High-p request sequence preferred item as a distracter Teacher/paraprofessional
Experimental Design	A combined multiple baseline and reversal(ABCBC; ACBCB)	An alternating treatments design
Results	Increase in responses to social requests in the invariant and variant condition Compliance was maintained in the variant condition	Both interventions were effective.
Generality	No	No
Procedural Integrity	Yes	Yes
Social Validity	No	Yes. By using a survey and direct observations of the teachers during transitions

Continued

Table 2.1(continued)

Study	Ducharme & Worling (1994)	Harchick & Putzier (1990)
Subjects/ setting	A 5 year old boy and a 15 year old girl with the mental retardation and with noncompliant behaviors The family home	A 23 year old woman with severe mental retardation and a seizure disorder A community-based group home
Dependent Variable & Measurement	Compliance to low-p “do” (e.g., “Stand up.”), “don’t” requests (e.g., “Don’t lie on the floor.”) Event recording	Number of times took medication and spit out the medication
Independent Variable/ Trainer	High-p intervention; high-p request fading Parents	High-probability requests Group home staff
Experimental Design	A combination of ABAB and multiple baseline design across subjects	An ABAB reversal design
Results	Increase in compliance to “do” requests for both subjects. No increases in compliance to “don’t” requests by subject 2, and increases in compliance to symmetrical requests Compliance was maintained during the high-p request-fading phase, and during the 16 weeks follow-up	Increase in the compliance to taking medication and decreased in vomit Compliance was maintained after 6 month follow-up
Generality	No	No
Procedural Integrity	Yes	Yes
Social Validity	Yes. Questionnaire by parents and therapists	No

Continued

Table 2.1 (continued)

Study	Horner, Day, Sprague, O'Brien, & Heathfield (1991)	Houlihan, Jacobson, & Brandon (1994)
Subjects/ setting	Study 1: 3 youths with severe mental retardation between the ages of 12 and 14; in a group home Study 2: a 14 year old boy with moderate mental retardation with a number of undesirable behaviors	A 5 year old boy with autism During play and work time in a special needs preschool classroom
Dependent Variable & Measurement	Percentage of aggression or self injury using an interval recording Percentage of trials attempted to complete task A partial interval observation	Percentage of compliance to low-p requests(e.g., "Take the book out of the box.")
Independent Variable/ Trainer	Easy tasks; hard tasks; hard and interspersed tasks Experimenters and novel trainers	High-p request sequence with 5-s and 20-s IPT Experimenter
Experimental Design	An ABABCBCDE within-subject reversal design	An alternating treatments design
Results	During interspersed task, aggression and self-injury decreased, trials attempted to complete task increased.	Increased in compliance with 5-s IPT, but no increase with 20-s IPT
Generality	Similar responding occurred with new trainers and new hard tasks	No
Procedural Integrity	Yes	No
Social Validity	Yes	No

Continued

Table 2.1 (continued)

Study	Kennedy, Itkonen, & Lindquist (1995)	Killu, Sainato, Davis, Ospelt, & Paul (1998)
Subjects/ setting	18 and 19 year old students with severe disabilities	3 boys with developmental delays and behavioral difficulties between ages of 4 and 5 a separate classroom
Dependent Variable and Measurement	Occurrence of compliance to low-p request (e.g., "Put away a jacket.") Event recording	Responding to low-p request (e.g., "Point to the block") Disruptive behavior Event recording
Independent Variable/ Trainer	Interspersed requests Social comments(2s) Social comments(15s) Experimenter	High-p request sequence Experimenter/Paraprofessional
Experimental Design	Subject 1 : ABACABACAC Subject 2: ACABABAC A multielement design using A,B,C,D	A multiple baseline design across subjects
Results	Increase in compliance to the low-p requests during the interspersed requests and social comments procedures 2-s interval between social comments and low-p requests were more effective than 15-s.	Compliance in all subjects increased with the first trainer, and slightly increased with the second trainer. Compliance was maintained after withdrawing the high-p request sequence. Disruptive behavior did not increase during the intervention.
Generality	No	Generalized compliance to secondary trainer
Procedural Integrity	No	Yes
Social Validity	No	Yes. By using a questionnaire

Continued

Table 2.1 (continued)

Study	Mace & Belfiore (1990)	Mace, Hock, Lalli, West, Belfiore, Pinter, & Brown (1988)
Subjects/ setting	A 38 year old woman with severe mental retardation and with a history of escape-motivated stereotypic behavior A university-affiliated group home	Study 1: A 36 year old man with severe mental retardation; a university affiliated group home Study 2: A 44 year old male with Down Syndrome Study 3: The same subject as Experiment 2
Dependent Variable & Measurement	Stereotypic touching responses(STR) Compliance with low-p requests A continuous count within 10-s interval recording	Study 1, 3: Compliance to low-probability “do” and “don’t” Study 2: Compliance to low-probability “do” Continuous 10-s interval
Independent Variable/ Trainer	High-p request sequence Attention control Experimenters	Study 1: A sequence of high-probability commands Study 2: A sequence of high-probability commands Study 3: Interprompt time(IPT) Experimenter
Experimental Design	A multiple schedule design with reversal components	Study 1: A multielement design Study 2: An ABAB reversal design Study 3: A multielement design to compare 5-s and 20-s IPTs
Results	Substantial increases in compliance with low-p requests and decreases in STR.	Both experiments Study 1 and Study 2 increased compliance. Increase in compliance with commands using 5-s IPT
Generality	No	No
Procedural Integrity	No	Yes
Social Validity	No	No

Continued

Table 2.1 (continued)

Study	Mace et al.(1988)-continued	Mace, Mauro, Boyajian, & Eckert (1997)
Subjects/ setting	Study 4: Two males with moderate mental retardation aged of a 34 year and 45 year old/Bathroom in the group home Study 5: The same subjects as Experiment 4/Bathroom and bedroom in the group home	2 adolescent boys with moderate mental retardation and with noncompliance, severe aggression, disruptive behaviors; four male rats
Dependent Variable & Measurement	Study 4: Compliance latency Event recording Study 5: The time elapsed to complete each of the three task segments for taking a shower Duration	Frequency, percentage of compliance to low-p instructors (e.g., “Stand up”)
Independent Variable/ Trainer	Study 4: Command sequence; Attention control Study 5: High-p command sequence; Contingency management	High-p treatment with praise, food, or both Experimenter
Experimental Design	A multielement design	Reversal designs replicated across low-p instructions; An ABAB reversal sequence
Results	Study 4: Decrease in latency to compliance Study 5: The high-p command sequence was the most effective and prompts, contingency management respectively.	Three experiments showed a consistent relationship between reinforcer quality and behavioral momentum.
Generality	No	No
Procedural Integrity	Yes	No
Social Validity	No	No

Continued

Table 2.1 (continued)

Study	McComas, Wacker, & Cooper (1998)	Rortvedt & Miltenberger (1994)
Subjects/ setting	22 month old boy with developmental delays and severe self-injurious behavior In the subject's hospital room	2 typically developing 4 year old girls In the home
Dependent Variable & Measurement	Percentage of compliance to the low-p request(e.g., "Hold still") A combination 10-s partial-interval and event-recording system	Compliance during continuous 10-s intervals (e.g., "Put your glass in the sink.")
Independent Variable/ Trainer	Differential reinforcement of alternative behavior with escape extinction(DRA/ESC EXT) High-P/DRA.ESC EXT Mother under direct supervision from a therapist	High-p sequence; time out Mothers
Experimental Design	A multiple schedule design	A multiple baseline across subjects design with an ABAB within-subject design
Results	Increase in compliance, and the difference between two treatments increased over time.	No increase in compliance with high-p request sequence Increase in compliance during time out procedure
Generality	No	No
Procedural Integrity	Yes	Yes
Social Validity	No	No

Continued

Table 2.1 (continued)

Study	Sanchez-Fort, Brady, & Davis (1995)	Santos & Lignugaris/Kraft (1999)
Subjects/ setting	2 children with severe and moderate disability between ages of 8 and 4 Summer school classroom in an integrated public school	5 preschoolers with developmental delays During center time activities in a special preschool program
Dependent Variable & Measurement	Percentage of correct low-p target responses(i.e., sign or words)	Number of attempts to respond to indirect requests Number of correct responses to indirect requests A 10-s interval recording system
Independent Variable/ Trainer	High-p request sequence Teacher, aide, experimenter	High-p request sequence Experimenter
Experimental Design	A multiple baseline design across low-p target words	A multiple probe design across subjects with intervention withdrawal
Results	Increase in target words for both subjects One subject showed the use of generalized words.	Attempts to respond and the correct responses to indirect requests in all subjects increased. Three of the subjects maintained at the high level of attempts to respond and correct responses to indirect requests after the intervention was withdrawn.
Generality	Inconsistent result in generalization	No
Procedural Integrity	Yes	Yes
Social Validity	No	No

Continued

Table 2.1(continued)

Study	Singer, Singer, & Horner (1987)	Wehby & Hollahan (2000)
Subjects/ setting	4 students with moderate to severe disabilities ranging in age from 7 to 10 years.	A 13 year old girl with learning disability in math and written language
	A special education classroom	During independent math work in math class
Dependent Variable & Measurement	Frequency of compliance to transition (recess to work) (e.g., "Go to work")	Latency to engagement Percentage of engagement
Independent Variable/ Trainer	Pretask requesting Special education teacher, aide	MOOSES High-probability sequence Neutral social comments Teacher
Experimental Design	An ABA and BAB reversal design	An ABABACB design
Results	Increase in compliance during pretask requesting	Effective in reducing the latency to compliance but minimally affected duration of engagement
Generality	No	No
Procedural Integrity	No	Yes
Social Validity	No	No

Continued

Table 2.1 (continued)

Study	Zarcone, Iwata, Hughes, & Vollmer (1993)	Zarcone, Iwata, Mazaleski, & Smith (1994)
Subjects/ setting	A 33 year old female with profound mental retardation	A 38 year and a 45 year old male with profound mental retardation and SIB Grounds of the facility at a day program
Dependent Variable and Measurement	Latency to self-injurious behavior Percentage of compliance Continuous 10-s intervals	Percentage of trials with SIB Percentage of compliance with low-p and high-p instructions Continuous 10s intervals
Independent Variable/ Trainer	High-p request sequence High-p request sequence and Escape extinction Escape Experimenter	High-p sequence High-p + EXT Experimenter
Experimental Design	ABCBD reversal design	A multielement format(functional assessment) ABCBC reversal design
Results	High-p plus extinction and extinction alone procedures were effective in increasing compliance, decreasing SIB High-p alone was not effective	High-p alone was not effective in SIB and compliance with low-p request. High-p with extinction increased compliance and decreased SIB.
Generality	No	No
Procedural Integrity	Yes	Yes
Social Validity	No	No

with physical assistance. The pretask intervention resulted in substantial increases in compliance and decreases in aggression when a teacher asked the students to work after recess.

Mace and his colleagues (1988) first used the momentum metaphor proposed by Nevin et al. (1983) to increase the compliant behavior of four adults with mental retardation in a group home. They conducted five experiments that evaluated the effectiveness of the high-probability command sequence on increasing compliance to self-care routines by including a variety of variables such as the form of the low-probability request (i.e., “do,” “don’t”), attention control, and the inter-prompt times (IPT).

In the first experiment, the effects of high-probability command sequence on compliance to low-probability “do” (e.g., “Please put your lunch box away.”) and “don’t” (e.g., “Please don’t leave your lunch box on the table.”) commands were examined. The high-probability command sequence intervention resulted in an increase of the subject’s compliance to both forms of the low-probability commands.

The second experiment was conducted to examine effects of positive attention alone on compliance “do” requests. Compliant responses increased after delivering the high-probability command sequence. However, compliance during the attention control session (i.e., the experimenter’s comments) was not changed from the baseline levels. The authors suggested that the presentation of discriminative stimuli for high-probability behaviors may be critical in obtaining the momentum-like effects.

The third experiment was conducted to evaluate the appropriateness of the behavioral momentum analogy in applied settings. The high-probability command

sequence was provided by 20-s and 5-s inter-prompt times (i.e., the time interval between the completion of the last high-probability command in the high-probability command sequence and the initiation of the low-probability command). The results demonstrated that the subject's compliance to low-probability "do" and "don't" commands was consistently higher with a 5-s inter-prompt time than with the 20-s inter-prompt time. The authors suggested that the momentum-like effects in the high-probability command sequence may be related to the temporal contiguity between the high-probability command sequence and the low-probability command. Thus, it may be critical that low-probability commands be delivered immediately after the high-probability request sequence. Additionally, the authors suggested that the results of this experiment are predicted by the behavioral momentum analogy because the effects demonstrated in the 5-s IPT procedure may have been due to the higher rates of presentation of reinforcement in the 5-s IPT than in the 20-s IPT condition.

The fourth experiment was conducted using a multielement design to assess the effects of the high-probability command procedure to reduce the subject's latency to respond to commands. The subjects had self-care skills; however, they were very slow to respond to staff requests. The use of the high-probability command sequence decreased the subjects' latency to respond to the low-probability commands.

The fifth experiment was performed to reduce the time a subject spent taking a shower. Three independent variables, including contingency management, prompts, and the high-probability command sequence were compared using a multielement design. The high-probability command sequence was shown to be the most effective in reducing task duration; prompts were less effective, and contingency management was least

effective among the three interventions. The authors suggested that it is possible to evoke behavior that affects reinforcement by manipulating the type of command issued so that a pattern of responding with a relatively high behavioral mass is established. Interpreting from a behavioral momentum framework, they suggested that increased compliance to low-probability commands following the high -probability request sequence may indicate resistance to change in the changed environmental conditions.

Subsequently, Horner and his colleagues (1991) used interspersed requests for adolescents with severe mental retardation who displayed aggression and self-injury to avoid difficult instructional situations in a residential setting. The authors examined the effects of interspersed requests on task completion, aggression, and self-injury during instruction. They interspersed three to five short, simple requests (e.g., following a “Do this” request) after about three training trials (e.g., sorting silverware from the dishwasher) and following any indication of resistance. Each interspersed request was followed by verbal praise, and the difficult task was presented within 5-s of completing the last interspersed request. The results demonstrated that the interspersed request intervention was effective at decreasing aggression and self-injury during instruction and at increasing attempts to complete task. In the second study with a child with moderate mental retardation in a self-contained classroom, the interspersed requests intervention resulted in a decrease in levels of aggression. The attempts to perform tasks increased during the intervention, and remained at high levels after the intervention phase.

On the basis of the early successful applications of high-probability request sequences, researchers have examined the effectiveness of the high-probability request intervention in promoting appropriate behaviors in a variety of contexts.

Applications of the High-Probability Request Sequences to Compliance

Many students with developmental disabilities have shown difficulties with compliance to requests. Noncompliance to requests is considered a primary reason for children's exclusion from social interactions and learning opportunities (Davis et al., 1992). The high-probability request sequence has been employed as a nonaversive and antecedent procedure to deal with noncompliance of the population with developmental disabilities while preventing coercive interactions with parents and teachers (Singer et al., 1986).

Compliance with routine requests. In a replication of the study by Mace et al. (1988), Houlihan, and his colleagues (1994) examined the effects of the high-probability request sequence on compliance, and compared the effects of 5-s and 20-s inter-prompt times (IPT) with a noncompliant preschool-aged boy with autism. A sequence of three high-probability requests (e.g., "Look at me.") was provided either 5-s or 20-s prior to the delivery of a low-probability request (e.g., "Take the book out of the box."), and compliance to requests was followed by social reinforcement and tactile reinforcers. The results of the study demonstrated that compliance with low-probability requests increased during the high-probability request intervention with 5-s IPT, however, it did not show improvement over baseline levels with the 20-s IPT. Thus, this finding replicated the third experiment of Mace et al.'s study (1988) and supported the length of time between the high-probability request and the low-probability request as an important factor in the high-probability request intervention.

Concerning of the maintenance and generalization of compliance, Davis and her colleagues (1992) extended previous work by facilitating generalized compliance to

adults who did not use the high-probability request sequence. The participants in the study were two boys with behavioral disorders and severe disabilities ages seven and five years old. The teachers rapidly delivered three to five high-probability requests (e.g., “Touch your head.”) immediately prior to presenting each low-probability request (e.g., “Come here.”). Verbal or gestural praise was provided for each response to a request. The results of the study indicated that the use of the high-probability request sequence increased compliance to low-probability requests. In addition, the use of multiple trainers resulted in generalized responding to low-probability requests with the fourth trainer for Subject 1 and with the third and the fourth trainer for Subject 2. Then the children’s increased responding was maintained at follow-up sessions.

In addition to Davis et al. (1992), Ducharme and Worling (1994) attempted to maintain the effectiveness of the high-probability request sequence procedure. They hypothesized that stimulus fading after use of the high-probability request sequence could be one strategy for promoting long-term effects in compliance since previous studies (Horner et al., 1991; Mace et al., 1988; Singer et al., 1987) had shown that compliance to low-probability requests typically returned to baseline levels after the high-probability request sequence was withdrawn. The authors examined the effects of the high-probability request sequence procedure along with stimulus fading to maintain compliant behaviors. The high-probability request sequence intervention was implemented by the subjects’ parents at home. Two children with developmental disabilities and noncompliant behaviors ages five and fifteen years old participated in this study. Fading procedures consisted of gradually decreasing the number of the high-probability requests delivered and increasing the delay in delivery between the high-probability and the low-

probability requests. The results indicated that both children showed increases in compliance to low-probability requests after implementing the high-probability request sequence procedure. In addition, compliance was maintained at high levels for both subjects during the high-probability request fading phase, and compliance levels remained at high levels at 16 weeks later. This study extended the research on using high-probability request sequence by demonstrating the maintenance of low-probability behaviors without delivery of the high-probability request sequences. Additionally, this study demonstrated the effectiveness of the high-probability request sequences implemented by parents. Parents reported high levels of satisfaction with the intervention.

As extension, Kennedy, Itkonen, and Lindquist (1995) compared the effectiveness of interspersed high-compliance requests and social comments as antecedents to increase compliance like Mace et al. (1988) included the attention control procedure (i.e., the experimenter's neutral or positive comments) in their study. Additionally, the authors evaluated the effects on compliance of the time interval between social comments and low-compliance requests. Two students with severe disabilities ages of eighteen and nineteen years old participated in two experimental sequences. In the first experiment, four high-compliance requests (e.g., "What's your name?") or four brief comments (e.g., "It's a beautiful day.") were delivered by 2-s interval prior to low-probability sequence (e.g., "Put away the jacket."). The second experiment compared interspersed requests and social comments within 2-s and 15-s interval procedures by using a multielement design. The results of the first experiment demonstrated that the two intervention procedures showed similar effects in increasing compliance, unlike the results of the study by Mace et al. (1988). The results of the second experiment showed that two subjects' compliance

was slightly higher in the interspersed requests condition. In addition, the shorter time interval between social comments and low-compliance requests (i.e., 2-s) resulted in higher compliance than the 15-s interval. The authors stated that the data should not be interpreted as meaning that social comments can replace the high-probability request sequence intervention, and that more research would be needed.

Another study that extends the literature examines the effects of a high-probability request sequence on compliance to low-probability requests and disruptive behavior in a classroom setting during typical activities and by using novel-trainer probes. Killu, Sainato, Davis, Ospel, and Paul (1998) implemented the high-probability request sequence intervention with preschoolers with developmental delays at an instructionally appropriate time during play routines. A multiple baseline design across subjects was used to evaluate the effects of the high-probability request intervention on children's compliance. Probes were used to assess the children's responses to the intervention with a second trainer. The results demonstrated that the high-probability request sequence increased compliant responding to requests and that the increased compliance was maintained after withdrawing the high-probability request sequence intervention. Compliance to requests from the second trainer slightly increased. Disruptive behavior did not sharply decrease due to the initial low baseline levels of challenging behavior. Despite the teacher's prediction, the use of the high-probability request sequence did not result in any increase of disruptive behavior. In addition, this study demonstrated that the high-probability request sequence can be integrated into an instructional routine and can be modified to meet the instructional needs of each child.

Although many studies have demonstrated the effectiveness of the high-probability request sequence on compliance with routine requests, research by Rortvedt and Miltenberger (1994) showed mixed results. They implemented the high-probability request sequence procedure to increase compliance in two typically developing preschoolers with noncompliant behaviors to routine requests, and compared the effectiveness of the time-out and the high-probability request sequence procedure. The parents delivered a sequence of three high-probability requests (e.g., “Touch your nose.”), immediately prior to the low-probability request (e.g., “Put your glass in the sink.”). For the next phase, a time out procedure for noncompliance was provided as a comparison procedure after the second baseline. The results demonstrated that the high-probability request sequence procedure did not show an increase in compliance. Although the second subject’s compliance with the low-probability requests increased slightly, it was difficult to implement the high-probability request sequence procedure since she was noncompliant with the high-probability requests in later sessions. However, the time out procedure resulted in increases in compliance for two subjects, and compliance was maintained at follow up sessions. The authors concluded that more research is needed concerning the feasibility of the high-probability request sequence intervention with typical children.

Regarding the results of the studies that failed to demonstrate the effectiveness of the high-probability request procedure, Mace, Mauro, Boyajian, and Eckert (1997) hypothesized that the high-probability request sequence intervention did not establish sufficient momentum to overcome the opposition force of the low-probability request. Thus, they suggested that the efficacy of the high-probability request treatment might be

improved by using higher quality reinforcers for compliance to high-probability instructions. The authors implemented the high-probability requests sequence and evaluated its effectiveness under the different reinforcement conditions. The first experiment was conducted to assess the effects of the high-probability instructions on compliance with low-probability instructions (e.g., “Come over here,” “Stand up,” etc.) for two adolescent boys with moderate mental retardation who exhibited severe aggression and disruptive behaviors. Each low-probability instruction was delivered after requesting a sequence of three or four high-probability instructions. Compliance to each high-probability instruction was reinforced with praise, food or both, and compliance to each low-probability instruction was reinforced by praise across all high-probability requests. The results indicated that providing food or food and praise as a reinforcer for high-probability compliance increased compliance with low-probability instructions. The second experiment compared the effects of the high-probability treatment with praise and food on the resistance of compliance to change with repeated low-probability instructions. The first phase remained the same as the high-probability request sequence procedure in the first experiment (single low-probability instruction following high-probability request sequence) with the food reinforcement. In the second and fourth phase the high-probability compliance (five low-probability instructions following high-probability request sequence) reinforced with praise and the high-probability compliance reinforced with food were alternated. For both forms of the intervention, compliance to low-probability instructions was reinforced with praise. In the third phase, two forms of the high-probability treatment (with praise and with food) were alternated across sessions. The results indicated that providing food as a reinforcer to compliance to the

high-probability requests produced greater compliance and compliance to successive low-probability requests persisted more when food, rather than praise, was provided as a reinforcer.

Compliance with prescribed medication routines/medical procedures. Some studies implemented the high-probability request sequence procedure to increase compliance to medical procedures. Harchik and Putzier (1990) examined the effectiveness of the high-probability request sequence intervention in increasing compliance with taking medication by adapting Singer et al.'s (1987) and Mace et al.'s (1988) procedures. The procedures were implemented by direct-care staff during their daily responsibilities. A 23-year-old woman with severe mental retardation and a seizure disorder who refused to take her medication participated in this study. Five high-probability requests (e.g., "Touch your nose.") were presented to the subject and praise and tokens were provided after the subject's compliance. Medication was presented immediately after compliance to the high-probability request sequence. The results of the study demonstrated that the subject's compliance with taking her medication increased and her vomiting decreased during the intervention. The effects of the high-probability request sequence procedure were maintained at the six-month follow up.

Another study used the high-probability request sequence to increase compliance with medical procedures. McComas, Wacker, and Cooper (1998) extended the use of the high-probability request sequence for compliance with the central venous line care for a toddler with developmental delays and severe self-injurious behavior (SIB). The participant received treatment for a short-bowel syndrome. Differential reinforcement of alternative behavior with escape extinction (DRA/ESC EXT) and the high-

probability/DRA/ESC EXT were compared. The participant's mother implemented the interventions under direct supervision and with specific instructions from a therapist. During the high-probability request sequence phase, three high-probability requests (e.g., "Touch your head.") were delivered prior to a low-probability request (i.e., "Hold still.") along with DRA/ESC EXT. This study demonstrated that the high-probability request sequence resulted in increases in compliance to the medical procedure, and the difference between the two treatments increased over time.

Compliance with transition time. The ability to make transitions is one of the critical skills for a child's independence in a classroom (Ardoyn, Martens, & Wolf, 1999). In addition to the previous study for compliance to transition time directives by Singer et al. (1987), Ardoyn et al. (1999) extended the study on the high-probability request sequence procedure used by a regular classroom teacher for second-grade typically developing children in a group (20 students in the classroom) in which three target children with a history of noncompliance in class were monitored. Using a multielement design, they evaluated the effects of the high-probability request sequence on transition instruction (e.g., "Get in quiet position.") along with fading procedures (i.e., high-p 2 and high-p 1). The results showed that high-probability request intervention and fading procedures were effective for two subjects. The effects of the intervention were maintained at two and three week follow-up points. However, the data of the third subject were inconclusive. The author provided several explanations for this subject's performance such as the teacher's low procedural integrity with this subject's sessions, the subject's loss of interest from the teacher's frequent use of the high-probability intervention without integrity in other times, and the subject's distraction by other

activities (e.g., eating breakfast). These findings indicated that the high-probability request sequence would be an effective group-administrated school based intervention for increasing compliance in some students.

To increase successful transition for two kindergartners with mental retardation and severe challenging behavior during transition times, Davis, Reichle, and Southards (2000) compared the effects of the high-probability request sequence and the use of a preferred item as a distracter on the compliance with transitions of two six-year old boys with severe challenging behaviors and developmental disabilities by using an alternating treatment design. The interventionists (i.e., the teacher or paraprofessional) implemented the high-probability request sequence and a preferred item as a distracter immediately prior to a request to make a transition (e.g., “Let’s go to class,” “Time to go to group,” etc.). The results indicated that the two interventions were effective in increasing successful transitions for both children. Additionally, the results of social validity measures for the two interventions assessed through teacher ratings indicated that both procedures were considered practical for use on a daily basis in the classroom.

Compliance with academic tasks. Extending the high-probability request sequence procedure to academic tasks, Belfiore, Lee, Vargas, and Skinner (1997) evaluated the effects of completing a sequence of three high-preference mathematics problems preceding a low-preference problem on latency for students to initiate working on a the low preference problem. In an alternative school setting, they presented three high-preference problems (i.e., 1-digit multiplication) to two students prior to delivery of the low-preference problem (i.e., one 3-digit multiplication). Unlike other high-

probability intervention studies, the researchers did not provide verbal praise as the reinforcer for completing each high-preference problem. Results showed that both subjects' latency to initiate the low-preference tasks decreased during the intervention.

Using academic tasks, Wehby and Hollahan (2000) further extended the high-probability request sequence to an intervention with a child with a learning disability. They examined the effects of the high-probability request procedure with an elementary student on the latency and duration of compliance to requests for independent completion of math problems. After three successful high-probability requests (e.g., "Put your name on your paper."), the low-probability request (e.g., "Begin independent seat work.") was presented. Neutral social comments (e.g., "It is hot today.") were provided as a comparison in the same manner used for high-probability requests. Praise was provided for responding to each high-probability and low-probability request. Results indicated that the latency to compliance substantially decreased after presenting the high-probability request sequence, whereas the neutral social comment phases showed long latencies before compliance. However, the high-probability request sequence procedure had little effect upon the duration of engagement.

Applications of High-Probability Request Sequences to Reduce Aggression, Self-Injury, and Stereotypic Behaviors

Researchers have attempted to reduce escape-motivated behaviors such as aggression, self-injurious behavior, or stereotypic behaviors as a collateral effect by increasing compliance with tasks. Mace and Belfiore (1990) noted that increases in compliance with task-related demands may have a collateral effect of reducing problem behaviors that are maintained by escape from demand. They suggested that compliance

with task-related activities is functionally incompatible with escape or avoidance of these same activities. The authors conducted the high-probability request sequence intervention to decrease stereotypic touching responses (STR), and increase compliance with low-probability requests (e.g., “Please hang up your coat.”) of a 38-year-old woman with the severe mental retardation who engaged in repetitive, stereotypic touching of objects, and people. The experimental analysis was conducted to identify the function of the subject’s STR which resulted in escape from task-related demands before implementing the high-probability request sequence. The use of a high-probability request intervention in which STR did not produce escape (i.e., escape extinction) resulted in substantial increases in compliance with low-probability requests and a collateral reduction in STR.

Whereas Mace and his colleagues (1990) examined the effects of the high-probability request intervention including escape extinction, Zarcone, Iwata, Hughes, and Vollmer (1993) evaluated the separate effects of the high-probability sequence procedure on the self-injurious escape behavior of a 33-year-old profoundly retarded woman. Using functional analysis, probable function of the subject’s self-injurious behavior (SIB) was an escape from instruction. The high-probability request procedure was employed alone and with escape extinction, and finally escape extinction alone was implemented. When the high-probability request sequence alone was employed, latency to SIB increased initially but decreased and then remained low, and compliance to low-probability requests showed little improvement. When escape extinction was employed along with the high-probability request sequence procedure, latency to SIB increased. In the final phase, only the escape extinction procedure was effective in decreasing latency to SIB. The subject’s compliance to low-probability requests was highest during the high-

probability sequence with extinction condition and extinction alone. Based on the results, the authors suggested that increasing compliance alone may not compete with the opportunity to escape from the demand.

On the basis of the study by Zarcone et al. (1993), Zarcone, Iwata, Mazaleski, and Smith (1994) replicated the previous study to examine the separate effects of the high-probability request sequence and escape extinction on reducing the self-injurious escape behavior of two men with developmental disabilities and self-injurious behavior (SIB). They conducted a functional analysis assessment in which it was identified that SIB in the two males was maintained by negative reinforcement (i.e., escape from instructional task). They then evaluated the effects of the high-probability request sequence on SIB during the high-probability request procedure alone and with the extinction procedure. Results demonstrated that the rates of self-injury increased and percentage of compliance to high-probability and low-probability requests decreased during the high-probability request sequence procedure alone. The high-probability procedures with extinction resulted in a decrease in the rates of self-injury and increases in compliance. The authors suggested that intervention based on the use of positive reinforcement alone may not be effective if the escape contingency is allowed when another response competes with compliance and is maintained by escape. They described that although the density of positive reinforcement for compliance increased by using the high-probability request sequence, the effects on escape behavior may be limited, and other treatment options may be needed (e.g., using higher quality of reinforcers, modification of task-related parameters such as rate of instructions, duration of instructional sessions, and effort.).

Applications of High-Probability Request Sequences to Promote Communication Skills

Investigators have prompted research that extends high-probability request sequence intervention to teaching procedures beyond simple compliance (Davis, 1995; Davis & Brady, 1993; Davis & Reichle, 1996; Davis et al., 1994; Killu, 1999; Killu et al., 1998; Sanchez-Fort, Brady, & Davis, 1995; Santos, 2001; Santo & Ligungaris/Kraft, 1999). They stated that the high-probability request procedure has potential in teaching applications such as communication and social responding.

In an extension of the previous studies using teaching applications, Sanchez-Fort and her colleagues (1995) incorporated the high-probability request sequence to teach word and sign communication targets to a preschooler with a moderate disability and an elementary child with a severe disability. The authors hypothesized that if a student does not use a communication function (i.e., the low probability behavior), the high-probability request sequences could increase the communication function by reinforcement following the communication attempts. Instructors dispersed the requests throughout the day in relevant conditions to the low-probability target responses (e.g., the word “help” while assisting the subject’s seat belt, lunch, toileting, etc.). Both subjects showed increases in the use of the low-probability target words after implementing the high-probability request sequences. However, the generalization effects were inconsistent. One subject showed use of the untrained words, but another subject did not. The authors noted that the teaching procedure, which relied on fifteen or fewer trials distributed through the day, and training words were not enough to produce generalized effects.

Another study on communication skills published by Santos and Lignugaris/Kraft (1999) implemented high-probability request sequences for five preschoolers with

developmental delays to increase responding to indirect requests that are common in inclusive early childhood settings. The authors hypothesized that responses to indirect questions would increase when the indirect question was asked immediately following a sequence of direct questions with delivery of contingent reinforcers. When the child engaged in play during the center time activities, the instructor delivered three direct questions (e.g., “What animal is this?”) rapidly prior to each indirect request (e.g., “Hmm, I wonder what animal this is?”), and each correct response to request was verbally praised. The results demonstrated that attempts to respond and the correct responses to indirect requests in all subjects increased during the high-probability request sequence intervention. In addition, three of the five subjects maintained high levels of attempts to respond and correct responses to indirect requests after the intervention was withdrawn.

Applications of High-Probability Request Sequences to Facilitate Social Interactions

Many strategies, including environmental arrangement, naturalistic approaches, teacher-mediated interventions, and peer-mediated interventions, have been developed to increase the social skills of young children with disabilities (Odom, et al., 1999). However, a few studies have focused on increasing social initiations of young children with disabilities. Researchers have demonstrated that the high-probability request sequence is among effective strategies to promote social initiations and social interactions of young children with disabilities.

Davis and her colleagues (1994) used the high-probability intervention to increase the social initiations and interactions of young children with disabilities. Three young children with severe disabilities who were socially withdrawn participated in the study. The high-probability request intervention was implemented during each participant’s

regular integrated play setting by the primary investigator, the children's teachers, and a graduate student in special education. The low-probability requests (e.g., "Give the toy to peer.") to initiate with peers were delivered after a series of high-probability requests. The results demonstrated that the target children increased their prompted and unprompted social behaviors with trained peers. In addition, the increased social initiations and interactions were generalized to nontrained peers in the training and nontraining settings. The increased social initiations and interactions showed maintenance for several months after withdrawal of the intervention.

In a subsequent study, Davis and Reichle (1996) extended previous research regarding high-probability request sequence by comparing the difference in responding to low-probability requests when high-probability requests were delivered in an invariant sequence or variant sequence. Zarcone et al. (1994) hypothesized that the repeated pairing of high-probability requests with low-probability requests would give the high-probability requests the same aversive properties as the low-probability requests; the high-probability requests, thus, might become discriminative stimuli for noncompliance. On the basis of the study by Zarcone et al. (1994), Davis and Reichle (1996) hypothesized that this problem might be overcome by varying the order of high-probability requests. They implemented variant (i.e., the high-probability requests delivered in a different sequence) versus invariant high-probability request sequences (i.e., high-probability requests delivered in the same order) to increase compliance with social requests in young children with emotional-behavioral disorders. In addition, they examined whether young peers could implement the high-probability request sequences and result in increases in target social behaviors. Peer interventionists were prompted to

maintain procedural integrity by whispering in the peer's ear or using hand gestures. During intervention, an intervention peer delivered the high-probability request sequence (e.g., "Point to the soda fountain.") immediately prior to the low-probability request (e.g., "Hand (peer) soda."), and the social peer responded to the target child with a statement extending the social interaction (e.g., "Thanks for the soda pop."). The results of the study demonstrated that the variant high-probability sequences were more effective than the invariant high-probability sequence, and young peers' interventions resulted in compliance with social requests. These findings indicated that the sequencing of the high-probability request sequence is critical to the effectiveness of the intervention strategy. Additionally, the intervention implemented by peers was effective; however, extensive teacher training and prompting were required.

Summary of Literature on High-Probability Request Sequence

By extending early applications, literature on the use of the high-probability request sequence has demonstrated its effects on a variety of subjects ranging from toddlers to adults and for persons with and without disabilities investigated compliance with routine requests, medication routines, transition time, academic tasks, reducing disruptive behaviors, and promoting communication skills and social interactions. Additionally, the high-probability request procedures have been successfully employed by teachers, paraprofessionals, and parents as well as by experimenters. Most of the studies on the use of the high-probability procedures have demonstrated their effectiveness in promoting appropriate behaviors; however, some studies have shown differential effects. McComas, Wacker, Peck, Golonka, Millard, and Richman (2000) noted that three general patterns of responding to low-probability requests in the

applications of the high-probability procedure have been shown: (a) compliance to the low-probability requests increased when the high-probability request sequence was delivered (e.g., Mace et al., 1988; Mace & Belfiore, 1990), (b) compliance with the low-probability requests increased following compliance with the high-probability requests, and these effects were maintained without presenting high-probability requests across sessions (e.g., Davis et al., 1992, 1994; Killu et al., 1998; Santos & Lignugaris/Kraft, 1999), and (c) the high-probability procedure did not increase compliance with low-probability requests (e.g., Rortvedt & Miltenberger, 1994; Zarcone et al., 1993, 1994). On the basis of some studies that have reported marginal improvements or no effects Mace and his colleagues (1997) attempted to enhance the effectiveness of the high-probability procedure by using a higher reinforcer. They suggested that varying the quality of reinforcement may increase the effectiveness of the high-probability procedure.

Research on the high-probability request sequence has methodologically extended previous studies. Mace and his colleagues (1988) and Houlihan and his colleagues (1994) examined the effects of varying the inter-prompt time between the delivery of reinforcement for the last high-probability request and the delivery of the low probability request. These studies indicated that the high-probability procedure was more effective with a shorter inter-prompt time (i.e., 5-s) than with longer inter-prompt time (i.e., 20-s). Davis and Reichle (1995) examined the use of variant versus invariant high-probability request sequence procedures and demonstrated that the presentation of high-probability requests in random order is more effective than using the same order each time during each trial. In addition, they demonstrated the effectiveness of the high-probability request sequence procedure implemented by peers.

The high-probability procedure was compared to other procedures (i.e., social comments) to determine whether simply gaining and maintaining the attention of the individual would increase responding to low-probability requests. Mace et al. (1988) and Mace and Belfiore (1990) demonstrated that social comments did not produce increases in compliance to the low-probability requests; however, Kennedy et al. (1995) showed that two interventions (i.e., the high-probability procedure and social comments) resulted in the similar effects.

Many studies on the use of high-probability procedures have been implemented in clinical settings, group homes, homes, special education classrooms, and regular education classrooms. Recently, researchers have attempted to incorporate the high-probability request sequence into appropriate instructional contexts in natural environments (Ardoin et al., 1999; Davis et al., 1992; 1994; 1996; 2000; Killu et al., 1998; Sanchez-Fort et al., 1995; Santos & Lignugaris/Kraft, 1999). They have prompted the extension of high-probability request sequence to improve a variety of functional skills in addition to compliant behaviors.

Social Interaction Interventions

Social relationships with peers are critical for children's development. Building meaningful social relationships between children with and without special needs is one of the most important goals of inclusion (Guralnick, 1999). These relationships are formed when children have positive interactions with peers in the classroom and in the community (Frea, Craig-Unkefer, Odom, & Johnson, 1999). Moreover, positive

interactions with peers is important for later adjustment, acceptance by others, and finally to one's quality of life (Guralnick, 1990). However, young children with disabilities often do not have the prerequisite social skills to develop relationships.

Children with autism have substantial social interaction deficits. The low frequency and quality of their social interactions is one of the most defining features of autism (McConnell, 2002; Rogers, 2000). They rarely initiate or respond to social interactions with their peers whereas typically developing children initiate or respond to social interactions with their peers most of the time (Koegel, Koegel, Frea, & Fredeen, 2001). Children with autism are unlikely to exhibit spontaneous language, gestures, or eye contact before speaking (Zanolli et al., 1996). The lack of social skills and of positive social interactions in children with autism may hinder their long-term development of social behaviors, and this expands the developmental gap between children with autism and their typical peers (McGee, Morrier, & Day, 1999). Numerous researchers note that social interactions between children with autism and typically developing peers are unlikely to occur without systematic and planned social interventions even when they are placed together in inclusive settings (Brown & Odom, 1995; Guralnick, 1990, 1999; Hundert & Houghton, 1992; Kohler & Strain, 1999; Koegel et al., 2001).

Due to the substantial social skill deficits of children with autism, facilitating their social interactions has been a critical issue in educational research. Researchers have developed a wide variety of interventions to increase the social interactions of young children with autism (Kohler, Anthony, Steighner, & Hoyson, 2001; Odom & Strain, 1986; Odom & Watts, 1991; Sainato, Goldstein, & Strain, 1992; Zanolli et al., 1996).

These interventions include environmental interventions (Ivory & McCollum, 1999; Odom, Peterson, McConnel, & Ostrosky, 1990; Sainato & Carta, 1992), naturalistic interventions (McEvoy et al., 1988; Kohler et al., 2001), teacher-mediated interventions (McConnell, Sisson, Cort, & Strain, 1991), and peer-mediated interventions (Goldstein, English, Shafer, & Kaczmarek, 1997; Odom & Strain, 1986; Odom & Watts, 1991; Odom et al., 1985; 1987; 1992; 1999). Among a wide variety of social skill intervention strategies, peer-mediated strategies are the most frequently used interventions and have shown the strongest empirical support of social outcomes (Rogers, 2000; Sasso et al., 1998; Zanolli et al., 1996). Peer-mediated interventions include peer initiation training, peer modeling, and peers participating in group-oriented contingencies (Kohler & Strain, 1990). This review on peer-mediated interventions focuses on peer initiation interventions and peer modeling.

Peer-Mediated Interventions

Peer Initiation Interventions

Interventions using peers as intervention agents train typically developing children to initiate play towards children with disabilities. Peers are cued by teachers to begin to interact with the target children around typical play materials and activities.

Table 2.2 provides a brief overview of the studies on peer initiation interventions.

Odom, Hoyson, Jamieson, and Strain (1985) examined the effects of using peer-initiation intervention packages to increase the social interactions of three socially withdrawn children. The peer confederates were taught to initiate social behaviors toward the children with disabilities at the beginning of the intervention phase. During

Study	Goldstein, English, Shafer, & Kaczmarek (1997)	McGee, Almeida, & Sulzer-Azaroff (1992)
Subjects/ setting	4 typically developing children and 4 children with disabilities, ages ranging from 42 to 61 months (Cohort 1) 4 typically developing children and 4 children with disabilities, ages ranging from 40 to 61 months (Cohort 2) Across activities in an integrated classroom	3 peer tutors and 3 children with autism, ages ranging from 3 to 5 years During free play in an integrated preschool
Dependent Variable & Measurement	Social communicative acts Event recording MOOSSES	Reciprocal peer interactions Continuous 10-s interval recording
Independent Variable	Buddy training procedure	Peer incidental teaching
Experimental Design	A multiple baseline design across subjects	A multiple baseline design across subjects
Results	Increase in social interactions between trained peers and target children	Increase in reciprocal peer interactions
Generality	Yes. Generalized interactions with other children	Yes. One child increased in the generality setting
Procedural Integrity	Yes	No
Social Validity	Yes. By using questionnaire	Yes. By teacher and peer ratings

Continued

Table 2.2 Summary of studies on peer-initiation intervention

Table 2.2 (continued)

Study	Odom, Chandler, Ostrosky, McConnell, & Reaney (1992)	Odom, Hoyson, Jamieson, & Strain (1985)
Subjects/ setting	6 preschool children with disabilities and 10 typically developing kindergarten children	3 preschool children with disabilities and 3 typically developing children
	During structured play activities in two special education classrooms	Structured play, a table activity, and learning centers in a mainstreamed preschool
Dependent Variable and Measurement	Initiations, responses, & social interactions Continuous 6-s interval recording	Initiations & response 10-s interval recording
Independent Variable	Peer training & teacher prompts; teacher prompts & visual feedback; fade verbal prompts; fade visual feedback	Peer initiation intervention & teacher prompts
Experimental Design	A combined sequential and partial withdrawal design	A multiple baseline design across settings
Results	Increase in social interactions, maintained after removing intervention	Increase in social interactions Decrease in social interactions with reducing teacher prompts
Generality	No	Yes. No generalization to other classroom setting
Procedural Integrity	Teacher prompts	No
Social Validity	No	No

Continued

Table 2.2 (Continued)

Study	Odom & Watts (1991)	Sainato, Goldstein, & Strain (1992)
Subjects/ setting	3 preschool children with autism and 3 typically developing preschool children	6 typical children and 6 children with autism
	Structured play activities in an integrated special education classroom	During a free play in an integrated preschool
Dependent Variable and Measurement	Initiations & responses	Initiations & responses
	Continuous event recording within 10-s intervals	Continuous 10-s interval recording
Independent Variable	Peer sociometric ratings Peer initiation intervention; correspondence training with visual feedback	Peer confederate training Self-evaluation training
Experimental Design	A multiple baseline with an embedded multi-element component	A multiple baseline design across subjects
Results	Increase in initiations with teacher prompt (peer initiation intervention) Increase in initiations with correspondence training with visual feedback	Self-evaluation strategy procedure increased social interactions
Generality	No	Yes. Generalized use of self evaluation strategy in other setting
Procedural Integrity	Teacher prompts	Yes
Social Validity	No	No

intervention, the teacher verbally prompted the peer confederate to initiate with the target child if the confederate did not initiate after a short period of time (i.e., 15-20 seconds). The token reinforcement system was implemented for peer initiations toward the target children.

Peers' initiations to the target children resulted in increased positive social interactions, but no generalization to other settings was demonstrated. Social interactions did not substantially decrease after withdrawing the confederates' token reinforcement system; however, they did decrease after reducing teachers' prompts. With reintroducing the teacher prompts to the confederates, peers' initiations increased, which resulted in increased positive social interactions between the target children and the confederate peers. Thus, the findings of this study indicate that teacher prompts are an important part of the peer initiations intervention.

In a subsequent study, Odom and Watts (1991) used correspondence training with visual feedback to fade out teacher prompts in a peer-mediated intervention for young children with autism. Two structured play settings were used for intervention. During the first intervention, three typically developing peers were taught initiation strategies and prompted to initiate play with the children with autism in the first setting. In the second setting, peers were not given any prompts from teachers. Social interactions between the children had increased in the first setting but remained at low levels in the second setting. In the next condition, peer initiation intervention in the first setting was continued, and correspondence training with visual feedback was implemented in the second setting. Social interactions in the second setting increased upon the implementation of corresponding training with visual feedback, but levels of social interactions were lower

than in the peer initiation intervention setting. In the final condition, only correspondence training with visual feedback was implemented in the first setting where peer initiation intervention was implemented. Social interactions with children with autism during this condition maintained the same levels as during the peer intervention condition. The researchers suggested that correspondence training with visual feedback could be used as a less intrusive strategy to reduce teacher prompts.

Sainato and her colleagues (1992) examined the effects of a self-evaluation procedure on preschool children's use of social interaction strategies with their classmates with autism. Three peer confederates were taught the facilitative strategies to initiate with the target children. In addition, each peer confederate was individually taught self-evaluation skills to increase the peer confederates' use of social interaction strategies without extensive teacher prompts. Results indicated that peers increased their use of strategies, and social interactions between the peers and the target children increased only after the self-evaluation intervention was introduced. Self-evaluation skills resulted in an increase of the peers' use of social interaction strategies as well as social interactions between children.

By extending the study by Sainato et al. (1992) and by Odom and Watts (1991), Odom, Chandler, Ostrosky, McConnell, and Reaney (1992) examined the effects of a strategy for fading out teacher prompts in peer initiation interventions. Peers were taught direct social initiations to children with disabilities, and teacher provided verbal prompts only if a social interaction did not occurred within approximately 30-s . In the next condition, teacher verbal prompts to peers and visual feedback that had peers monitor their social initiations toward the target children were provided. Next, verbal prompts and

visual feedback on social interactions to peers were systematically faded out. Peer initiations increased when the peer initiation intervention and teacher prompts were implemented, which resulted in increases in social interactions with the children with disabilities. After systematic fading out of the prompts and visual feedback to the peers, social interactions continued at the levels obtained during intervention and were maintained during a short maintenance period.

In an attempt to increase the maintenance and generalization of the social interactions, McGee, Almeida, Sulzer-Azaroff, and Feldman (1992) examined the effects of peer incidental teaching to increase reciprocal peer interactions in children with autism. Three typical preschoolers were taught to use incidental teaching. The incidental teaching procedure included waiting for the target child to request a toy, asking the target child to label the toy, and providing praise for the correct answer while giving the toy to the target child. As the peers followed the teaching sequence with an experimenter model, the experimenter supervision and assistance were gradually faded out. Peer incidental teaching resulted in more social interactions between the peers and the children with autism. Social interactions between the peers and the target children maintained during the phase of fading out the experimenter's prompts. However, one child among the three children maintained social interactions in the generality setting.

Goldstein, English, Shafer, and Kaczmarek (1997) extended previous peer-mediated interventions to address the limitations in maintenance and generalization. They examined the effects of a peer-mediated intervention package that taught typical peers to better discriminate nonverbal communicative behaviors (e.g., smiling, watching or making eye contact, handing over a toy) when interacting with children with disabilities.

Peers were taught social interaction strategies (buddy training) and prompted to use them during classroom activities. The intervention was distributed across a variety of settings throughout the school day. The peer intervention package across the day resulted in improved social-communicative interactions between the target children and their peer confederates. When peers were reassigned to different target children during generalization probes, the interactions were maintained.

Peer Modeling

As part of the peer-mediated intervention, peer modeling has been suggested as a strategy to increase social interactions (Baily & Wolery, 1992; Kohler & Strain, 1999). Kohler and Strain (1999) suggested that peer modeling might produce positive effects on social behaviors as well as on children's generalized imitation, motor and language, and pre-academic skills. Moreover, the peer modeling procedure may reduce the amount of teacher time and teacher prompts and could provide more helpers in the classroom for children with disabilities (Wert, Caldwell, & Wolery, 1996). This procedure could be easily embedded into classroom routine activities and facilitates more generalized observational learning (Wert et al. 1996). No recent studies using peer modeling to increase social interactions were found. This review includes the studies on using peer modeling to increase imitation of peers' classroom activities. Table 2.3 provides a brief overview of the studies on peer-modeling's effect on imitation.

Carr and Darcy (1990) examined the effects of peer modeling on facilitating peer imitation for young children with autism and whether the effects generalized to different settings. A typically developing peer served as a model for four children with autism

Study	Carr & Darcy (1990)	Venn, Wolery, Werts, Morris, DeCesare, & Cuffs (1993)
Subjects/ setting	4 preschool children with autism and a 5-year old typically developing child A hallway in a day school program for children with developmental disabilities	3 preschool children with disabilities During an art activity in a mainstreamed program
Dependent Variable and Measurement	Imitation of peer modeling Frequency of correct imitated responses of 10 opportunities	Full imitation; assisted imitation, approximation, errors/non responses
Independent Variable	Peer imitation training	5-s momentary time sample Embedded progressive time delay in the art activity
Experimental Design	A multiple baseline design across subjects	A multiple probe design across subjects
Results	Increase in imitated responses	Increase in peer imitation in the art activity
Generality	Yes. Generalized imitation in the nontraining setting	Yes. Generalized imitation in the nontraining setting
Procedural Integrity	No	Yes
Social Validity	No	No

Table 2.3 Summary of studies on peer modeling

using a common preschool activity (Follow-the-Leader). After a peer model was trained to perform the targeted activities, the peer model modeled the activities while telling the target children what to do (e.g., “watch me,” “pick up the cup”). The intervention was implemented at 10 different locations in the hallway. As a result of the intervention, all of the target children demonstrated increased imitation of the model’s behaviors in the intervention and generality setting. Additionally, they reported anecdotal data that the model often embellished an activity and the observer frequently imitated such behaviors during the intervention.

Venn, Wolery, Morris, and Cuffs (1993) conducted a study to examine the effectiveness of embedding progressive time delay in art activities to teach young children with disabilities to imitate peers. Five requests to imitate peers were embedded into daily art activities for three target children with autism and other disabilities. The teacher asked the target child to watch what the peer performed, and then the target child was requested to do it. Physical assistance was provided to perform the behavior modeled by the peer immediately after the request. For the delayed request, the teacher waited for the child to imitate the peer after giving the request. The length of time that the teacher waited after giving the request and before providing the physical assistance increased gradually (e.g., 0-s, 2-s, 4-s, and 6-s). The target children’s peer imitations increased with intervention and generalized into other activities (i.e., fine motor area).

Summary

Peer initiation interventions have demonstrated the effectiveness on increasing social interactions between children with autism and typically developing children. However, researchers have noted that most of the interventions required teacher intensive

prompts and showed lack of maintenance and generalization (Brown & Odom, 1994; Chandler, Lubeck, & Fowler, 1992; Fox & McEvoy, 1993; Hundert & Houghton, 1992; McGee et al., 1992; Odom et al., 1992; Sasso et al., 1998). Researchers have developed procedures in an attempt to increase maintenance and generalization of the effects of peer initiation interventions while using corresponding training (Odom & Watts, 1992), teacher prompt fading out procedures (Odom et al., 1992), self-evaluation strategies (Sainato et al., 1992), peer incidental teaching (McGee et al., 1992) and distributing the intervention across the school day (Goldstein et al., 1997).

The studies have demonstrated that the peer modeling procedure increased the imitation of peer models' behaviors in children with disabilities, and their imitations generalized into the nontraining setting. In addition, the peer modeling procedure may be a less intrusive strategy that can be incorporated into classroom routines without extensive training.

Generality

Stokes and Baer (1977) defined the generalization of behavior as “the occurrence of relevant behavior under different nontraining conditions (across subjects, setting, behaviors, and/or time) without the scheduling of the same events in those conditions as had been scheduled in the training conditions” (p.350). Effective social interaction interventions should be concerned about how behavior changes can be extended across situations, people, and responses to persist over time (Fox & McEvoy, 1993). However, the literature on social interaction interventions reports that the generality of newly learned social behaviors has been limited (Brown & Odom, 1994; Chandler et al., 1992; Fox & McEvoy, 1993; Hundert & Houghton, 1992; McConnell, 2002).

There are a number of strategies used to promote generalized behavior in children with disabilities (Stokes & Baer, 1977; Stokes & Osnes, 1986). Some of these strategies include using natural consequences, using multiple exemplars, and programming common stimuli.

Contacting Natural Consequences

One strategy for increasing generality and maintenance of newly learned social behavior is to teach behaviors that are more likely to contact with naturally reinforcing consequences (Stokes & Osnes, 1986). Certain behaviors are more likely to be reinforced by the natural environment (Fox & McEvoy, 1993). Researchers note that specific behaviors are more likely to evoke social responses and positive social interactions such as sharing, play assisting, verbally organizing play, rough and tumble play, and showing affection (Tremblay, Strain, Hendrickson, & Shores, 1981; Fox & McEvoy, 1993; Goldstein et al., 1997). Additionally, studies on friendship activities demonstrated that greeting, sharing, complimenting, and sharing affection behaviors have a high probability of receiving positive responses from peers and of facilitating positive interactions (McEvoy et al. 1990; Twardosz et al., 1983).

Teaching children to recruit social behavior from peers would promote generalization to other situations and other children (Stokes & Osnes, 1986). For instance, teaching children specific play initiations (e.g., “Let’s play duck-duck-goose.”) and general social initiations (e.g., “Come play with me”) would be more likely to recruit natural consequences (Brown & Odom, 1994). Importantly, both increasing functional social initiations of children with disabilities as well as increasing responding to peer initiations would facilitate contacting with natural consequences (Brown & Odom, 1994).

Using Multiple Exemplars

More generality of social interactions in children with autism has been observed in interventions using multiple trainers, multiple settings, and multiple response exemplars (Stokes & Osnes, 1989). Multiple exemplar training in social behavior has been applied across multiple peers, other stimuli, or activity settings (Fox & McEvoy, 1993). Additionally, teaching multiple exemplars of target social skills is important to increase generalization of social behaviors. Only initiation or only responding to other's social behavior may not be effective since many possible social initiations and responses might be appropriate across the various situations (Brown & Odom, 1994).

Programming Common Stimuli

Newly acquired social skills would be more likely to generalize into the nontraining setting if the nontraining setting shares common physical and social stimuli with the training setting (Brown & Odom, 1994). The most frequent common physical stimuli have included the same room or physical setting, the same type of assessment, or the same type of toys (Fox & McEvoy, 1993). Additionally, the presence of the interventionist or trained peers in the generality setting may facilitate generality because of acquired discriminative properties (Stokes & Osnes, 1989).

Conclusion

The importance of children's development and learning in the early years has been strongly emphasized in practice and research (Sandall et al., 2000). To date, a variety of empirically validated strategies in early childhood special education and applied behavior analysis have been developed. The increasing inclusion of young children with disabilities demands broader strategies that accommodate the range of

children's educational needs and that can be easily incorporated into instructional routines. Among the variety of effective instructional strategies, the high-probability request sequence has been demonstrated as an antecedent and non-aversive procedure, which can be well incorporated into classroom routines (Ardoin et al., 1999; Davis et al. 1992, 1994, 2000; Killu et al., 1998; Santos & Lingungaris/Kraft, 1999; Sanchez-Fort et al., 1995). Few studies on the use of the high-probability request sequence have addressed the social behaviors of young children with autism with peers in their natural environment (Davis & Reichle, 1996; Davis et al., 1994).

Building positive social relationships between children with and without disabilities is one of the most important goals of inclusion. Due to the substantial social skill deficits of children with autism, promoting positive social interactions in young children with autism has been a critical issue in educational research. Peer-mediated interventions have demonstrated the strongest empirical support for increasing social interactions between children. However, researchers noted that these strategies often required extensive teacher prompts and showed lack of generalization and maintenance of social interactions (Chandler et al., 1992; Hundert & Houghton, 1992; Odom et al., 1992; Sainato et al., 1992; Sasso et al., 1998). Few studies have been implemented to teach social behaviors to children with autism as well as to their typically developing peers.

Teaching social behaviors to children with autism as well as to the typically developing children at the same time would be a powerful intervention to increase social interactions (Odom & Watts, 1991). This study will extend the literature by examining the effects of a combined high-probability request sequence and peer-mediated

intervention on increasing social interactions of young children with autism in an inclusive setting. In addition, this study will examine the effects of the intervention on generalized social interactions. Social validity measures will be obtained from parents of participants, and professionals in early childhood education.

CHAPTER 3

METHOD

This section describes the research methodology, data collection and analyses used to answer the research questions. A description of the children, setting, materials, dependent variables, measurement, procedural integrity, research design, procedures and social validity measures are included.

Participants

The participants were selected from an inclusive charter school for children with autism spectrum disorders. This study was conducted in the preschool/kindergarten transition classroom. The classroom consisted of six children with disabilities and seven typically developing peers. The classroom had one lead teacher and two assistants. The participants included three children between the ages of 4 and 6 years old. One target child had an independent diagnosis of autism by the 1994 American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (4th ed.). The two other target children had been independently diagnosed as PDDNOS (Pervasive

Developmental Disorder, Not Otherwise Specified). Six of the typical peers in the class were also included in this study. Participants with disabilities were selected who had IEP objectives related to social skills.

Direct observations of the students were conducted in the classroom as well as interviews with teachers in order to identify participants who did not interact with peers during free play center time. Several prerequisite skills were required for inclusion into the study. Participants were required to have the ability to imitate simple motor tasks and verbalization. For the children with autism, scores on the Childhood Autism Rating Scale (Schopler, 1988) were obtained from the school record or assessed by the experimenter. The CARS is a 15-item rating scale that differentiates between mild/moderate to severe autism and other developmental disabilities. Each child's cognitive skills and communication skills were assessed by the experimenter using the Battelle Developmental Inventory (Newborg et al., 1984). Results from the tests are summarized in Table 3. 1. Typical peers who followed teacher directions consistently, who demonstrated age appropriate interactions with peers, and who attended school regularly were chosen from the classroom. These trained peers were three females ages 51, 52, and 61-months old, respectively. Another three nontrained generality peers were two males, and one female ages, 66, 51, and 54-months old, respectively. Parent permission was obtained for all participants prior to the beginning of data collection, in addition to permission from The Ohio State University Behaviors and Social Science Institutional Review Board.

Characteristics	Eric	Paul	Chris
Age	63 months	75 months	77 months
Sex	Male	Male	Male
Diagnosis	PDDNOS	PDDNOS	Autism
CARS ^a	31.5	33.5	42
Cognition ^{b,c}	43 months	35 months	30 months
Receptive Language ^{b,c}	32 months	23 months	23 months
Expressive Language ^{b,c}	30 months	18 months	16 months

^a- Childhood Autism Rating Scale (Schopler, 1988), scores of 30-36 indicating mild to moderate autism and scores over 36 indicating severe autism.

^b- Battelle Developmental Inventory (Newborg et al., 1984)

^c- Age-equivalency scores reported in months

Table 3.1: Characteristics of target children

Eric

Eric was a 63 month-old male who had an independent diagnosis of PDDNOS (Pervasive Developmental Disorder, Not Otherwise Specified), who attended a center-based early childhood special education classroom for two years. He received a score of 31.5 on the Childhood Autism Rating Scale (Schopler, 1988) indicating mild to moderate autism. Eric received the following age equivalent scores on the Battelle Developmental Inventory (Newborg et al., 1984): cognition, 43 months; receptive language, 32 months; and expressive language, 30 months. He was able to verbally respond to adults and peers,

and sometimes expressed spontaneous comments. Eric participated in action songs during circle time, however, he often engaged in stereotypic finger flapping and in the inappropriate play with toys during center time. Eric often did not interact with peers appropriately although he sometimes responded to his peers' initiations. If other children attempted to engage Eric he often ignored them or exhibited negative responses toward them.

Eric's peer, Stacie, was a 53 month-old female. Stacie engaged in play with others and followed the teacher's directions. Stacie would occasionally attempt to talk with her friends, but would easily cease to initiate if they did not respond. Eric's generality peer, Megan, was a 54 month-old female. She engaged in appropriate play with her friends or herself, and most of time was quiet.

Paul

Paul was a 75 month-old male who had an independent diagnosis of PDDNOS, and had attended a center-based early childhood special education classroom for three years. He received a score of 33.5 on the Childhood Autism Rating Scale (Schopler, 1988) indicating mild to moderate autism. Paul received the following age equivalent scores on the Battelle Developmental Inventory (Newborg et al., 1984): cognition, 35 months; receptive language, 23 months; and expressive language, 18 months. Paul participated in action songs during circle time, and followed teachers' simple, and routine requests; however, he exhibited disruptive behaviors (e.g., kicking, crying, hitting himself, throwing away the task materials) when he was asked to do demanding tasks or requests. Paul did not exhibit appropriate play skills and often engaged in stereotypic play with \

several specific toys (e.g., horses, dinosaurs, etc.). Paul responded to teacher's initiations, however, he seldom interacted with other children, and was more likely to avoid other children when they initiated to him.

Paul's peer, Jennifer, was a 51 month-old female. Jennifer played and interacted with other children appropriately, however, she was hesitant to initiate to Paul, and would seldom engage with him. Paul's generality peer, Randy, was a 66 month-old male. Randy would play with Jennifer, however, he seldom engaged in play with Paul although he played in close proximity to him.

Chris

Chris was a 77-month-old male who had an independent diagnosis of autism, who had been the recipient of a discrete trial program for two years, and who had attended a center-based early childhood special education classroom for 3 years. Chris received a score of 42 on the Childhood Autism Rating Scale (Schopler, 1988) indicating severe autism. Chris received the following age equivalent scores on the Battelle Developmental Inventory (Newborg et al., 1984): cognition, 30 months; receptive language 23 months; and expressive language 16 months. Chris liked to write letters, draw, and hold the puppy book while sitting in a bean bag, and sucking his thumb. Chris was able to follow the daily routine; however, he exhibited disruptive behaviors (e.g., screaming, hitting himself or others on the head, pinching, scratching, etc.) during some transition times. He seldom engaged in play and typically stared into space while sucking his thumb. When he was asked to do demanding tasks, he often screamed, hit, pinched, or scratched others. When other children attempted to play with him, he often yelled or hit them.

Chris's peer, Hilary, was a 61 month-old female. She was very responsible child who took charge of her friends with disabilities. Hilary was not fearful of Chris's behavior and sometimes gave Chris prompts not to do certain inappropriate behaviors. Although Hilary occasionally attempted to play with Chris, if other children were present she would often engage them. If Chris did not respond she would cease to initiate and play by herself. Tyler, Chris's generality peer, was a 51-month-year old male. He was not fearful of Chris's behavior even when Chris attempted to pinch him.

Experimenter

The experimenter is a doctoral candidate in the Special Education and Applied Behavior Analysis program at The Ohio State University. She was a teacher in a middle school for three years, an early childhood special education teacher for two years, an educational diagnostician, and an administrator in early childhood special education for five years prior to her enrollment in the doctoral program.

Classroom Staff

The classroom staff consisted of one lead teacher and two teacher assistants. The lead teacher holds Ohio certification in Developmental Handicaps and Early Education of the Handicapped and has taught preschoolers with disabilities for five years. Both of the teacher's assistants are certified as independent care providers in the state of Ohio. The assistants had each had one year of experience in a classroom setting.

Research setting

This study was conducted in a private charter school licensed by the state of Ohio to deliver educational services for children from preschool through third grade. This study was conducted in the preschool/kindergarten transition classroom. The classroom

consisted of six children with disabilities and seven typically developing peers between the ages of 4 and 6 years old. The classroom contained one teacher and two assistants. The classroom was separated into defined play areas (See Figure 3. 1).

Figure 3.1 Illustration of classroom

These play areas included a kitchen area, an art/manipulative area, blocks and trucks area, books/language area, train table, workbench, and a sensory area. Three intervention settings were selected for each target child based on the child's preference and the settings that would encourage interactive play between children. The targeted areas for the study were the kitchen area, blocks and trucks area, train table, and drawing area. The sensory area, workbench, and blocks and trucks were selected for generality settings as well. The daily schedule in the classroom included free play, circle time, center time, story time, lunch, recess, art/language/math/ board games, and snack. Research was conducted Monday through Friday 10:00-11:00 a.m. during center time.

Materials and Equipment

A variety of materials and equipment were used to implement this study. These included toys and play materials, index cards, data collection forms, consent forms, video camera, tripod, videotapes, audiotape recorder, interval tape, stop watch, and two placemats.

Toys and Play Materials

Each of the three target areas per child was clearly defined and contained easily accessible age appropriate toys and materials. Toys and play materials were selected based on the following criterion: developmental and age appropriateness, the extent to which items were found in typical preschool settings, child preferences, and the likelihood that the toy would prompt social interactions.

Kitchen area. The following items were located in the kitchen area: a child size table, two chairs, play stove, sink, baby doll, baby bottles, play food, play pizza set, play dishes, lunch box, cash register, play money, dress-up clothes and hats, and a play doctor kit.

Blocks and Trucks. Two .9 m by 1.2 m bookshelves contained the following materials: cardboard blocks, wooden blocks, construction vehicles, cars, semi-trucks, dump trucks, airplane, farm animals, dinosaurs, a castle and knights, and pop tubes.

Train table. The table was a 1.8 m by .8 m wooden train table. On the table was a large wooden track that circled the perimeter of the table with a bridge and a mountain, cave and train station. There were a variety of trains, trees, houses, road signs, barrels, and loaders.

Art/Manipulative area. The Art/Manipulative area was placed near a big table, and materials were available on a nearby bookcase. This area included paints, markers, glue, play dough, a variety of puzzles. Drawing materials and a notebook were used for intervention.

Index Cards

White, 13 cm by 7.5 cm index cards were used to cue the experimenter on the delivery of requests.

Data Collection Forms

Printed data collection forms were used to record and code during intervention and generality: (a) participant's prompted initiations (i.e., those initiations preceded by a low probability request), (b) unprompted initiations by participants, (c) responses to initiations, (d) delivery of and response to high probability and low probability requests,

(e) inter-prompt time (i.e., time between the reinforcement of the previous request and the delivery of the next request), (f) negative interactions, and (g) disruptive behavior, (h) experimenter general prompts (see Appendix A). Other forms include the procedural integrity checklist (see Appendix C), parent and teacher questionnaires (see Appendix D), social validity forms (see Appendix E), and high-probability and low-probability request status assessment forms (see Appendix F).

Consent Form

Signed consent forms were obtained from the parent of each child participating in the study. Consent forms were secured for the purpose of (a) the child's participation in the research study; (b) permission for the child to be videotaped; and (c) permission for release of information (see Appendix G).

Video Recording Equipment

All experimental and generality sessions were recorded on digital video cassette tapes. A Sony Digital Handycam video camera (DCR-TRV340 NTSC) was used to record all sessions. A Sony Electret Condenser Microphone was attached to the video camera to enhance the quality of videotape to measure the children's behavior. The camera was positioned on a tripod mounted on a countertop to enable views of all play areas.

Audio tape recorder and 6-s Interval Tape

A 6-s interval tape was made using a stopwatch and a handheld cassette recorder for coding purposes. The 6-s intervals were played directly into the auditory system of the video camera by placing it within range of the video camera microphone.

Stop Watch

A digital stopwatch was used for timing the intervention.

Placemats

Two placemats were used to help children define the play area in the block area. The placemats were .4 m by .3 m in size.

Definition and Measurement of Dependent Variables

This study focused on increasing social interactions between children with autism spectrum disorders and typically developing peers in an inclusive setting. During baseline and intervention, responses to low probability requests (i.e., prompted initiations), unprompted social initiations, and unprompted social responses were measured as dependent variables. Additional data on negative interactions and disruptive behaviors were observed. The dependent variables were defined as follows:

Definition of Dependent Variables

Response to low-probability request

The response to a low- probability request was defined as the child initiating the requested response within 5-s and the successful completion of a targeted low-probability request as determined (See Appendix H). In this study, the low-probability requests were the requests to initiate to a peer, which the student had a history of being unlikely to respond (i.e., with a criterion of responding to less than 50% of the opportunities). The assignment of low probability request per target child was determined during assessment (see Appendix E). Examples of low-probability requests are presented in Table 3. 2.

Participants	Low-probability request (percent correct responses to requests during assessment)	High-probability request (percent correct responses to requests during assessment)
Eric	Say to (peer) “how are you?”(50%)	Hands on your shoulders (80%)
	Say to (peer) “fly the plane to me” (60%)	Build an airport (80%)
	Push the train to (peer) (40%)	Connect trains together (90%)
	Say to (peer) “I am making a sandwich for you” (60%)	Put the sandwich on the plate (90%)
Paul	Shake hands with your friend (50%)	Move your shoulder (80%)
	Say to (peer) “horse please” (60%)	Put the cow in the farm (90%)
	Say to (peer) “train please” (40%)	Put the barrel in loader (80%)
Chris	Give (peer) the pizza (40%)	Cut the pizza (90%)
	Say to (peer) “hi, (peer)” (40%)	Clap your hands (70%)
	Say to (peer) “notebook, please” (40%)	Write the letter “C” (80%)
	Give (peer) the train (50%)	Push the train (80%)
	Put the sandwich on (peer)’s plate (50%)	Put the cheese on your pizza (90%)

Table 3.2: Examples of low-probability and high-probability requests for target children
(Note: Complete low-probability and high-probability requests are located in Appendix H)

Social Interaction

Social interaction was categorized into initiations, and responses. Social interactions were defined and measured using adaptations of Odom et al.'s recoding system (1987; 1992).

Initiation. An initiation was any verbal or gestural behavior that the target child directed to a peer or the peer directed to a target child that was not preceded by a social behavior from the same peer in the previous 3-seconds.

Response. A response was any verbal or gestural behavior that was directed toward a peer initiation that occurred in the previous 3-seconds. The following statements describe social interactions:

1. Attention seeking: The child attempts to direct or call the attention of the other child (e.g., making eye contact, verbal greeting or any appropriate physical gesture, tapping a child on the arm, saying "look at this", and showing off).
2. Greeting: The child emits a vocal greeting (e.g., "Hi," "How are you," "Hello," etc.) or any appropriate physical gesture (e.g., hand waving).
3. Requesting: The child orders or directs other children in order to receive an object, information, or begin or terminate some activity.
4. Complimenting: The child makes statement indicating affection, attraction, or praise.
5. Assisting: The child teaches, shows how to play, or helps another child.
6. Play organizing: The child verbally specifies an activity, role, or other play for peers (e.g., "Let's play house.").

7. Sharing or cooperating: The child offers or exchanges an object with another child; both cooperate in the use of one object or toy or both simultaneously use the same materials or engage in turn taking.

Other Behaviors

Negative social interaction. Negative interaction was defined as any inappropriate verbal or gestural behavior toward another child such as hitting, kicking, pushing, destroying others' construction, or vocalizations such as crying, shouting, or a calling another child name.

Disruptive behavior. Disruptive behavior was defined as any inappropriate verbal or gestural behaviors such as throwing away the toys, hitting himself, or screaming during play, or inappropriate responses by the child that were not necessary for performing a request.

Measurement

The children were videotaped during one hour center time using a video camera mounted on a tripod. The secondary observer monitored the video camera during all sessions to capture all aspects of the experimental phases. Children's behaviors were recorded using a combination 6-s partial interval and event-recording scheme for 10 minutes. Children's discrete social initiations, responses, and other behaviors such as negative interactions, disruptive behaviors, and self-stimulating behaviors were measured via 6-s partial interval recording. Children's responses to high-probability and low-probability requests were recorded using event recording. Based on a count of appropriate responses to high-probability and low-probability requests, a percentage of appropriate responding to requests was calculated. Children's responses to requests were

categorized into responses, nonresponses, and noncompliance. Coding sheets were designed to capture the relevant dimensions of the observations (see Appendix A).

Procedures to Assess Believability of Data

Accuracy measures were conducted and analyzed to ensure the believability of the coded data. Approximately 20% of all videotaped sessions were observed by a second observer to determine the accuracy of the observations. A percentage correct was calculated for children's responses to the requests, social initiations and responses, disruptive behaviors, delivery of low-probability request and high-probability request sequences, and the experimenter's general prompts.

Accuracy Measures

All experimental and generality sessions were videotaped. Accuracy data were collected for children's responses to the requests, social initiations and responses, disruptive behavior, delivery of low-probability and high-probability requests, and the experimenter's general prompts.

Observers. The experimenter served as the primary observer and recorded children's responses to requests, social initiations and responses, other behaviors including negative interactions, disruptive behaviors, self-stimulating behaviors, delivery of low-probability and high-probability requests, and the experimenter's general prompts during experimental and generality sessions from observing the videotapes.

The second observer was an undergraduate student major in special education at The Ohio State University. The observer had experience working with young children with disabilities as a teacher assistant. The second observer conducted accuracy measures for dependent variables, delivery of low-probability and high-probability

requests, and the experimenter's general prompts. The second observer also collected data to measure procedural integrity checklists, and helped monitor the video camera to capture all aspects of the experiment.

The third observer was a undergraduate special education student at The Ohio State University who had completed at least one course and practicum that involved working with young children with disabilities. The third observer collected data to measure procedural integrity by checklist and helped monitor the video camera to capture all aspects of the experiment.

Training. Prior to the beginning of the study, the experimenter provided the second observer with written and verbal definitions of the dependent variables (see Appendix B). The observers jointly viewed and discussed videotapes of children during center time. The experimenter and second observer identified and coded children's social initiations, responses, and experimenter's general prompts using the 6-second interval tape. The experimenter and second observer identified and coded children's responses to low-probability requests and high-probability requests using the event recording. The experimenter and second observer trained until they reached at least 95% agreement on at least two sessions.

General procedures for accuracy measures. Following each session the experimenter independently viewed and coded the video tape. Dependent variables and experimenter's behaviors were identified and coded on the data collection sheets. For measurement of accuracy the experimenter and second observer jointly viewed the

videotape and independently coded and recorded the dependent variables and experimenter behaviors. If coding was not clear for any observer, two observers watched the behavior until the observers reached to the agreement.

Accuracy measure was assessed for approximately 20% of the sessions for each child during each phase of the experiment. The percentage of agreement was calculated for each child by dividing the number of agreements by the number of agreements plus disagreement and multiplying by 100 (on a point by point basis for occurrence and non occurrence) (Cooper, Heron, & Heward, 1987). The following formula was used for calculating percentage accuracy:

$$\frac{\text{\# of agreements}}{\text{\# of agreements} + \text{disagreements}} \times 100 = \text{agreement \%}$$

Procedural Integrity

Procedural integrity measurements were conducted to ensure that the experimenter accurately and consistently implemented the intervention with each child. Two primary measures of procedural integrity occurred. First, a checklist of the steps used during intervention was developed for each condition. Second, the delivery of low-probability and high-probability request, and the number of intervals of experimenter prompts provided to the students were recorded and counted. Accuracy was calculated for 20% of the experimental and generality sessions.

Checklist of the steps used during intervention. A checklist of experimental procedures was developed and provided to the second and third observers. The observers completed the checklists while observing experimenter behaviors across all conditions. The observers marked each procedural step with regard to experimenter behavior as

either observed (+), not observed (-), or not applicable (NA). If the experimenter did not maintain at least a 90% correct implementation of the procedural steps, a review of the steps was conducted using written material and practice of the procedural implementation without the presence of the child. Interobserver agreement between the second and the third observers for procedural integrity was conducted for 20% of all experimental phases and generality sessions.

Delivery of low-probability and high-probability requests. Experimenter's behaviors necessary for implementing each low-probability and high-probability request sequence were recorded by the experimenter and second observer while viewing videotaped sessions using the event recording scheme. Observers ensured that at least three high-probability requests were delivered prior to the delivery of a low-probability request, and at least three appropriate responses to high-probability requests were obtained prior to the delivery of a low-probability request. Appropriate responding to both high-probability requests was followed by a praise statement, and these were measured as well. Inter-prompt time between the reinforcement of the previous request and the delivery of the next request was measured to ensure that the experimenter delivered each request within 5-s after reinforcement for performing the last request.

Response to high-probability request. The response to a high-probability request was defined as the child initiating the requested response within 5-s and the successful completion of a targeted high-probability request as determined (See Appendix H). These behaviors are responses to requests to which each participant performs consistently or is likely to respond to (i.e., with a criterion of 80 % or greater). Each target child's high-probability requests were assessed. The high-probability requests consisted of the

requests to perform preferred action songs that the child liked and the play skills appropriate within the given context. Examples of high-probability requests are presented in Table 3.2.

Experimenter's general prompts. The experimenter general prompts were measured by the experimenter and second observer while viewing videotaped sessions using a partial-interval recording scheme. The experimenter's general prompts were defined as prompts to direct the child's inappropriate behaviors. The experimenter provided general prompts to stay in the assigned center, to engage in the play, or to stop disruptive behaviors (e.g., "Get busy," "Stay in your center," "Don't hit your friend," "hands down," etc.).

Experimental Design

A single subject multiple baseline design across subjects was used to assess the effects of high probability request sequence with embedded peer modeling on increasing social interactions between children with autism and their peers during center time. When using a multiple baseline design across subjects, the effects of the independent variables were predicted, verified and replicated by the repeated opportunities provided by using several subjects. Predictions were based on the response of the participant when exposed to the intervention after stable responding occurred during baseline. Verification occurred when the participant moved into the intervention condition with no change in the baseline responding of the other participants. This pattern was repeated as each participant moved from one condition to the next. Replication occurred when participant's target behaviors responded in the same manner as the other participant's when introduced to the same experimental conditions (Cooper et al., 1987). Experimental control was demonstrated in

this design by determining the children's level of compliant responding to low-probability requests, and social interactions between children. The levels of compliant responses to requests during low-probability request alone were compared to the same behavior following the systematic implementation of high-probability request sequences with embedded peer modeling. The levels of social interactions were compared with baseline levels of the same behavior. There was an increase of child behaviors during intervention over the established baseline levels of the same behaviors, while baseline conditions remained the same for the other children.

Data were collected and graphed during the intervention period for percent correct responses to requests, and the number of the intervals of social initiations and responses. Intervention was introduced sequentially when stable responding had occurred. The intervention was implemented for the first participant when a stable rate of responding was present during the baseline condition in both the intervention and generality settings. Intervention was introduced to the second child when the first child demonstrated stable responding to the intervention. The same decision guidelines were used before starting intervention for the third child. This process was replicated when introducing the next phase of experiment.

Data Analysis

Experimental control in a multiple baseline design is observed by visual inspection of the data. Visual inspection was used to evaluate the experimental effects and determine the clinical significant of the intervention (Cooper et al., 1987). Daily data collection provided a basis for the decisions regarding progress and when to make

condition changes. Within each condition, data were analyzed to determine the number of data points, variability within phases, and changes in level and trends within and between phases.

The percent correct responses to requests and the number of intervals of social initiations and responses were the basis of the experimental analysis and were graphed daily. Additional data were collected on negative interactions, disruptive behaviors and self-stimulating behaviors in the intervention and generality setting. Data were collected across all experimental conditions. The experimenter behaviors including delivery of low-probability and high-probability requests and the experimenter general prompts were also monitored.

Procedures

The five experimental conditions were as follows: baseline, low-probability requests alone, high-probability request sequence with embedded peer modeling, low-probability requests alone, and maintenance (prompt removal). Generality probes were conducted in the nontraining setting during center time which followed the experimental sessions across all conditions.

General Procedures

For the purpose of the study three specific play areas per child were chosen based on the children's play preferences and play materials prompting interactive play. These play settings included kitchen, blocks and truck area, train table, and art/manipulative area. Children's participation in each setting was rotated throughout the study. The preschool's normal routine during center time was to have the children play in two centers that the teacher assigned before the class. Children could move from center to

center within the assigned two centers. The experimenter assigned one intervention center and generality center, and the teacher assigned another center. The target child, the peer, and the generality peer were assigned the same center. However, no instruction was given to the generality peer except a general prompt when they left the assigned center and when they engaged in inappropriate behaviors. Children were required to play in each area for 10 minutes. The second observer started to play the interval tape right after the experimenter gave the general instruction to the target child and the peer, and cued the experimenter to conclude after 10-min.

Normative Measurement

Prior to baseline, observations were conducted to obtain normative data on the numbers of intervals with social initiations, and social responses among typically developing peers. Five typical children were randomly selected in the same class. The experimenter collected data on the children's social initiations and responses toward other children in the training setting during a center time. These observations were conducted for 5 days for all five students. The average intervals of social initiations were 7.4 for 10-min play. The average intervals of social responses were 1.6. The average intervals of total social behaviors (i.e., initiations and responses) were 9 during 10 minutes. These observation data were similar to the previous studies (Davis & Reichle, 1996; Davis et al. 1994) which observed 8 initiations by young children during the 10-minute free play. These data provided a guide to determine how frequently a low-probability request (i.e., prompt for social initiation) should be issued to approximate natural peer interactions.

Status Assessment of High-Probability and Low-Probability request

Children's preferences for center time activities and play materials were observed. Teachers and parents were also surveyed with regard to children's preferences prior to assessment of high-probability and low-probability requests. Three intervention settings and one generality setting per child were selected. The high-probability and low-probability status of requests in each intervention setting was determined by assessing each child's responding to the pool of requests. In addition to play settings, the requests adapted from action songs and friendship activities were assessed. Friendship activities using songs and games have demonstrated effects on increasing social interactions among children, prompting greetings, complementing, and displaying affection behaviors (Brown, McEvoy, & Bishop, 1991; Brown, Raglan, & Bishop, 1989; Brown & Odom, 1995; Cooper & McEvoy, 1996; McEvoy, Twardosz, & Bishop, 1990; Twardosz, Nordquist, Simon, & Botkin, 1984).

Prior to assessing the status of high-probability and low-probability requests for each child, the experimenter examined the children's IEP, observed the participants in the centers, and surveyed the teacher, the teacher assistants, and the parents about the requests that the children could perform during play (see Appendix D). Early childhood special education teachers were asked to determine whether the play skills were appropriate for young children. Next, the experimenter selected the requests that were relevant to three play settings and adapted from action songs and friendship activities for each child. Specific requests were delivered 10 times to each child, and a percentage of correct responding was calculated during a 3 week assessment period. The low-probability requests (i.e., requests for social initiations) were determined by children's

responding to less than 50% of the opportunities. The high-probability requests were determined with a criterion of children's responding to 80% or greater of the requests. However, for Child 1, Eric, low-probability requests were those to which he responded 60% or less of the time. For Child 3, Chris, high-probability requests were those to which he responded 70% or more of the time. Four low-probability requests in each of three intervention settings and four requests adapted from friendship activities were determined. The total low-probability requests per child were 16 requests. Thirty three high-probability requests for Child 1, Eric, and Child 2, Paul, and 28 high-probability requests for Child 3, Chris were determined (see Appendix H).

Baseline

The target child, typical peer, and generality peer were assigned to an intervention center. Three intervention settings per group were rotated throughout the sessions. The target child and his peer were instructed, "Stay in your center and play with your friend. Now go and play." Stickers or small toys were offered non-contingently to the target child and peer before starting play. The generality peer played in the same center without any instruction. The experimenter gave general prompts to play only when the child was off-task or engaged in stereotypic behaviors or disruptive behaviors (e.g. "Get busy," "Play, stay in your center," etc.). If the child was engaged in disruptive behavior, the experimenter followed the behavior management procedures regularly used by the classroom teachers. That is, the experimenter brought the child to the chart, and had the child put the sad mark on it while providing corrective feedback (e.g, "Pinching your friend is not a good choice. That's sad. Don't pinch your friend.")). The experimenter did

not give any specific prompts to interact with children. After 10-min play, the children were verbally praised for doing a good job and were told that they may stay or change their center.

Peer training. After stable responding was achieved in baseline, the experimenter trained the peer to recognize the target child's initiations and to respond to them. The experimenter used role-play and discussion for peer training.

The peer was told the play situation specific to the target child's play settings and available toys. The second observer or third observer played the role of the target child. The experimenter delivered the low-probability request to the observer and the observer responded to the experimenter's low-probability requests as if she were the target child. The peer was told to wait until the target child followed the experimenter's instruction when the experimenter told the target child what to do. The experimenter asked the peer what her response might be to the initiation. When the peer did not respond appropriately, the experimenter modeled and discussed how to respond to the initiation. The same procedures continued for all target behaviors in three intervention settings. Peer training sessions continued until the peer reached to the criterion of 90% correct responses to the experimenter's questions for 3 consecutive sessions. Peer training scripts for three peers are located in Appendix I.

Additionally, when the peers' responses to the target children's prompted initiations or unprompted initiations decreased, the experimenter reviewed the target behaviors with the peers and asked what their responses might be to the given initiation. The review sessions with each peer were conducted before the intervention in each intervention setting during sessions # 51 through #55.

Low-probability requests alone

The target child, peer, and generality peer were assigned to an intervention center. Three intervention centers chosen for each target child were rotated throughout the sessions. The experimenter delivered eight low-probability requests to each target participant during a 10-min center time. Low-probability requests were verbal requests to initiate social behavior toward the peer (See Appendix H). Eight low-probability requests included four requests adapted from friendship activities (e.g., “Shake hands with your friend,” “Say to Hilary, Hi,” etc.) and four other requests relevant to the assigned play setting (e.g., “Push the train to Stacie,” “Give Jennifer the pizza,” etc.). Low-probability requests were written on individual index cards to cue the experimenter on the delivery of requests. Before each session the experimenter shuffled the cards with low-probability requests to vary the order of their delivery. However, the low-probability requests included friendship activities that were delivered at the beginning or end of the session in the appropriate context.

Before starting to play, the target child and the peer were told “Stay in your center and play with your friend. Now, go and play.” No instructions were given to the generality peer assigned in the same center in order that she/he would be able to play with either the target, peer, or by herself/himself. After giving the general instructions, the experimenter delivered a low-probability request to the target child. If the target child performed the request within 5-s, the experimenter provided verbal and gestural praise. If the target child did not perform the request, the experimenter waited approximately 75-s, an amount of time that was based upon the normative data and previous studies (Davis & Reichle, 1996; Davis et al., 1994). After the 75-s, the experimenter delivered a

new low-probability request. No consequence was provided for nonresponse to requests. The experimenter did not issue any specific prompts to interact; general prompts were issued when the child was off-task or engaged in stereotypic behaviors or disruptive behaviors (e.g. “Get busy,” “play, stay in your center,” etc.). After 10-min of play the children were verbally praised, and toys or stickers were given to the target child and the peer.

High-Probability Request Sequences with Embedded Peer Modeling

Once stable baseline responding was established the high-probability request sequence using embedded peer modeling was implemented. The target child, peer, and generality peer were assigned to an intervention center. Three intervention centers chosen for each target child were rotated throughout the sessions. The same eight low-probability requests as the previous low-probability request condition were used. High-probability requests consisted of the requests to perform play skills relevant to the play setting (e.g., “Cut the pizza,” “Build an airport,” etc), and the requests adapted from action songs (e.g., “Hands on your shoulder,” “Move your eyebrows,” etc.) (see Appendix H). The high-probability request sequences for each child were written on the index cards to cue the experimenter. Each card displayed 6 different high-probability requests written. The cards were shuffled every session so that the order of delivery was varied.

Before starting the intervention, the target child and peer were told, “We are going to play a fun game. You need to listen to me, and listen to your friend to play together. And do what I am asking you.” The high-probability request sequence was first delivered to the peer, and then the same high-probability request sequence was delivered to the target child. In effect, the target child observed how the peer responded to the requests, and how

she was praised. Furthermore the peer initiated the target child responding to a social behavior. Table 3. 3 presents an example of the high-probability request sequence using embedded peer modeling.

Delivery of high-probability request sequences to peer			
Experimenter	Peer	Experimenter	Target
“Cut the pizza”(High-P)	Cut the pizza	Praise	Observe
“Put the pizza on the plate” (High-P)	Put the pizza on the plate	Praise	Observe
“Pretend to eat pizza” (High-P)	Pretend to eat pizza	Praise	Observe
“Give(peer) the pizza” (Low-P)	Give the target child the pizza	Praise	Receive the pizza
Delivery of high-probability request sequences to target child			
Experimenter	Target child	Experimenter	Peer
“Cut the pizza”(High-P)	Cut the pizza	Praise	Observe
“Put the pizza on the plate” (High-P)	Put the pizza on the plate	Praise	Observe
“Pretend to eat pizza” (High-P)	Pretend to eat pizza	Praise	Observe
“Give(peer) the pizza” (Low-P)	Give the peer the pizza	Praise	Receive the pizza

Table 3.3 Example of a high-probability request sequence using embedded peer modeling

The high-probability request sequence included (a) rapid-paced delivery of three high-probability requests (i.e., within 5-s of each other); (b) delivery of verbal or gestural praise (e.g., tickling, patting, thumbs up, etc.); and (c) delivery of the low-probability request within 5-s reinforcement for performing the previous high-probability request.

After issuing the high-probability request, if the child did not perform the request, a different high-probability request was delivered 5-s after the delivery of the previous request. The experimenter continued to deliver high-probability requests until three consecutive responses were obtained. The low-probability request was delivered immediately (within 5-s) after reinforcement for performing the last high-probability request. If the child did not respond to the low-probability request, the experimenter issued the next high-probability request sequence 5-s after the delivery of the previous request. If the children did not continue the interactive play after successful performing the high-probability request sequence, the experimenter issued the next high-probability request sequence. After 10-min of play the experimenter provided verbal praise, gave the children a sticker or a small toy and asked them to give it each other while saying “good job.”

Low-Probability Requests Alone

During this condition, the high-probability request sequence using embedded peer modeling was withdrawn and remained the same as the previous low-probability request procedure. This condition was provided to monitor whether the child’s responding to the low-probability requests would be maintained after removal of the intervention.

Maintenance

The setting and context of play remained the same as in the baseline phase. Children were told to play with the toys and their peers without the low-probability requests. This condition was provided to assess the extent to which the increased social interactions were maintained without the prompts.

Generality

Generality probes were conducted in the nontraining setting during center time. Procedures were identical to baseline procedures, however, no stickers or toys were given to the children. The target child, peer, and generality peer were assigned to the generality setting. The target child and his peer were told, “Stay in your center and play with your friend. Now go and play.” During play, no prompts were provided except for general prompts given when the children were off-task or engaged in stereotypic behaviors or disruptive behaviors. After 10-min of play the children were verbally praised for doing a good job and were told that they could stay or change their center.

Social Validity

Social validity involves assessing the acceptability or viability of the goals, procedures and outcomes to those who would be the most influenced by the interventions (Fawcett, 1991; Schwartz & Baer, 1991). According to Schwartz and Baer (1991), it is recommended that social validity be a standard part of any intervention, that those assessments be conducted throughout the intervention, and that all relevant consumers be included. The relevant consumers in this study were the parents of the target children and professionals in early childhood special education including the target children’s teachers.

For this study, these consumers were asked to provide information regarding the social importance of the intervention goals, procedures, and outcomes. Social validity forms and instructions are located in Appendix E.

Intervention Goals

The social validity of the intervention goals was addressed by gathering information from three parents of the children participating in the study, and three early childhood special education teachers at the school. Parents and teacher were asked to fill out a questionnaire that asked about their goals for their children in the social interaction domain. In addition, the questions involved asking the parents and the teacher about the types of toys the children played with at home. The lead teacher and the assistants in the targeted classroom were included in the planning process of how the procedures would be implemented and which play areas and requests would be chosen for intervention.

Another questionnaire involved asking the parents and the teachers at school about the research goals and research questions. They were asked whether they thought each research question was valid and useful (See Appendix D).

Intervention Procedures

In order to determine the social acceptability and usability of the intervention procedures the experimenter gathered information from 20 professionals in early childhood special education. The teachers were asked to read a description of high-probability request sequence using embedded peer modeling.

The professionals were asked to view three unidentified 2 minute segments of videotape depicting the target children during baseline, low-probability request intervention, and high-probability request sequence using embedded peer modeling. Next,

the professionals were asked whether they thought the intervention would be easy to use during the daily class routine, and whether they would use the intervention in their classroom when considered both time and effort necessary for the intervention.

Intervention Outcomes

The same professionals in early childhood special education above were asked to complete a checklist which included targeted skills by intervention in this research after viewing the videotape. The experimental phases were randomly placed. The teachers were asked to view one videotaped segment and then to complete a checklist. The same procedures were repeated for three experimental phases per child. Next, the teachers were asked to answer follow-up questions regarding whether they thought this intervention would be effective to increase social interactions between children with autism and typically developing peers.

CHAPTER 4

RESULTS

The results of this study are presented in this chapter. The chapter begins with a report of the procedures implemented to ensure the believability of the data including measures of procedural integrity for experimental procedures and experimenter prompts. Interobserver agreement was calculated for the procedural integrity checklist. Accuracy measures were conducted for delivery of the low-probability requests and the high-probability request sequences, responses to high-probability requests, and experimenter prompts, as well as for the dependent variables.

Summaries of individual children's data across all conditions are presented for the dependent variables of compliant responding to low-probability requests, social initiations and responses. Results for children's compliant responding to low-probability requests include the percent correct responses to low-probability requests during the initial low-probability requests alone, the high-probability request sequence with embedded peer modeling, and the low-probability request condition. Data on social initiations and responses include the number of intervals of observed social initiations and responses for each child during all experimental conditions and generality probes.

Additional data on other behaviors such as disruptive behaviors negative interactions, and self-stimulating behaviors were obtained and presented. In addition, social validity results from parents and the professionals in early childhood special education are provided.

Procedural Integrity

Procedural integrity data were gathered to ensure the fidelity of the implementation of experimental procedures and experimenter prompts. The data were collected using procedural integrity checklists to record observed experimental procedural steps. Data were collected using event recording to examine the procedure of each delivery of the low-probability requests and high-probability request sequence. A partial-interval recording scheme was used for experimenter prompts. Accuracy measures were conducted for procedural integrity checklists, the delivery of the low-probability requests and the high-probability requests checklists, as well as experimenter prompts.

Procedural Integrity Checklists

To help ensure that experimental procedures were conducted consistently and as described, data were collected using procedural integrity checklists specifically designed to address each experimental and generality condition (see Appendix C). The second and third observer completed procedural integrity checklists as they observed the experimenter during the intervention sessions across all conditions. Accuracy measures for procedural integrity checklists were conducted for approximately 20% of the experimental sessions and approximately 30% of the generality sessions. Table 4.1 displays a summary of procedural integrity checklist measures and IOA for procedural integrity checklists was 100% of all participants during all conditions. The following describes the procedural integrity for each child overall conditions.

	Baseline		Low-P		High-P		Low-P		Maintenance	
	I	G	I	G	I	G	I	G	I	G
Eric										
# of sessions	6	2	10	2	13	5	8	4	6	2
# of checklist completed	2	1	2	1	3	1	2	1	2	1
% of sessions checklist completed	30	50	20	50	23	20	25	25	33	50
% of steps completed correctly	100	100	94	100	100	100	100	100	100	100
# of checklists for IOA	2	1	2	1	3	1	2	1	2	1
% of IOA	100	100	100	100	100	100	100	100	100	100
Paul										
# of sessions	10	3	11	3	18	6	11	3	4	2
# of checklists completed	3	1	3	1	5	2	3	1	1	1
% of sessions checklist completed	30	33	27	33	28	33	27	33	25	50
# of steps completed correctly	100	100	100	100	100	100	100	100	100	100
# of checklist for IOA	3	1	3	1	5	2	3	1	1	1
% of IOA	100	100	100	100	100	100	100	100	100	100
Chris										
# of sessions	6	4	10	3	19	5	7	4	1	-
# of checklists completed	4	2	3	1	4	1	2	1	1	-
% of sessions checklist completed	25	50	30	33	21	20	29	25	100	-
% of steps completed correctly	100	100	100	100	100	100	100	100	100	-
# of checklists for IOA	4	2	3	1	4	1	2	1	1	-
% of IOA	100	100	100	100	100	100	100	100	100	-

Table 4.1: Summary of procedural integrity checklists completed and interobserver agreement (IOA) calculated for procedural integrity checklists for participants across conditions in the intervention (I) and generality setting (G).

Eric

Procedural integrity checklists were completed for at least 20 % for all conditions for Eric. The number of steps completed correctly ranged from 94 to 100 % across all conditions. IOA which was measured for the entire procedural integrity checklist for experimental and generality sessions was 100%.

Paul

For Paul, procedural integrity checklists were completed for at least 25% of all sessions across all conditions. The number of steps completed correctly was 100% for all conditions. IOA which was measured for the entire procedural integrity checklist for experimental and generality sessions was 100%.

Chris

The observers completed procedural integrity checklists for at least 20% of all sessions across all conditions. The number of steps completed correctly was 100% for all conditions. IOA which was measured for the entire procedural integrity checklist for experimental and generality sessions was 100%.

Delivery of Low-Probability and High-Probability Requests

The summary of the delivery of the low-probability and the high-probability request sequence is reported for each child during the low-probability requests alone and high-probability request sequences with peer modeling. The data include the number of low-probability and high-probability requests delivered, percentage of praise delivered for the correct responses to requests, inter-prompt time between the high-probability requests and between the high-probability and the low-probability request. Accuracy measures were conducted for delivery of the low-probability and the high-probability

requests. Table 4.2 provides a summary of the mean number and range of the low-probability and the high-probability requests delivered, the mean percentage of praise delivered for correct responses to the requests, and the accuracy measures for the delivery of the low-probability and high-probability requests.

Eric and Stacie

During baseline, no low-probability requests were delivered as the children were observed. During 10 sessions of low-probability requests alone, eight low-probability requests were delivered each session. The percentage of praise delivered for correct responding to the low-probability requests ranged from 0 to 100% with a mean of 90%. In the first low-probability request session, Eric responded to one low-probability request out of eight low-probability requests, however, the experimenter did not deliver the praise for his correct response. Accuracy measures were conducted for 20% of the sessions and resulted 100%.

During high-probability requests sequences with peer modeling, 13 sessions were conducted. The number of the high-probability requests delivered for Eric ranged from 22 to 26 with a mean of 24.31. Praise was correctly delivered for correct responding to high-probability requests 100% of the time. Inter-prompt times (IPT) between the high-probability requests ranged from 1 to 5-s with a mean of 1.5-s. The mean of the low-probability requests delivered for Eric was 7.8 with a range from 7 to 8. The percentage of praise delivered for the correct responding to the low-probability requests was 100%. Inter-prompt times (IPT) between the last high-probability request and the low-probability request ranged from 1 to 5-s with a mean of 1.7-s. Accuracy measures conducted for 20% of the sessions and the results were 100%.

	Eric	Paul	Chris	Stacie	Jennifer	Hillary
Low-P						
# of sessions	10	11	10	-	-	-
# of low-p delivered	8	8	8	-	-	-
% of praise for correct response to low-p	90 (0-100)	100	100	-	-	-
% of Accuracy measured	20	27	30	-	-	-
% of Accuracy	100	100	100	-	-	-
High-P						
# of sessions	13	18	19	13	18	19
# of high-p delivered	24.31 (22-26)	24.06 (24-25)	25.73 (24-31)	24.85 (24-30)	24	24
% of praise for correct response to high-p	100	100	100	100	100	100
IPT	1.48 (1-5)	1.38 (1-3)	1.30 (1-3)	1.52 (1-5)	1.33 (1-3)	1.17 (1-3)
# of low-p delivered	7.8 (7-8)	8	7.9 (7-8)	7.8 (7-8)	8	8
% of praise for correct response to low-p	100	100	100	100	100	100
IPT	1.73 (1-5)	1.46 (1-3)	1.36 (1-3)	1.83 (1-5)	1.46 (1-3)	1.31 (1-3)
% of Accuracy measured	23	28	21	23	28	21
% of Accuracy	100	100	100	100	100	100
Low-P						
# of sessions	8	11	7	-	-	-
# of low-p delivered	8	8	8	-	-	-
% of praises for correct responses to low-p	100	100	100	-	-	-
% of Accuracy measured	25	27	29	-	-	-
% of Accuracy	100	100	100	-	-	-

Table 4.2: The mean percentage and range of delivery of the low-p and the high-p requests and accuracy measures for delivery of the low-p and high-p requests. (IPT = Inter-prompt time)

For Eric's peer, Stacie, the mean number of the high-probability requests delivered was 24.85 with a range from 24 to 30. The praise provided for correct responses to the high-probability requests was 100%. IPT between the high-probability requests ranged from 1 to 5-s with a mean of 1.5-s. The mean number of the low-probability requests delivered for Stacie was 7.8 with a range from 7 to 8. Praise was correctly delivered for correct responding to low-probability requests 100% of the time. IPT between the last high-probability request and the low-probability request ranged from 1 to 5-s with a mean of 1.8-s. Accuracy measures for the delivery of high-probability and low-probability requests were conducted for 23% of the sessions during this condition. Accuracy resulted in 100%.

Over eight sessions of the low-probability requests alone condition, eight low-probability requests were delivered each session and the praise was correctly delivered for the correct responses to the requests 100% of the time. Accuracy measures for the low-probability requests conducted for 23% of the sessions and resulted in 100%.

Paul and Jennifer

During the baseline condition, no low-probability requests were delivered as the children were observed. During 11 sessions of low-probability requests alone, eight low-probability requests were delivered during each session, and correct delivery of praise statements occurred over 100% of correct responses to low-probability requests. Twenty seven percent of the sessions were measured for accuracy checks. Accuracy resulted in 100%.

Over 18 sessions of high-probability requests sequences with peer modeling, the high-probability requests for Paul were delivered with a mean of 24.06 and a range from

24 to 25. The experimenter delivered praise for the correct responses to the high-probability requests 100% of available opportunities. Inter-prompt times (IPT) between the high-probability requests ranged from 1 to 3-s with a mean of 1.4-s. The mean number of the low-probability requests delivered for Paul was 8. The percentage of praise statements delivered for correct responding to low-probability requests was 100%. Inter-prompt times (IPT) between the last high-probability request and the low-probability request ranged from 1 to 3-s with a mean of 1.5-s. Accuracy measures were conducted for 28% of the sessions and resulted in 100%.

For Jennifer, Paul's peer, the mean number of the high-probability requests delivered was 24 and the praise provided for correct responding to each high-probability request was 100 %. IPT between the high-probability requests ranged from 1 to 3-s with a mean of 1.3-s. The mean number of low-probability requests delivered for Jennifer was 8. Correct delivery of praise statements occurred during 100% of correct responding to low-probability requests. IPT between the last high-probability request and the low-probability request ranged from 1 to 3-s with a mean of 1.5-s. Accuracy measures for the delivery of the high-probability and low-probability requests were conducted for 28% of the sessions during this condition. Accuracy measures resulted in 100%.

During 11 sessions of low-probability requests alone, the number of low-probability requests delivered during each session was eight. Praise was correctly delivered for correct responding to low-probability requests 100% of the time.

Chris and Hilary

During the baseline condition, no low-probability requests were delivered as the children were observed. Over 10 sessions of the low-probability requests alone condition,

the number of low-probability requests delivered during each session was eight. Praise statements, delivered by the experimenter for correct responses was 100%. Accuracy measures were conducted for 30% of the sessions, and accuracy on delivery of low-probability resulted in 100%.

During 19 sessions in high-probability request sequences with embedded peer modeling, the number of the high-probability requests delivered for Chris ranged from 24 to 31 with a mean of 25.73. The experimenter's praise delivered for the correct responses to the high-probability requests was 100%. IPT between the high-probability requests ranged from 1 to 3-s with a mean of 1.3-s. The mean number of the low-probability requests delivered for Chris was 7.9 with a range from 7 to 8. The percentage of praises delivered for the correct responding to the low-probability requests was 100%. IPT between the last high-probability request and the low-probability request ranged from 1 to 3-s with a mean of 1.3-s. Accuracy measures were conducted for 21% of the sessions and were 100%.

For Hilary, Chris's peer, the mean number of the high-probability requests delivered was 24. The praise provided for the correct responses to the high-probability requests was 100%. IPT between the high-probability requests ranged from 1 to 3-s with a mean of 1.2-s. The mean number of low-probability requests delivered for Hilary was 8. Praise for correct responses to the low-probability requests was delivered at 100%. IPT between the last high-probability request and the low-probability request ranged from 1 to 3-s with a mean of 1.3-s. Accuracy measures for the delivery of the high-probability and the low-probability requests were conducted for 21% of the sessions during this condition. Accuracy measures resulted in 100% observed compliance to the procedure.

During low-probability requests alone, seven sessions were conducted. Eight low-probability requests were delivered during each session, and praise for correct responses to low-probability requests was delivered at 100%. Accuracy measures were conducted for 29% of the sessions, and accuracy measures on delivery of low-probability requests resulted in 100%.

Experimenter General Prompts

The summary of the mean number of intervals and range of experimenter prompts, as well as the percentage of accuracy measures for experimenter prompts follows.

General prompts were delivered for all conditions by the experimenter to the target children, peers, and generality peers. The experimenter prompts consisted of general prompts to the children to direct the children's inappropriate behaviors. Examples of experimenter general prompts were "Get busy," "Stay in your center," "Don't hit your friend," and "Hands down." Low levels of experimenter prompts were delivered during both intervention and generality for all conditions except when the children engaged in disruptive behaviors. The following information summarizes the mean number of intervals and range of experimenter prompts for each child during both intervention and generality across all conditions. Table 4.3 provides a summary of the mean number of intervals and range of experimenter prompts data during all conditions.

Target		BL		Low-P		High-P		Low-P		Maint.	
		I	G	I	G	I	G	I	G	I	G
Eric											
# of sessions		6	2	10	2	13	5	8	4	6	2
Mean		4.33	4.50	4.40	3.00	1.54	1.80	1.13	1.75	1.33	1.50
Range		2-7	4-5	0-7	2-4	0-5	0-3	0-2	1-2	0-3	1-2
Paul											
# of sessions		10	3	11	3	18	6	11	3	4	2
Mean		5.10	6.67	3.45	4.00	1.61	2.83	2.18	2.67	3.50	2.50
Range		2-15	2-4	1-7	2-6	0-3	2-4	0-5	2-4	2-5	2-3
Chris											
# of sessions		16	4	10	3	19	5	7	4	1	-
Mean		5.00	2.50	5.80	4.33	2.16	1.80	2.57	2.00	3.00	-
Range		2-13	1-4	2-11	3-5	0-4	1-3	0-5	0-4	3	-
Peers											
Stacie											
# of sessions		6	2	10	2	13	5	8	4	6	2
Mean		1.00	1.50	0.40	0.50	0.38	0.00	0.38	0.75	0.67	1.00
Range		0-4	1-2	0-1	0-1	0-2	-	0-1	0-2	0-2	-
Jennifer											
# of sessions		10	3	11	3	18	6	11	3	4	2
Mean		2.30	1.33	1.82	3.00	0.89	0.67	0.45	0.00	0.25	0.00
Range		0-7	1-2	0-6	1-6	0-2	0-2	0-2	-	0-1	-

Continued

Table 4.3: The mean number of intervals and range of general prompts for participants during the intervention (I) and generality setting (G).

Table 4.3 (continued)

	BL		Low-P		High-P		Low-P		Maint	
	I	G	I	G	I	G	I	G	I	G
Hillary										
# of sessions	16	4	10	3	19	5	7	4	1	-
Mean	0.81	0.75	0.40	0.00	0.58	0.60	0.00	0.00	0.00	-
Range	0-2	0-1	0-2	-	0-3	0-1	-	-	-	-
Generality Peers										
	BL		Low-P		High-P		Low-P		Maint.	
	I	G	I	G	I	G	I	G	I	G
Megan										
# of sessions	3	2	6	2	13	4	3	3	5	2
Mean	0.00	0.50	0.00	1.50	0.00	0.25	0.00	0.00	0.00	0.00
Range	-	0-1	-	1-2	-	0-1	-	-	-	-
	BL		Low-P		High-P		Low-P		Maint.	
	I	G	I	G	I	G	I	G	I	G
Randy										
# of sessions	9	3	11	3	18	5	11	3	3	2
Mean	0.11	0.33	0.18	0.00	0.06	0.00	0.09	0.00	0.33	0.00
Range	0-1	0-1	0-2	-	0-1	-	0-1	-	0-1	-
	BL		Low-P		High-P		Low-P		Maint	
	I	G	I	G	I	G	I	G	I	G
Tyler										
# of sessions	16	4	10	3	17	5	7	4	-	-
Mean	0.81	1.25	0.40	0.00	0.18	0.40	0.29	0.50	-	-
Range	0-5	0-2	0-1	-	0-2	0-1	0-1	0-1	-	-

Eric, Stacie, and Megan

Baseline. During baseline for intervention and generality, the range of intervals of general prompts for Eric was 2 to 7 with a mean of 4.33, and 4 to 5 with a mean of 4.5, respectively. The mean number of intervals of the general prompts for Eric's peer, Stacie, in the intervention and generality setting, was 1 with a range from 0 to 4, and 1.5 with a range from 1 to 2. The mean number of intervals of the prompts for Eric's generality peer, Megan in the intervention and generality setting was 0, and 0.5 with a range from 0 to 1, respectively.

Low-probability requests alone. The number of intervals of general prompts for Eric in intervention and generality setting ranged from 0 to 7 with a mean number of 4.4, and ranged from 2 to 4 with a mean of 3.0, respectively. The mean number of intervals of general prompts for Stacie for intervention and generality was 0.4 (range from 0 to 1) and 0.5 (range from 0 to 1), respectively. The mean number of intervals of general prompts for Megan in intervention and generality setting was 0, and 1.5 with a range from 1 to 2, respectively. The general prompts for Eric, Stacie, and Megan remained at the same levels as during baseline.

High-probability request sequences with embedded peer modeling. The mean number of intervals of general prompts for Eric in the intervention setting and generality setting decreased to 1.54 with a range from 0 to 5, and 1.80 with a range from 0 to 3, respectively. The number of intervals of general prompts for Stacie in intervention ranged from 0 to 2 with a mean of 0.38, and no prompts were provided in the generality setting. No general prompts were given to Megan in the intervention setting. The mean number

of intervals of general prompts in the generality setting for Megan was 0.25 with a range from 0 to 1. The general prompts for Stacie and Megan maintained at the same levels as during the low-probability request condition.

Low-probability requests alone. The number of intervals of general prompts in intervention setting for Eric ranged from 1 to 2 with a mean of 1.13, and in the generality setting ranged from 1 to 2 with a mean of 1.75. For Stacie, the mean number of intervals of general prompts for the intervention and generality setting was 0.38 with a range from 0 to 1, and 0.75 with a range from 0 to 2, respectively. No general prompts were given to Megan in the intervention and generality setting. The general prompts for Eric, Stacie, and Megan remained at the same levels as the high-probability request sequences using embedded peer modeling.

Maintenance. The mean number of intervals of general prompts in the intervention setting for Eric was 1.33 with a range from 0 to 3; the mean of this same measure in the generality setting was 1.5 with a range from 1 to 2. The number of intervals of general prompts for Stacie in the intervention setting ranged from 0 to 2 with a mean of 0.67. The mean number of general prompts for Stacie was 1. No general prompts were delivered to Megan. The general prompts for Eric, Stacie, and Megan maintained the same levels as the previous low-probability request condition.

Paul, Jennifer, and Randy

Baseline. The mean number of intervals of general prompts for Paul in the intervention and generality setting was 5.1 with a range from 2 to 15, and 6.67 with a range from 2 to 4, respectively. The number of intervals of general prompts for Jennifer, Paul's peer, in the intervention setting ranged from 0 to 7 with a mean of 2.3, and the

general prompts in the generality setting ranged from 1 to 2 with mean of 1.33. For Paul's generality peer, Randy, the mean number of intervals of general prompts in the intervention and generality setting were 0.11 with a range from 0 to 1, and 0.33 with a range from 0 to 1.

Low-probability requests alone. For Paul, the mean number of intervals of general prompts during intervention was 3.45 with a range from 1 to 7; the mean number of intervals of general prompts in the generality setting was 4 with a range from 2 to 6. Levels of general prompts for Paul in the intervention and generality setting during this condition decreased somewhat. For Jennifer, the intervals of general prompts in the intervention setting ranged from 0 to 6 with a mean of 1.82. The mean number of intervals of general prompts in the generality setting was 3 with a range from 1 to 6. The general prompts for her in the intervention setting maintained the same levels, but the general prompts in the generality setting increased slightly to 3. For Randy, the mean of general prompts in the intervention setting was 0.18 with a range from 0 to 2, however, no general prompts were provided in the generality setting. The general prompts to Randy remained the same as during the baseline condition.

High-probability request sequences with embedded peer modeling. The mean number of intervals of general prompts for Paul in the intervention and generality setting decreased to 1.61 with a range from 0 to 3, to 2.83 with a range from 2 to 4, respectively. The number of intervals of general prompts for Jennifer in the intervention setting ranged from 0 to 2, with a mean of 0.89; the mean number of intervals of general prompts in the generality setting was 0.67 with a range from 0 to 2. The mean number of intervals of

general prompts for Randy in the intervention setting was 0.06 with a range from 0 to 1; no general prompts in the generality setting were provided to Randy. Levels of general prompts for Jennifer and Randy remained low.

Low-probability requests alone. The number of intervals of general prompts in the intervention setting for Paul ranged from 0 to 5 with a mean of 2.18, and in the generality setting ranged from 2 to 4 with a mean of 2.67. The general prompts in the intervention setting increased slightly, but maintained low levels overall. For Jennifer, general prompts in the intervention setting remained with a low mean of 0.45 and a range from 0 to 2. No general prompts were provided in the generality setting. For Randy, general prompts in the intervention setting remained low with a mean of 0.09 and a range from 0 to 1. No general prompts were given to Randy in the generality setting.

Maintenance. For Paul, the mean number of intervals of general prompts in the intervention and generality setting was 3.5 with range from 2 to 5, and 2.5 with a range from 2 to 3, respectively. The general prompts for Paul increased somewhat during the maintenance condition. For Jennifer, the number of intervals of general prompts in the intervention setting remained low with a mean of 0.25 and a range from 0 to 1. No general prompts were provided in the generality setting. The number of intervals of general prompts for Randy in the intervention setting maintained the low levels with a mean of 0.33 and a range from 0 to 1. No general prompts were provided in the generality setting.

Chris, Hilary, and Tyler

Baseline. For Chris, the mean number of intervals of general prompts in the intervention setting ranged from 2 to 13 with a mean of 5. The number of intervals of

general prompts in the generality setting ranged from 1 to 4 with a mean of 2.5. For Hilary, the mean number of intervals of the general prompts in the intervention and generality setting was 0.81 with a range from 0 to 2, and 0.75 with a range from 0 to 1. For Tyler, Chris's generality peer, the number of intervals of the general prompts in the intervention setting ranged from 0 to 5 with a mean of 0.81; the number of intervals of the general prompts in the generality setting ranged from 0 to 2 with a mean of 1.25.

Low-probability requests alone. The mean number of intervals of general prompts for Chris in the intervention and generality setting were 5.8 with a range from 2 to 11, and 4.33 with a range from 3 to 5. The general prompts for Chris in the intervention setting remained the same, however, the general prompts slightly increased in the generality setting. For Hilary, levels of the general prompts in the intervention setting maintained the same as baseline, with a mean of 0.4 and a range from 0 to 2. No general prompts were provided in the generality setting. The number of intervals of general prompts for Tyler remained low with a mean of 0.4 and range from 0 to 1.

High-probability request sequences with embedded peer modeling. The mean number of intervals of general prompts for Chris in the intervention setting and generality setting decreased to 2.16 with a range from 0 to 4, and 1.80 with a range from 1 to 3, respectively. The number of intervals of general prompts for Hilary in the intervention and generality setting ranged from 0 to 3 with a mean of 0.58, and ranged from 0 to 1 with a mean of 0.6. For Tyler, the mean number of intervals of general prompts was 0.18 with a range from 0 to 2, and 0.4 with a range from 0 to 1, respectively. The general prompts for Hilary and Tyler maintained the same levels as the low-probability requests condition.

Low-probability requests alone. The intervals of general prompts in the intervention setting for Chris ranged from 0 to 5 with a mean of 2.57, and in the generality setting ranged from 0 to 4 with a mean of 2. No general prompts were provided to Hilary. For Tyler, the mean number of intervals of general prompts in the intervention and the generality setting was 0.29 with a range from 0 to 1, 0.5 with a range from 0 to 1. The general prompts for Chris, Hilary, and Tyler remained at the same levels as the previous condition.

Accuracy Measures for Experimenter General Prompts

Accuracy measures were conducted for at least 20% of all sessions across all conditions and settings for experimenter general prompts. The following is a summary of the percentage of accuracy for experimenter prompts delivered to participants for all conditions. Table 4.4 describes the mean percentage and range of accuracy for experimenter general prompts across all conditions.

Eric. The percentage of accuracy for experimenter general prompts both in the intervention and generality setting during baseline was 100%. During low-probability requests, the mean percentage of accuracy in the intervention and generality setting was 99%, 100%, respectively. For the high-probability request sequences with embedded peer modeling, the mean percentage of accuracy on experimenter general prompts in the intervention and generality setting was 99%, 98%, respectively. During the low-probability request condition, accuracy for experimenter general prompts both in the intervention and generality setting was calculated to be 100%. Accuracy for the maintenance condition both in the intervention and generality setting was 100%.

	BL		Low-P		High-P		Low-P		Maintenance	
	I	G	I	G	I	G	I	G	I	G
Eric										
% of sessions	30	50	20	50	23	20	25	25	33	50
Mean	100	100	99	100	99	98	100	100	100	100
Range	-	-	-	-	-	-	-	-	-	-
Paul										
% of sessions	30	33	27	33	28	33	27	33	25	50
Mean	99	98	99.7	99	99.8	99.5	100	100	99	100
Range	98-100	-	99-100	-	99-100	99-100	-	-	-	-
Chris										
% of sessions	25	50	30	30	21	20	29	25	100	-
Mean	99.5	99.5	98.7	97	100	98	100	100	99	-
Range	98-100	99-100	98-100	-	-	-	-	-	-	-

Table 4.4: Accuracy measures for experimenter general prompts for participants in the intervention (I) and generality setting (G).

Paul. Accuracy measures for Paul in the intervention setting during baseline ranged from 98% to 100% with a mean of 99%. The mean percentage of accuracy in the generality setting was 98%. For the low-probability requests condition, the mean of accuracy in the intervention setting was 99.7% with a range from 99% to 100%; the mean percentage of accuracy in the generality setting was 99%. During the high-probability request sequences with embedded peer modeling, accuracy in the intervention setting ranged from 99% to 100% with a mean of 99.8%; the accuracy in the generality setting ranged from 99% to 100% with a mean of 99.5%. For low-probability requests alone, accuracy for experimenter general prompts both in the intervention and the generality setting was 100%. During the maintenance condition, the mean of accuracy in the intervention setting was 99% while the mean of accuracy in the generality setting was 100%.

Chris. During baseline, accuracy on experimenter general prompts for Chris in the intervention setting ranged from 98% to 100% with a mean of 99.5%; in the generality setting, the mean percentage of accuracy was 99.5% with a range from 99% to 100%. During low-probability requests the mean percentage of accuracy in the intervention setting was 98.7% with a range from 98% to 100%. For the generality sessions, the mean percentage of accuracy had a mean of 97%. During the high-probability request sequences with embedded peer modeling, accuracy in the intervention setting was 100% while in the generality setting accuracy was 98%. For the low-probability requests condition, accuracy both in the intervention and generality setting was 100%. For one session of maintenance, accuracy was 99%.

*Responses to high-probability requests during high-probability request sequences with
embedded peer modeling*

The summary of the mean percentage and range of children's correct responses, nonresponses, and noncompliance to high-probability requests (see Table 4.9), as well as the mean percentage of accuracy measures for responses to high-probability follows.

Table 4.5 provides the mean percentage and range of accuracy for responses, nonresponses, and noncompliance to high-probability requests.

Eric and Stacie

During 13 sessions of the high-probability request sequence with embedded peer modeling, for high-probability requests, Eric responded to a mean percentage of 98.15% with a range from 92% to 100%. The mean percentage of nonresponses to high-probability requests was 0.62 with a range from 0 to 4. Eric did not exhibit any noncompliance to high-probability requests. Twenty three percent of the sessions were measured for accuracy. Accuracy for responses, nonresponses, and noncompliance to high-probability requests was 100%.

Eric's peer, Stacie's mean percentage of responses to high-probability requests was 98% with a range from 87% to 100%. The mean percentage of nonresponses to high-probability requests was 0.8 with a range from 0% to 10%. Stacie's mean percentage of noncompliance to high-probability requests was 0.5% with a range from 0% to 4%. Accuracy for responses, nonresponses, and noncompliance to the high-probability requests was 100%.

			Low-P			High-P						Low-P		
			Low-P			Low-P			High-P			Low-P		
			R	NR	NC	R	NR	NC	R	NR	NC	R	NR	NC
Eric														
%of sessions	20%					23%						25%		
Mean			100	100	100		100	100	100	100	100		100	100
Range														
Paul														
%of sessions	27%					28%						27%		
Mean			100	96	96		100	100	100	100	100		100	100
Range				88-100	88-100		-	-	-	-	-		-	-
Chris														
%of sessions	30%					21%						29%		
Mean			100	96	96		100	100	100	100	100		100	100
Range				88-100	88-100		-	-	-	-	-		-	-
Stacie														
%of sessions						23%								
Mean			-	-	-		100	100	100	100	100		-	-
Range			-	-	-		-	-	-	-	-		-	-
Jennifer														
%of sessions						28%								
Mean			-	-	-		100	100	100	100	100		-	-
Range			-	-	-		-	-	-	-	-		-	-
Hillary														
%of sessions						21%								
Mean			-	-	-		100	100	100	100	100		-	-
Range			-	-	-		-	-	-	-	-		-	-

Table 4.5: Accuracy measures for the target children's and the peers' responses (R), nonresponse (NR), and noncompliance (NC) to low-probability and high-probability requests.

Paul and Jennifer

During 18 sessions of high-probability request sequences with embedded peer modeling, Paul's mean percentage of responses to high-probability requests was 99.56% with a range from 96% to 100%. The mean percentage of nonresponses to high-probability requests was 0.22% with a range from 0% to 4%. Paul did not exhibit any noncompliance to high-probability requests. Accuracy measures were conducted for 28% of the sessions. Accuracy for responses, nonresponses, and noncompliance to the high-probability requests was 100%.

Jennifer, Paul's peer responded to a mean percentage of 99% with a range from 96% to 100% for high-probability requests. The mean percentage of nonresponses to high-probability requests was 0.3% with a range from 0% to 4%. Jennifer did not display any noncompliance to high-probability requests. Accuracy measures were conducted for 28% of the sessions and resulted in 100%.

Chris and Hilary

During 19 sessions of the high-probability request sequence with peer modeling, the mean percent of responses to high-probability requests was 95.74% with a range from 92% to 100%. The mean percent of nonresponses to high-probability requests was 3.84% with a range from 0% to 10%. Chris did not exhibit any noncompliance to high-probability requests. Accuracy measures were conducted for 21% of the sessions and resulted in 100%.

Chris's peer, Hilary's responses to high-probability requests was 100%. She did not display any nonresponses and noncompliance to the high-probability requests.

Accuracy measures were conducted for 21% and these results were 100% accuracy for responses, nonresponses, and noncompliance to the high-probability requests.

Peer Training

The peers were trained to recognize the target children's initiations and to respond to them until they reached the criterion of 90% correct responses to the experimenter's questions regarding target behaviors for 3 consecutive sessions.

Stacie, Eric's peer

The mean percentage of correct responses to 16 target behaviors was 96% with a range from 94% to 100% for session 7, 8, and 9. Procedural integrity checklists were completed for 33% of the peer training sessions, and the number of steps completed correctly was 100%. During peer review sessions # 51, 52, and 55, Stacie exhibited 100% of correct responses to the target behaviors in each setting.

Jennifer, Paul's peer

The mean percentage of correct responses to the 16 target behaviors was 96% with a range from 94% to 100% for sessions 16, 18, and 19. Procedural integrity checklists were completed for 33% of the peer training sessions, and the number of steps completed correctly was 100%. During peer review of the sessions # 52, 53, and 54, she exhibited 100% of correct responses to the target behaviors in each setting.

Hilary, Chris's peer

The mean percentage of correct responses to the 16 target behaviors was 100%. Procedural integrity checklists were completed for 33% of the peer training sessions, and

the number of steps completed correctly was 100%. During the peer review of sessions # 51, and 52, Hilary exhibited 100% of correct responses to the target behaviors in each setting.

Procedures to Ensure the Believability of Dependent Variables

Accuracy measures were conducted for children's compliant responding to low-probability requests and social initiations and responses for all conditions. A percentage of agreement was calculated for accuracy of coding each variable by dividing the total number of agreements for each behavior by the number of agreement plus disagreements for that behavior and multiplying by one hundred. The mean percentage and range of accuracy for each child and variable across all conditions and settings are reported below.

Accuracy Measures for Compliant Responding to Low-Probability Requests

Accuracy measures were conducted for children's compliant responding to low-probability requests across approximately 20% of experimental sessions during low-probability requests alone, high-probability request sequence using embedded peer modeling, and low-probability requests alone (see Table 4.5).

Eric

During low-probability requests alone, accuracy measures were conducted for 20% of the sessions. Accuracy was 100% for all three variables: responses, nonresponses, and noncompliance to the low-probability requests. During the high-probability request sequences with embedded peer modeling, 23% of the sessions were measured for accuracy. Accuracy for all three variables was 100%. For 25% of the low-probability requests alone, accuracy for the three variables was 100%. For Stacie, Eric's peer, the accuracy during the high-probability requests condition, on the three variables was 100%.

Paul

Twenty seven percentages of sessions of low-probability requests were measured for accuracy. Accuracy for responses to low-probability requests was 100%. The mean percentage of accuracy for both nonresponses and noncompliance to low-probability requests was 96% with a range from 88% to 100%. During the high-probability request sequences with embedded peer modeling, 28% of sessions were measured for accuracy. Accuracy on all three variables was 100%. For Paul's peer, Jennifer, accuracy on responses, nonresponses, and noncompliance was calculated for 28% of the high-probability requests sequence using peer modeling. These results were 100% accurate for responses, nonresponses, and noncompliance to low-probability requests.

Chris

Thirty percent of the low-probability requests sessions were measured for accuracy checks. For Chris, accuracy for responses to low-probability requests during the low-probability requests condition alone was 100%. The mean percentage of accuracy for both nonresponses and noncompliance to low-probability requests was 96% with a range from 88% to 100%. During 21% of high-probability request sequences using embedded peer modeling accuracy was measured; accuracy for the three variables was 100%. During 29% of the low-probability requests sessions, accuracy was measured; accuracy for responses, nonresponses, and noncompliance to low-probability requests was 100%. For Chris's peer, Hilary, accuracy measures were conducted for 21% of the high-probability request sequences using embedded peer modeling. Accuracy for responses, nonresponses, and noncompliance to low-probability requests was 100%.

Accuracy Measures for Social Initiations and Responses

Accuracy measures were conducted for at least 20% of all sessions across all conditions and settings for social initiations and responses. The following is a summary of the percentage of accuracy for social interactions. Table 4.6 describes the mean percentage and range of accuracy for social initiations and responses in the intervention setting. Table 4.7 describes the mean percentage and range of accuracy for social initiations and responses in the generality setting.

Eric

During 30% of the baseline sessions, the mean percentage of accuracy for social initiations and responses was 99%, 99.5% with a mean of 99% to 100%, respectively. In the generality setting, 50% of the baseline sessions were measured. The mean percentage of accuracy for social initiations and responses was 99.5 with a range from 99% to 100%, and 100%, respectively.

For low-probability requests alone, accuracy measures in the intervention setting were conducted for 20% of the sessions. Accuracy for social initiations ranged from 96% to 97% with a mean of 96.5%; the range of accuracy for social responses was 97% to 98% with a mean of 97.5%. In the generality setting accuracy measures were conducted for 20% of the sessions. Accuracy measures on social initiations and responses were 97%, and 99%, respectively.

During the high-probability requests sequences with peer modeling, accuracy measures in the intervention settings were conducted for 23% of the sessions. Accuracy for social initiations ranged from 98% to 99% with a mean of 98.3%. The mean percentage of accuracy for social responses was 98.6% with range from 98% to 99%.

	Eric		Paul		Chris	
	I	R	I	R	I	R
BL						
%sessions	30	30	30	30	25	25
Mean	99	99.5	100	100	100	100
Range	-	99-100	-	-	-	-
Low-P						
%sessions	20	20	27	27	30	30
Mean	96.5	97.5	98.5	99.7	99.3	99
Range	96-97	97-98	97-100	99-100	94-100	98-100
High-P						
%sessions	23	23	28	28	21	21
Mean	98.3	98.6	99.4	99.3	99.3	99.3
Range	98-99	98-99	97-100	98-100	99-100	98-100
Low-P						
%sessions	25	25	27	27	29	29
Mean	96.5	97	97.3	99	96	95.3
Range	96-97	96-98	95-100	97-100	95-97	94-97
Maintenance						
%sessions	33	33	25	25	100	100
Mean	99.5	98	100	100	98	98
Range	99-100	97-99	-	-	-	-

Table 4.6: Accuracy measures for social initiations (I) and responses (R) in the intervention setting.

	Eric		Paul		Chris	
	I	R	I	R	I	R
BL						
%sessions	50	50	33	33	50	50
Mean	99.5	100	99	99	99	98.5
Range	99-100	100	-	-	98-100	97-100
Low-P						
%sessions	20	20	33	33	33	33
Mean	97	99	99	100	99	100
Range	-	-	-	-	-	-
High-P						
%sessions	20	20	33	33	20	20
Mean	95	95	98.5	99.5	100	100
Range	-	-	97-100	99-100	-	-
Low-P						
%sessions	25	25	33	33	25	25
Mean	96	95	98	97	97	96
Range	-	-	-	-	-	-
Maintenance						
%sessions	50	50	50	50	-	-
Mean	99	96	99	98	-	-
Range	-	-	-	-	-	-

Table 4.7: Accuracy measures for social initiations (I) and responses (R) in the generality setting.

Twenty percent of the sessions in the generality setting were measured for accuracy checks. The mean percentage of accuracy for both social initiations and responses was 95%.

During the low-probability requests alone condition, 25% of the sessions in the intervention setting were measured for accuracy checks. The range of accuracy for social initiations was 96% to 97% with a mean of 96.5%. Accuracy for social responses was 97% with a range from 96% to 98%. For 25% of the sessions in the generality setting, accuracy on social initiations and responses was 96%, 95%, respectively.

For the maintenance condition, accuracy measures in the intervention setting were conducted for 33% of the sessions. Accuracy for social initiations yielded a mean of 99.5% with a range from 99% to 100%. The range of accuracy for social responses was 97% to 99% with a mean of 98%. Fifty percent of the sessions in the generality setting were measured for accuracy. Accuracy measures for both social initiations and responses were 99%, and 96%, respectively.

Paul

Accuracy measures in the intervention setting were conducted for 30% of the baseline sessions for Paul. The mean percentage of accuracy measures for both social initiations and responses was 100%. In the generality setting, 33% of the baseline sessions were measured. The mean of accuracy for both social initiations and responses was 99 %.

During the low-probability requests alone conditions, accuracy measures in the intervention setting were conducted for 27% of the sessions. Accuracy measures for social initiations ranged from 97% to 100% with a mean of 98.5%. The percentage of the

range of accuracy for social responses was 99% to 100% with a mean of 99.7%. In the generality setting, accuracy measures were conducted for 33% of the sessions. The mean percentage of accuracy for social initiations and responses was 99% and 100%, respectively.

During the high-probability request sequences with embedded peer modeling, accuracy measures in the intervention settings were conducted for 28% of the intervention sessions. Accuracy on social initiations ranged from 97% to 100% with a mean of 99.4%. The mean percentage of accuracy for social responses was 99.3% with range from 98% to 99%. In the generality setting, 33% of the sessions were measured for accuracy checks. Accuracy for social initiations ranged from 97% to 100% with a mean of 98.5 %. The range of accuracy for social responses was 99% to 100% with a mean of 99.5%.

During the low-probability request alone condition, 27% of the sessions in the intervention setting were measured for accuracy checks. The range of accuracy for social initiations was 95% to 100% with a mean of 97.3%. Accuracy for social responses was 99% with a range from 97% to 100%. Accuracy checks in the generality setting were taken for 33% of the sessions; the percentage of accuracy for social initiations and responses was 98%, and 97%, respectively.

For the maintenance condition, accuracy measures in the intervention setting were conducted for 25% of the sessions. The mean percentage of accuracy for both social initiations and responses was 100%. During the generality probes, 50% of the sessions were measured for accuracy. Accuracy measures for social initiations and social responses were 99%, and 98%, respectively.

Chris

During baseline, accuracy measures were conducted for 25% of the sessions. The mean percentage of accuracy for both social initiations and responses was 100%. In the generality setting, 50% of the sessions were measured for accuracy checks. The mean percentage of accuracy on social initiations and responses in the generality setting was 99% with a range from 98% to 100%, and 98.5% with a range from 97% to 100%, respectively.

For the low-probability requests alone, 30% of the sessions were measured for accuracy. Accuracy for social initiations in the intervention setting was 99.3% with a range from 94% to 100%. The mean percentage of accuracy for social responses in the intervention setting was 99% with a range from 98% to 100%. In the generality setting, accuracy measures were conducted for 33% of the sessions. Accuracy for social initiations and responses was 99%, and 100%, respectively.

During high-probability request sequences with peer modeling, accuracy measures in the intervention setting were conducted for 21% of the sessions. The mean percentage of accuracy for social initiations and responses in the intervention setting was 99.3% with a range from 99% to 100%, and 99.3% with a range from 98% to 100%. The mean percentage of accuracy for both social initiations and responses in the generality setting was 100%.

For low-probability requests, accuracy measures in the intervention setting were conducted for 29% of the sessions. The mean percentage of accuracy was 96% with a range from 95% to 97%, and 95.3% with a range from 94% to 97%, respectively. In the

generality setting, 25% of the sessions were measured for accuracy. The mean percentage of accuracy for social initiations and responses in the generality setting was 97%, and 96%, respectively.

Accuracy Measures for Disruptive Behaviors

Disruptive behavior was recorded using interval recording. Accuracy measures were conducted for disruptive behavior for at least for 20% of all conditions. Table 4.8 describes the mean percentage and range of accuracy for disruptive behaviors in the intervention and generality setting.

Eric

During baseline, 30% of the sessions in the intervention setting and 50% of the sessions in the generality setting were measured for accuracy checks. Accuracy for disruptive behaviors in both the intervention and generality setting was 100%. During low-probability requests alone, accuracy measures were conducted for 20% of the sessions in the intervention and the generality setting. The accuracy in both settings was 100%. During the high-probability requests sequence with embedded peer modeling, 23% of the intervention sessions and 20% of the generality sessions were measured for accuracy. Accuracy for disruptive behaviors in both intervention and the generality setting was 100%. During low-probability requests, 25% of the sessions in the intervention and generality sessions were measured for accuracy. Accuracy for disruptive behaviors in both intervention and in the generality setting was 100%. During the maintenance condition, accuracy measures were conducted for 33% of the sessions in the intervention setting, and for 50% of the sessions in the generality setting. Accuracy in both settings was 100%.

	Eric		Paul		Chris	
	I	G	I	G	I	G
BL						
%sessions	30	50	30	33	25	50
Mean	100	100	100	100	100	100
Range	-	-	-	-	-	-
Low-P						
%sessions	20	20	27	33	30	33
Mean	100	100	100	100	97.7	98
Range	-	-	-	-	96-98	-
High-P						
%sessions	23	20	28	33	21	20
Mean	100	100	100	100	99.8	100
Range	-	-	-	-	99-100	-
Low-P						
%sessions	25	25	27	33	29	25
Mean	100	100	100	100	100	100
Range	-	-	-	-	-	-
Maintenance						
%sessions	33	50	25	50	100	-
Mean	100	100	100	100	100	-
Range	-	-	-	-	-	-

Table 4.8: Accuracy measures for disruptive behaviors in the intervention (I) and generality settings (G).

Paul

During the baseline condition, accuracy measures were conducted for 30% of the sessions in the intervention setting, and for 33% of the sessions in the generality setting. Accuracy for disruptive behaviors in both settings was 100%. During low-probability requests alone, accuracy measures were conducted for 27% of the sessions in the intervention setting, and for 33% of the sessions in the generality setting. Accuracy in both settings was 100%. For Paul, during the high-probability requests with embedded peer modeling, accuracy measures were conducted for 28% of the sessions in the intervention setting and 33% of the sessions in the generality setting. Accuracy for disruptive behavior in both settings was 100%. During the low-probability requests alone, 27% of the interventions sessions and 33% of the generality sessions were measured for accuracy checks. Accuracy for both settings was 100%. During the maintenance condition, accuracy measures were conducted for 25% of the sessions in the intervention setting, and 50% of the sessions in the generality setting. Accuracy for both settings was 100%. During maintenance, 25% of the intervention sessions, and 50% of the generality sessions were measured for accuracy checks. Accuracy for both settings was 100%.

Chris

During the baseline condition, accuracy measures were conducted for 23% of the interventions sessions and 50% of the generality sessions. Accuracy in both settings was 100%. During low-probability requests, 30% of the intervention sessions and 33% of the generality sessions were measured for accuracy checks. The mean percentage of accuracy in the intervention and in the generality settings was 97.7% with a range from 96% to 98%, and 98%, respectively. During the high-probability request sequences with

embedded peer modeling, accuracy measures were conducted for 21% of the intervention sessions and for 20% of the generality sessions. The mean percentage of accuracy for disruptive behaviors in the intervention and the generality settings was 99.8% with a range from 99% to 100%, and 100%, respectively. During the low-probability requests alone condition, 29% of the interventions sessions and 25% of the generality sessions were measured for accuracy checks. Accuracy in both settings was 100%. During maintenance, one session in the intervention setting was measured for accuracy. Accuracy for disruptive behavior was 100%.

Dependent Variables

The dependent variables measured in this study were children's compliant responding to low-probability requests to initiate social behaviors toward peers, social initiations and responses. Dependent variables were observed and measured during free play in center time.

Compliant Responding to Low-Probability Requests

The following section will address the research question, "What are the effects of the use of high-probability request sequences with embedded peer modeling on compliant responding to low-probability requests to initiate social behaviors for young children with autism?"

The results of each child's percent correct responses to low-probability requests to initiate social behaviors toward peers are represented for low-probability requests, the high-probability request sequences with embedded peer modeling, and a second low-probability request condition. Figure 4.1 visually displays the percent correct responses to low-probability requests during the initial low-probability requests alone condition, the

high-probability request sequences with peer modeling, and the second low-probability request condition. Table 4.9 presents the mean percentage and range of participants' compliant responses, nonresponses, and noncompliance to the low-probability requests to initiate social behaviors.

Eric

Baseline. No low-probability requests were delivered as the children were observed during six sessions of baseline.

Low-probability requests alone. During 10 sessions of low-probability requests alone, Eric responded to a mean of 34.14% with a range from 13% to 50%. Baseline data demonstrated some variability and gradual stability. The mean percentage of nonresponses to the low-probability requests was 66% with a range from 50% to 88%. Eric did not exhibit any noncompliance to the low-probability requests.

High-probability request sequences with embedded peer modeling. Eric's compliant responding to low-probability requests to initiate social behaviors to peers during the high-probability request sequence using embedded peer modeling ranged from 75% to 100% with a mean of 92.38 % over 13 sessions. For sessions 28 and 29, observations did not occur due to the target child's absences. For session 31, and sessions 34-40, observations did not occur due to the peer's absences. Eric's compliant responding to low-probability requests sharply increased with the implementation of the intervention.

Figure 4.1: Percent correct responses to requests. Filled circles (●) represent percent correct responses to Low-P requests, and open circles (○) represent percent correct responses to High-P requests; "A" represents absence; "X" depicts the sessions that data were taken without Low-P requests in baseline and maintenance.

		Low-P			High-P						Low-P		
		Low-P			Low-P			High-P			Low-P		
		R	NR	NC	R	NR	NC	R	NR	NC	R	NR	NC
Eric	10 _a				13 _b						8 _c		
Mean		34.14	66.00	0.00		92.38	6.00	2.00	98.15	0.62	0.00	97.00	3.25
Range		13-50	50-88	-		75-100	0-25	0-13	92-100	0-4	-	88-100	0-13
Paul	11 _a				18 _b						11 _c		
Mean		37.81	38.81	23.90		99.33	0.72	0.00	99.56	0.22	0.00	98.90	0.00
Range		13-50	0-87	0-62		88-100	0-13	-	96-100	0-4	-	88-100	-
Chris	10 _a				19 _b						7 _c		
Mean		14.00	50.10	36.60		67.68	24.42	8.21	95.74	3.84	0.00	89.57	3.43
Range		0-50	13-100	0-88		50-100	0-50	0-29	92-100	0-10	-	75-100	0-12
Stacie	-				13 _b						-		
Mean		-	-	-		100.00	0.00	0.00	98.00	0.80	0.50	-	-
Range		-	-	-		-	-	-	87-100	0-10	0-4	-	-
Jennifer	-				18 _b						-		
Mean		-	-	-		-	-	-	99.00	0.30	0.00	-	-
Range		-	-	-		-	-	-	96-100	0-4	-	-	-
Hillary	-				19 _b						-		
Mean		-	-	-		100.00	0.00	0.00	100.00	0.00	0.00	-	-
Range		-	-	-		-	-	-	-	-	-	-	-

_a – Number of sessions during the Low-P condition

_b – Number of sessions during the High-P condition

_c – Number of sessions during the second Low-P condition

Table 4.9: The mean percentage and range of the target children's and peers' responses (R), nonresponses (NR), noncompliance (NC) to low-probability and high-probability requests.

The mean percentage of Eric's nonresponses to the low-probability requests was 6% with a range from 0 to 25%. The mean percentage of noncompliance to the low-probability requests was 2% with a range from 0 to 13 %. Additionally, Eric's peer, Stacie was asked to perform the low-probability requests as a peer model. The mean percentage of the compliant responding to low- probability requests was 100%.

Low-probability requests alone. Eric maintained a mean level of responding to low-probability requests of 97% with a range of 88% to 100 % over 8 sessions. His responses to low-probability requests slightly increased than during the high-probability request sequences with peer molding. Eric maintained steady responding to low-probability requests during this condition, and demonstrated an increase from his responding during the first low-probability request condition. The mean percentage of the nonresponses to low-probability requests was 3.25 % with a range from 0% to 13 %. Eric did not engage in any nocompliance to low-probability requests during this condition.

Paul

Baseline. No low-probability requests were delivered as the children were observed during 10 sessions of the baseline condition.

Low-probability requests alone. During 11 sessions of low-probability requests, Paul responded to a mean of 37.81% of low-probability requests, with a range of 13% to 50%. Paul's compliant responding to low-probability requests showed stability with a little variability at the beginning of the condition. The nonresponses to the low-probability requests ranged from 0% to 87% with a mean of 38.81% and the noncompliance to the low-probability requests ranged from 0% to 62% with a mean of 23.90%.

High-probability request sequences with embedded peer modeling. Paul's compliant responding to low-probability requests to initiate social behaviors during the high-probability request sequence using embedded peer modeling ranged from 88% to 100% with a mean of 99.33% over 18 sessions. The mean percentage of the nonresponses to the low-probability requests was 0.72% with a range from 0 to 13%. Paul's compliant responding to low-probability requests sharply increased with the implementation of the intervention. He demonstrated stable responding during this condition while exhibiting 100% of responding to requests during all but one session. Paul's peer, Jennifer responded 100% to the low-probability requests to initiate social behaviors with Paul.

Low-probability requests alone. Eleven sessions of low-probability requests were conducted with Paul. Paul's compliant responding to low-probability requests ranged from 88% to 100%, with a mean of 98.90%. The mean percentage of noncompliance to the low-probability requests was 0.85% with a range from 0 to 13%. His responses to low-probability requests during all but one session was 100%. Paul maintained steady responding during this condition. Compared to the first the low-probability request condition Paul exhibited robust change in his responsiveness to low-probability requests during the second low-probability request alone condition.

Chris

Baseline. No low-probability requests were delivered as the children were observed during 16 sessions of the baseline condition.

Low-probability requests. During 10 sessions of low-probability requests, Chris complied to a mean of 14% of the requests, with a range from 0% to 50%. The mean percentage of nonresponses to the low-probability requests was 50.10% with a range

from 13% to 100%. The mean percentage of noncompliance to the low-probability requests was 36.60% with a range from 0% to 88%. Chris' responding to the low-probability requests to initiate social behaviors to peers was low with some variability.

High-probability request sequences with embedded peer modeling. Chris's compliant responding to the low-probability requests to initiate social behaviors to peers during the high-probability request sequence using embedded peer modeling ranged from 50% to 100% with a mean of 67.68%, over 19 sessions. The nonresponses to the low-probability requests ranged from 0% to 50% with a mean of 24.42%, and the noncompliance to the low-probability requests ranged from 0% to 29% with a mean of 8.21%. There was an increase in level with some variability over the low-probability requests condition. His peer, Hilary, demonstrated 100% correct responding to the low-probability requests during this condition.

Low-probability requests alone. During the 7 sessions of low-probability requests, Chris maintained the mean of 89.57, with a range of 75% to 100% of responding to low-probability requests. Nonresponses to the low-probability requests ranged from 0% to 12% with mean of 3.43%. The mean percentage of noncompliance to the low-probability requests was 3.57% with a range from 0% to 25%. His responding to low-probability requests during this condition showed a continuing increase. Following this same trend, the responding remained more stable than the responding during the high-probability request sequence.

Social Interactions in the Intervention Setting

This following section will address the research question, “What are the effects of the use of high-probability request sequences with embedded peer modeling on social interactions of young children with autism toward their typically developing peers?”

The results of each child’s total social initiations and responses, total unprompted initiations and responses to the peer and generality peer are represented for all experimental conditions in the intervention setting. Additionally, the social behaviors of the trained peers toward the target children are reported. Figure 4.2 visually displays the numbers of intervals of the target children’s social initiations and responses for all conditions. Table 4.10 and Table 4.11 present the mean number of intervals and range of the target children’s social initiations and responses to the trained peers and generality peers, and the mean number of intervals and range of the trained peers’ social initiations and responses to the target children and generality peer during the experimental conditions.

Eric and Stacie

Baseline. Six data points were obtained for Eric’s baseline. During baseline, the number of intervals of his initiations and responses to the peer and generality peer were low. The mean number of intervals of total unprompted social initiations and responses to the peer and to the generality peer were 0.67 with a range of 0 to 3. The mean number of intervals of initiations to the peer and generality peer was both 0.17 with a range from 0 to 1. The number of intervals of responses to the peer ranged from 0 to 2 with a mean of 0.33. Eric exhibited no response behaviors to the generality peer.

Figure 4.2: Number of intervals of social behaviors in the intervention setting. Bar graphs depict number of intervals of unprompted social initiations and responses to all peers. Data points (▲) represent total number of intervals in which social interactions of both prompted and unprompted initiations and responses occurred in the intervention setting; "A" represents absences; "X" represents peer trainings.

Eric	I				R		Total	Total
	Prompted		Unprompted		Unprompted		UI _b & UR _c	I & R
	P	G	P	G	P	G	P & G	P & G
BL(6 _a)								
Mean	0.00	-	0.17	0.17	0.33	0.00	0.67	0.67
Range	-	-	0-1	0-1	0-2	-	0-3	0-3
Low-P(10 _a)								
Mean	2.8	-	0.00	0.00	0.6	0.00	0.6	3.4
Range	1-5	-	-	-	0-2	-	0-2	2-6
High-P(13 _a)								
Mean	7.23	-	3.00	0.92	6.85	0.15	10.92	18.15
Range	6-8	-	0-7	0-10	0-15	0-1	0-18	8-25
Low-P(8 _a)								
	7.75	-	12.50	0.25	5.88	0.13	18.75	26.50
	7-8	-	7-23	0-2	1-16	0-1	13-39	18-47
Maintenance(6 _a)								
Mean	-	-	11.67	2.67	7.50	1.17	23.00	23.00
Range	-	-	5-23	0-10	5-11	0-3	14-31	14-31
Paul	I				R		Total	Total
	Prompted		Unprompted		Unprompted		UI _b & UR _c	I & R
	P	G	P	G	P	G	P & G	P & G
BL(10 _a)								
Mean	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00
Range	-	-	-	-	-	-	-	-
Low-P(11 _a)								
Mean	3.00	-	0.00	0	0.27	0.00	0.27	3.27
Range	1-4	-	-	-	0-3	-	0-3	1-6
High-P(18 _a)								
Mean	7.94	-	0.39	0	7.89	0.00	8.28	16.22
Range	7-8	-	0-3	-	6-12	-	5-15	12-23
Low-P(11 _a)								
Mean	7.91	-	0.45	0	1.55	0.27	2.27	10.18
Range	7-8	-	0-2	-	0-5	0-3	0-6	8-14
Maintenance(4 _a)								
Mean	-	-	0.50	0	2.50	1.75	4.75	4.75
Range	-	-	0-1	-	1-4	0-4	1-9	1-9

^a- Number of sessions

^b-Unprompted initiation

^c-Unprompted response

Continued

Table 4.10: The mean number of intervals and range of the target children's social initiations (I) and responses (R) to the peer (P) and generality peer (G) in the intervention settings.

Table 4.10 (continued)

Chris	I				R		Total	Total
	Prompted		Unprompted		Unprompted		UI _b & UR _c	I & R
	P	G	P	G	P	G	P & G	P & G
BL(16 _a)								
Mean	0.00	-	0.00	0.00	0.00	0.13	0.13	0.13
Range	-	-	-	-	-	0-1	0-1	0-1
Low-P(10 _a)								
Mean	1.10	-	0.00	0.00	0.00	0.00	0.00	1.10
Range	0-4	-	-	-	-	-	-	0-4
High-P(19 _a)								
Mean	5.37	-	0.95	0.05	9.68	0.11	10.79	16.16
Range	4-8	-	0-6	0-1	4-19	0-2	4-23	8-30
Low-P(7 _a)								
Mean	7.14	-	4.29	0.43	15.00	3.29	23.00	30.14
Range	6-8	-	0-11	0-2	5-30	0-7	15-48	21-55
Maintenance(1 _a)								
Mean	0	-	4	0	12	0	16	16
Range	-	-	-	-	-	-	-	-

Stacie	I				R		I & R			Total I & R		
	Prompted		Unprompted		Unprompted		Unprompted			Prompted & Unprompted		
	T	G	T	G	T	G	T	G	Total	T	G	Total
BL (6 _a)												
Mean	-	-	0.67	3.17	0.00	1.67	0.67	4.83	5.50	0.67	4.83	5.50
Range	-	-	0-4	0-17	-	0-7	0-4	0-20	0-20	0-4	0-20	0-20
Low-P (10 _a)												
Mean	-	-	2.1	3.4	1.7	0.8	3.8	4.2	8	3.8	4.2	8
Range	-	-	0-7	0-15	0-3	0-5	0-8	0-20	2-20	0-8	0-20	0-20
High-P (13 _a)												
Mean	7.92	-	2.77	0.08	6.92	0.00	9.69	0.08	9.77	17.62	0.08	17.62
Range	7-8	-	0-8	0-1	4-11	-	5-15	0-1	5-15	13-23	0-1	13-23
Low-P (8 _a)												
Mean	-	-	7.75	0.00	11.88	0.00	19.63	0.00	19.63	19.63	0.00	19.63
Range	-	-	1-18	-	6-24	-	7-42	-	7-42	7-42	-	7-42
Maintenance(6 _a)												
Mean	-	-	8.83	2.00	9.00	1.17	17.83	3.17	21.00	17.83	3.17	21.00
Range	-	-	5-13	0-5	3-17	0-5	12-29	0-10	12-29	12-29	0-10	12-29

_a – Number of sessions

Continued

Table 4.11: The mean number of intervals and range of the peers' social initiations (I) and responses (R) to the target (T) and the generality peer (G) in the intervention setting.

Table 4.11 (continued)

	Jennifer		I		R		I & R			Total I & R		
	Prompted		Unprompted		Unprompted		Unprompted			Prompted & Unprompted		
	T	G	T	G	P	G	T	G	Total	T	G	Total
BL (10a)												
Mean	-	-	0.00	2.80	0.00	2.10	0.00	4.90	4.90	0.00	4.90	4.90
Range	-	-	-	0-9	-	0-11	-	0-18	0-18	-	0-18	0-18
Low-P (11a)												
Mean	-	-	0.36	3.09	1.64	0.73	2.00	3.82	5.82	2.00	3.82	5.82
Range	-	-	0-4	0-7	0-3	0-2	0-7	0-9	1-10	0-7	0-9	1-10
High-P (18a)												
Mean	8.00	-	1.28	0.50	6.61	0.11	7.89	0.61	8.50	15.89	0.61	16.50
Range	-	-	0-5	0-4	4-10	0-1	4-11	0-4	5-15	12-23	0-4	12-23
Low-P (11a)												
Mean	-	-	1.73	1.82	7.09	0.91	8.82	2.73	11.55	8.82	2.73	11.55
Range	-	-	0-6	0-6	6-8	0-4	7-13	0-10	8-19	7-13	0-10	8-19
Maintenance (4a)												
Mean	-	-	2.75	9.00	0.25	2.50	3.00	11.50	14.50	3.00	11.50	14.50
Range	-	-	1-4	2.19	0-1	1-7	1-4	3-26	4-30	1-4	3-26	4-30

Continued

Table 4.11 (continued)

	Hillary	I				R		I & R			Total I & R		
		Prompted		Unprompted		Unprompted		Unprompted			Prompted & Unprompted		
		T	G	T	G	T	G	T	G	Total	T	G	Total
152	BL (16a)												
	Mean	-	-	0.19	1.06	0.00	1.00	0.19	2.06	2.25	0.19	2.06	2.25
	Range	-	-	0-2	0-7	-	0-7	0-2	0-12	0-12	0-2	0-12	0-12
	Low-P (10a)												
	Mean	-	-	0.90	2.60	0.70	1.60	1.60	4.20	5.80	1.60	4.20	5.80
	Range	-	-	0-5	0-7	0-3	0-7	0-5	0-14	1-14	0-5	0-14	1-14
	High-P (19a)												
	Mean	8.00	-	5.05	0.26	4.68	0.42	9.74	0.68	10.42	17.74	0.68	18.42
	Range	-	-	0-11	0-2	0-9	0-4	1-20	0-6	1-20	9-28	0-6	9-28
	Low-P (7a)												
	Mean	-	-	16.00	1.29	8.43	1.00	24.43	2.29	26.71	24.43	2.29	26.71
	Range	-	-	6-31	0-5	2-16	0-4	10-47	0-9	16-47	10-47	0-9	16-47
	Maintenance(1a)												
	Mean	-	-	16	0	4	0	20	0	20	20	0	20
	Range	-	-	16	-	4	-	20	-	20	20	-	20

Stacie, Eric's peer, demonstrated few interactions with Eric. The mean number of intervals of total unprompted social initiations and responses was 5.50 with a range of 0 to 20. The mean number of intervals of total unprompted social initiations and responses to Eric, and the generality peer were 0.67 with a range of 0 to 4, and 4.83 with a range of 0 to 20, respectively. The number of intervals of unprompted initiations to Eric ranged from 0 to 4 with a mean of 0.67, and the number of intervals of unprompted initiations to the generality peer ranged from 0 to 17 with a mean of 3.17. The mean number of intervals of unprompted responses to Eric and to the generality peer was 0, and 1.67 with a range of 0 to 7, respectively.

Low-probability requests alone. During 10 sessions, the mean number of intervals of the total social initiations and responses to the peer and the generality peer was 3.4 with a range from 2 to 6. The mean number of intervals of prompted initiations (i.e., responses to the low-probability requests) was 2.8 with a range of 1 to 5. The mean number of intervals of unprompted responses to the peer was 0.6 with a range of 0 to 2. Eric did not spontaneously initiate to the peer and generality peer without low-probability prompts. During this condition, Eric's unprompted social behaviors toward the peer and generality peer remained low.

Stacie engaged in more play with Eric during this condition than during baseline. However, the levels of her interactions with Eric were low. The mean number of intervals of total unprompted social initiations and responses to the target child and the generality peer was 8 with a range of 0 to 20. The mean number of intervals of unprompted social initiations and responses to Eric, and to the generality peer was 3.8 with a range of 0 to 8, and 4.2 with a range of 0 to 20. The mean number of intervals of unprompted initiations

to Eric and to the generality peer was respectively, 2.1 with a range of 0 to 7, 3.4 with a range of 0 to 15. The mean number of intervals of unprompted responses to Eric and the generality peer was 1.7 with a range of 0 to 3, 0.8 with a range of 0 to 5, respectively.

High-probability request sequences with embedded peer modeling. Eric's mean number of intervals of the total social initiations and responses to the peer and to the generality peer was 18.15 with a range of 8 to 25 during 13 sessions. The mean number of his prompted initiations increased from 2.8 to 7.23. The mean number of intervals of total unprompted social initiations and responses to the peer and to generality peer was 10.92 with a range of 0 to 18. The number of intervals of unprompted initiations to the peer ranged from 0 to 7 with a mean of 3, and the number of intervals of unprompted initiations to generality peer ranged from 0 to 10 with a mean of 0.92. The mean number of intervals of unprompted responses to the peer and the generality peer was 6.85 with a range of 0 to 15, and 0.15 with a range of 0 to 1, respectively. The data demonstrated the immediate increase in the level of his interactions with the peer and the generality peer in this condition.

Stacie's total initiations and responses to Eric and the generality peer ranged from 13 to 23 with a mean number of 17.62. The mean number of intervals of the prompted initiations (i.e., responses to the low-probability requests) that were performed as a model was 7.92 with a range from 7 to 8. The mean number of intervals of total unprompted initiations and responses to the target child and the generality peer was 9.77 with a range of 5 to 15. The mean number of intervals of unprompted social initiations and responses to Eric, and the generality peer was 9.69 with a range of 5 to 15, 0.08 with a range of 0 to 1, respectively. The mean number of intervals of unprompted initiations to Eric and the

generality peer was 2.77 with a range of 0 to 8, and 0.08 with a range of 0 to 1, respectively. The mean number of intervals of unprompted responses to Eric was 6.92 with a range of 4 to 11, however, she engaged in no responses to the generality peer. She engaged in more social interactions with Eric than the generality peer during this condition. Her unprompted initiations to Eric remained at the same level as the previous condition, however, her unprompted responses to Eric increased more than during the low-probability request condition.

Low-probability requests alone. The condition occurred for eight sessions. Eric's total social initiations and responses had a mean number of 26.50 with a range of 18 to 47. The prompted initiations maintained at a mean number of intervals of 7.75 after removing the high-probability request sequence. The number of intervals of the total unprompted social initiations and responses to the peer and to the generality peer ranged from 13 to 39 with a mean of 18.75. The mean number of intervals of the unprompted social initiations to the peer and the generality peer were 12.50 with a range of 7 to 23, and 0.25 with a range of 0 to 2, respectively. The mean number of intervals of unprompted social responses to the peer and the generality peer were 5.88 with a range of 1 to 16, and 0.13 with a range of 0 to 1, respectively. The unprompted social initiations and responses continued the increasing trend.

Stacie's mean number of intervals of the total unprompted social initiations and responses to Eric was 19.63 with a range of 7 to 42. Stacie's mean number of intervals of unprompted social initiations and responses to Eric, and the generality peer was 19.63 with a range of 7 to 42, and 0 respectively. Stacie engaged in no interactions with the generality peer during this condition. The intervals of unprompted initiations to Eric

ranged from 1 to 18 with a mean number of 7.75. The mean number of intervals of the unprompted responses to Eric was 11.88 with a range of 6 to 24. Stacie's interactions with Eric increased more than in the previous high-probability request sequence condition.

Maintenance. Over 6 sessions Eric's total unprompted initiations and responses had a mean of 23.33 with a range from 14 to 31. The mean number of intervals of the unprompted initiations to the peer and the generality peer was 11.67 with a range from 5 to 23, and 2.67 with a range from 0 to 10, respectively. The mean number of intervals of unprompted responses to the peer and generality peer was 7.50 with a range of 5 to 11, and 1.17 with a range of 0 to 3, respectively. Eric maintained an increased level of social initiations and responses to the peer without any prompts.

Stacie's total unprompted social initiations and responses to Eric and the generality peer ranged from 12 to 29 with a mean number of 21. Stacie's mean number of intervals of total unprompted social initiations and responses to Eric, and the generality peer was 17.83 with a range from 12 to 29, and 3.17 with a range from 0 to 10, respectively. The mean number of unprompted initiations to Eric and the generality peer was 8.83 with a range from 5 to 13, and 2 with a range from 0 to 5, respectively. The mean number of intervals of unprompted responses to Eric and the generality peer was 9 with a range of 3 to 17, and 1.17 with a range of 0 to 5, respectively. Stacie's interactions with Eric remained at the same level as the previous low-probability requests condition.

Paul and Jennifer

Baselines. Paul exhibited no social interactions to the peer, Jennifer, or the generality peer during 10 sessions. Paul's peer, Jennifer's unprompted initiations and responses to the generality peer had a mean of 4.90 with a range from 0 to 18. Jennifer engaged in no interactions with Paul during this condition.

Low-probability requests alone. Over 11 sessions, the mean number of intervals of the total social initiations and responses to the peer and generality peer was 3.27 with a range from 1 to 6. Paul's mean number of intervals of prompted initiations (i.e., response to the low-probability requests) was 3.0 with a range of 1 to 4. His unprompted social behavior was the responses to the peer with a mean number of intervals of 0.27, and with a range of 0 to 3. The levels of social interactions were low.

The mean number of Jennifer's number of intervals of the total unprompted initiations and responses was 5.82 with a range of 1 to 10. Her mean number of intervals of total unprompted initiations and responses to Paul and the generality peer was 2 with a range from 0 to 7, and 3.82 with a range from 0 to 9, respectively. The mean number of intervals of the unprompted initiations to Paul and the generality peer was 0.36 with a range from 0 to 4, and 3.09 with a range from 0 to 7, respectively. The mean number of intervals of the unprompted responses to Paul and the generality peer was 1.64 with a range from 0 to 3, and 0.73 with a range from 0 to 2, respectively. While Jennifer's social interactions with Paul increased slightly they remained very low.

High-probability request sequences with embedded peer modeling. The mean number of intervals of Paul's total social initiations and responses was 16.22 with a range from 12 to 23. The mean number of intervals of prompted initiations increased from 3 to

7.94 during this condition. The mean number of intervals of the total unprompted social initiations and responses ranged from 5 to 15 with a mean of 8.28. Paul engaged in no interactions with the generality peer. The unprompted social initiations increased slightly from the previous condition with a mean number of intervals of 0.39, and a range of 0 to 3. The mean number of intervals of the unprompted responses to the peer was 7.89 with a range from 6 to 12. Paul's overall social initiations and responses including unprompted social behaviors increased from the previous condition with the implementation of the high-probability request sequence using embedded peer modeling.

The mean number of intervals of Jennifer's total social initiations and responses to Paul and the generality peer was 16.50 with a range of 12 to 23. The mean number of intervals of the prompted initiations to Paul was 8. The mean number of intervals of the total unprompted initiations and responses to Paul and to the generality peer was 8.50 with a range from 5 to 15. The mean number of intervals of unprompted initiations and responses to Paul and the generality peer was 7.89 with a range from 4 to 11, and 0.61 with a range from 0 to 4, respectively. She engaged in the unprompted initiations to Paul with a mean number of 1.28 and with a range from 0 to 5, and unprompted initiations to the generality peer ranged from 0 to 4 with a mean number of 0.50. The mean number of intervals of the unprompted responses to Paul and to the generality peer was 6.61 with a range of 4 to 10, and 0.11 with a range of 0 to 1, respectively. Jennifer engaged in more interactions with Paul in this condition.

Low-probability requests alone. There were 11 data points during this condition. The mean number of intervals of Paul's total social initiations and responses was 10.18 with a range from 8 to 14. The prompted initiations maintained at a mean number of

intervals of 7.91 during the second low-probability request condition. The intervals of the total unprompted social initiations and responses ranged from 0 to 6 with a mean of 2.27. The mean number of intervals of the unprompted social initiations to the peer was 0.45 with a range from 0 to 2. The mean number of intervals of the unprompted social responses to the peer and the generality peer was 1.55 with a range of 0 to 5, and 0.27 with a range from 0 to 3, respectively. Although his prompted initiations and unprompted initiations maintained at the same level as in the previous condition, his unprompted social responses decreased from the previous condition.

During this condition, the levels of Jennifer's unprompted social interactions with Paul remained the same as the previous condition although her total social initiations and response to Paul decreased slightly. The unprompted initiations and response to Paul and the generality peer ranged from 8 to 19 with a mean number of 11.55. Her mean number of intervals of total unprompted initiations and responses to Paul and the generality peer was 8.82 with a range from 7 to 10, and 2.73 with a range from 0 to 10, respectively. The mean number of intervals of unprompted initiations to Paul and to the generality peer was 1.73 with a range from 0 to 6, and 1.82 with a range from 0 to 6, respectively. The mean number of intervals of unprompted responses to Paul and to the generality peer was 7.09 with a range from 6 to 8, and 0.91 with a range from 0 to 4, respectively.

Maintenance. During four sessions, the mean number of intervals of Paul's total unprompted initiations and responses ranged from 1 to 9 with a mean of 4.75. The mean number of intervals of the unprompted initiations to the peer was 0.50 with a range from 0 to 1. He engaged in no initiations with the generality peer. The mean number of

intervals of the unprompted responses to the peer and the generality peer was 2.50 with a range of 1 to 4, and 1.75 with a range of 0 to 4, respectively. The unprompted initiations and responses increased slightly from the previous low-probability request condition, and he engaged in responses to the generality peer during this condition although his total social initiations and responses decreased slightly.

The mean number of intervals of Jennifer's total unprompted initiations and responses to Paul and the generality peer was 14.50 with a range of 4 to 30. The mean number of intervals of Jennifer's unprompted initiations and responses to Paul and the generality peer was 3 with a range from 1 to 4, and 11.50 with a range from 3 to 26, respectively. The mean number of intervals of the unprompted initiations to Paul and to the generality peer was 2.75 with a range from 1 to 4, and 9 with a range from 2 to 19, respectively. The mean number of intervals of the unprompted responses to Paul and to the generality peer was 0.25 with a range from 0 to 1, and 2.50 with a range from 1 to 7, respectively. The unprompted initiations to Paul slightly increased than during the previous condition, however, her unprompted responses to Paul decreased during this condition. Jennifer engaged in more social interactions with the generality peer than with Paul.

Chris and Hilary

Baseline. Across a total of 16 sessions, the mean number of intervals of Chris's total unprompted social initiations and responses ranged from 0 to 1 with mean number of intervals of 0.13. His social behavior engaged during baseline was the responses to the generality peer with a mean number of intervals of 0.13 with a range from 0 to 1. The levels of the social interactions were very low.

Hilary, Chris's peer demonstrated low levels of interactions with Chris during baseline. The mean number of intervals of the total unprompted initiations and responses to Chris and the generality peer was 2.25 with a range of 0 to 12. The mean number of intervals of unprompted initiations and responses to Chris and to the generality peer was 0.19 with a range from 0 to 2, and 2.06 with a range from 0 to 12, respectively. The mean number of intervals of the unprompted initiations to Chris and to the generality peer was 0.19, with a range from 0 to 2, and 1.06 with a range from 0 to 7, respectively. Hilary exhibited no responses with Chris; the mean number of intervals of the unprompted responses to the generality peer was 1 with a range from 0 to 7.

Low-probability requests. The mean number of intervals of Chris's total social initiations and responses was 0.10 with a range of 0 to 4 over 10 sessions. The mean number of intervals of prompted initiations (i.e., responses to low-probability requests) was 1.10 with a range from 0 to 4. Chris engaged in no initiations and responses with the peer and the generality peer but in only responses to the low-probability requests (i.e., prompted initiations).

The mean number of Hilary's total unprompted initiations and responses to Chris and to the generality peer was 5.80 with a range of 1 to 14. Her mean number of intervals of unprompted initiations and responses to Chris and to the generality peer were 1.60 with a range from 0 to 5, and 4.20 with a range from 0 to 14. The mean number of intervals of unprompted initiations to Chris and to the generality peer was 0.90 with a range from 0 to 5, and 2.60 with a range from 0 to 7, respectively. The mean number of

intervals of unprompted responses to Chris and to the generality peer was 0.70 with a range from 0 to 3, and 1.60 with a range from 0 to 7. Hilary's interactions with Chris remained at low levels during this condition.

High-probability request sequences with embedded peer modeling. The mean number of intervals of Chris's total social initiations and responses ranged from 8 to 30 with a mean of 16.16 over 19 sessions. The prompted initiations increased from the mean of intervals of 1.10 to 5.37. The mean number of intervals of the total unprompted social initiations and responses to the peer and to the generality peer was 10.79 with a range from 4 to 23. The mean number of intervals of unprompted initiations to the peer and the generality peer was 0.95 with a range from 0 to 6, 0.05 with a range of 0 to 1, respectively. The number of intervals of unprompted responses to the peer ranged from 4 to 19 with a mean of 9.68 and the number of intervals of the unprompted responses to the generality ranged from 0 to 2 with a mean of 0.11. Chris's social behaviors toward the peer and the generality peer sharply increased as compared to the previous baseline and the low-probability requests condition.

The mean number of Hilary's total initiations and responses to Chris and the generality peer was 18.42 with a range of 9 to 28. The mean number of intervals of prompted initiations was 8. The total mean number of intervals of unprompted initiations and responses to Chris and to the generality peer was 10.42 with a range of 1 to 20. Her mean number of intervals of unprompted initiations and responses to Chris and to the generality peer was 9.74 with a range from 1 to 20, and 0.68 with a range from 0 to 9. The mean number of intervals of unprompted initiations to Chris and to the generality

peer was 5.05 with a range from 0 to 11, and 0.26 with a range from 0 to 2, respectively. The intervals of unprompted responses to Chris ranged from 0 to 9 with a mean number of 4.68, and the intervals of the unprompted responses to the generality peer ranged from 0 to 4 with a mean number of 0.42. Hilary engaged in more social interactions with Chris during this condition than during the previous low-probability requests condition.

Low-probability requests alone. The mean number of intervals of Chris's total social initiations and responses to the peer and to the generality peer ranged from 21 to 55 with a mean of 30.14 over 7 sessions. His prompted initiations (i.e., responses to the low-probability requests) increased from the mean of intervals of 5.38 to 7.14 with a range from 6 to 8. The mean number of intervals of the total unprompted social initiations and responses ranged from 15 to 48 with a mean of 23.00. The mean number of intervals of the unprompted social initiations to the peer and the generality peer was 4.29 with a range from 0 to 11, and 0.43 with a range from 0 to 2, respectively. The mean number of intervals of the unprompted social responses to the peer and the generality peer was 15 with a range from 5 to 30, and 3.29 with a range from 0 to 7 respectively. Chris's unprompted initiations and responses continued the increasing trend and he engaged in more social interactions with the generality peer than in the high-probability request sequences using peer modeling.

The mean number of Hilary's total unprompted initiations and responses to Chris and the generality peer was 26.71 with a range of 16 to 47. The mean number of intervals of unprompted initiations and responses to Chris and to the generality peer was 24.43 with a range from 10 to 47, and 2.29 with a range from 0 to 9, respectively. The mean

number of intervals of unprompted initiations to Chris and to the generality peer was 16 with a range from 6 to 31, and 1.29 with a range from 0 to 5. The mean number of unprompted responses to Chris and the generality peer was 8.43 with a range from 2 to 16, and 1 with a range from 0 to 4. Hilary's interactions toward Chris demonstrated continuous increase.

Maintenance. One data point was obtained for Chris with withdrawing the low-probability prompts. Chris's unprompted social initiations and responses to the peer were 16. In this session he engaged in 4 intervals of initiations to the peer, and 12 intervals of responses to the peer in this session. He engaged in social interactions only with the peer due to the absence of the generality peer. Chris maintained his increased unprompted initiations and responses after removing the low-probability prompts.

The mean number of intervals of Hilary's unprompted initiations and responses to Chris was 20. The mean number of intervals of unprompted initiations to Chris was 16, and of unprompted responses to Chris was 4. Her interactions toward Chris maintained at the same level as the previous low-probability request condition during maintenance.

Social Interactions in the Generality Setting

This following section will address the research question, "What are the effects of the use of high-probability request sequences with embedded peer modeling on the social interactions of young children with autism toward their typically developing peers during the generality sessions?" The results of each child's total number of intervals of unprompted initiations to peer and generality peer, and responses to peer and generality peer are represented for all experimental conditions during the generality sessions. Additionally, the social behaviors of the trained peers toward each target child are

reported. Figure 4.3 presents the number of intervals of social initiations and response to the peer and generality peer. Table 4.12 presents the mean number of intervals and range of target children's social initiations and responses to trained peers and generality peers in the generality setting, and Table 4.13 presents the mean number of intervals and range of the peers' social initiations and responses to the target children and generality peers in the generality setting.

Eric and Stacie

During the generality sessions for Eric, the mean number of intervals of total unprompted initiations and responses ranged from 0 to 1 with a mean of 0.50. He displayed only one initiation to the generality peer during two sessions. Eric's peer, Stacie, did interact with the generality peer in this condition. During two conditions, Stacie had one initiation to the generality peer.

During the low-probability requests condition for Eric, his interactions slightly increased, however, his interactions remained at low levels. The mean number of intervals of total unprompted social initiations and responses to the peer and the generality peer ranged from 1 to 3 with a mean of 2. The mean number of intervals of unprompted initiations to the peer was 1. The number of intervals of unprompted response to the peer ranged from 0 to 2 with a mean of 1. He engaged no social interactions with the generality peer. Eric's peer, Stacie, showed slight increases in initiations to Eric during this condition. The mean number of total unprompted social initiations and responses to the peer and generality peer was 15 with a range from 12 to 18. Stacie had a mean number of 2 unprompted initiations to the target child during two sessions of the low-probability request condition. The mean number of intervals of

Figure 4.3: Number of intervals of social behaviors in the generality setting.

Eric	UI_b			UR_c			Total UI & UR
	P	G	Total	P	G	Total	P & G
BL (2 _a)							
Mean	0.00	0.50	0.50	0.00	0.00	0.00	0.50
Range	-	0-1	0-1	-	-	-	0-1
Low-P (2 _a)							
Mean	1	0	1	1	0	1	2
Range	-	-	-	0-2	-	0-2	1-3
High-P (5 _a)							
Mean	4.60	7.60	12.20	3.40	6.40	9.80	22.00
Range	1-10	6-13	7-20	0-13	1-10	3-23	13-39
Low-P (4 _a)							
Mean	5.75	7.67	11.67	4.00	1.67	5.25	16.75
Range	3-11	0-8	10-14	2-7	0-3	3-7	7-18
Maintenance(2 _a)							
Mean	3.00	16.50	19.50	0.50	8.00	8.50	28.00
Range	0-6	11-22	17-22	0-1	2-14	3-14	20-36
Paul	UI_b			UR_c			Total UI & UR
	P	G	Total	P	G	Total	P & G
BL (3 _a)							
Mean	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Range	-	-	-	-	-	-	-
Low-P (3 _a)							
Mean	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Range	-	-	-	-	-	-	-
High-P (6 _a)							
Mean	0.33	0.00	0.33	1.00	1.33	2.33	2.67
Range	0-1	-	0-1	0-4	0-5	0-9	0-9
Low-P (3 _a)							
Mean	0.67	0.33	1.00	0.67	2.33	3.00	4.00
Range	0-2	0-1	0-2	0-2	0-5	2-5	2-6
Maintenance (2 _a)							
Mean	6.50	3.50	10.00	4.50	5.00	9.50	19.50
Range	2-11	0-7	9-11	2-7	0-10	7-12	18-21

_a – Number of sessions; _b-Unprompted initiation; _c -Unprompted response

Continued

Table 4.12: The mean number of intervals and range of the target children's social initiations (I) and responses (R) to the peer (P) and generality peer (G) in the generality setting.

Table 4.12 (continued)

Chris	UI _b			UR _c			Total UI&UR
	P	G	Total	P	G	Total	P & G
BL (4 _a)							
Mean	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Range	-	-	-	-	-	-	-
Low-P (3 _a)							
Mean	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Range	-	-	-	-	-	-	-
High-P (5 _a)							
Mean	0.80	0.40	1.20	2.00	3.80	5.80	7.00
Range	0-2	0-1	0-3	0-4	0-10	1-11	1-14
Low-P (4 _a)							
Mean	2.25	0.00	2.25	11.75	4.75	16.50	18.75
Range	0-7	-	0-7	6-15	0-16	14-22	16-22
Maintenance							
Mean	-	-	-	-	-	-	-
Range	-	-	-	-	-	-	-

Stacie	UI _b			UR _c			Total UI & UR		
	T	G	Total	T	G	Total	T	G	Total
BL (2 _a)									
Mean	0.00	0.50	0.50	0.00	0.00	0.00	0.00	0.50	0.50
Range	-	0-1	0-1	-	-	-	-	0-1	0-1
Low-P (2 _a)									
Mean	2.00	11.50	13.50	0.00	1.50	1.50	2.00	13.00	15.00
Range	-	9-14	11-16	-	1-2	1-2	-	10-16	12.00
High-P (5 _a)									
Mean	4.20	3.60	7.80	3.40	1.40	4.80	7.60	5.00	12.60
Range	0-14	1-8	1-18	0-9	0-5	1-14	0-23	2-9	2-32
Low-P (4 _a)									
Mean	4.75	2.50	7.25	4.50	0.50	5.00	9.25	3.00	12.25
Range	2-10	0-7	3-10	2-10	0-1	2-10	4-20	0-8	5-20
Maint. (2 _a)									
Mean	1.67	12.67	14.33	2.33	4.67	7.00	4.00	17.33	21.33
Range	1-3	2-20	3-21	0-5	3-8	3-13	1-6	5-28	6-34

^a- Number of sessions

^b-Unprompted initiation

^c-Unprompted response

Continued

Table 4.13: The mean number of intervals and range of peers' social initiations (I) and responses to the target children (T) and the generality peer (G) in the generality setting.

Table 4.13 (continued)

	Jennifer	UI _b			UR _c			Total UI & UR		
		T	G	Total	T	G	Total	T	G	T & G
170	BL (3 _a)									
	Mean	0.00	6.00	6.00	0.00	5.33	5.33	0.00	11.33	11.33
	Range	-	1-15	1-15	-	0-12	0-12	-	1-27	1-27
	Low-P (3 _a)									
	Mean	0.00	1.33	1.33	0.00	2.33	2.33	0.00	3.67	3.67
	Range	-	0-2	0-2	-	2-3	2-3	-	3-4	3-4
	High-P (6 _a)									
	Mean	1.00	2.67	3.67	0.00	2.67	2.67	1.00	5.33	6.33
	Range	0-4	2-4	0-4	-	0-10	0-10	0-4	1-12	4-13
	Low-P (3 _a)									
	Mean	0.67	2.33	3.00	0.33	1.33	1.67	1.00	3.67	4.67
	Range	0-2	0-5	0-7	0-1	0-2	0-3	0-3	0-7	0-10
	Maint. (2 _a)									
	Mean	4.50	0.00	4.50	5.00	0.00	5.00	9.50	0.00	9.50
	Range	2-7	-	2-7	0-10	-	0-10	2-17	-	2-17

Continued

Table 4.13 (continued)

[illegible]

unprompted initiations to the generality peer was 11.5 and ranged from 9 to 14. The mean number of unprompted responses to the target child and the peer were 0, and 1.5 with a range from 1 to 2, respectively. Stacie's initiations to Eric slightly increased; however, she continued to exhibit low levels of social interactions with Eric.

For five sessions during the high-probability request sequences with peer modeling the mean number of intervals of the Eric's total unprompted social initiations and responses was 22 with a range of 13 to 39. The mean number of intervals of unprompted initiations to the peer and the generality peer was 4.60 with a range of 1 to 10, and 7.60 with a range from 6 to 13, respectively. The mean number of intervals of the unprompted responses to the peer and the generality peer was 3.40 with a range from 1 to 13, and 6.40 with a range from 1 to 10, respectively. The levels of his interactions with the generality peer as well as the peer sharply and immediately increased upon the intervention.

Stacie's interactions with Eric sharply increased during this condition. The number of intervals of the total unprompted initiations and responses to the target child and generality peer ranged from 2 to 32 with a mean of 12.60. The mean number of intervals of total unprompted social initiations and responses to the target child ranged from 0 to 23 with a mean of 7.60. The mean number of intervals of total unprompted social initiations and responses to the generality peer was 5 with a range from 2 to 9. The mean number of intervals of unprompted initiations to the target child and generality peer was 4.20 with a range from 0 to 14, 3.60 with a range from 1 to 8, respectively. The mean number of intervals of unprompted responses to the target child and generality peer was 3.40 with a range from 0 to 9, and 1.40 with a range from 0 to 5, respectively.

Four generality sessions during the low-probability request condition were conducted. The mean number of intervals of total unprompted initiations and responses to the peer and the generality peer was 16.75 with a range of 7 to 18. His unprompted initiations to the peer and generality peer ranged from 3 to 11 with a mean of 5.75, and ranged from 0 to 8 with a mean of 7.67, respectively. The mean number of intervals of unprompted responses to the peer and generality peer was 4 with a range from 2 to 7, and 1.67 with a range from 0 to 3, respectively. The levels of his interactions were lower than during the previous condition. However, his interactions with the peer remained at the high levels.

Stacie's increased levels of social interactions with Eric maintained during the low-probability request condition. The mean number of the unprompted initiations and responses to the peer and generality peer was 12.25 with a range from 5 to 20. The mean number of unprompted social initiations and responses to the target child was 9.25 with a range from 4 to 20; the mean number of unprompted social initiations and responses to the generality peer was 3 with a range from 0 to 8. The intervals of unprompted initiations to the target child and the generality peer ranged from 2 to 10 with a mean number of 4.75, and ranged from 0 to 7 with a mean number of 2.50. The mean number of intervals of unprompted responses to the target and the generality peer was 4.50 with a range from 2 to 10, 0.50 with a range from 0 to 1, respectively.

During Eric's maintenance phase, the mean number of total unprompted initiations and responses was 28 with a range of 20 to 36. The unprompted initiations to the peer and to the generality peer ranged from 0 to 3 with a mean number of 3, and ranged from 11 to 22 with a mean number of 16.50, respectively. The mean number of

the unprompted responses to the peer and the generality peer was 0.50 with range from 0 to 1, and 8 with a range from 2 to 14, respectively. During the maintenance condition, the level of his interactions increased. Stacie's interactions with Eric during this condition decreased although her total initiations and responses increased. For Stacie, the mean number of total unprompted initiations and responses to the peer and generality peer was 21.33 with a range from 6 to 34. Stacie's unprompted initiations and responses to the target child and the generality peer ranged from 1 to 6 with a mean number of 4, and ranged from 5 to 28 with a mean of 17.33, respectively. The mean number of intervals of unprompted initiations to Eric was 1.67 with a range from 1 to 3. The mean number of intervals of unprompted initiations to the generality peer was 12.67 with a range from 2 to 20. The mean number of the intervals of unprompted responses to the target child and generality peer was 2.33 with a range from 0 to 5, and 4.67 with a range from 3 to 8, respectively.

Paul and Jennifer

Paul engaged in no social interactions with the peer or the generality peer over 3 sessions of baseline condition. Paul's peer, Jennifer engaged in play with the generality peer only. The mean number of intervals of Jennifer's unprompted initiations and responses to the generality peer were 6 with a range from 1 to 15, and 5.33 with a range from 0 to 12, respectively.

Three generality sessions were conducted during the low-probability request condition. Paul did not interact with his peer and the generality peer during this condition.

His peer, Jennifer interacted with the generality peer. The mean number of intervals of unprompted initiations and responses to the generality peer were 1.33 with range from 0 to 2, and 2.33 with a range from 2 to 3, respectively.

During the high-probability request sequences with embedded peer modeling, the levels of Paul's interactions slightly increased. Additionally, he engaged in interactions with the generality peer. The mean number of the total unprompted initiations and responses to the peer and to the generality peer was 2.67 with a range from 0 to 9. The number of intervals of unprompted initiations to the peer and the generality peer ranged from 0 to 1 with a mean of 0.33, and 0, respectively. The mean number of intervals of unprompted responses to the peer and generality peer was 1 with a range from 0 to 4, and 1.33 with a range from 0 to 5, respectively. Paul's peer, Jennifer's mean number of total unprompted initiations and responses to the target child and generality peer was 6.33 with a range from 4 to 13. Jennifer's unprompted initiations and responses to Paul ranged from 0 to 4 with a mean of 1. Her unprompted initiations and responses to the generality peer ranged from 1 to 12 with a mean of 5.33. For Jennifer the mean number of unprompted initiations to Chris and to the generality peer was 1 with a range from 0 to 4, and 2.67 with a range from 2 to 4, respectively. The number of intervals of unprompted responses to the generality peer ranged from 0 to 10 with a mean of 2.67. Jennifer engaged in no responses to Paul.

Three generality sessions were conducted during the low-probability request condition. Paul's total number of intervals of unprompted initiations and responses to the peer and generality peer ranged from 2 to 6 with a mean of 4. The mean number of unprompted initiations to the peer and generality peer was 0.67 with a range from 0 to 2,

and 0.33 with a range from 0 to 1, respectively. The mean number of unprompted responses to the peer and generality peer was 0.67 with a range from 0 to 2, and 2.33 with a range from 0 to 5, respectively. Paul's social behaviors toward the peer and generality peer continued the increasing trend during this condition. Jennifer's social initiations and responses to Paul maintained the same levels as the previous condition. Jennifer's total unprompted initiations and responses to the target child and generality peer ranged from 0 to 10 with a mean number of 4.67. The mean number of intervals of unprompted social initiations and responses to Paul was 1 with a range from 0 to 3. The mean number of intervals of unprompted social initiations and responses to the generality peer was 3.67 with a range from 0 to 7. The mean number of unprompted initiations to the target child and generality peer was 0.67 with a range from 0 to 2, and 2.33 with a range from 0 to 5, respectively. Jennifer's mean number of unprompted responses to the target child and generality peer was 0.33 with a range from 0 to 1, 1.33 with a range from 0 to 2, respectively.

During maintenance, the level of Paul's interactions with the peer and the generality peer sharply increased. The mean number of total unprompted initiations and responses to the peer and the generality peer was 19.50 with a range from 18 to 21. The mean of the unprompted initiations to the peer and to the generality peer was 6.50 with a range from 2 to 11, and 3.50 with a range from 0 to 7, respectively. The number of intervals of unprompted responses to the peer ranged from 2 to 7, with a mean of 4.50. The mean number of unprompted responses to the generality peer was 5 with a range from 0 to 10.

Jennifer's interactions with Paul sharply increased during this condition. The number of intervals of total unprompted initiations and responses to Paul and the generality peer ranged from 2 to 17 with a mean of 9.50. Jennifer engaged in no social interactions with the generality peer. The number of intervals of unprompted initiations to Paul was 4.5 with a range from 2 to 7, and the mean number of intervals of the unprompted responses to Paul was 5, with a range from 0 to 10.

Chris

During the baseline condition, Chris engaged in no social interactions with the peer or generality peer. His peer, Hillary did not interact with Chris, however, she engaged in the play with the generality peer during this condition. The mean number of unprompted initiations and responses to the generality peer was 5.25 with a range from 0 to 14, and 2.25 with a range from 0 to 8, respectively.

During the low-probability request condition Chris did not interact with the peer or the generality peer. Chris's peer, Hilary initiated to Chris with a mean of 0.67 with a range from 0 to 1, however, she did not engage in the response to Chris. For Hilary, the mean number of unprompted initiations and responses to the generality peer was 2.67 with a range from 0 to 4, and 4.33 with a range from 0 to 12, respectively.

Levels of initiations and responses increased during the high-probability request sequences with embedded peer modeling. The mean number of total unprompted initiations and responses to the peer and to the generality peer was 7.00 with a range from 1 to 14. The number of intervals of unprompted initiations to the peer ranged from 0 to 2 with a mean of 0.8 and unprompted initiations to the generality peer ranged from 0 to 1 with a mean of 0.4. The mean number of unprompted responses to the peer and generality

peer was 2 with a range from 0 to 4, and 3.80 with a range from 0 to 10, respectively. Chris engaged in interactions with the generality peer as well as the peer during this condition.

During this condition, for Hilary, the level of initiations and responses to Chris increased. The mean number of Hilary's total unprompted initiations and responses to the target child and the generality peer was 13.80 and ranged from 3 to 28. The mean number of intervals of unprompted initiations and responses to the target child was 2.4 with a range from 0 to 6 while the mean number of intervals of unprompted initiations and responses to the generality peer was 11.40 with a range from 1 to 19. The number of intervals of unprompted initiations to the target child ranged from 0 to 4 with a mean of 2, and the number of intervals of unprompted initiations to the generality peer ranged from 0 to 14 with a mean of 5.20. The mean number of the intervals of unprompted responses to the target and the generality peer was 0.4 with a range from 0 to 2, 6.2 with a range from 1 to 13.

During the low-probability request condition, the number of intervals of the total unprompted initiations and responses to the peer and generality peer ranged from 16 to 22 with a mean of 18.75. The mean number of unprompted initiations to the peer and generality peer were 2.25 with a range from 0 to 7, and 0, respectively. The mean number of unprompted responses to the peer and generality peer was 11.75 with a range from 6 to 15, and 4.75 with a range from 0 to 16, respectively. The increasing trend in social interactions with the peer and generality peer continued over seven sessions.

During this condition, Hilary's level of social interactions with Chris increased. The number of interval of unprompted initiations and responses to the peer and generality

peer ranged from 12 to 43 with a mean of 22.75. The number of intervals of unprompted initiations and responses to the target child and generality peers was 14.25 with a range from 9 to 19, 8.50 with a range from 2 to 27, respectively. The mean number of unprompted initiations to the target child and generality peer was 12.75 with a range from 9 to 16, and 5.75 with a range from 1 to 18, respectively. The mean number of unprompted responses to the target child and generality peer was 1.50 with a range from 0 to 6, and 2.75 with a range from 0 to 9, respectively. No sessions were conducted during the maintenance condition due to the end of the school year.

Additional data on other behaviors

Disruptive Behaviors

In addition to the dependent variable, additional data for disruptive behaviors were recorded. Table 4.14 represents the mean number of intervals and range of disruptive behaviors across all experimental conditions in the intervention and generality setting.

Eric. During baseline condition in intervention setting, Eric rarely engaged in disruptive behavior with a mean number of 0.2 and a range from 0 to 1. During the low-probability request condition in the intervention setting, the mean number of intervals of disruptive behaviors was 0.4 with a range from 0 to 3. Eric displayed no disruptive behavior during the high-probability request sequences with embedded peer modeling. During the following low-probability request and maintenance sessions, he did not engage in any disruptive behavior. In the generality setting, Eric displayed no disruptive behavior across all experimental conditions.

	BL				Low-P				High-P				Low-P				Maintenance			
	I		G		I		G		I		G		I		G		I		G	
	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S
Eric																				
# of sessions	6		2		10		2		13		5		8		4		6		2	
Mean	0.20	2.60	0.00	0.50	0.40	15.60	0.50	3.00	0.00	3.75	0.00	0.67	0.00	3.50	0.00	9.75	0.00	8.50	0.00	8.50
Range	0-1	0-5	-	0-1	0-3	0-56	0-1	2-4	-	0-20	-	0-2	-	0-11	-	3-18	-	2-20	-	4-13
Paul																				
# of sessions	10		3		11		3		18		6		11		3		4		2	
Mean	1.60	15.78	0.33	12.00	2.09	5.18	0.67	6.67	0.06	5.88	0.67	12.00	0.58	9.90	0.67	7.33	0.00	13.00	0.00	10.00
Range	0-10	0-41	0-1	5-17	0-5	0-12	0-2	2-9	0-1	0-20	0-4	9-17	0-1	2-29	0-1	6-10	-	1-22	-	-
Chris																				
# of sessions	16		4		10		3		19		5		17		4		1		-	
Mean	1.13	25.56	0.75	9.25	6.00	10.70	3.33	4.67	0.79	7.79	1.20	8.40	1.43	1.57	0.00	3.75	1.00	0.00	-	-
Range	0-7	5-49	0-2	2-28	0-14	1-21	2-6	1-10	0-2	0-21	0-3	0-33	0-9	0-9	-	0-12	-	-	-	-

Table 4.14: The mean number of intervals and range of the target children's disruptive behaviors(D) and self-stimulating behaviors(S) in the intervention(I) and generality setting(G).

Paul. In the intervention setting, Paul's number of intervals of disruptive behaviors during baseline ranged from 0 to 10 with a mean of 1.6. During the low-probability request condition, Paul's disruptive behavior increased. The mean number of intervals of disruptive behavior was 2.09 with a range from 0 to 5. His disruptive behavior decreased to a mean of 0.06 with a range from 0 to 1 during the high-probability request sequences with embedded peer modeling. During the low-probability request condition, the levels of his disruptive behavior remained low. Paul engaged in no disruptive behavior during the maintenance condition.

In the generality setting, the mean number of intervals of disruptive behavior was 0.33 with a range from 0 to 1 during baseline, 0.67 with a range from 0 to 2 during the low-probability request condition, 0.67 with a range from 0 to 4 during the high-probability request intervention. Paul engaged no disruptive behavior in the generality setting during maintenance.

Chris. Chris engaged in disruptive behavior with a mean number of 1.13 and with a range from 0 to 7 in the intervention setting during baseline. During the low-probability request condition, the mean number of intervals of disruptive behavior was 6 which ranged from 1 to 14. Chris's disruptive behavior decreased during the high-probability request intervention. The number of intervals of disruptive behavior ranged from 0 to 2 with a mean of 0.79. During the low-probability request condition, the mean number of intervals of disruptive behavior was 1.43 with a range from 0 to 9. During one session of the maintenance, Chris exhibited one disruptive behavior.

In the generality setting the mean number of intervals of disruptive behavior was 0.75 with a range from 0 to 2 during baseline. During the low-probability request condition, the mean of intervals of disruptive behavior was 3.33 with a range from 2 to 6. Chris engaged in disruptive behavior with a mean number of 1.2 and a range from 0 to 3 during the high-probability request sequences with embedded peer modeling. During the low-probability requests, Chris engaged in no disruptive behaviors.

Self-Stimulating Behaviors

Each target child's self-stimulating behaviors were recorded. Table 4.14 represents the mean number of intervals and the range of self-stimulating behaviors across all experimental conditions in the intervention and generality setting.

Eric. During the baseline condition in the intervention setting, Eric engaged in self-stimulating behaviors with a mean number of intervals of 2.60 and a range from 0 to 5. During the low-probability request condition in the intervention setting, the mean number of intervals of self-stimulating behaviors was 15.60 with a range from 0 to 56. Eric displayed self-stimulating behaviors with a mean number of intervals of 3.75 and a range from 0 to 20 during the high-probability request sequences with embedded peer modeling. During the following low-probability request, the mean number of intervals of self-stimulating behaviors was 3.50 with a range from 0 to 11. Eric's self-stimulating behaviors ranged from 2 to 20 with a mean of 8.50 during the maintenance condition. Eric's self stimulating behaviors in the intervention setting decreased after implementing the high-probability request sequence intervention, remained at the same levels during the second low-probability requests, and increased during the maintenance condition.

In the generality setting, Eric's mean number of intervals of self-stimulating behaviors was 0.50 with a range from 0 to 1. During the low-probability request condition in the generality setting, the mean number of intervals of self-stimulating behaviors was 3 with a range from 2 to 4. Eric's self-stimulating behaviors during the high-probability request sequence using embedded peer modeling ranged from 0 to 2 with a mean of 0.67. During the second low-probability request condition, Eric engaged in self-stimulating behaviors with a mean number of intervals of 9.75 with a range from 3 to 18. The mean number of intervals of self-stimulating behaviors during maintenance was 8.50 with a range from 4 to 13. Eric's self-stimulating behaviors in the generality setting decreased during the high-probability request sequence intervention and increased again during the next low-probability request and maintenance condition.

Paul. In the intervention setting, Paul's number of intervals of self-stimulating behaviors during baseline ranged from 0 to 41 with a mean of 15.78. During the low-probability request condition, Paul's self-stimulating behavior decreased. The mean number of intervals of self-stimulating behaviors was 5.18 with a range from 0 to 12. During the high-probability request sequences with embedded peer modeling, his self-stimulating behaviors remained at the same levels as during the previous condition. The mean number of intervals of self-stimulating behaviors was 5.88 with a range from 0 to 20. During the low-probability request condition, the levels of his self-stimulating behaviors increased to a mean number of intervals of 9.9 with a range from 2 to 29. His self-stimulating behaviors during the maintenance condition ranged from 1 to 22 with a mean number of intervals of 13.

In the generality setting, the mean number of intervals of self-stimulating behaviors was 12 with a range from 5 to 17 during baseline, 6.67 with a range from 2 to 9 during the low-probability request condition, and 12 with a range from 9 to 17 during the high-probability request intervention. Paul's self-stimulating behaviors ranged from 6 to 10 with a mean number of intervals of 7.33 during the low-probability request condition. During maintenance, he engaged in self-stimulating behaviors with a mean number of intervals of 10.

Chris. Chris engaged in self-stimulating behaviors with a mean number of 25.56 and with a range from 5 to 49 in the intervention setting during baseline. During the low-probability request condition, the mean number of intervals of self-stimulating behaviors was 10.70 with a range from 1 to 21. Chris's self-stimulating behaviors decreased during the high-probability request sequences with embedded peer modeling. The number of intervals of self-stimulating behaviors ranged from 0 to 21 with a mean of 7.79. During the low-probability request condition, the mean number of intervals of self-stimulating behaviors was 1.57 with a range from 0 to 9. During one session of the maintenance, Chris exhibited no self-stimulating behaviors. Chris's self-stimulating behaviors in the intervention setting decreased as the sessions continued.

In the generality setting, the mean number of intervals of self-stimulating behaviors was 9.25 with a range from 2 to 28 during baseline. During the low-probability request condition, the mean of intervals of disruptive behavior was 4.67 with a range from 1 to 10. Chris engaged in self-stimulating behaviors with a mean number of 8.40 and a range from 0 to 33 during the high-probability request sequence. During the low-

probability requests, the mean number of intervals of self-stimulating behaviors was 3.75 with a range from 0 to 12. Chris's self-stimulating behaviors in the generality setting decreased toward the end of the sessions.

Negative interactions

Negative interactions were recoded using partial interval recording across all conditions. Few negative interactions were observed for the target children.

Eric. Eric engaged in few negative interactions with a mean of 0.16 intervals and a range from 0 to 1 during baseline in the intervention setting. No negative interactions were recorded in the generality setting. During the low-probability requests alone, Eric exhibited a mean of intervals of 0.2 negative interactions in the intervention setting. No negative interactions were observed during the other conditions.

Paul. Paul engaged in no negative interactions across all conditions in the intervention and generality settings.

Chris. During the baseline condition, Chris engaged in no negative interactions in the intervention and generality settings. During the low-probability requests alone condition, the mean of intervals of negative interactions in the intervention setting was 0.3 with a range from 0 to 2. Chris exhibited no negative interactions in the generality setting. During the high-probability request sequences with embedded peer modeling, Chris engaged in negative interactions with mean of 0.3 and a range from 0 to 2 in the intervention setting. In the generality setting the mean of intervals of negative interactions was 1 with a range from 0 to 2. During the low-probability requests alone, the mean of intervals of negative interactions in the intervention setting was 0.29 with a

range from 0 to 2. Chris engaged in no negative interactions in the generality setting. During one session of the maintenance condition, Chris displayed no negative interactions in the intervention setting.

Social Validity

Information was collected from relevant consumers and evaluated to determine the social validity of the intervention goals, procedures, and outcomes. The following is a summary of the results of the social validity information gathered from parents of the children participating in the study and the professionals in early childhood special education including the classroom teachers with whom the study was conducted.

In this section the following research question will be addressed: To what extent do the parents and early childhood special education teachers find the intervention goals, procedures, and outcomes to be relevant, useful, and effective for children with autism?

Intervention Goals

The social validity of the intervention goals was addressed by gathering information from three parents of the children participating in the study, and three early childhood special education teachers at the school. Parents and teachers were requested to fill out a questionnaire that asked about the intervention goals before conducting the study. Parents and early childhood special education teachers were asked whether they considered the research questions to be valid and useful for their children. Results are summarized as follows (see Table 4.15).

		Eric's parent	Paul's parent	Chris's parent	Classroom teacher	Teacher 1	Teacher 2
1	Do you think this research question is valid/useful for your child's education? What are the effects of the use of high-probability requests sequence on social interactions of young children with autism and typically developing children in an inclusive setting?	Unsure	Yes	Yes	Yes	Yes	Yes
2	Do you think this research question is valid/useful for your child's education? To what extent does the child generalize social interactions to a nontraining condition?	Yes	Yes	Yes	Yes	Yes	Yes
3	Do you think this research question is valid/useful for your child's education? To what extent does the child maintain social interactions in an inclusive setting following the removal of the high-probability request intervention?	Yes	Yes	Yes	Yes	Yes	Yes
4	Do you think this research question is valid/useful for your child's education? To what extent does the child maintain the social interactions in an inclusive setting following the removal of the low-probability request prompts?	Yes	Yes	Yes	Yes	Yes	Yes
5	Do you think this research question is valid/useful for your child's education? To what extent does the parent find the intervention goals, procedures, and outcomes to be relevant, valuable, and effective with their children during center time in an inclusive setting?	Yes	Yes	Yes	Yes	Yes	Yes
6	Do you think this research question is valid/useful for your child's education? To what extent do early childhood special education teachers find the intervention goals, procedures, and outcomes to be relevant, useful, and effective with children with autism in an inclusive setting?	Yes	Yes	Yes	Yes	Yes	Yes

Table 4.15: Summary of parent and teacher questionnaire.

Parents

Eric. Eric's mother answered that the five research questions were valid and useful for her child. However, for the first question she marked that she was unsure of the usefulness of the question regarding the effects of the use of high-probability request sequences on social interactions of young children with autism and typically developing children in an inclusive setting. Additionally she wrote her goal on increasing social interactions was using appropriate greetings (e.g., "Good bye," "How are you?").

Paul. Paul's parent answered that she thought all research questions were useful and valid for her child. Her goal, regarding social interactions, was teaching turn-taking.

Chris. Chris's mother answered that she thought all research questions were useful and valid for her child. In the domain of social interactions, she wanted her child to talk and play with other children.

Teachers

Three teachers including the classroom teacher who conducted the study were asked to fill out a questionnaire. All of the teachers answered that all of the research questions were useful and valid for the children with autism.

Intervention Procedures

The experimenter gathered information from 20 professionals in early childhood special education to determine the social acceptability and usability of the intervention procedures. They included 10 early childhood special education teachers, two speech therapists, two occupational therapists, one regular education teacher, three graduate students (student teachers), and two assistants in the classroom where the study was conducted. Their experiences of working with young children with disabilities ranged

from one to six years. Teachers were asked to view three unidentified 2-min segments of videotape depicting the target children during baseline, low-probability requests alone, and the high-probability request sequence using embedded peer modeling. Video segments that were representative of each child's performance in each condition were chosen. Teachers were asked whether they thought the intervention would be easy to use during the daily routine, and whether they would use the intervention in their classroom when considering both time and effort necessary for the intervention.

Sixty percent of the professionals responded that the high-probability intervention using peer modeling would be easy to use during the student's regular routine. They reported that this intervention was simple enough to be adapted to fit in with the children's natural routine setting with readily available materials, the activities the children would enjoy, as well as during free-choice center time. Additionally, children with such low levels of social interactions would benefit from such an intense intervention. On the other hand, 40% of the professionals responded that the intervention would be time consuming with the demands made by the rest of the students in the classroom. In the classroom, one on one adult interaction was not always available. Pre-assessment for high-probability and low-probability requests would be time consuming in a classroom served by one teacher.

After observing the amount of time and effort needed to implement the procedures described in the high-probability request sequence using peer modeling, 85% of the professionals responded that they would use the intervention in their classroom. They reported that this intervention enabled the child to engage in play and social interactions, demonstrated a difference in behaviors as shown in video clips, was

effective, and was possible to incorporate into some activities. Additionally, the intervention could be modified and adapted to be less demanding using more naturally occurring activities. One teacher responded that due to the labor intensive preparation, this would be considered as a viable intervention when other less intensive interventions had failed. On the other hand, some professionals responded that the intervention seemed hard, or time consuming to implement if the classroom were too busy and include too many children.

Eighty five percent of the professionals responded that the high-probability request intervention was useful to improve social interactions between children. They reported that the intervention promotes communication and language, and motivates and promotes appropriate social interactions between children because of the low level of stress placed on the performance. Additionally, they noted that this intervention would be effective in terms of the use of the peer model and providing an opportunity for the target child to experience child to child appropriate interactions. However, several professionals reported that the intervention did not seem to natural in terms of prompting children.

Intervention Outcomes

Information was gathered from the same 20 professionals in early childhood special education above and evaluated to determine the social validity of the intervention outcomes. After viewing video clips, the professionals were asked to complete a checklist which included skills targeted by intervention in this study. Results are summarized as follows (see Table 4.16).

Skills		% of the professionals observed skills								
		Eric			Paul			Chris		
		BL	Low-p	High-p	BL	Low-p	High-p	BL	Low-p	High-p
1	Complies with the requests	15	25	95	10	70	95	5	25	95
2	Focuses on a task/play	35	0	100	15	15	100	5	25	95
3	Shares materials/toys with peers	0	5	100	0	10	90	0	5	100
4	Responds when spoken to	40	25	100	20	75	100	60	90	100

Table 4.16: Summary of observed skills for the target children during intervention videotaped segments by the professionals in early childhood special education.

Eric

During baseline for Eric, 15% of the professionals observed the first skill in the checklist “complies with requests.” Thirty five percent of the professionals identified the second skill in the checklist “focuses on a task/play.” For the third skill “shares materials/toys with peers,” none of the professionals identified the skill. Forty percent of the professionals observed the fourth skill “responds when spoken to.” During the first low- probability requests condition, 25%, 0%, 5%, and 25% of the professionals identified having observed the first, second, third, and the fourth skill on the checklist, respectively. For the high-probability request sequences with embedded peer modeling condition, 95% -100% of the professionals identified having observed the target child performing the skills listed on the checklist.

Paul

During baseline for Paul, 10% of the professionals observed the first skill in the checklist “complies with requests.” Fifteen percent of the professionals identified the second skill in the checklist “focuses on a task/play.” None of the professionals identified having observed the third skill “shares materials/toys with peers.” Twenty percent of the professionals observed the fourth skill “responds when spoken to.” For the first low- probability requests condition, 70% of the professionals observed the first skill, 15% of the professionals identified having observed the second skill, 10% of the professionals reported having observed the third skill, and 75% of the professionals had observed the fourth skill in the checklist. During the high-probability request sequences with peer modeling, 95%, 100%, 90%, and 100% of the professionals identified having observed the above skills, respectively.

Chris

During baseline for Chris, 5% of the professionals observed the first skill in the checklist “complies with requests.” Five percent of the professionals identified the second skill in the checklist “focuses on a task/play.” None of the professionals identified having observed the third skill “shares materials/toys with peers.” Sixty percent of the professionals observed the fourth skill “responds when spoken to.” For the first low-probability requests condition, 25% of the professionals observed the first skill, 25% of the professionals identified having observed the second skill, 5% of the professionals reported having observed the third skill, and 90% of the professionals had observed the fourth skill in the checklist. During the high-probability request sequences with embedded peer modeling, 95%, 95%, 100%, and 100% of the professionals identified having observed the above skills, respectively.

CHAPTER 5

DISCUSSION

This chapter discusses the results of the study investigating the effects of the high-probability request sequence using peer modeling on compliant responding to requests, as well as for increasing the social interactions of young children with autism in an inclusive classroom. Limitations of the study, results relative to the research questions, implications for practice, and directions for future research will be discussed.

Limitations of the Study

This study was limited by the length of the study and the nature of the participants.

Length of Study

This study was conducted over a course of 16 weeks. The school year ended before follow-up data could be collected. Social interaction interventions require implementation over an extended period of time while providing multiple and repeated opportunities to practice emerging skills (Kohler & Strain, 1999). More sessions to practice targeted social behaviors would have likely led to an increase in unprompted social behaviors.

One session during maintenance was observed for Chris. No follow-up data were obtained for the target children. It would have been beneficial to observe the children's social behaviors for additional maintenance and follow-up sessions.

Participants

The role of peers, as well as the target children's social behaviors, is important for increasing social interactions. The second peer of this study was found to have limited skills. She could verbally respond to the experimenter's questions about what she might do when her paired target child, Paul, initiated a social interaction with her. However, she was often hesitant to initiate and respond to the target child during play (although she engaged in interactive play with the generality peer in the same setting) and she often left her assigned center. However, when the generality peer, Randy, initiated play with Paul, she was more likely to engage him in play. Thus, a different match between the peer and this target child may have an increase in more social interactions that could be observed between the children.

The first target child's peer, Stacie, missed seven consecutive sessions since she and her family were on vacation during that period. Due to her absences, intervention with Eric was not implemented for those days.

Research Questions

The following is a discussion of the results of the study as they pertain to the research questions provided in Chapter 1.

What are the effects of the use of high-probability request sequences with embedded peer modeling on complaint responding to low-probability requests to initiate social behaviors for young children with autism?

Data were collected in each session on the children's compliant responding to requests to initiate social behaviors during the initial low-probability request alone condition, the high-probability request sequences with embedded peer modeling, and the second low-probability request condition. No low-probability requests were delivered when the children were observed during the baseline. During the initial low-probability request condition, Eric displayed few responses to the low-probability requests, and he often ignored his peer's play initiations. Paul exhibited disruptive behaviors both when the experimenter invited him to the assigned center and gave him the instructions before observation and upon delivery of some low-probability requests during the session. Paul's compliant responding to the low-probability requests was low. Chris also had low levels of compliant responding and often displayed no response or noncompliance to the low-probability requests.

The high-probability request sequence intervention was combined with peer modeling to increase compliant responding to requests as well as social interactions. During the high-probability request sequences with embedded peer modeling, all of the participants' compliant responding to low-probability requests increased immediately upon implementation of the intervention. The experimenter's general prompts for the three target children decreased during this condition. Eric exhibited high levels of compliant responding to low-probability requests while displaying low levels of self-stimulating behaviors. He often smiled and laughed while performing the high-probability requests. Paul's compliant responding to the low-probability requests increased after introducing the intervention. His disruptive behaviors decreased and his self-stimulating behavior maintained the same levels as the low-probability request

condition. He eagerly participated in the intervention activities while waiting for the next high-probability request sequence. Chris exhibited an increase in compliant responding to low-probability requests with some variability. His disruptive and self-stimulating behaviors decreased, and he displayed more engagement in appropriate play during the intervention. He often laughed during the delivery of requests and praise statements.

The low-probability request alone condition was reintroduced to assess whether compliant responding to requests was maintained after withdrawal of the high-probability request sequence. Upon return to the low-probability request condition, the target children's compliant responding to low-probability requests maintained at the previous high levels. The experimenter's general prompts remained at the same levels as during the previous condition. Eric's levels of compliant responding to the low-probability requests increased to higher levels than those observed during the high-probability request sequence using peer modeling. Eric's engagement in self-stimulating behaviors remained at the same levels as during the previous condition. Paul maintained high levels of compliant responding to the low-probability requests. He engaged in low levels of disruptive behaviors, but his self-stimulating behaviors increased more than levels observed during the high-probability request sequence using peer modeling. It is worth noting that he was in the process of losing a tooth and the increase in self-stimulating behavior might have been related to this event. For Chris, the levels of compliant responding to the low-probability requests increased more during this condition than during the high-probability request sequence using peer modeling. His disruptive behaviors increased slightly but remained at the low levels. He also engaged in less self-stimulating behavior during this condition.

Research on the use of the high-probability request sequence has found that compliant responding to low-probability requests increases with implementation of the intervention (Davis & Reichle, 1996; Davis et al., 1992, 1994, 2000; Ducharme & Worling, 1994; Mace et al., 1988; Killu et al., 1998; Sanchez-Fort et al., 1995; Santos & Lignugaris/Kraft, 1999). The results of this study support the existing literature on the effectiveness of the high-probability request sequence intervention on compliant responding to requests.

Regarding the maintenance of compliant responding to low-probability requests, some studies have shown that compliant responding to low-probability requests decreased to the baseline levels after withdrawal of the high-probability request intervention (Belfiore et al., 1997; Mace et al., 1988; Mace & Belfiore, 1990; Kennedy et al., 1995; Singer et al., 1987; Wehby & Hollahan, 2000). Other studies demonstrated that with the systematic fading procedure of the high-probability request sequence, the target children's compliance maintained the same levels as during the high-probability request sequence (Ducharme & Worling, 1994; Ardoin et al., 1999). In this study, the increased compliant responding of the target children maintained the high levels, and two of the children's compliant responding to the low-probability requests continued increasing trends after removal of the high-probability request sequence. The results of this study are consistent with the findings of Davis et al. (1992; 1994), and Killu et al. (1998). In this study, the natural community of reinforcement from social interactions between children may have helped to maintain and increase compliant responding to the low-probability requests after removal of the intervention.

The present study supports and extends findings in the literature regarding the high-probability request sequence intervention. Further, the intervention was implemented involving peers as peer models as well as play partners.

What are the effects of the use of high-probability request sequences with embedded peer modeling on the social interactions of young children with autism toward their typically developing peers?

Children's social initiations and responses were observed across all experimental conditions. During baseline, all participants were given instructions to stay in the center and play with a friend. The three target children seldom engaged in social interactions with peers.

During the initial low-probability request condition, prompted social initiations increased slightly with the implementation of low-probability requests while remaining at the low levels. However, unprompted initiations and responses maintained the same levels as during the baseline condition. Eric often ignored his peer's initiations and engaged in more self-stimulating behavior. Paul's unprompted social interactions remained at the low levels, and he often engaged in stereotypic behaviors (e.g., repeatedly pounding the floor with his toys). Chris engaged in no unprompted social interactions during this condition. Peers attempted several unprompted initiations to the target children at the beginning of the low-probability request condition after peer training and before moving to the low-probability request condition. Their initiations did not continue as the sessions went on largely because the target children were not responding to the peers.

Upon introduction of the high-probability request sequences with embedded peer modeling, both the target children and the peers were prompted to initiate social behaviors toward each other. All the children's unprompted social initiations and responses as well as prompted initiations increased. Eric exhibited an immediate increase in social initiations and responses. He engaged in interactive play with his peer, Stacie, while using the target behaviors (e.g., "Hey, fly the plane to me," "Let's build an airport," "How are you?" "I like to play with you," etc.). Additionally, he often initiated play using the same high-probability requests delivered by the experimenter (e.g., "Take off the runway," "Fold down the stairs," etc.). When his peer did not respond to his initiations, he initiated Stacie again ("I am talking to you," "I flied the plane to you," etc.). Eric exhibited a slight increase in interactions with the untrained, generality peer during this condition while he engaged in no interactions with her during the low-probability request condition. Eric's peer, Stacie, showed the same level of unprompted initiations as during the previous condition while responding to Eric's play initiations most of the time. Additionally, her interactions focused upon Eric rather than upon the generality peer, although she did engage in more interactions with the generality peer during the low-probability request alone condition. The second target child, Paul, showed increased levels of social initiations and responses toward his peer during the intervention. He responded to all of his peer's initiations; however, his unprompted initiations remained at relatively low levels while exhibiting a slight increase. One week after implementation of the intervention, he displayed unprompted initiations to his peer using the targeted low-probability requests (e.g., "Come to me, Jennifer," tickling his peer, etc.); however, his peer, Jennifer, did not respond to his unprompted initiations. Jennifer displayed a slight

increase in unprompted initiations to Paul, but they nevertheless remained at low levels. Jennifer sometimes did not respond to Paul's initiations and did not want to share toys with him. Chris's social initiations and responses showed higher levels than during the low-probability request condition. He engaged in responses most of time when his peer, Hilary, initiated toward him. His unprompted initiations increased but still remained at low levels. As the sessions continued, he engaged in more unprompted initiations. He engaged in interactions with the generality peer during this condition. Hilary increased her unprompted social initiations and responses to Chris, and she engaged in more interactions with Chris than with the generality peer.

After reintroducing the low-probability request alone condition, Eric's initiations and responses to his peer increased more than during the high-probability request sequence intervention. His peer, Stacie, exhibited more interactions with him than during the high-probability request sequence using peer modeling. She displayed no interactions with the generality peer during this condition. For Paul, his initiations and responses to his peer decreased slightly during this condition. Paul's peer, Jennifer, had levels of social initiations that were slightly decreased although she maintained the same levels of unprompted initiations and responses as in the previous condition. The third target child, Chris, continued to show increasing social initiations and responses to his peer, and his generality peer. His peer, Hilary, demonstrated continuous increasing interactions toward Chris. During this condition, Hilary often prompted Chris to play while using the same high-probability requests that the experimenter had delivered (e.g., "Push the train," "Put the barrel in loader," "Cut the pizza," etc.). She modeled and provided physical assistance when Chris did not respond to her.

The low-probability request prompts were removed to assess whether social interactions between the children were maintained during the maintenance condition. Eric maintained the same levels of unprompted initiations and responses to his peer, Stacie, and his social behaviors toward the generality peer increased during this condition. Stacie exhibited more initiations and responses to him than during the low-probability request sequence. Paul's unprompted initiations and responses increased slightly, and he engaged in more interactions with his generality peer than during the previous condition. Paul's peer, Jennifer, showed a slight increase in unprompted social initiations to him. She engaged in more interactions with the generality peer. Chris's unprompted initiations remained at the same levels as during the previous condition, but his responses to his peer, Hilary, maintained relatively high levels while showing a slight decrease.

Results of this study can be compared with two fields of research, including the high-probability request sequence intervention and peer-mediated social interaction studies. Davis et al. (1994) found that using the high-probability request intervention increased social interactions between children with disabilities and typically developing children and that the target children's social behaviors generalized to the generality peer in the intervention and generality setting. Additionally, after removing the prompts, children's social interactions maintained and even increased more than during the high-probability request sequence intervention in their study. With the exception of Paul and Jennifer, whose social behaviors slightly decreased the results of this study support Davis et al. (1994). Regarding the continued increase in social interactions after removing

intervention, Davis et al. (1994) proposed that the prompted interactions during the intervention may have prevented an increase in the unprompted interactions due to the time children engaged in prompted interactions.

In addition, in this study the targeted requests included behaviors that are more likely to facilitate other children's responses, such as greetings, complimenting, and demonstrating affectionate behaviors (Fox & McEvoy, 1993; Tremblay et al., 1981). Additionally, prompting both the target children and the peers to initiate may have facilitated ongoing interactions and would have provided them with natural communities of reinforcement for engagement in social interactions.

In the studies on peer-mediated social interaction interventions, peer initiations decreased after removing teacher prompts (Odom et al., 1985). Researchers noted that peer confederates in peer-mediated interventions may become weary from their roles as the initiating playmate for the child with disabilities and, thus, their levels of social initiations might become fewer as the intervention progresses (Odom et al., 1987; Odom & Watts, 1991). Thus, subsequent studies have focused on maintaining peer initiations using teacher prompts fading procedures, corresponding training, incidental teaching, and self-evaluation strategies (McGee et al., 1992; Odom & Watts, 1991; Odom et al., 1992; Sainato et al., 1992). In this study, the peers were trained once stable responding was demonstrated by the target children during baseline before moving to the low-probability request sequence. During the high-probability request sequence, the peers were provided with the high-probability request sequence to initiate the target children while modeling for the target children. After the high-probability request sequences with embedded peer modeling phase, the peers were not given any prompts to interact with the target children.

Although Jennifer did not maintain the same levels of social behaviors as during the high-probability sequence intervention, results indicated that the peers' unprompted initiations to the target children showed a continued increasing trend toward the end of the study. Odom and Watts (1991) suggested that the peers and the children with disabilities might be taught social interaction skills at the same time in order to encourage more reciprocal social interactions rather than the one-sided interactions that occur when one child is always initiated by the peer or the target child. In this study, prompting the target children as well as the peers using the high-probability request sequence during the intervention may account for maintaining the peers' interactions toward the target children.

Another component of this study was peer modeling. Peer modeling was proposed to increase the social behaviors of children with disabilities (Bailey & Wolery, 1992; Kohler & Strain, 1999). No recent studies using peer modeling focused on social interactions had been reported prior to this study. Thus, comparison of the combined high-probability request sequence using embedded peer modeling with current research is difficult. In the studies on using peer modeling to increase imitation of peer's behaviors, Carr and Darcy (1990) and Venn et al. (1993) found that peer modeling increased the target children's imitation of classroom activities in a natural environment.

Although this study did not measure the separate effects of peer modeling on social interactions, peer modeling may partially account for the target children's increased social behaviors. The target children understood the sequence of the intervention and waited their turn after delivery of the high-probability request sequence. During the previous condition, the target children often ignored their peers' initiations or sometimes exhibited negative interactions with their peers; however, the target children

were more likely to respond to their peers' initiations after the intervention was introduced. Additionally, it was observed that the target children imitated their peers' extended play (i.e., building a tall and long airport building, pretending to eat toy food, peek-a-boo play, pouring tea into a cup, etc.). Bailey and Wolery (1992) suggest that future research would need to address whether peer modeling procedures result in the learning of complex social play skills. In this study, the high-probability request sequence consisted of a sequence of the related play skills within the given context (e.g., "Pick up the pizza," "Cut the pizza," "Put the cheese on the pizza," "Give Hilary the pizza," etc.). Moreover, the third peer used this sequence independently for Chris and provided physical assistance when Chris did not respond to her prompts. In this study, it was proposed that a sequence of play skills that consisted of response chains may facilitate social play with peer modeling.

Peer modeling is an important way of learning for children (Car & Dary, 1990). This procedure is easily embedded into daily activities without extensive teacher time and prompting and facilitates more generalized observational learning (Wert et al., 1996). A more structured peer modeling procedure for increasing social interactions would be beneficial to build effective strategies.

Regarding the types of social interactions, the three children demonstrated different results. The first target child, Eric, showed a sharp increase in unprompted social initiations as well as responses, and he engaged in more initiations than responses during the play. The second child, Paul, had initially low levels of social initiations although his social initiations slightly increased with the implementation of the intervention. His social behaviors were focused on responses to his peer or his generality

peer. Paul showed significant deficits in language skills and rarely talked with others but used some request words if necessary. The third child, Chris, demonstrated robust changes in social responses to his peer or his generality peer; however, his unprompted initiations showed delayed increase after intervention was introduced. Chris seldom talked with others, and he often repeated the sentences that were said.

Social skills are complex, requiring multiple skills from other developmental domains such as communication, play, and cognitive skills (Bailey & Wolerly, 1992). In particular, communication skills are very important for ongoing extended social interactions. The first target child, Eric, was able to comment using simple sentences related to the play situation. Eric's communication skills may have contributed to his increased social behaviors, especially initiations. The other two children had limited language skills, which may have influenced their social behaviors. Chris demonstrated that his social initiations were increasing toward the end of the study. Paul showed a sharp increase in social initiations during the generality setting at the end of the study. Both target children and their peers engaged in more play toward the end of the study and found more fun play that was not included in the intervention. Paul, his peer, and his generality peer engaged in playing with a toy tool box with sounds, and they were taking turns clicking the sound button. Additionally, Paul enjoyed simple games (i.e., "Up high, down low, too slow.") that other children in the class liked to do during the transition time or free play. For Chris, his peer, Hilary, played "Boo" to get his attention. They enjoyed playing "peek-a-boo" together. After finding the common game to play, Paul's and Chris's social initiations toward the other children increased much more than before.

This result suggests that adapting a game that the target children and peers commonly like would facilitate the social interactions of children with limited communication skills and their typically developing peers.

What are the effects of the use of high-probability request sequences with embedded peer modeling on the social interactions of young children with autism toward their typically developing peers during generality sessions?

For each session, data were collected to determine the number of intervals of unprompted social initiations and responses in the generality setting. The general procedure remained the same as during baseline; however, the children were not given any stickers or toys during the generality sessions. The experimenter's general prompts for the children remained at low levels across the conditions. During the baseline condition, all children exhibited no interactions except that Eric engaged one initiation in the generality setting. His peer engaged in interactive play, mostly with the generality peer.

For the generality sessions for the initial low-probability request alone condition, all children's social interactions were very low. Social interactions between Eric and Stacie increased slightly, however, remained at the low levels. Paul and Chris continued to display no interactions. During this condition, their peers, Jennifer and Hilary engaged in social interactions with the generality peers.

During the generality sessions for the high-probability request sequences with embedded peer modeling, the social interactions of all three children increased. Eric exhibited more unprompted initiations and responses toward his generality peer as well as his trained peer. Stacie, Eric's peer, engaged in interactive play with Eric as well as with

the generality peer. All three children played often and talked together as a group. Eric often used the target behaviors during play (e.g., “I like to play with you guys.”). Paul exhibited a slight increase in initiations and responses, but his overall initiations remained at the low levels. His peer, Jennifer, slightly increased her interactions with Paul. She also engaged in more interactions with the generality peer. Chris’s initiations and responses increased with the generality peer as well as with his trained peer, Hilary. Like Paul’s peer, Hilary exhibited increased interactions with him while also playing more with the generality peer.

For the generality sessions of the second low-probability request condition, all three target children’s social interactions increased more than during the high-probability request sequences with embedded peer modeling. Eric maintained high levels of social initiations and responses with both his trained peer and his generality peer. Stacie engaged in more interactions with Eric during this condition. Paul exhibited a slight increase in initiations and responses toward his generality peer as well as toward his trained peer although his initiations and responses remain low overall. Jennifer maintained the same levels of social interactions with Paul. Chris’s social initiations and responses to his peer, Hilary, increased more than during the previous condition. Hilary engaged in interactive play with him more than with the generality peer.

During the maintenance condition in the generality setting, Eric and Paul exhibited increases in unprompted initiations and responses. Eric continued interactive play with Stacie and his generality peer. Stacie engaged in interactions more with the generality peer; however, they continued to play as a group. Paul’s initiations and responses with his generality peer and his trained peer sharply increased. They played

together while engaging in turn taking. Jennifer engaged in interactions with Paul rather than with the generality peer during this condition. No generality data were taken during the maintenance phase for Chris.

The results of this study regarding generality support Davis et al. (1994). Davis et al. demonstrated that children's unprompted social interactions generalized to the trained peers in the nontraining setting and the generality peers in both the intervention and generality setting. In their study, the low-probability requests were prompted in the nontraining settings; however, this study did not provide any prompts for the children to interact in the generality setting as occurred in the baseline condition. In relation to the results of unprompted social interactions, this study is consistent with Davis et al. (1994).

Goldstein et al. (1997) demonstrated that interactions were maintained when the peers were reassigned to different target children during the generality probes. They distributed the intervention to facilitate generalization across a variety of settings throughout the school day. This study rotated three intervention settings, and the high-probability and low-probability requests included multiple exemplars even though the intervention was provided during one hour center time in the morning. Additionally, several generality strategies were included in the high-probability request sequence using peer modeling. Odom and Brown (1994) suggested that teaching children to recruit social behaviors from peers would promote generalization to other situations and other children. In this intervention, the targeted behaviors included specific play initiations (e.g., "fly the plane to me," "Pizza, please," etc.) and general social initiations (e.g., "I like to play with you," "How are you?" "Hi," etc.) to recruit social behaviors from peers. Additionally, the targeted behaviors included some affectionate behaviors that were more likely to

facilitate positive social interactions (Fox & McEvoy, 1993; McEvoy et al., 1990; Twardosz et al., 1983). These strategies may have facilitated the generalized social interactions with the generality peers in the intervention setting and with the trained peer and generality peer in the nontraining settings.

To what extent do parents and early childhood special education teachers find the intervention goals, procedures, and outcomes to be relevant, useful, and effective for children with autism?

Parents and professionals in early childhood special education assessed the social validity of the intervention goals, procedures, and outcomes. Three parents of target children and three early childhood special education teachers were asked whether they considered the research questions to be valid and useful for their children. All of the parents and the teachers answered that all of the research questions were useful and valid for the children with autism except one parent answered “unsure” for one of the research questions. Additionally, parents were asked to identify goals in the social interaction domain, which included the targeted behaviors.

To obtain data regarding the intervention procedures, 20 professionals in early childhood special education watched three unidentified 2-minute segments of videotape depicting the target children and answered open-ended questions regarding the following conditions: baseline, the initial low-probability request alone condition, and the high-probability request sequence using peer modeling. Most of the professionals responded that this intervention would be easy to use during the students’ regular routine, and they would use this intervention in their classroom. Additionally, most of professionals thought that the high-probability request intervention using peer modeling would be

useful to improve social interactions between the children. Some of the respondents indicated that the intervention seemed time-consuming if the classroom was too busy and included too many children.

To assess the intervention outcomes, the same 20 professionals completed the checklists that consisted of the skills targeted by the intervention. Over 95 % of the professionals responded that they had observed all targeted skills during the high-probability request sequences with embedded peer modeling. In addition to compliant behaviors to requests and social interactions, at least 95% of the professionals observed that the children focused on the task/play. Several professionals reported that the intervention did not seem to be natural in terms of prompting the children.

In addition to the professionals' assessment of intervention outcomes, the target children's social interactions can be compared to normative data on typically developing children. Normative data samples on social interactions were collected in the same classroom in which the study was conducted. Overall, all target children's social initiations and responses in the intervention and generality setting met or exceeded the levels of social interactions observed by typically developing children in the same classroom.

Few previous studies on using the high-probability request sequence reported on social validity (Davis et al., 2000; Durcharme & Wolering, 1994; Horner et al., 1991; Killu et al., 1998). Durcharme and Wolering (1992) found that parents reported high levels of satisfaction with the high-probability request sequence. Other studies reported that the intervention was effective and practical to implement (Davis et al., 2000; Horner

et al., 1991; Killu et al., 1998). The results of social validity assessment in this study supported the previous studies on the use of the high-probability request sequence.

Some professionals indicated that this intervention seemed to be time-consuming as part of a daily routine, and they perceived the high-probability request sequence to be unnatural. However, other professionals reported that the high-probability request sequence intervention would be easy to modify and adapt by using more naturally occurring activities based on the classroom environment and the specific target behaviors.

Implications for Practice

The results of this study suggest that the combined methods of the high-probability request sequence and peer modeling were successful for increasing compliant responding to requests to initiate social behaviors and social initiations and responses between children with autism spectrum disorders and typically developing children. Prompting the target children and peers to interact at the same time by combining the high-probability request sequences and the peer-mediated social interaction intervention was an effective procedure to encourage interactions between the children. These two interventions are recommended by the Division of Early Childhood Recommended Practice Guidelines (DEC) (Wolery, 2000). The high-probability request sequence was suggested as one of several strategies to increase the complexity and duration of the children's play, engagement, appropriate behavior, and learning (Wolery, 2000). Additionally, the DEC recommended that peer-mediated strategies be used to promote social and communicative behavior (Wolery, 2000).

This intervention was conducted during center time using typical play materials in the classroom. The targeted low-probability requests were chosen based on the children's

IEP goals, the parents' social skill goals for their children and individual assessments that were embedded into the children's interactive play within the context of their routine activities. Additionally, the intervention consisted of using the high-probability requests that the children liked to perform while using their favorite play materials and action songs. Embedding instruction into existing classroom activities and routines was considered to be an effective strategy in the inclusive setting (Horn, Lieber, Sandall, & Schwartz, 2000). Pretti-Frontczak and Bricker (2001) described that the embedding strategy promised intervention that: a) provides multiple opportunities for children to practice and learn targeted skills within the daily activities and events in the children's natural environment; b) is compatible with an inclusive program; c) focuses on a child's interests and motivation; d) can be implemented by professionals, parents, or peers; and e) can be incorporated into a wide range of curricula models. The high-probability request sequence could be incorporated into classroom routines while addressing the individual child's educational needs.

The potential for observational learning and facilitating positive social relationships between children are major rationales for the inclusion of children with disabilities (Werts et al., 1996). Additionally, Erwin and Robin (1999) described typical peers as a viable source of support who can provide positive interactions in ways that adults cannot. Young typically developing children may be able to make accommodations appropriate to the individual needs of children with disabilities while playing or communicating (Erwin, 1996; Guralnick, 1999). This study included the peers as models as well as play partners. Peers were trained how to respond to each targeted social initiation of the target children and were prompted to initiate to the target children

by delivering the high-probability request sequence as a model. They maintained social interactions with the target children while extending the play. A peer modeling procedure would be usable to increase other important skills as well as social interactions without extensive training. Additionally, the classroom teacher responded that the intervention would be effective in terms of using the peer model and providing an opportunity for the target child to experience appropriate child to child interactions.

The results of the study demonstrated that social interactions generalized to nontrained peers in the intervention and the generality setting. Generality and the maintenance of social interactions between children has been a critical issue in studies on increasing the social interactions of children with autism. Selecting targeted social behaviors is an important factor for generalized social interactions. Recruiting social behaviors from peers, including specific play initiations and general social initiations, would increase generalized social interactions (Brown & Odom, 1994). Additionally, some behaviors such as sharing, assisting with play, verbally organizing play, engaging in rough and tumble play, complimenting, and displaying affectionate behaviors would be more likely to facilitate other children's interactions (Tremblay et al., 1981; Fox & McEvoy, 1993). Providing various examples of social behaviors and fun experiences for children would facilitate generalized social interactions with other children and in the nontraining setting.

Directions for Future Research

Literature on the high-probability request sequence procedure has demonstrated its effectiveness in increasing compliance with requests and has extended into teaching specific skills in natural environments along with methodological extensions. More

research is needed to maximize the effectiveness of the high-probability request in teaching young children with disabilities and to increase the feasibility of the procedure in early childhood special education settings.

This research extended the literature on the high-probability request sequence and peer-mediated social interaction interventions by combining the instructions. Future research could investigate the effects of this combined intervention on increasing social interactions by using adapted specific fun games (e.g., board games, “Simon says,” etc.) that are popular among typically developing children. Peers’ participation in the intervention as models as well as play partners may be an important factor to maintain the children’s social interactions. Thus, providing pleasant experiences for the children is necessary so that the peers would not be weary of their role as play partner to children with autism who have limited language skills.

Future research might investigate the use of the high-probability request sequence for teaching pre-academic skills to young children with disabilities. Some studies have demonstrated the effectiveness of the intervention on academic tasks with older children with disabilities (Belfiore et al., 1997; Wehby & Hollahan, 2000). Additionally, Mace and Belfiore (1990) demonstrated that increasing compliance to task-related demands may have the collateral effect of reducing problem behaviors that are maintained by escape from demand. Some children with disabilities have difficulty learning pre-academic skills while engaging in escape and avoidance behaviors. By combining the high-probability request sequence with other existing effective procedures such as task

analysis, prompting strategies, or time delay, the effects of the high-probability request sequence intervention on teaching pre-academic skills for young children with autism could be further investigated.

The literature on the high-probability request sequence intervention has implications for use with a wide range of children with disabilities and for improving a variety of skills. As researchers have been prompted to extend the procedure to all areas of individual learning and development (Davis & Reichle, 1996; Davis et al., 1992, 1994; 2000; Killu et al., 1998; Sanchez-Fort et al., 1995; Santos & Lignugaris/Kraft, 1999), future research might examine the effectiveness of the use of the high-probability request sequence for improving a broader range of skills (e.g., nonverbal tasks) with children with severe disabilities such as those with motor skills and self-help skills.

Future research might examine the effectiveness of the high-probability request sequence to improve group responding. Children in preschools spend the majority of their time in large group activities such as circle time and activity time (Bailey & Wolery, 1992; Pretti-Frontczak & Bricker, 2001). During large group activities, children are more likely to have more dead time waiting for other children to complete activities (Baily & Wolery, 1992). Moreover, in large groups, children with disabilities may not be skilled at responding to group instructions and may be more likely to engage in challenging behaviors. One study demonstrated that the high-probability request procedure can be interspersed across class activities during group transitions of elementary students (Ardoin et al., 1999). Future research could apply the procedure to increase group responding for young children during large group activities such as circle time.

Finally, research might examine the effectiveness of this strategy's use in the home by parents and siblings. Several studies have demonstrated that the interventions implemented by parents were successful in increasing compliant responding (Ducharme & Worlring, 1994; McComas et al., 1998). In addition to parents, the effects of the procedure when used by siblings might be investigated to increase other specific skills such as appropriate play skills.

Summary

The increasing inclusion of young children with disabilities in classrooms with typically developing children demands the use of various instructional strategies to provide effective interventions for children with a wide range of educational needs in early childhood settings. Additionally, these instructional strategies need to be incorporated into the instructional routines of the child's natural classroom environment. Among the variety of effective instructional strategies, the high-probability request sequence has been demonstrated as an antecedent and non-aversive procedure, which is well-incorporated into classroom routines (Davis & Brady, 1993). The high-probability request sequence procedure has been demonstrated to be an effective strategy to increase compliance and recently has been applied to teach specific skills. Few studies on the use of the high-probability request sequence have addressed the social behaviors of young children with autism with peers in their natural environment (Davis et al., 1994).

Building meaningful social relationships between children with and without disabilities is an important goal in inclusion. Due to the substantial social skill deficits of children with autism, facilitating social interactions has been a critical issue in educational research. Peer-mediated interventions have shown the strongest empirical

support for social behaviors (Rogers, 2000; Sasso et al., 1998; Zanolli, et al., 1996). However, it is noted that these strategies have been limited in generalization and maintenance after removal of the intervention.

The present study investigated the effects of the high-probability request intervention and peer modeling on compliant responding to low-probability requests to initiate social behaviors and social interactions of young children with autism spectrum disorders. This study was implemented in an inclusive classroom using the children's favorite toys and play materials during their center time. The high-probability request intervention was first delivered to peer models and then to the target children. Daily observations were completed during an hour of center time, and all sessions were videotaped.

Results of the study indicate that compliant responding of target children to low-probability requests increased and was maintained after withdrawal of the high-probability request sequence using peer modeling. The intervention resulted in increased social interactions between children with autism spectrum disorders and typically developing children. Social interactions were maintained for two groups of children after withdrawal of the intervention, and the children's social interactions generalized to the nontrained generality peers and into the nontraining setting.

The results of the social validity assessment indicate that parents and early childhood special education teachers perceived that the research questions in this study were valid and useful. Professionals in early childhood special education reported that the intervention was feasible for use in a typical classroom routine. Additionally, regarding

intervention outcomes, most of them observed the targeted skills during the intervention and reported that the intervention was effective in increasing social interactions.

The combined strategy of the high-probability request sequence and peer modeling was shown to be effective for increasing compliant responding to requests and social interactions in young children with autism spectrum disorders. The intervention can be embedded in classroom activities using typical toys and play materials, it facilitates observational learning for children with autism spectrum disorders using peer modeling, and it facilitates generalized social interactions by providing multiple exemplars and experiences.

This research extended the literature on the high-probability request sequence and peer-mediated social interaction interventions by combining the two strategies. Future research may investigate the effects of the high-probability request sequence with peer modeling using adapted games in social interactions. Directions for future research include investigating the effectiveness of this strategy with pre-academic skills, with other skills for a wide range of children with disabilities, with group responding, and with parents and siblings in the home setting.

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APPENDIX A

DATA COLLECTION FORMS

Data Collection Sheet

Date: _____ Child: _____ Session #: _____ Observer: _____ IOA Observer: _____

Experimental Condition: _____ Setting/Activity: _____

Code: HP=Delivery of high-probability requests, LP=Delivery of low-probability request, R: Response to request, NR: Nonresponse to request, NC: Noncompliance to request, Pr: Teacher praise,

T: Target child, P: The paired peer, Op: Other peer, A: Adult, Pt: Prompted, N: Negative interaction, D: Disruptive behaviors

1	5	9	13	17	21
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Data Collection Sheet

Date: _____ Child: _____ Session #: _____ Observer: _____ IOA Observer: _____

Experimental Condition: _____ Setting/Activity: _____

Code: HP=Delivery of high-probability requests, LP=Delivery of low-probability request, R: Response to request, NR: Nonresponse to request, NC: Noncompliance to request, Pr: Teacher praise,

T: Target child, P: The paired peer, Op: Other peer, A: Adult, Pt: Prompted, N: Negative interaction, D: Disruptive behaviors

25	29	33	37	41	45
HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt
26	30	34	38	42	46
HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt
27	31	35	39	43	47
HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt
28	32	36	40	44	48
HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt

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T: Target child, P: The paired peer, Op: Other peer, A: Adult, Pt: Prompted, N: Negative interaction, D: Disruptive behaviors

49	53	57	61	65	69
HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt
50	54	58	62	66	70
HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt
51	55	59	63	67	71
HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt
52	56	60	64	68	72
HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt

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T: Target child, P: The paired peer, Op: Other peer, A: Adult, Pt: Prompted, N: Negative interaction, D: Disruptive behaviors

73	77	81	85	89	93
HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt
74	78	82	86	90	94
HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt
75	79	83	87	91	95
HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt
76	80	84	88	92	96
HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt

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97					
HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt
98					
HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt
99					
HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt
100					
HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P T P D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt	HP/LP R/NR/NC Pr IPT (P) HP/LP R/NR/NC Pr IPT HP/LP R/NR/NC Pr IPT (T) HP/LP R/NR/NC Pr IPT T T T T T N D P P P P P N D Op Op Op Op Op A A A A A Pt Pt Pt Pt Pt

APPEPNDIX B

CODING MANUAL

Coding Manual

This coding system is based on interactions between the children and responses to the high-probability request sequences. Partial time sampling procedure using a 6-s interval will be used to observe social interactions. Event recording will be used to observe responses to the high-probability request sequences.

Responses to the high-probability request sequence

Recording procedure: event recording is a tally or count of behaviors as they occur (Cooper, Heron, & Heward, 1987). The high-probability requests procedure is performed as follows (Davis, 1995): (a) deliver a sequence of three high-probability requests with rapid pace, (b) deliver praise for performance of these high-p requests, (c) deliver the low-p requests, and (d) deliver praise for the performance of the low-probability request.

Experimenter behavior

- Delivery of the high-probability request (HP) is coded by circling HP when the experimenter delivers a high-probability request.
- Delivery of the low-probability request (LP) is coded by circling LP when the experimenter delivers a low-probability request.
- Delivery of praise is coded by circling P if the experimenter praises a high-probability or a low-probability response.
- Inter-prompt time (IPT) is time between the reinforcement of the previous request and delivery of the next request (i.e., within 5s).

Child Behavior

- Response to the high-probability or the low-probability (R) will be coded by circling (R) next to HP/LP in a same line. The response to the high-probability or the low-probability requests defined as the initiation of the task within 5-s of a request by the experimenter.
- Nonresponse to request (NR) is circled if the child fails to emit any response.
- Noncompliance to request (NC) is circled if the child (a) responds inappropriately, (b) fails to initiate a requested response or (c) fails complete the requested response.
- Disruptive behavior is defined as any inappropriate verbal or gestural behaviors such as hitting, pinching, and screaming during play, or inappropriate responses by the child which are not necessary for performing a request.

Social Interaction Code

Recording procedure for 6-s partial interval recording

Interval recording is used to measure the presence or absence of behavior within specific time intervals (Cooper, Heron, & Heward, 1987). In partial interval recording the

observer records simply whether the behavior was present or absent at any time during the interval. Partial interval recording is not concerned with how many times the behavior occurs during the interval or how long the behavior is present.

Social interactions between:

T-The target child. The child with autism spectrum disorder

P-The peer. The typically developing child who is paired with the target child.

OP-The typically developing peer who has not participated and is not paired with the target child during intervention.

Social interactions are categorized as initiations and responses.

Initiations

An initiation was any verbal or gestural behavior that the target child directed to a peer or the peer directed to a target child that was not preceded by a social behavior from the same peer in the previous 3-seconds (e.g., greetings, sharing, assisting, touching, comments, calling the peer's name, giving directions and other positive directed behaviors)

The 3-second rule: Initiations are defined by their occurrence following a three second period without interactions. For example, if child B doesn't hear child A or chooses to ignore him/her then child A might say Child B's name 3 times in a row. This would be only recorded as one initiation. When Child A waits and initiates again 3-s after, it would be recorded as 2 initiations.

Initiations are coded by drawing a line from the person that initiated interaction to the person the interactions was directed to. If the child's initiation is spontaneous without any prompt, the initiation is coded without marking "Pt" (Prompt). If the child's initiation is prompted by the low-probability request, it is coded by circling "Pt."

Types and examples of initiations:

- Attention seeking: The child attempts to direct or call the attention of an other child (e.g., making an eye contact, verbal greeting or any appropriate physical gesture, tapping a child on the arm, saying "look at this," or showing off).
- Complimenting: The child makes statement indicating affection, attraction, liking or praise.
- Affection: patting, hugging or holding hands with another child.
- Assisting: The child teaches, shows how to play, or helps another child.
- Play organizing: The child verbally specifies an activity, role, or other play for peers to engage (e.g., "Let's play house.").
- Sharing or cooperating: The child verbally or nonverbally offers or exchanges an object with another child; both cooperate in the use of one object or toy or simultaneously use the same materials or in turn taking.

Response

A response is any verbal or gestural behavior that is directed toward a peer initiation that occurred in the previous 3-seconds. These behaviors include looking or answering when his name is called, following directions.

The 3-second rule: Response must fall within three-seconds of the previous initiation. For example, if child A says, “Hi,” and child B doesn’t answer then all of a sudden about 5 seconds later child B says, “Hi”. That is not recorded as a response. It would be recorded as an initiation.

Responses are coded by drawing a line from the person who responds to the person to whom the response is directed to. If the child’s response is spontaneous without any prompt, the initiation is coded without marking “Pt: (Prompt). If the child’s response is prompted, it is coded by circling “Pt.”

Types and examples of responses:

- Responding to another child’s utterance
- Repeating, expanding upon a previous utterance, and requesting clarification
- Descriptive talking such as giving a play idea, complimenting, offering to share
- Sharing, turn taking, or exchanging toys
- Pointing, motioning, or nodding toward their buddy or materials they are working with
- An acknowledgement of the other child’s utterance

Negative interactions

Negative interactions include undesirable interactions such as hitting, kicking, pushing, destroying others’ construction, or vocalization such as crying, shouting, or calling another child name.

Negative interaction will be coded by marking in N.

Adult’s behavior

General Verbal and Physical Prompts (Pt).

The following statements describe adult prompts defined and coded as “Pt”.

- Verbal statements or physical guidance, instruction, or feedback to cue the child to stay in his/her center.
- Verbal statements or physical guidance, instruction, or feedback to cue the child to redirect child behavior.
- Verbal statements or physical guidance, instruction, or feedback to cue the child to prompt engagement with materials.
- Prompts will be recorded as they occur.
- See “the high-probability request sequences” for other adult’s behavior.

Coding rules for the high-probability request sequences and social interactions

The experimenter delivered the high-probability request, the target child responded to the request within 5-s, the experimenter delivered praise to the target child, and delivered the next request in 3-s. This is recorded based on each trial regardless of interval (i.e. event recording):

HP/LP R/NR/NC Pr IPT (P)
HP/LP R/NR/NC Pr IPT
HP/LP R/NR/NC Pr IPT (T) 3
HP/LP R/NR/NC Pr IPT
T T T T T N D
P P P P P N D
Op Op Op Op Op
A A A A A
Pt Pt Pt Pt Pt

One initiation from the target to the paired peer is considered one initiation. An example might be the target child saying the paired peer's name "Hi Cindi." If the initiation is prompted by the experimenter (i.e. response to the high-probability or low-probability request), it is connected with LP. If the initiation is not prompted and spontaneous, it is coded by drawing a line from T to P:

HP/LP R/NR/NC Pr IPT (P)	HP/LP R/NR/NC Pr IPT (P)
HP/LP R/NR/NC Pr IPT	HP/LP R/NR/NC Pr IPT
HP/LP R/NR/NC Pr IPT (T)	HP/LP R/NR/NC Pr IPT (T)
HP/LP R/NR/NC Pr IPT	HP/LP R/NR/NC Pr IPT
T T T T T N D	T T T T T N D
P P P P P N D	P P P P P N D
Op Op Op Op Op	Op Op Op Op Op
A A A A A	A A A A A
Pt Pt Pt Pt Pt	Pt Pt Pt Pt Pt

Two spontaneous initiations, one from the target to the paired peer, and another from the target to the other peer without a response:

HP/LP R/NR/NC Pr IPT (P)
HP/LP R/NR/NC Pr IPT
HP/LP R/NR/NC Pr IPT (T)
HP/LP R/NR/NC Pr IPT
T T T T T N D
P P P P P N D
Op Op Op Op Op
A A A A A
Pt Pt Pt Pt Pt

One initiation and one response from the target to the peer and then the peer responded back:

Two initiations, one initiation from the target to the peer after the 3-second rule the peer says something to the target:

The target and the peer talking back and forth. Two initiation and responses:

If the target child uses the bathroom or is called out of the room by the teacher, an X is placed over the entire interval to show that the target child can not be observed.

HP/LP R/NR/NC Pr IPT (P)									
HP/LP R/NR/NC Pr IPT									
HP/LP R/NR/NC Pr IPT (T)									
HP/LP R/NR/NC Pr IPT									
T T T T T N D									
P P P P P N D									
Op Op Op Op Op									
A A A A A									
Pt Pt Pt Pt Pt									

APPENDIX C

PROCEDURAL INTEGRITY CHECKLIST

Procedural Integrity: Baseline

Date: _____ Child: _____ Session #: _____

Observer: _____ IOA Observer: _____ Setting/Activity: _____

	Procedure	Observation
1	All necessary materials are available.	
2	Experimenter invites the target child and the peer to the assigned center.	
3	Experimenter provides the general instruction to play (e.g., stay in your center, and play with your friend).	
4	Experimenter gives the children stickers before the session.	
5	Experimenter gives prompts to play only when the child leaves his center, engaged in self-stimulatory behavior, or in disruptive behavior (e.g., go play, stay in your center, get busy, don't hit your friend)	

+ **Observed**
 - **Not observed**
 NA **Not applicable**

Procedural Integrity: Peer Training

Date: _____ Child: _____ Session #: _____

Observer: _____ IOA Observer: _____ Setting/Activity: _____

	Procedure	Observation
1	Experimenter invites the peer and gives her the instruction (e.g., we will learn how to play with your friend).	
2	All materials are available.	
3	Experimenter delivers the low-probability requests to the second observer.	
4	The second observer responds to the low-probability requests like the target child.	
5	Experimenter provides prompts to wait until the target child initiates.	
6	Experimenter asks the peer how to respond when the target child initiates to her (e.g., what would you do when your friend gives you the train?).	
7	Experimenter repeats the same steps for each target behavior.	
8	Experimenter gives the peer sticker after session.	
9	Experimenter repeats the same procedure until the peer reaches to 90% of correct responses.	

+ **Observed**
 - **Not observed**
 NA **Not applicable**

Procedural Integrity: Low-probability requests alone

Date: _____ Child: _____ Session #: _____

Observer: _____ IOA Observer: _____ Setting/Activity: _____

	Procedure	Observation
1	All necessary materials are available.	
2	Experimenter invites the target child and the peer to the assigned center.	
3	Experimenter provides the general instruction to play (e.g., stay in your center, and play with your friend).	
4	Experimenter delivers low-probability requests without high-probability requests.	
5	Experimenter delivers praise statement after each appropriate response to low-probability request.	
6	Experimenter uses child's name prior to request while establishing eye contact prior to the request at eye level of child.	
7	Experimenter gives prompts to play only when the child leaves his center, engaged in self-stimulatory behavior, or in disruptive behavior (e.g., go play, stay in your center, get busy, don't hit your friend)	
7	Experimenter gives the children stickers after 10-minute session with verbal praise.	

+ **Observed**
 - **Not observed**
 NA **Not applicable**

Procedural Integrity: High-probability requests embedded in peer modeling

Date: _____ Child: _____ Session #: _____

Observer: _____ IOA Observer: _____ Setting/Activity: _____

	Procedure	Observation
1	All necessary materials are available.	
2	Experimenter invites the target child and the peer to the assigned center.	
3	Experimenter provides the general instruction to play (e.g., stay in your center, and play with your friend).	
4	Experimenter delivers at least 3 high-probability requests prior to low-probability request.	
5	Experimenter delivers praise statement delivers after each appropriate response to high-probability request.	
6	Experimenter delivers praise statement after each appropriate response to low-probability request.	
7	Experimenter uses child's name prior to request while establishing eye contact prior to the request at eye level of child.	
8	Experimenter gives prompts to play only when the child leaves his center, engaged in self-stimulatory behavior, or in disruptive behavior (e.g., go play, stay in your center, get busy, don't hit your friend)	
9	Experimenter gives the children stickers to exchange each other after 10-minute session with verbal praise.	

+ **Observed**
 - **Not observed**
 NA **Not applicable**

Procedural Integrity: Generality

Date: _____ Child: _____ Session #: _____

Observer: _____ IOA Observer: _____ Setting/Activity: _____

	Procedure	Observation
1	All necessary materials are available.	
2	Experimenter invites the target child and the peer to the assigned center.	
3	Experimenter provides the general instruction to play (e.g., stay in your center, and play with your friend).	
4	Experimenter gives prompts to play only when the child leaves his center, engaged in self-stimulatory behavior, or in disruptive behavior (e.g., go play, stay in your center, get busy, don't hit your friend).	

+ **Observed**
 - **Not observed**
 NA **Not applicable**

APPENDIX D

PARENT AND TEACHER QUESTIONNAIRE

Child's name: _____

Dear Parent/ Teacher:

I want to thank you for the opportunity to work with your child. As I explained, this study focuses on teaching the social interaction skills between children. The idea of this study is to teach children to respond to the requests of social initiations (less likely to be performed) with and after their favorite and highly possible requests. In addition, I would like to use the child's favorite toys and play items, activities for intervention. The intervention would include your child's favorite requests delivered immediately prior to a request that the child does not perform well (i.e., social initiation in this study). Thus, I would like to ask you your child's favorite toys, play items, stickers, activities, and the requests that are less likely to be performed and more likely to be performed.

Child's favorite activities, toys, plays materials, and stickers

Activities, toys, play materials (including the specific manufacture's name)

Stickers

Directions for completing the survey

1. Please put circle (Yes) for the requests that your child does 80 %of the time.
2. Please put circle (Not Usually) for the requests that your child does less than 50% of the time.

Example

Says " Hi " (Yes) or (Not usually)
Tickle your friend (Yes) or (Not usually)
Give me five (Yes) or (Not usually)
Hug your friend (Yes) or (Not usually)
Hold your friend's hands (Yes) or (Not usually)
Shake hands (Yes) or (Not usually)
Point to (the toy) (Yes) or (Not usually)
Clap your hands (Yes) or (Not usually)
Wave Hi (Yes) or (Not usually)
Say "show me your toy" (Yes) or (Not usually)

Look at me (Yes) or (Not usually)
 Say "look at me" (Yes) or (Not usually)
 Say your friend's name (Yes) or (Not usually)
 Push (the truck) to your friend (Yes) or (Not usually)
 Throw the ball to your friend (Yes) or (Not usually)
 Ask your friend to play (Yes) or (Not usually)
 Look at the (toys) (Yes) or (Not usually)
 Jump (Yes) or (Not usually)
 Raise your hand (Yes) or (Not usually)
 Tell your friend "good job" (Yes) or (Not usually)
 Tell your friend "let's play together" (Yes) or (Not usually)
 Touch (your nose or other body part) (Yes) or (Not usually)
 Stamp your feet (Yes) or (Not usually)
 Tell your friend "thank you" (Yes) or (Not usually)
 Tap your friend (Yes) or (Not usually)
 Look at your friend (Yes) or (Not usually)
 Tell your friend "look at this" (Yes) or (Not usually)
 Tell your friend "I am making a ()" (Yes) or (Not usually)
 Roll (the ball) to your friend (Yes) or (Not usually)
 Pick up () (Yes) or (Not usually)
 Sit down (Yes) or (Not usually)
 Give (the toy) to your friend (Yes) or (Not usually)
 Share (the toy) with your friend (Yes) or (Not usually)
 Stack the block (Yes) or (Not usually)

Please write down if there are any other requests that your child consistently performs and is likely to respond.

Please write down if there are any other requests related to social initiations that you would like to teach.

Thank you for your time.
 Sunhwa Jung

Dear Parent/Teacher:

I would like to ask if you think that the research goals of my study will help lead to satisfactory outcomes in your child's education. The purpose of this study is to further investigate a strategy to increase social interactions of children with autism in an inclusive setting. This study will employ high-probability request intervention embedded in peer modeling to increase the social interactions of children with autism.

The high-probability request interventions include your child's favorite requests (i.e., the high-probability requests) delivered immediately prior to a request that the child does not perform well (i.e., the low-probability requests which are requests for social behaviors in this study). High-probability and low-probability requests will consist of the play skills relevant to the play settings and low-probability requests will include a social initiation to a peer, which will consist of social behaviors that are likely to be responded. Please put circle "Yes, No, or Unsure" for each question whether you think it is valid/useful for you child's education.

1. Do you think this research question is valid/ useful for your child's education?

Yes No Unsure

What are the effects of the use of high-probability request sequence on social interactions of young children with autism and typically developing children in an inclusive setting? The high-probability request sequence includes delivery of three to five high-probability requests (e.g., pick a block, stack the block, pick a block), delivery of praise for each performance of the high-probability request, delivery of the low-probability request (e.g., give the block to your friend), and delivery of praise for the performance of the low-probability request.

2. Do you think this research question is valid/ useful for your child's education?

Yes No Unsure

To what extent does the child generalize social interactions to a nontraining condition? Your child's behavior will be observed whether their learned social behaviors are generalized across the settings without delivery of the high-probability request interventions.

3. Do you think this research question is valid/useful for your child's education?

Yes No Unsure

To what extent does the child maintain social interactions in the inclusive setting following the removal of the high-probability request intervention? Once the child demonstrates high stable responding to the high probability request intervention, the low-

probability requests (i.e., requests for social initiations) will be delivered to assess if the learned social behaviors are maintained by only prompting the target behaviors without the high-probability request interventions.

4. Do you think this research question is valid/useful for your child's education?

Yes

No

Unsure

To what extent does the child maintain the social interactions in the inclusive setting following the removal of the prompts? The children will be asked to play and interact with toys and peers without the implementation of any low-probability or high-probability requests on the part of the experimenter. This will demonstrate if high probability sequence intervention increases the spontaneous interactions or unprompted initiation to peers.

5. Do you think this research question is valid/useful for your child's education?

Yes

No

Unsure

To what extent do the parents find the intervention goals, procedures, and outcomes to be relevant, valuable, and effective with their children during center time in an inclusive setting?

6. Do you think this research question is valid/useful for your child's education?

Yes

No

Unsure

To what extent do early childhood special education teachers find the intervention goals, procedures, and outcomes to be relevant, useful, and effective with children with autism in inclusive settings?

Thank you for your time.

Sunhwa Jung

APPENDIX E

SOCIAL VALIDITY FORM

Instructions

You will watch a videotape which includes three 2-minute video clips for each group. These video clips are representative of each phase. The phase consists of 3 phases: baseline, low-probability request alone, and high-probability request intervention. And these conditions are randomly assigned. After watching each video clip, please assess the target child's behaviors based on the checklist. Finally please answer the follow-up questions. Thank you for your time.

Instructions:

1. Read the sheet entitled "intervention procedures"
2. Read the checklist
3. Watch the first video clip for the first group, and complete the first checklist. Then watch the second video clip and complete the second checklist. Continue this for the third video clip.
 - Observed: When you observe the target child's behaviors most of the time
 - Not observed: When you don't observe the behaviors most of the time
 - Include both of the prompted and unprompted behaviors
4. Follow the same steps for the second and third group.
5. Answer the follow-up questions.

Intervention Procedures

The high-probability request intervention includes a sequence of easy and favorite requests (i.e., high-probability requests) delivered immediately prior to a request that is not typically performed (i.e., low-probability request) (Davis & Brady, 1993; Davis, 1995).

The high-probability requests are requests that a child consistently performs (Davis, 1995; Santos, 2001). The low-probability requests are requests that the child does not typically perform, thus, the probability of the child performing them is low (Davis, 1995; Santos, 2001).

Low-probability requests alone

The experimenter delivered the low-probability requests to each target participant for 10 minutes in the play settings during center time using the toys that each target participant prefers. The experimenter gives verbal requests to initiate interaction with a peer. For example, the experimenter asks the target child “Andrew, give Katie the pizza”. If the target child performs the request within 5 seconds, the experimenter provides verbal praise.

High-Probability Request Sequences usin Embedded Peer Modeling

High-probability and low-probability requests consisted of the play skills relevant to the play settings (e.g., “connect trains together” “cut the pizza”, etc), and the low-probability requests consisted of social initiations to a peer.

The high-probability request sequences are first delivered to the peer and then the target child. The high-probability request sequences are as follows:

- (a) three high probability requests are delivered rapidly (i.e., within 2s to 5 s);
- (b) verbal or gestural praise for each request performed, and
- (c) the low probability request is delivered within 5 seconds after reinforcement for performing the last high probability request.

Child 1

Video Clip 1

Behaviors	Not Observed	Observed
1. Complies with requests		
2. Focuses on a task/play		
3. Shares materials/toys with peers		
4. Responds when spoken to		

Video Clip 2

Behaviors	Not Observed	Observed
1. Complies with requests		
2. Focuses on a task/play		
3. Shares materials/toys with peers		
4. Responds when spoken to		

Video Clip 3

Behaviors	Not Observed	Observed
1. Complies with requests		
2. Focuses on a task/play		
3. Shares materials/toys with peers		
4. Responds when spoken to		

Child 2

Video Clip 1

Behaviors	Not Observed	Observed
1. Complies with requests		
2. Focuses on a task/play		
3. Shares materials/toys with peers		
4. Responds when spoken to		

Video Clip 2

Behaviors	Not Observed	Observed
1. Complies with requests		
2. Focuses on a task/play		
3. Shares materials/toys with peers		
4. Responds when spoken to		

Video Clip 3

Behaviors	Not Observed	Observed
1. Complies with requests		
2. Focuses on a task/play		
3. Shares materials/toys with peers		
4. Responds when spoken to		

Child 3

Video Clip 1

Behaviors	Not Observed	Observed
1. Complies with requests		
2. Focuses on a task/play		
3. Shares materials/toys with peers		
4. Responds when spoken to		

Video Clip 2

Behaviors	Not Observed	Observed
1. Complies with requests		
2. Focuses on a task/play		
3. Shares materials/toys with peers		
4. Responds when spoken to		

Video Clip 3

Behaviors	Not Observed	Observed
1. Complies with requests		
2. Focuses on a task/play		
3. Shares materials/toys with peers		
4. Responds when spoken to		

Follow-up Questions

1. Would it be easy to use the high-probability request intervention during the student's regular routine?

Yes

No

Please explain

2. Balancing the time and effort it would take to implement the procedures described in the high-probability request intervention you observed in the child's play with peer would you use the intervention in your classroom?

Yes

No

Please explain

3. Do you think the high-probability request intervention is useful to improve social interactions between children?

Yes

No

Please explain

APPENDIX F

HIGH-PROBABILITY REQUEST ASSESSMENT FORM

High-Probability and Low-Probability Assessment Form

Child:

Setting:

Request presented	Trials (circle for response; x for nonresponse)	%	Status (H/L)
	1 2 3 4 5 6 7 8 9 10		
	1 2 3 4 5 6 7 8 9 10		
	1 2 3 4 5 6 7 8 9 10		
	1 2 3 4 5 6 7 8 9 10		
	1 2 3 4 5 6 7 8 9 10		
	1 2 3 4 5 6 7 8 9 10		
	1 2 3 4 5 6 7 8 9 10		
	1 2 3 4 5 6 7 8 9 10		
	1 2 3 4 5 6 7 8 9 10		
	1 2 3 4 5 6 7 8 9 10		
	1 2 3 4 5 6 7 8 9 10		
	1 2 3 4 5 6 7 8 9 10		
	1 2 3 4 5 6 7 8 9 10		
	1 2 3 4 5 6 7 8 9 10		
	1 2 3 4 5 6 7 8 9 10		
	1 2 3 4 5 6 7 8 9 10		
	1 2 3 4 5 6 7 8 9 10		
	1 2 3 4 5 6 7 8 9 10		
	1 2 3 4 5 6 7 8 9 10		
	1 2 3 4 5 6 7 8 9 10		
	1 2 3 4 5 6 7 8 9 10		

APPENDIX G

CONSENT FORM

Dear Parents,

My name is Sunhwa Jung and I am a doctoral candidate in Early Childhood Special Education at the Ohio State University. I am planning to conduct my dissertation, which I will be conducting in your child's classroom. I will be conducting this research under the supervision of my advisor Dr. Sainato, an associate professor at the School of Physical Activity and Educational Services at The Ohio State University. I am writing to you explain my research and ask your permission to include your child in my study. The title of my study is **Effects of High-Probability Request Sequences to Increase Social Interactions in Young Children with Autism.**

The goal of my study would be to help children learn the social interaction skills, and have positive relationships with their peers in the classroom after the implementation of the high-probability request intervention. This study will involve your child during center time for about 10 -15 minutes per day. The idea is to teach children to respond to the requests of social initiations with and after their favorite and highly possible requests. The high-probability request interventions include your child's favorite requests delivered immediately prior to a request that the child does not perform well, but should be learned (social interaction in this study). This intervention is looking at the child's responses to the requests, and social interactions between children with autism and typical peers.

I would like to request that your child be included in this research study. I am further requesting permission to videotape and audiotape your child during the sessions and permission to access your child's records. The videotapes and audiotapes will be used by the researchers to record data. In order to prepare for this study, your child's educational records, including social skills assessments and individual plans will be reviewed to identify target specific goals for each child. If I have your permission, please sign the enclosed form and return it to me by December 20. All information as well as data collected will be kept confidential. Your child's name will not appear in any publication record or documentation of the study. Data obtained will not be made part of any permanent record that can be identified with your child. I will be happy to share any results with you if you are interested.

You are not obligated to grant permission for your child to participate in this research. If your child participates, you have the right to withdraw him/her from the research at any time to discontinue participation in the study without prejudice to your child.

If you have any questions pertaining to this research or your rights related to participation in this research, please feel free to contact myself at 263-3703 or Dr. Sainato at 292-8709. Thank you for the opportunity to work with your child.

Sincerely,

Sunhwa Jung
Doctoral Candidate

Dr. Diane Sainato
The Ohio State University

Dear Parents,

My name is Sunhwa Jung and I am a doctoral candidate in Early Childhood Special Education at the Ohio State University. I am planning to conduct my dissertation, which I will be conducting in your child's classroom. I will be conducting this research under the supervision of my advisor Dr. Sainato, an associate professor at the School of Physical Activity and Educational Services at The Ohio State University. I am writing to you explain my research and ask your permission to include your child in my study. The title of my study is **Effects of High-Probability Request Sequences to Increase Social Interactions in Young Children with Autism**.

This study will be conducted in your child's classroom during free play and center time per day. The participants' plays during the sessions will be videotaped and audiotaped in order to record data. Although we are not requesting permission for your child to participate in the study, we are requesting permission to video and audio tape the entire class during play time to determine the impact of the study during playtime in the classroom. All videotapes will be kept confidential.

If I have your permission, please sign the enclosed form and return it to me by December 20, 2002.

If you have any questions pertaining to this research, please feel free to contact myself at 263-3703 or Dr. Sainato at 292-8709. Thank you for the opportunity to work with your child.

Sincerely,

Sunhwa Jung
Doctoral Candidate

Dr. Diane Sainato
The Ohio State University

CONSENT FOR PARTICIPATION IN
SOCIAL AND BEHAVIORAL RESEARCH

I consent to my child's participation in the research in research entitled: Effects of High-Probability Request Sequences to Increase Social Interactions in Young Children with Autism.

Dr. Diane Sainato or her authorized representative, Sunhwa Jung, has explained the purpose of the study, the procedures to be followed and the expected duration of my child's participation. I understand the possible benefits of my child's participation.

I acknowledge that I have had the opportunity to obtain additional information regarding the study and that my questions I have raised have been answered to my full satisfaction. Further, I understand that I am free to withdraw consent at any time without prejudice to my child or me.

Finally, I acknowledge that I have read and fully understand the consent form. I sign it freely and voluntarily. A copy has been given to me.

I have read the information above and give permission for my child _____ to participate in the research study.

Signature of Parent/ Guardian

Date

Signature of Principal Investigator

Date

Signature of Student Investigator

Date

PARENT PERMISSION FOR
VIDEOTAPING AND AUDIOTAPING

I give Sunhwa Jung permission to videotape and audiotape my child _____, during free play and center time at the Children's Center for Developmental Enrichment. I understand that the videotapes and audiotapes will be used in and for the research purpose only. They will be kept confidential, and be kept in a locked file in the principle investigator's office until the results of the study have been published and the 5 years past the publications of the paper, and then the tapes will be erased.

Parent/Guardian

Date

Witness

Date

Principal Investigator

Date

Student Investigator

Date

RELEASE OF INFORMATION CONSENT FORM

I _____ hereby authorize _____ to release the following information to Dr. Sainato and Sunhwa Jung, School of Activity and Educational Services, College of Education at The Ohio State University, for the purpose of providing descriptive information for educational research.

_____ Educational evaluations _____ IEP Goals
(Individualized Education Program)

This consent form has been explained to me and I understand the contents to be released and the need for information and that there are statues and regulations protecting the confidentiality of authorized information. I hereby acknowledge that this consent is truly voluntary. I further understand that I may revoke my consent at any time by giving written notice to Dr. Diane Sainato or Sunhwa Jung.

Child's Name

Parent/Guardian Signature

Date _____

Principal Investigator

Date _____

Investigator

Date _____

APPENDIX H

HIGH-PROBABILITY AND LOW-PROBABILITY REQUESTS

Eric's Low-Probability and High- Probability Requests

Setting	Low-Probability requests (percent correct responses to requests during assessment)	High-Probability Requests (percent correct responses to requests during assessment)
Friendship activities	Say to (peer) "how are you?" (50%) Say to (peer) "I like to play with you" (40%) Say to (peer) "Look at me" Hug your friend (60%)	Touch your nose (100%) Clap your hands (90%) Hands on your shoulders (80%) Hands on your knees (90%) Hands up high (80%) Move your eyebrows (90%) Move your shoulders (80%) Look at me (100%)
Blocks and Trucks	Give (peer) the plane (50%) Say to (peer) "I am coming" (50%) Give (peer) the block (50%) Say to (peer) " fly the plane to me" (60%)	Take off the roof (80%) Fold down the stairs (80%) Build an airport (80%) Touch the wing (80%) Put the block next to the airplane (90%) Take off the run away (90%) Pick up the airplane (90%) Fly the airplane (90%)
Train	Give (peer) the train (40%) Push the train to (peer) (40%) Say to (peer) "push the button, please" (50%) Connect trains with your friend (40%)	Put the barrel in loader (90%) Push the button (90%) Put the tree on the grass (90%) Connect trains together (90%) Push the train around the track (80%) Put the house on the ground (80%) Pick up the train (80%)
Kitchen	Give (peer) the pizza (50%) Give (peer) the cheese (40%) Say to (peer) " more pizza, please" (50%) Say to (peer) "I am making a sandwich for you" (50%)	Cut the pizza (100%) Put the pizza on the plate (90%) Put the cup on the table (80%) Put the fork on the table (80%) Put the cheese on your pizza (80%) Put the cheese on your pizza (80%) Make a sandwich (80%) Put the sandwich on the plate (100%) Pick up the sandwich (90%)

Paul's Low-Probability and High- Probability Requests

Setting	Low-Probability requests (percent correct responses to requests during assessment)	High-Probability Requests (percent correct responses to requests during assessment)
Friendship activities	Say to (peer) "look at me" (30%) Shake hand with your friend (50%) Hug your friend (40%) Tickle your friend (50%)	Give me five (100%) Touch your nose (100%) Clap with your hands (100%) Hands on your shoulder (100%) Hands on your knees (90%) Touch your shoulder (100%) Hands up high (90%) Move your eyebrows (80%) Move your shoulder (80%) Look at me (80%)
Blocks and Trucks	Say to (peer) "make a farm" (40%) Say to (peer) "horse please" (60%) Give (peer) the cow (50%) Push the tractor to (peer) (40%)	Pick up the cow (90%) Put the cow in the farm (90%) Pick up the horse (80%) Put the horse in the farm (80%) Put the tractor in the farm (80%) Put the cow in the truck (80%) Put the block next to the farm (80%) Push the tractor to the farm (80%) Stack the block (80%)
Train	Push the train to (peer) (50%) Connect trains with your friend (50%) Say to (peer) "come to me" (40%) Say to (peer) "train please" (40%)	Pick up a train (80%) Put the tree on the grass (80%) Push the button (80%) Open the box (80%) Put the barrel in loader (80%) Connect trains together (80%) Put the house on the ground (90%)
Kitchen	Give (peer) the pizza (40%) Put the pizza on (peer)'s plate (50%) Say to (peer) "pizza please" (50%) Give (peer) the sandwich (60%)	Pick up the pizza (80%) Cut the pizza (90%) Put the pizza on your plate (90%) Pretend to eat pizza (80%) Put the fork on the table (80%) Put the cup on the table (80%) Put the sandwich on the plate (100%)

Chris's Low-Probability and High- Probability Requests

Setting	Low-Probability requests (percent correct responses to requests during assessment)	High-Probability Requests (percent correct responses to requests during assessment)
Friendship Activities	Look at your friend (50%) Say to (peer) "hi, (peer)" (40%) Tap your friend (40%) Say to (peer) "good job" (40%)	Give me five (100%) Stomp your feet (70%) Clap your hands (70%) Hands on your knees (70%) Move your eyebrows (70%) Hands up high (80%) Move your shoulder (80%)
Art/Manipulative (Drawing)	Give the slippery soap to (peer) (40%) Say to (peer) "Blues' clues, please" (50%) Say to (peer) "notebook, please" (40%) Give (peer) the notebook (30%)	Stamp Slippery Soap (90%) Stamp Mrs. Pepper (90%) Stamp Mr. Sault (100%) Stamp Mr. Blues Clues (100%) Stamp your fingers (90%) Write the letter "C" (80%) Write the number "3" (80%) Write the number "7" (80%) Draw a circle 80 (80%)
Train	Give (peer) the train (50%) Push the train to (peer) (40%) Give (peer) the barrel (50%) Say to (peer) "tree please" (30%)	Pick up the train (80%) Put the tree on the grass (80%) Connect trains together (70%) Put the barrel in loader (80%) Push the button (80%) Push the train (80%)
Kitchen	Give (peer) the sandwich (40%) Put the sandwich on (peer)'s plate (50%) Give (peer) the pizza (40%) Say to (peer) "Pizza please" (40%)	Cut the pizza (80%) Put the cheese on your pizza (90%) Put the pizza on the plate (90%) Put the sandwich on the plate (80%) Pretend to eat pizza (80%) Put the cup on the table (70%) Pretend to drink water (70%)

APPENDIX I

PEER TRAINING SCRIPTS

Peer Training

The experimenter delivers the low-probability request to the second observer who pretends to be the target child, and the second observer responds to the experimenter's low-probability requests. The peer is told to wait until the target child follows the experimenter's instruction and the experimenter says, "You wait until your friend is doing what I ask him to do"

The experimenter uses role-plays and discusses how to respond to the target child's initiations. The experimenter delivers each low-probability request to the second observer, and asks the peer how she would respond to that. Peer training sessions provide until the peer reaches the criterion of 90% correct responses to the experimenter's questions for 3 consecutive sessions.

Training for Eric's peer, Stacie

"(Stacie), we are going to learn how to play with your friend, Eric. Ms. () is pretending to be Eric, now. Then you will explain to me how to play with Eric when Eric gives you toys or talks to you."

Friendship activities

1. The experimenter delivers the low-p request to the second observer "Eric, say to Stacie how are you?" After responding to the request, the experimenter asks Stacie "What would you say/do to your friend?" If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models saying, "I am fine. How are you, Eric?"
2. The experimenter delivers the low-p request to the second observer "Eric, say to Stacie, I like to play with you" After responding to the request, the experimenter asks Stacie "What would you say/do to your friend?" If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter says, "Great! I like to play with you, too. Let's play."
3. The experimenter delivers the low-p request to the second observer "Eric, say to Stacie, Look at me" After responding to the request, the experimenter asks Stacie "What would you say/do to your friend?" If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models looking at the second observer and saying "Hi Eric"

4. The experimenter delivers the low-p request to the second observer “Eric, “hug your friend” After responding to the request, the experimenter asks Stacie “What would you say/do to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models hugging the second observer and saying “Hi, Eric”

Blocks and Trucks

5. The experimenter delivers the low-p request to the second observer “Eric, give Stacie the plane ” After responding to the request, the experimenter asks Stacie “What would you say/do to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models receiving the plane and saying “thank you, Eric, this is a big plane.”
6. The experimenter delivers the low-p request to the second observer “Eric, give Stacie the block.” After responding to the request, the experimenter asks Stacie “What would you say/do to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models while receiving the block, and saying “Thank you, let’s build an airport”
7. The experimenter delivers the low-p request to the second observer “Eric, aske to Stacie fly the plane to me.” After responding to the request, the experimenter asks to Stacie “What would you say/do to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models saying “All right, here we go.”
8. The experimenter delivers the low-p request to the second observer “Eric, Say to Stacie I am coming”. After responding to the request, the experimenter asks to Stacie “What would you say to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models receiving the train, and saying “O.K. I am here.”

Trains

9. The experimenter delivers the low-p request to the second observer “Eric, Give Stacie the train”. After responding to the request, the experimenter asks to Stacie “What would you say/do to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models receiving the train, and saying “Thank you, (Eric), I like the train.”
10. The experimenter delivers the low-p request to the second observer “Eric, push the train to Stacie”. After responding to the request, the experimenter asks Stacie,

“What would you say/do to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models receiving the train and saying “Thank you, Eric. this goes to you again.”

11. The experimenter delivers the low-p request to the second observer “Eric, Say Stacie, push the button, Stacie”. After responding to the request, the experimenter asks to Stacie “What would you say/do to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models saying “O.K., Eric, here we go.”
12. The experimenter delivers the low-p request to the second observer “Eric, connect trains with Stacie.” After responding to the request, the experimenter asks Stacie “What would you say/do to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models saying “Good, let’s make a long train.”

Kitchen

13. The experimenter delivers the low-p request to the second observer “Eric, give Stacie the pizza”. After responding to the request, the experimenter asks Stacie “What would you say/ do to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models receiving the pizza and saying “Thank you, Eric, this is a good pizza”.
14. The experimenter delivers the low-p request to the second observer “Eric, give Stacie the cheese.” After responding to the request, the experimenter asks Stacie “What would you say/ do to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models receiving the cheese and saying “Thank you, Eric.”
15. The experimenter delivers the low-p request to the second observer “Eric, say to Stacie more pizza please.” After responding to the request, the experimenter asks Stacie “What would you say/do to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models giving pizza and saying “Here it is, I like pizza, too.”
16. The experimenter delivers the low-p request to the second observer “Eric, say to Stacie I am making a sandwich for you”. After responding to the request, the experimenter asks Stacie “What would you say/do to your friend?” If the peer

responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models receiving the sandwich, and saying “Thank you, Eric, it’s delicious.”

Checklist for Stacie

	Target behavior	Response		
1	Say to () “How are you”			
2	Say to () “I like to play with you”			
3	Say to () “Look at me”			
4	Hug your friend			
5	Give () the plane			
6	Say to () “ I am coming”			
7	Give () the block			
8	Say to () “fly the plane to me”			
9	Give () the train			
10	Push the train to ()			
11	Say to () “ push the button, please”			
12	Connect trains with your friend			
13	Give () pizza			
14	Give () cheese			
15	Say to () “more pizza, please”			
16	Say to ()”I am making a sandwich for you”			

Correct response +

Correct response with prompts ±

In correct response -

Training for Paul's peer, Jennifer

Friendship activities

1. The experimenter delivers the low-p request to the second observer "Paul, shake hands with your friend." After responding to the request, the experimenter asks Jennifer "What would you say/do to your friend?" If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models shaking hands with Paul while saying, "Hi, Paul".
2. The experimenter delivers the low-p request to the second observer "Paul, tickle your friend." After responding to the request, the experimenter asks to Jennifer "What would you say/do to your friend?" If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models saying, "I am going to tickle you, too."
3. The experimenter delivers the low-p request to the second observer "Paul, tap your friend". After responding to the request, the experimenter asks Jennifer, "What would you say/do to your friend?" If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models saying "Hi Paul, or good job."
4. The experimenter delivers the low-p request to the second observer "Paul, say to Jennifer, Look at me." The experimenter asks Jennifer "What would you say/do to your friend?" If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models saying "Hi, Paul, "or "High five, Paul."

Blocks and Trucks

5. The experimenter delivers the low-p request to the second observer "Paul, say to Jennifer, make a farm". After responding to the request, the experimenter asks to Jennifer "What would you say/do to your friend?" If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models saying "O.K. Let's make a big farm."
6. The experimenter delivers the low-p request to the second observer "Give Jennifer the cow." After responding to the request, the experimenter asks Jennifer "What would you say/do to your friend?" If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models saying "Thank you, Paul. Let me put it in the farm."

7. The experimenter delivers the low-p request to the second observer “Paul, say to Jesse, horse please.” After responding to the request, the experimenter asks Jennifer, “What would you say/do to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models giving the horse while saying “Here it is, Paul, I like horse, too.”
8. The experimenter delivers the low-p request to the second observer “Paul, push the tractor to Jennifer”. After responding to the request, the experimenter asks Jennifer, “What would you say/do to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models receiving the train, and saying “Thank you, Paul, here we go.”

Train

9. The experimenter delivers the low-p request to the second observer “Give Jennifer the train.” After responding to the request, the experimenter asks Jennifer, “What would you say/do to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models receiving the train, and saying “Thank you, Paul, here is the train, here we go.”
10. The experimenter delivers the low-p request to the second observer “Paul, connect trains with Jennifer”. After responding to the request, the experimenter asks Jennifer, “What would you do/say to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models receiving the train and saying “Good job, High five, Paul, let’s make the long trains” .
11. The experimenter delivers the low-p request to the second observer “Paul, say to Jennifer, Come to me, Jennifer”. After responding to the request, the experimenter asks Jennifer, “What would you say/do to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models saying “O.K., Paul, I am coming.”
12. The experimenter delivers the low-p request to the second observer “Paul, say to Jennifer, Train, please”. After responding to the request, the experimenter asks Jennifer, “What would you say/do to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models saying “Here it is, Paul.”

Kitchen

13. The experimenter delivers the low-p request to the second observer “Paul, give Jennifer the pizza.” After responding to the request, the experimenter asks Jennifer, “What would you do/say to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models receiving the pizza, and saying “Thank you, Paul, this is a good pizza.”
14. The experimenter delivers the low-p request to the second observer “Paul, say to Jennifer, pizza, please.” After responding to the request, the experimenter asks Jennifer, “What would you do/say to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models receiving the pizza, and saying “Here it is, Paul or give him high-five.”
15. The experimenter delivers the low-p request to the second observer “Paul, say to Jennifer, Water, please”. After responding to the request, the experimenter asks Jennifer, “What would you do/say to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models giving water, and saying “Here it is, Paul.”
16. The experimenter delivers the low-p request to the second observer “Paul, put the sandwich on Jennifer’s plate.” After responding to the request, the experimenter asks Jennifer, “What would you do/say to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models receiving the sandwich, and saying “Thank you, Paul, this is delicious.”

Checklist for peer training

	Target behavior	Response		
1	Shake hands with your friend			
2	Tickle your friend			
3	Tap your friend			
4	Say to () “Look at me”			
5	Say to (), Make a farm”			
6	Give () the cow			
7	Say to () “Horse please”			
8	Push the tractor to ()			
9	Push the train to ()			
10	Connect trains with your friend			
11	Say to () “come to me”			
12	Say to () “Train, please”			
13	Give () pizza			
14	Say to () “Pizza please”			
15	Say to () “ Water please”			
16	Put the sandwich on Jesse’s plate			

Correct response +

Correct response with prompts ±

In correct response -

Peer training for Hilary

Friendship activities

1. The experimenter delivers the low-p request to the second observer “Chris, say to Hilary, “Hi, Hilary!” After responding to the request, the experimenter asks Hilary “What would you say/do to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models saying, “Hi, Chris.”
2. The experimenter delivers the low-p request to the second observer “Chris, hold your friend’s hand” After responding to the request, the experimenter asks Hilary, “What would you do/say to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models holding hands and says, “ Hi Chris, nice to see you” or “Hi Chris!”
3. The experimenter delivers the low-p request to the second observer “Chris, tap your friend.” After responding to the request, the experimenter asks Hilary, “What would you do/say to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models tapping while saying “Good job, Chris. High five.”
4. The experimenter delivers the low-p request to the second observer “Chris, say to Hilary, Good job” After responding to the request, the experimenter asks Hilary, “What would you say/do to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models saying “Thank you, Chris”

Drawing

5. The experimenter delivers the low-p request to the second observer “Chris, give Hilary Slippery soap ” After responding to the request, the experimenter asks Hilary, “What would you do/say to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models receiving the slippery soap, saying “Thank you, Chris, look at this, now your turn.”
6. The experimenter delivers the low-p request to the second observer “Chris, say to Hilary, Blues’s Clues, please.” After responding to the request, the experimenter asks Hilary, “What would you do/say to your friend?” If the peer responds

appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models receiving it and saying “All right, here we go, Chris. Now my turn.”

7. The experimenter delivers the low-p request to the second observer “Chris, say to Hilary, Notebook, please”. After responding to the request, the experimenter asks Hilary, “What would you do/say to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models receiving the notebook while saying “O.K., Here you go.”
8. The experimenter delivers the low-p request to the second observer “Chris, give Hilary the notebook”. After responding to the request, the experimenter asks Hilary, “What would you do/say to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models receiving the notebook, saying “Thank you Chris, look at this. Now your turn.”

Train

9. The experimenter delivers the low-p request to the second observer “Chris, Give Hilary the train”. After responding to the request, the experimenter asks Hilary , “What would you do/say to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models receiving the train and saying “Thank you, Chris, high five”
10. The experimenter delivers the low-p request to the second observer “Chris, push the train to Hilary”. After responding to the request, the experimenter asks Hilary, “What would you do/say to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models receiving the train and saying “Good job, Chris, high five. Here is the train.”
11. The experimenter delivers the low-p request to the second observer “Chris, give Hilary the barrel”. After responding to the request, the experimenter asks Hilary “What would you do/say to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models saying “Thank you, Chris, push the button, or look at this.”
12. The experimenter delivers the low-p request to the second observer “Chris, say to Hilary, Train please”. After responding to the request, the experimenter asks Hilary, “What would you do/say to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models giving the train and saying “O.K. Here you go. Let’s make long trains, Chris.”

Kitchen

13. The experimenter delivers the low-p request to the second observer “Chris, put the sandwich on Hilary’s plate”. After responding to the request, the experimenter asks Hilary, “What would you do/say to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models pretending to eat the sandwich, and saying “Thank you, Chris, This is delicious. Here is the sandwich for you.”
14. The experimenter delivers the low-p request to the second observer “Chris, give Hilary the pizza”. After responding to the request, the experimenter asks Hilary, “What would you do/say to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models receiving the pizza and saying “Thank you, Chris. This is a good pizza. Here is the pizza for you.”
15. The experimenter delivers the low-p request to the second observer “Chris, say to Hilary, Pizza please.” After responding to the request, the experimenter asks Hilary, “What would you do/say to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models giving pizza, and saying “Here you go, Chris.”
16. The experimenter delivers the low-p request to the second observer “Chris, give Hilary, Cheese.” After responding to the request, the experimenter asks Hilary, “What would you do/say to your friend?” If the peer responds appropriately, verbal praise is provided. If the peer does not respond appropriately, the experimenter models while receiving the cheese and saying “Thank you, Chris. Here is the cheese for you.”

Checklist for peer training

	Target behavior	Response		
1	Say to () “Hi Hilary”			
2	Hold your friend’s hand			
3	Tap your friend			
4	Say to () “Good job”			
5	Give () the slippery soap			
6	Say to () “Blues’ Clues, please”			
7	Say to () “Notebook please”			
8	Give () notebook			
9	Give () the train			
10	Push the train to ()			
11	Give () the barrel			
12	Say to () “train please”			
13	Put the sandwich on ()’s plate			
14	Give () the pizza			
15	Say to () “Pizza, please”			
16	Give () the cheese			

Correct response +

Correct response with prompts ±

In correct response -